Station Support Department

PECO ENERGY

PECO Energy Company
Nuclear Group Headquarters
965 Chesterbrook Boulevard
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August 1, 1994

Docket Nos. 50-352
50-353
License Nos. NPF-39
NPF-85

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

SUBJECT: Limerick Generating Station, Units 1 and 2
Technical Specifications Change Request No. 93-18-0
Response to Requests for Additional Information

Gentlemen:

By letter dated January 14, 1994, PECO Energy Company submitted a Limerick Generating Station (LGS), Unit 1 and Unit 2, Technical Specifications (TS) Change Request No. 93-18-0 that proposed to increase the allowable leak rate for the main steam isolation valves (MSIVs) and to delete the MSIV Leakage Control System (LCS). By letters dated May 6, 1994, and May 23, 1994, and during telephone conversations on June 9, 1994, the NRC requested additional information, which is provided in Appendix 1. In addition to the NRC's request for additional information, changes to information presented in the January 14, 1994, submittal were identified by PECO during the development of the final design. These identified changes are included in this letter, and supersede the affected information contained in the January 14, 1994 submittal.

Information supporting the response for additional information, and proposed changes supporting TS Change Request No. 93-18-0, are contained in Appendix 1 to this letter. Proposed TS replacement pages are contained in Appendix 2. This additional information is being submitted under affirmation, and the associated affidavit is enclosed. Appendix 3 contains a letter from General Electric Company to PECO dated May 27, 1994 supporting the information provided.

If you have any questions, please do not hesitate to contact us.

Very truly yours,

G. A. Hunger, Jr.,
Director - Licensing

Attachments

Enclosure

cc: T. T. Martin, Administrator, Region I, USNRC (w/ attachments and enclosure)
N. S. Perry, USNRC Senior Resident Inspector, LGS (w/attachments and enclosure)
R. R. Janati, PA Bureau of Radiological Protection (w/attachments and enclosure)

A017

COMMONWEALTH OF PENNSYLVANIA :

: ss.

COUNTY OF CHESTER :

W. H. Smith, III, being first duly sworn, deposes and says: That he is Vice President of PECO Energy Company, the Applicant herein; that he has read the enclosed additional information supporting Technical Specifications Change Request No. 93-18-0 "Increase the Allowable Leak Rate for the Main Steam Isolation Valves and Delete the MSIV Leakage Control System," for Limerick Generating Station, Unit 1 and Unit 2, Facility Operating License Nos. NPF-39 and NPF-85, and knows the contents thereof; and that the statements and matters set forth therein are true and correct to the best of his knowledge, information and belief.

William H. Smith III

Vice President

Subscribed and sworn to

before me this 1st day

of August 1994.

Notary Public

Notarial Seal
Erica A. Santori, Notary Public
Tredyffrin Twp., Chester County
My Commission Expires July 10, 1995

APPENDIX 1

LIMERICK GENERATING STATION
UNIT 1 AND UNIT 2

Docket Nos.
50-352
50-353

License Nos.
NPF-39
NPF-85

TECHNICAL SPECIFICATIONS CHANGE REQUEST

NO. 93-18-0

"Increase the Allowable Leak Rate for the Main Steam Isolation Valves and Delete the MSIV Leakage Control System"

Additional Information - 9 Pages and Attachments

Changes Resulting from Final Design Work

PECO Energy Company identified two changes during the development of the final design of Limerick Generating Station (LGS) modification (P-00017) which will implement the proposed Technical Specifications (TS) Change Request No. 93-18-0, affecting Units 1 and 2. The first change involves a change to the wording on proposed TS page, 3/4 6-3, provided in the change request letter from PECO to the NRC, dated January 14, 1994. Specifically, TS Section 3.6.1.2, ACTION c, was proposed as follows.

> "The leakage rate to less than or equal to 11.5 scf per hour for any one main steam line through the isolation valves, and the total Main Steam line leakage to less than 200 scf per hour for all Main Steam lines, and"

Upon further review of this statement, it has been determined that it is potentially confusing and could be incorrectly interpreted as meaning that once any MSIV is over 100 scf per hour leakage, all valves are required to be restored to less than 11.5 scf per hour. The following rewording is proposed, to avoid any misinterpretations, and will supersede the above wording submitted with the January 14, 1994 request.

> "The leakage rate to $\leq$ 11.5 scf per hour for any main steam isolation valve that exceeds 100 scf per hour, and restore the combined maximum pathway leakage to $\leq$ 200 scf per hour, and"

Therefore, the revised proposed TS pages, affecting Unit 1 and Unit 2, are being re-submitted and are contained in Appendix 2 of this letter.

A second change to the submittal is a clarification of the size of the opening for the MSIV Leakage Alternate Drain Pathway. The Safety Evaluation supporting the modification, and the original TS Change submittal, specified that the opening was 1.68 inches. In the final design phase of the modification, the maximum opening was determined to be 1.5 inches in diameter. As stated in the submittal, dated January 14, 1994, the size of the opening has the potential to change the dose calculations for the modifications. To address this concern, General Electric Company has performed an analysis, and identified supporting information, that the identified change in the size opening has a minimal impact on the dose calculations performed. PECO has accepted this conclusion for LGS and provided the letter from General Electric in Appendix 3.

Response to Requests for Additional Information

RESPONSES TO QUESTIONS CONTAINED IN NRC LETTER DATED 5/6/94:

1. What evaluation or calculation supports the conclusion that the Turbine Building at LGS will withstand an SSE?

   Response:

   As identified in the PECO TS Change Request 93-18-0, dated 1/14/94 the LGS Updated Final Safety Analysis Report (UFSAR) section 3.7.2 8 describes the analysis performed for the Turbine Building as part of the original licensing of LGS. This evaluation identifies the following information in support of the adequacy of the Turbine Building to withstand an SSE:

   > "In addition, the turbine enclosure was dynamically analyzed to ensure the capacity to withstand a SSE without collapsing on or impairing the integrity of the adjacent reactor and control structure."

   Also in section 3.2 of the UFSAR table 3.2-1, note (28), the following is identified:

"The main steam systems supporting structures (those portions of the Turbine Enclosure) are such that the main steam system and its supports can maintain their integrity."

2. What explanation or calculation supports the conclusion that the main steam supports can maintain their integrity during an SSE?

Response:

The design methodology and materials for the piping (pathways 208 and 214) for the MSIV Leakage Alternate Drain Pathway and their associated supports are identified in our response to question No. 6 contained in this Appendix, proposed by the NRC in a letter to PECO dated 5/26/94. Piping and supports for Seismic category I and seismic category IIA are seismically analyzed, and design margins are adequate to assure good seismic performance.

Seismic category II piping and supports originally not designed for SSE loading were evaluated for available margin, using the following described methodology .

Margin Assessment:

This assessment is to demonstrate that the Main Steam Drain Line design provides adequate margin, when subject to weight, operating mechanical and seismic loads, to provide a reasonable assurance that position retention of the line will be maintained. This, in conjunction with the supplemental field verification performed as described in Reference 1, has provided assurance that the supports will behave in a ductile manner, that the lines are free of known seismic hazards, and that the Limerick design, when modified, will perform in a manner similar to piping and supports which have observed good seismic performance in past, strong-ground-motion earthquakes.

The Conservative Deterministic Failure Margin (CDFM) methodology was utilized to demonstrate the margin inherent in the piping support design. This methodology is described in detail in Reference 2 and utilizes a deterministic approach to margin assessment with the following basic steps:

The Earthquake Response Spectrum is conservatively defined as 84% non-exceedance.

The Estimated Structural and Piping Response is median centered.

The Component Support Capacity is conservatively estimated.

This combination of conservatively defined, seismic demand, median centered response to the seismic demand and conservative estimate of capacity is considered to result in a High Confidence of Low Probability of Failure (HCLPF) which provides the reasonable assurance of desired performance.

The piping support evaluations are performed using a median centered best estimate of the appropriate loadings as shown below:

Loading Combination	Component Standard Expansion Support Designed by Anchors Load Rating	
OML+DW+Seismic	$TL \times 0.7\frac{Su}{Su^*}$	References 2 & 3

Where:

OML=Operating Mechanical Loads
DW= Dead Weight
Seismic=Earthquake Inertial Loading
TL=Support test load equal to or less than load under which support fails to perform its intended function
Su= Material ultimate strength at temperature
Su^*=Material ultimate strength at test temperature.

Operating mechanical loads for the piping supports are thermal expansion loads. Piping systems designed utilizing rod supports typically impose little constraint on thermal expansion.

Seismic Demand:

The seismic margin evaluation employs an earthquake response spectrum which is conservatively defined. This earthquake input motion definition is taken as NUREG-0098 (Reference 4) shape, as specified in NUREG 1407 (Reference 5), and is initially referenced to the plant design basis peak ground acceleration of 0.15g. Adjustments are then made to the Turbine Building design instructure response spectra to estimate the median centered response to the NUREG-0098 motions. These adjustments are based on scaling the Limerick Turbine Enclosure design spectra. The margin is then computed relative to the 0.15g Design Basis earthquake, and the HCLPF is then derived. The HCLPF calculations are performed in a manner consistent with margins computation performed for (IPEEE) severe accident vulnerabilities.

HCLPFs for highly loaded supports are given in Table 1, which shows that HCLPFs are greater than 0.4g, which is greater than the 0.15g Design Basis Earthquake peak ground acceleration for the plant. Based on these HCLPFs, there is reasonable assurance that position retention of the line will be maintained.

Field walk-down of the alternate leakage pathway had identified outliers as summarized in Table 3. These outliers have been resolved as shown in Table 3.

REFERENCES:

1. General Electric BWR Owners Group Report for Increasing MSIV Leakage Rate Limits and Elimination of Leakage Control Systems, GE NEDC-31858P Revision 2 September 1993.

2. EPRI NP-6041, A Methodology for Assessment of Nuclear Power Plant Seismic Margin(Revision 1) August 1991.

3. EPRI NP-5228, Seismic Verification of Nuclear Plant Equipment Anchorage (Revision 1), June 1991.

4. Newmark,N.M., W.J. Hall. Development of Criteria for Seismic Review of Selected Nuclear Power Plants.NUREG/CR - 0098, May 1978.

5. Nuclear Regulatory Commission. Procedure and Submittal Guidance for the Individual Plant Examination of External Events for Severe Accident Vulnerabilities. NUREG-1407, April 1991.

3. What explanation or calculation has been performed to support the conclusion that the block wall adjacent to the main steam transmitters will not fall during an SSE?

Response:

The identified block wall was evaluated by utilizing a seismic margins methodology, which shows the block wall has a High Confidence of Low Probability of Failure (HCLPF) for earthquakes, greater than .3g, at ground level, which is higher than the .15g SSE. From this evaluation, it was concluded that the block wall adjacent to the main steam pressure transmitters will not fall during an SSE and compromise the pressure boundary of the MSIV Leakage Alternate Drain Pathway.

4. How will the piping supports which were identified to be "outliers" be modified to resolve the identified concern?

Response:

A complete list of "outliers" is provided in Table 3, which also identifies the applicable required action.

RESPONSES TO QUESTIONS CONTAINED IN NRC LETTER DATED 5/26/94:

1. Provide supplemental and updated piping earthquake performance database to those presented in NEDC-31585P, Rev. 2, including a more complete database for small bore piping.

Response:

The supplemental and updated piping earthquake performance data was provided to the NRC by the BWROG under Plant Hatch Letter HL #4468 dated 1/6/94. The information supplied was provided by the BWROG MSIV Leakage Closure Committee, of which PECO Energy is a member, and is generic and applicable to Limerick.

2. To ensure that the Limerick SSE design spectra are bounded by the experience database spectra, provide a plant-specific comparison of Limerick SSE Design Ground Response Spectra and the recorded ground motions at the selected earthquake database sites.

Response:

Three graphs, which are provided as Attachment 1, provide the comparison between the Limerick Response Spectra and the experience database spectra. Graph 1A provides a comparison of the Limerick horizontal ground response spectra to those experience data base spectra identified in NEDC-31585P Rev. 2. Graph 1B and 1C provide the comparison of the Limerick acceleration to those contained in the supplemental experience database provided in Plant Hatch Letter HL #4468 dated 1/6/94. As shown in the attachments, the Limerick SSE acceleration is well bounded by the experience database acceleration.

3. Provide a plant specific comparison for design attributes of the main steam system piping utilized in the Limerick Alternate Leakage Pathway and those in the experience database, including pipe thickness, diameter-to-thickness ratio, and pipe span.

Response:

The information requested is provided in Table 2 which can be compared to the data provided in NEDC-31585P Revision 2.

4. Provide a plant specific comparison for design attributes of the Limerick main condenser and those in the experience database, including condenser size, weight, height, footprint, and anchorage capacity.

Response:

As stated in TS Change Request 93-18-0, an evaluation of the LGS main condenser found that it is comparable to those in the seismic experience database contained in NEDC 31585P Rev. 2. The following information is provided to demonstrate the acceptability of the Limerick Main Condenser Design:

1. The Limerick condenser was constructed by Foster Wheeler and is a triple shell, triple pressure condenser built to the following design and construction codes:

    - American Society of Testing and Materials (ASTM)
    - Heat Exchanger Institute (HEI)
    - American National Standards Institute (ANSI)

2. The overall condenser surface area falls within the sizes of the condensers in the seismic experience database as demonstrated by Figure 2A of Attachment 2.

3. The condenser's ability to resist seismic demand is demonstrated through Figures 2B and 2C, which show that the condensers' shear area/seismic demand exceeds those contained in the seismic database.

This information supports the conclusion, previously stated in TS Change Request 93-18-0, that the Limerick Main Condenser is seismically rugged and is comparable to those condensers which have shown to be capable of withstanding a Seismic Event.

5. Provide the Licensee approved plant walk-down verification procedure for the Limerick Alternate Drain Pathway.

Response:

PECO Energy has completed the walk-downs for both Limerick Unit 1 and Unit 2. The following is a summary of the activities which resulted in the completion of the walk-down evaluations and supports the conclusions presented in TS Change Request 93-18-0. The information provided is for the Limerick Unit 1 walk-down only, but is representative of the activities performed for Limerick Unit 2.

PECO Energy engineering procedure "MOD-CG-9" "Guideline for Walk-downs," provides instructions for conducting walk-downs on plant systems, structures, and components. In accordance with this guideline, a walk-down plan was developed to identify the purpose, the intended use, the qualification of participants, the criteria to be evaluated, and the verification requirements. A copy of the walk-down Plan for Limerick Unit 1 is provided as Attachment 3.

The PECO Energy engineering strategy for the conduct of the seismic verification was to contract with EQE Engineering to perform the necessary reviews of all piping within the boundaries of the MSIV Leakage Alternate Drain Pathway. To ensure a complete and thorough walk-down of the piping, PECO Energy engineering first identified the boundaries of the MSIV Leakage Alternate Drain Pathway and then assembled a complete set of Engineering Drawings to be referenced during the field walk-downs. The Engineering Drawings included all plant P&ID's, Piping Isometric Drawings, and Hanger Support Details, where available, which fell within the MSIV Leakage Alternate Drain Pathway Boundaries. A copy of this walk-down package was provided to EQE Engineering for review and reference.

As outlined in the "Walk-down Plan," general criteria was provided which established areas for consideration for the walk-down participants. These criterion were subjective, but provided focus to the major failure modes which have been identified in the EQE Seismic Experience Data Base. Furthermore, EQE Engineers, who were the authors of NEDC-31585P, Rev. 2, Experience Database Study, provided the key experience and knowledge to the walk-down team. This experience was not available within PECO Energy, and was essential to the conduct of a thorough and complete seismic evaluation. PECO Energy ensured the completeness of the walk-down by having the Lead Responsible Engineer for the Technical Specification Change Request and the Modification, lead the walk-down team and provide the required plant knowledge and interfaces.

The walk-down team also involved an Installation/Piping Design Engineer, and a Piping Designer to evaluate any outliers identified during the walk-down. These individuals who participated in the plant walk-down were tasked to develop a preliminary engineering solution to any "outliers" identified during the walk-down and review the proposed changes with EQE Engineering to ensure proper and effective resolution of the "outliers".

The walk-down was performed over the course of three days at Limerick. The walk-down team was initially briefed, as required by the walk-down plan and given precise instructions as to their duties. The EQE Engineers individually walked down the piping identified in the "MSIV Leakage Alternate Drain Pathway" scope. If a seismic "outlier" was identified a "Walk-down Data Sheet" was completed. A copy of the "Walk-down Data Sheet" form is provided as Attachment 4. When an "outlier" was identified, a piping designer and engineer would review the noted discrepancy and develop an engineering solution to the identified problem. This solution was then reviewed with the EQE Engineers to ensure the problem was appropriately addressed. At the conclusion of the walk-down, a review was performed to ensure all activities were completed and the full scope of the "MSIV Leakage Alternate Drain Pathway" was walked down. Following the completion of the physical walk-down, EQE Engineering provided a "Walk-down Report," which summarized the walk-down activities and identified the seismic "outliers". This "Walk-down Report" (provided to the NRC as Appendix 3 to TS Change Request 93-18-0 dated 1/14/94) serves as the quality record for the walk-down portion of the "seismic evaluation" performed.

6. For the non-seismic category I portion of the main steam system piping, including the associated supports which are utilized as an alternate leakage pathway, provide a discussion of the materials involved and the methodologies used for their original design and installation.

Response:

Two candidate drain paths to convey any MSIV leakage to the condenser are considered for Limerick Generating Station: Path 208 and path 214.

Path 208:

Path 208 originates in the steam tunnel just downstream of the outboard MSIVs and terminates at the high pressure condenser. Lines within the steam tunnel are Seismic category I up to valve HV-C-2F020, and Seismic Category IIA up to the Turbine building. Piping within the Turbine Building is Seismic Category II.

Path 214:

Path 214 originates from the main steam lines in the turbine building just upstream of the Main Stop Valves (MSV) and terminates at the high pressure condenser. The path is Seismic Category II downstream of the main steam lines and serves as the startup and operating drains to the condenser.

SEISMIC CATEGORY IIA:

DESIGN BASIS:

Piping Code: ANSI B31.1 1973 Code with Addenda thru winter 1974.

PIPING DESIGN DATA:

Design Temperature: 582° F
Design Pressure: 1115 psia

Pipe Size(NPS)	Thickness	D/t
4	0.337	13
3	0.438	8
2	0.343	7
1	0.250	5
1	0.179	7

Piping identified as seismic category IIA was originally analyzed for seismic category I loading and constructed to the requirements of ANSI B31.1 code.

Design Loadings: Weight, Thermal and Seismic SSE.

Piping Material: Carbon Steel, Welded Construction.

Support Types: Springs, Struts, Snubbers, Box types.

Seismic Design Basis: Response Spectrum Analysis using floor response spectra based on the design basis earthquake(DBE) from FSAR (0.15 g Maximum Ground Motion)

SEISMIC CATEGORY II:

Piping identified as Seismic Category II is Non-Safety Related; not normally designed for seismic acceleration. Piping is designed and constructed as per ANSI B31.1 design code.

DESIGN BASIS:

Piping Code: ANSI B31.1 1973 Code with Addenda thru winter 1974.

PIPING DESIGN DATA:

Design Temperature: 582° F
Design Pressure: 1115 psia.

Pipe Size(NPS)	Thickness	D/t
4	0.337	13
2	0.343	7
1	0.250	5

Design Loading: Weight, Thermal.

Piping Material: Carbon Steel, Welded Construction.

Support Types: Springs, Rod Hanger, Cantilevered Bracket, and Stanchion

Design Basis: Computerized dead weight and Thermal Analysis.

Design parameters are summarized in Table 2 for the alternate leakage pathway.

7. Provide a summary of the engineering analyses for all the piping and component supports on the Limerick Alternate Leakage Pathway. This is necessary in order for the licensee to demonstrate that, despite the support failures observed in the database facilities, the supports in the above alternate pathway will maintain their structural integrity with acceptable safety factors, and will, in turn, ensure the pressure boundary integrity of the pathway during and after the design SSE loading.

Response:

See PECO's response to question No. 2 contained in this Appendix proposed by the NRC in a letter to PECO dated 5/6/94.

8. Discuss to what extent you commit to include the Alternate Leakage Path in the ASME code section XI Inservice Inspection program. Also discuss how repair and replacement of the piping will be performed, if needed.

Response:

The MSIV Leakage Alternate Drain Pathway will be included in the LGS Augmented Repair and Replacement Program. However, the pathway will not be included in the LGS ASME Section XI, ISI Program.

9. Address the Single Failure criterion with respect to the proposed alternate MSIV Leakage Drain Path system. A single failure to open of valve HV-041-2F021 (single power supply) disables the entire alternate drain system. It is much more likely for this valve to fail to open following a LOCA than it is to lose the integrity of the main steam system and/or the alternate drain path. Given that a LOCA and failure of a Diesel to start is within your design basis, you should show that the consequences of a failure to open of the drain pathway isolation valve are acceptable.

Response:

Two different pathways have been included in the boundary of the MSIV Leakage Alternate Drain Pathway which do not require the opening of any valves. These pathways are shown in blue, on the colored pathway print, provided as Attachment 5, (Line EBD-1(2)08 and EBD-1(2)14). They provide orifice flow pathways which ensure, even with the failure of valve HV-041-1(2)F021, that there will be flow directed to the main condenser at the same elevation as that assumed in the radiological dose calculation. The radiological analysis was not performed assuming these openings are available. Although there is no fully evaluated backup to the primary pathway, there are two essentially passive backups that ensure sufficient flow to the main condenser and will act to reduce the radiological impact to within the limits of 10CFR100. Furthermore, there are motor operated valves (HV-1(2)04 and HV-1(2)01A(B-D) in separate drain pathways, which are <u>not</u> supplied with Class 1E power, therefore, they are not assumed in the dose calculation, but which will open on a turbine trip and provide a flow pathway of equal or greater cross sectional area than that assumed in the dose calculation.

Further considerations involve the fact that power to HV-041-1(2)F021 is supplied by the Limerick Diesel Generator Bus which is supplied by two independent offsite sources and the diesel generator. This provides a highly reliable source of power to the motor operated valve. Also, Limerick has proposed in TS Change Request 93-18-0 that the MSIV Leakage Alternate Drain Pathway be added to the LGS Technical Specifications. The new specifications will require that the HV-041-1(2)F021 be tested in accordance with the IST Program, which will require the valve to be tested on a quarterly basis. In addition, this valve will be added to the Generic Letter 89-10 Motor Operated Valve Program. The highly reliable power source in combination with the required testing for the HV-041-1(2)F021 provide a high degree of confidence that the subject valve will remain functional.

In addition, PECO Energy has evaluated the acceptability of the MSIV Leakage Alternate Drain Pathway, and found that in comparison to the capability and design of the MSIV Leakage Control System (LCS), the MSIV Leakage Alternate Drain Pathway provides a significant enhancement to the overall safe operation of the plant. This is based on the fact that the MSIV LCS, although single failure proof by design, is a relatively complicated system with several critical restrictions. These include the inability to handle total MSIV Leakage greater than 100 scfh, and the need for several components in the system to operate correctly. NUREG 1169 identifies that generically the MSIV Alternate Drain Pathway, or as called in the document the "Isolated Main Steam System", is more effective than the MSIV Leakage Control System, since the Offsite Doses from the "Isolated Main Steam System" as compared to the MSIV Leakage Control System are substantially less and that the "Isolated Main Steam System" has a capability greater than that of the MSIV LCS. Furthermore, NUREG 1169 identifies that based on probability, the net availability with Operator Action of the "Isolated Main Steam System" is greater (i.e., 0.938), compared to that of the MSIV LCS (i.e., 0.802).

Based on the above discussion, PECO Energy has determined that the MSIV Leakage Alternate Drain Pathway provides the necessary level of protection which is required for this service.

Table 1: Seismic Margin of a Representative and Highly Loaded Bounding Support Design

Support Designation Note (1)	Dead Load (lb)	Operating Mech. Loads (lb)	DBE Seismic Load (lb) Note (2)	Total Loads (lb) Note (3)	Component Capacity (lb) Note(6)	Anchorage Capacity (lb) Note (4)	Component Capacity/ Demand	Anchorage Capacity/ Demand Note(7)	HCLFF Note(5)
EBD-208-H22	-341 ---	-293 ---	272 (V) 1064 (H)	909(V) 1064(H)	6300 6300	T=5867 V=31,260	5.92	1.92	≥ .4g
EBD-208-H26	-306	-22	245 (V)	573 (V)	6300	T=5867 V=31,260	10.99	1.83	≥ .4g
EBD-214-E1-H6	-389	12	623 (V)	1024 (V)	3955	T=4000 V=21,600	3.91	2.6	≥ .4g

Note (1) EBD-208-H22 is highly loaded support in Path 208 and EBD-214-E1-H6 is highly loaded support in Path 214.These are cantilevered supports.

Note (2) Seismic load is 1.0 times media-centered peak floor response spectra.

Note (3) Total loads = Dead Load + Operating Mechanical Load + Seismic Load
V = Vertical Load
H = Lateral Load

Note (4) Anchorage capacity is based on bolt capacities shown in EPRI NP 5228 Rev. 1 Table 2.12 and the safety factors from EPRI NP-6041 Rev. 1 App. O.

Note (5) HCLPF = High Confidence of Low Probability of Failure.

Note(6) Component Capacity is Equal to 5 x Catalog Load Rating x 0.7

Note(7) Based on Pullout and Shear Interaction.

Table 2: Drain Pathway System Design Parameters

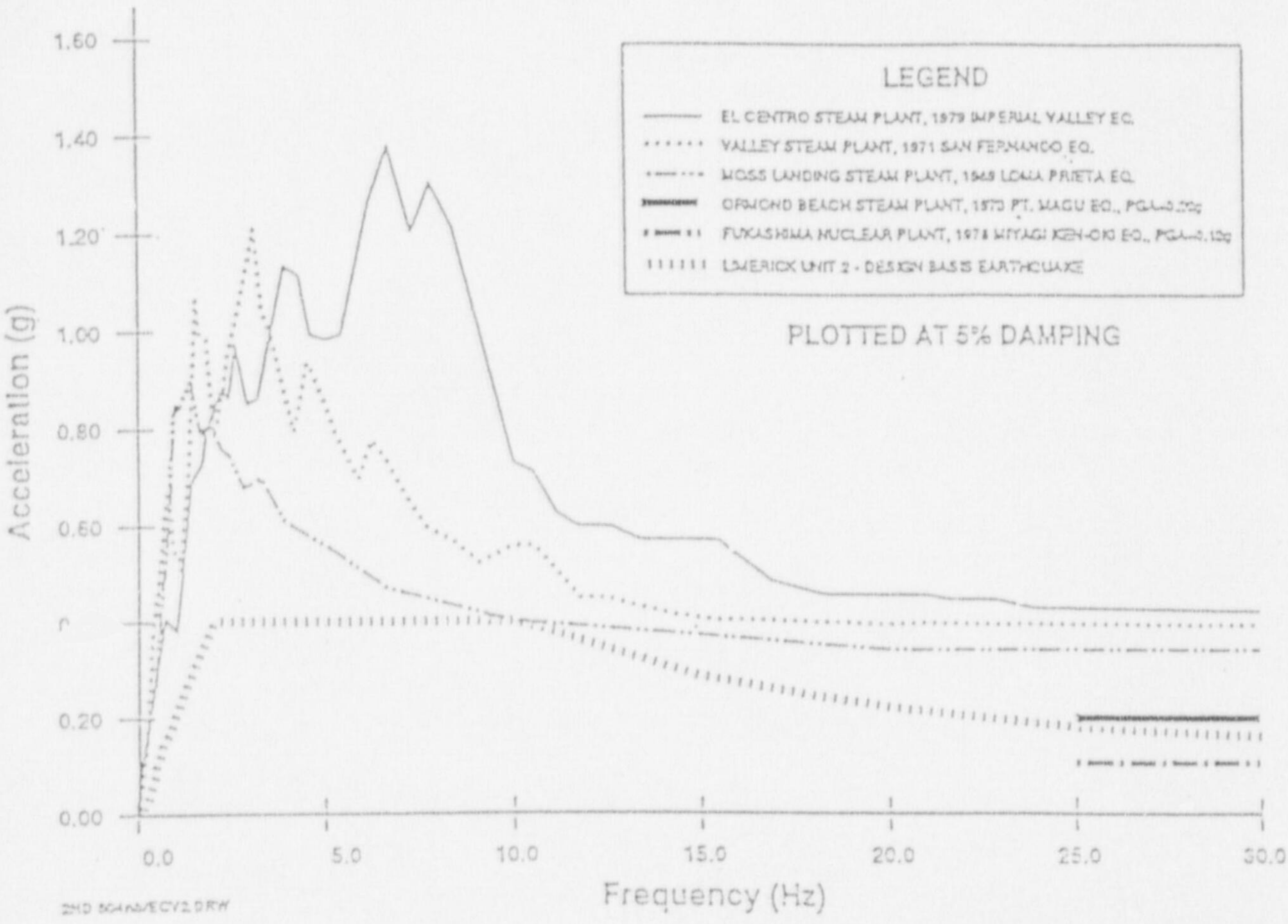
System Designation	Piping Design	Temp. (°F)	Pres. (psig)	Nom Size	Sch	D/t (1)	Supports Spacing	Types	Des. Code	Loading	Analysis Method	Seismic Des. Basis
Drain from outboard MSIV to HV-C-F020	ASME Sect. III	582	1115	2" & 3"	160	7 & 8	ASME Sect. III	Spring strut snubbers box type	AISC MSS SP58	D. W. Thermal Hydro	Linear Elastic	R. S. Analysis using SSE
Drain from HV-C-F020 to Turbine Bldg	ANSI B31.1	582	1115	3" & 4"	160 & 80	8 & 13	ANSI B31.1	Spring strut snubbers box type	AISC MSS SP58	D. W. Thermal Hydro	Linear Elastic	R. S. Analysis using SSE
Drain from HV-C-F020 to condenser in Turbine Bldg	ANSI B31.1	582	1115	4"	80	13	ANSI B31.1	Rod hangers spring concrete anchorage bolted connection Structural Members	AISC MSS SP58	D. W. Thermal Hydro	Linear Elastic	None
Operating drain from main steam MSV to high pressure condenser	ANSI B31.1	582	1115	1" & 2"	160	5 & 7	ANSI B31.1	Rod hangers springs concrete anchorage bolted connection Structural Members	AISC MSS SP58	D. W. Thermal Hydro	Linear Elastic	None

(1) Diameter to Thickness

Table 3: Outlier Identification and Resolution

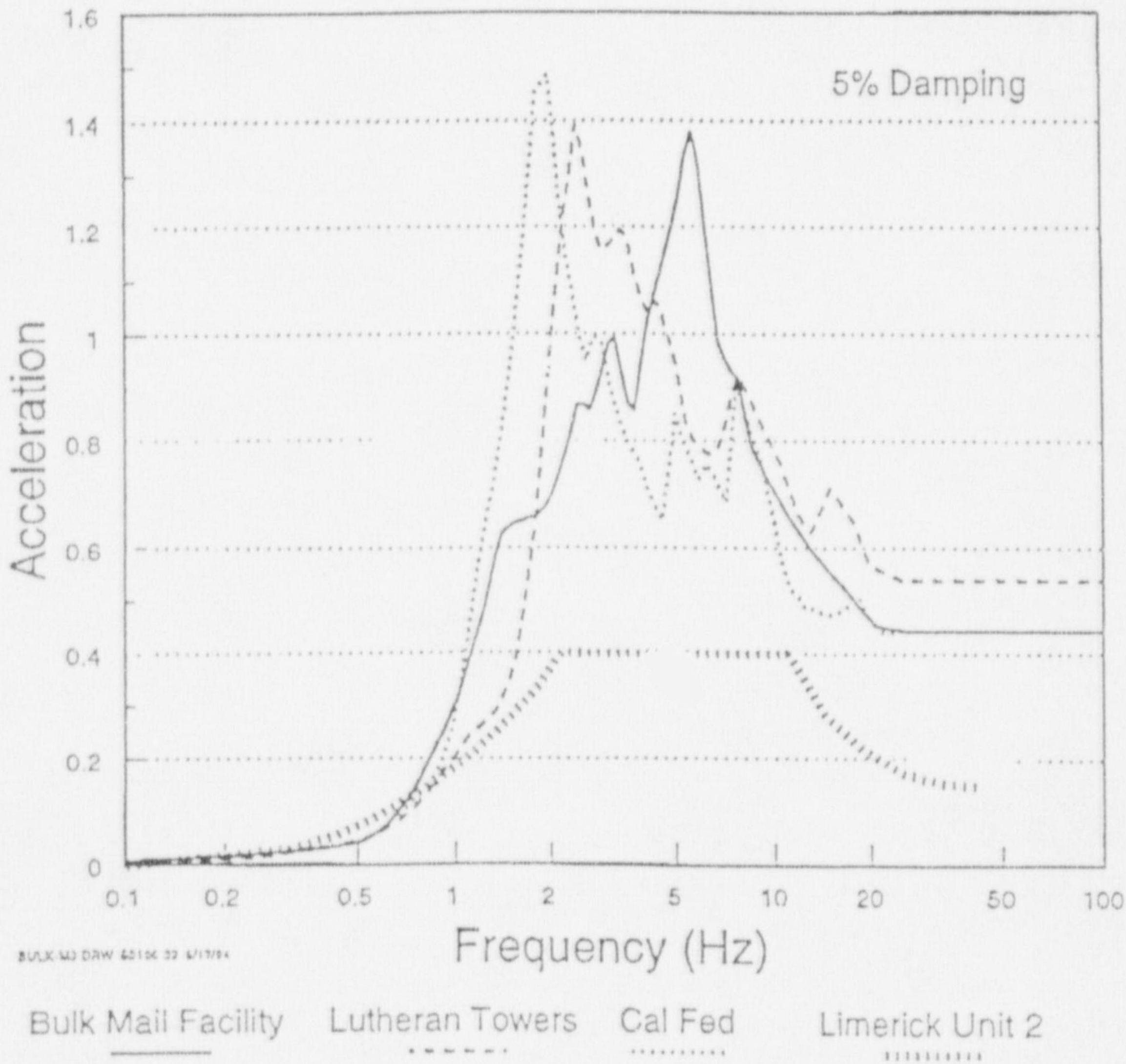
System Description	Outlier Description	Outlier Type (Potential Failure Mode)					Resolution Status	Required Action
		A	F	P	D	V		
4" EBD 208 Line in Turbine Bldg Drain from outboard MSIV to condenser	Potential for pipe falling off of its dead weight supports during an SSE		X				Not acceptable as is	Modify support EBD-208-H25 to provide bi-lateral restraint. Add lateral stops for supports EBD-208-H23, 24, and 26 thru 28
2" EBD-214 in Turbine Bldg Drain from MSV to high pressure condenser	Beam clamp support Not documented		X				Not acceptable as is	Remove the support
Valve HV-204 movement	Potential large movement during an SSE affecting EBD-214 drain pathway and condenser penetration			X			Valve relocated and concern addressed	Relocate valve
Block wall adjacent to the main steam pressure transmitter	Potential failure of wall during an SSE		X				Acceptable by analysis	None

ATTACHMENT 1
GRAPH 1A

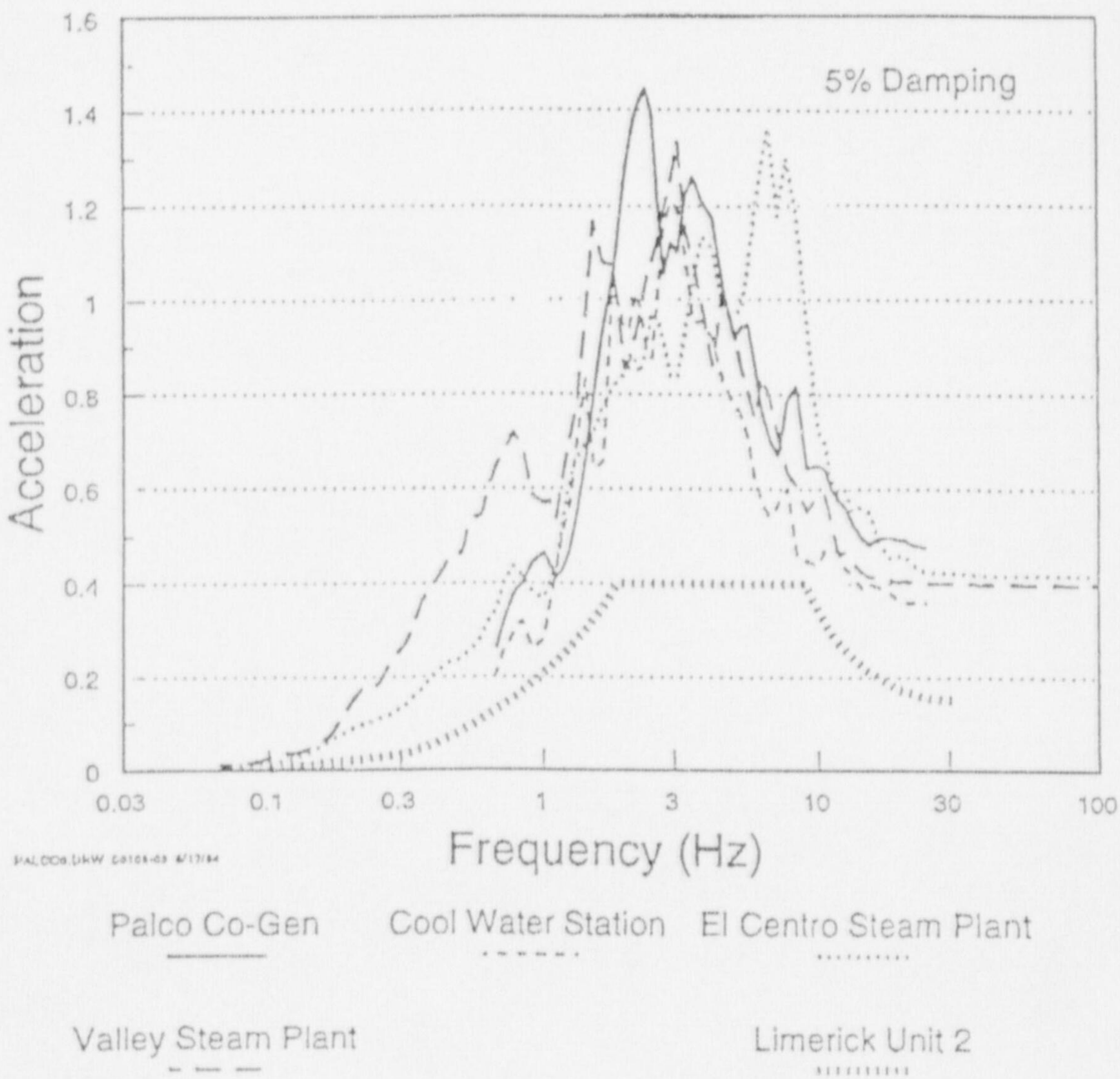


Comparison of experience database and Limerick SSE horizontal ground response spectra

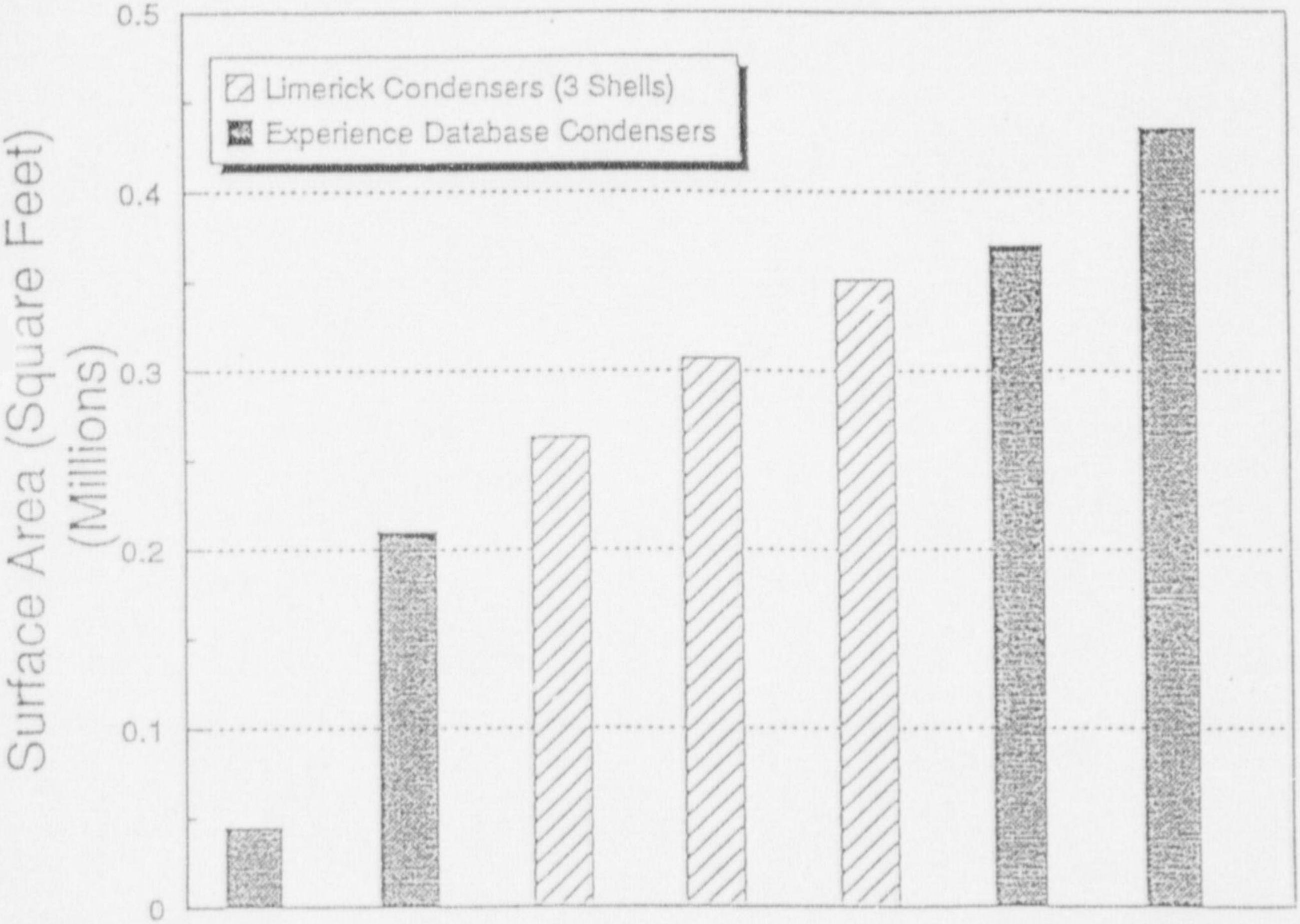
ATTACHMENT 1
GRAPH 1B



ATTACHMENT 1
GRAPH 1C

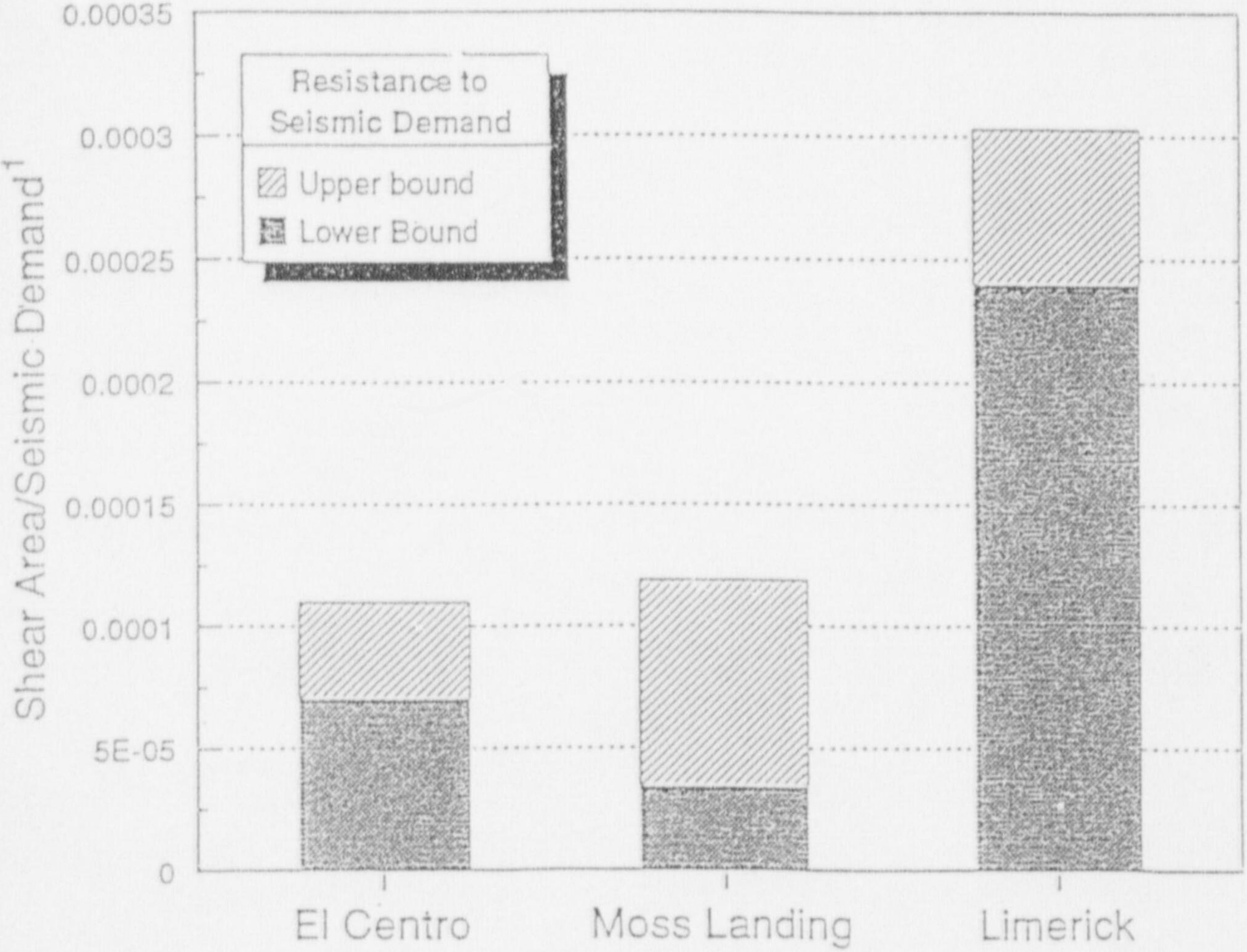


ATTACHMENT 2
FIGURE 2A



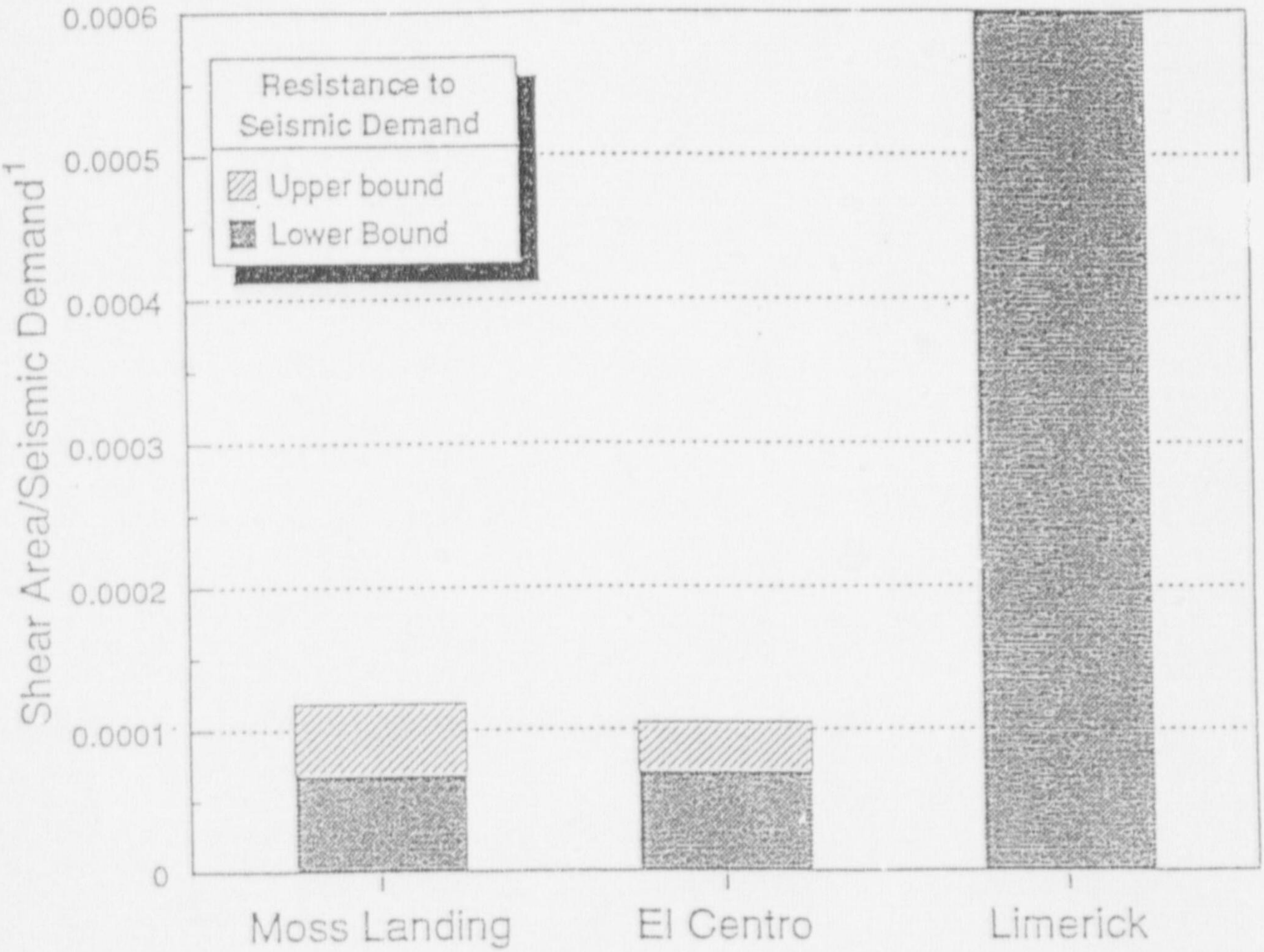
Comparison of data base and Limerick condenser surface areas

ATTACHMENT 2
FIGURE 2B



Condenser anchorage to demand for direction transverse to turbine generator axis

ATTACHMENT 2
FIGURE 2C



Note:

1 - Shear Area (in^2)/Demand (condenser weight x g level)

Comparison of selected data base sites and Limerick condenser anchorage to seismic demand for direction parallel to turbine generator axis

WALKDOWN PLAN

1.0 LIMERICK GENERATING STATION U/1:

MODIFICATION P-00017 "ELIMINATION OF MAIN STEAM ISOLATION VALVE (MSIV) LEAKAGE CONTROL SYSTEM (LCS)"

2.0 PURPOSE:

There are two reasons for this walkdown. The first reason is to perform the necessary evaluations to demonstrate that the piping being credited for use in the "MSIV Leakage Alternate Drain Pathway" falls within the criteria specified in NEDC 31858P Revision 2. The second reason is to perform the necessary walkdowns to gather information for the "final design" for Unit 1, and provide general design information for the "final design" for Unit 2, since this walkdown is not possible.

3.0 INTENDED USE:

The results of the seismic evaluation will be incorporated into a "Design Analysis" for Unit 1. This "Design Analysis" will demonstrate the adequacy of the MSIV Leakage Alternate Drain Pathway. The results of the modification walkdown will be used in the "final design" for LGS Units 1 and 2.

4.0 QUALIFICATION:

Each walkdown team member must be familiar with the modification and the stated purpose of the walkdown. Two members of the walkdown team, shall be knowledgeable of the requirements specified in NEDC-31858P revision 2, and able to produce a walkdown report which will document any seismic outliers which may be identified in the walkdown. One member of the walkdown team will be familiar with installation issues.

5.0 PARTICIPATING ORGANIZATIONS:

EQE ENGINEERING	Steven P. Harris Thomas Roche	NEDC-31858P RVWR NEDC 31858P RVWR
System Design (CB)	Andy Winter	LRE
Limerick Technical	Bill Klinko	LSR
Limerick Contract Mngmt	Rob Krieder	LIR
UE&C	Gerry Tuday Jack Kopko Tom Powell	Installation/Design Piping Design Electrical Design

6.0 ATTACH WALKDOWN DATA SHEETS FOR:

6.1 Discrepancies Identified during Seismic Walkdown. The following is a description of considerations to be given during this portion of the walkdown:

Seismic Failure Modes:

In general the walkdown should identify seismic outliers which may result in seismic induced pressure boundary failure and inventory release of the main steam and drain piping. These outliers shall include support failure and falling of non-seismically designed plant features (II/I), proximity impact, and differential seismic anchor motion on piping systems. Considerations for each of these classes of outliers is provided as follows:

Failure/Proximity Impact:

Assurance that detrimental falling hazards and proximity interactions do not exist. Components/Piping should at a minimum be 1 foot away from any potential seismic interaction which has the potential to cause damage during a seismic event. Also, critical piping shall not be in the pathway of any credible falling concern. Potential seismic interactions should be evaluated for piping components such as valve operators, vents, drains, instrumentation, and fragile appurtenances. All outliers will be documented and evaluated.

Differential Seismic Anchor Motions:

Piping should be reviewed for seismic anchor movements imposed by the following three conditions:

- Excessive movement of terminal end equipment.
- Differential movement between pipe supports in adjacent uncoupled buildings.
- Excessive movements imposed on small branch lines by flexible headers.

6.2 Discrepancies/Issues Identified during Design Walkdown. The following is a description of considerations which should be made during this portion of the walkdown:

Piping Walkdown:

The piping walkdown will ensure that the piping being rerouted will meet the "seismic criteria" outlined in NEDC-31858P and the Safety Evaluation for License Change Request 93-18 revision 2. Any problems meeting this criteria shall be identified as a discrepancy. The "seismic criteria" shall at a minimum include the considerations provided in section 6.1 of this plan and the assumptions made in the seismic calculation performed by EQE which are contained in the Safety Evaluation for LCR 93-18.

For this portion of the walkdown a Piping Walkdown check list will be prepared by UE&C which will identify the applicable drawings to be reviewed and the criteria to be evaluated.

Electrical Walkdown:

For this portion of the walkdown an Electrical Walkdown checklist will be prepared by UE&C which will identify the applicable drawings to be reviewed and the criteria to be evaluated.

7.0 VERIFICATION REQUIREMENTS:

The seismic walkdown will require independent verification. The services of EQE Engineering have been procured to provide this service which will be documented by a "Walkdown Report". The design walkdowns will not require independent verification, but will be reviewed by the modification team.

8.0 PREPARED BY: ______________________ DATE: 2/15/94
Andy Winter (LRE Mod P-00017)

m:\aaw\mod17\wlkpln

WALKDOWN DATA SHEET
MODIFICATION P-00017

1.0 GENERAL

LIMERICK GENERATING STATION U/1 DWG. NO./REV: ________

COMPONENT: ________

2.0 INSTRUCTIONS:

2.1 Review Walkdown Checklist.
2.2 Provide a separate data sheet for each discrepency.
2.3 Sign and date each data sheet.
2.4 Have data verified by another member of the walkdown team, as required.

3.0 INFORMATION TO BE ENTERED FOR DISCREPENCY/COMPONENT/DRAWING LISTED ABOVE:

3.1 COMPONENT NAME: ____________________

3.2 COMPONENT TYPE: ____________________

3.3 SPECIFIC ATTRIBUTE: ____________________

____

____

4.0 DISCREPANCIES IDENTIFIED:

____

____

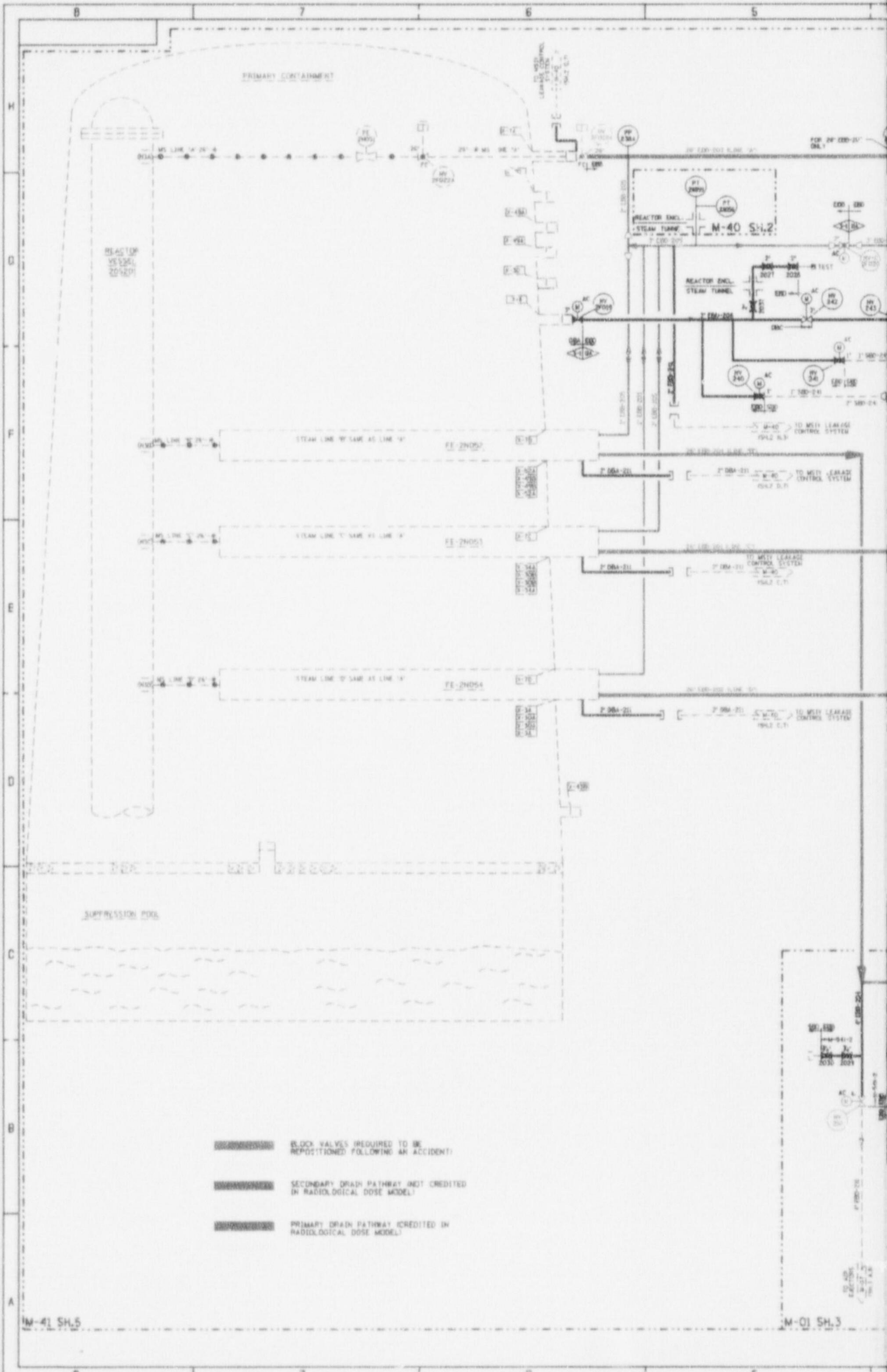
____

____

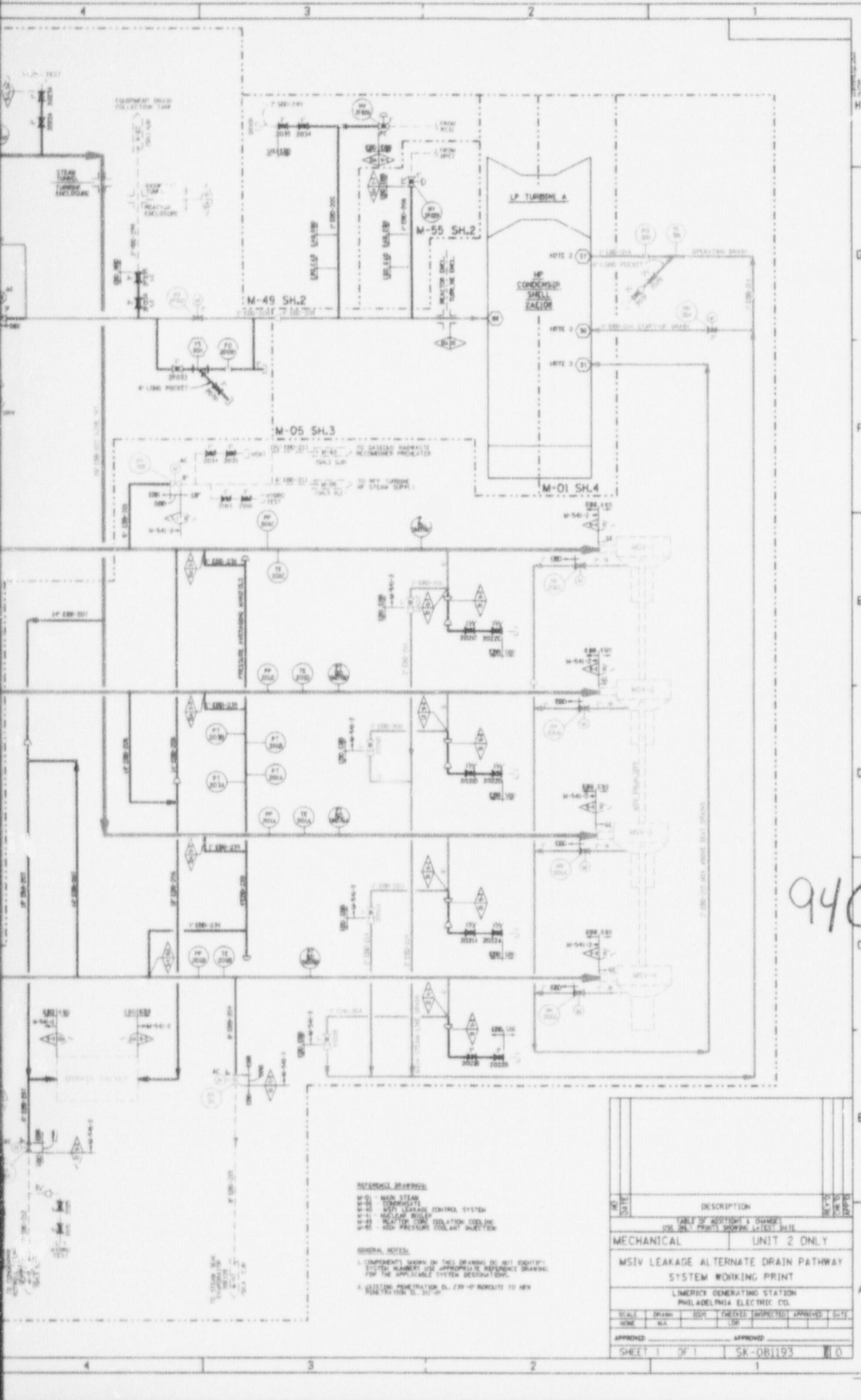
5.0 SIGN-OFFS:

Prepared by: ____________________ Date: ________

Verified by: ____________________ Date: ________



PRIMARY CONTAINMENT
REACTOR VESSEL
M-40 SH.2
REACTOR ENCL.
STEAM TUNNEL
STEAM LINE "B" SAME AS LINE "A"
STEAM LINE "C" SAME AS LINE "A"
STEAM LINE "D" SAME AS LINE "A"
FE-2N052
FE-2N051
FE-2N054
TO MSIV LEAKAGE CONTROL SYSTEM
SUPPRESSION POOL
BLOCK VALVES (REQUIRED TO BE REPOSITIONED FOLLOWING AN ACCIDENT)
SECONDARY DRAIN PATHWAY (NOT CREDITED IN RADIOLOGICAL DOSE MODEL)
PRIMARY DRAIN PATHWAY (CREDITED IN RADIOLOGICAL DOSE MODEL)
M-41 SH.5
M-01 SH.3



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ATTACHMENT 5