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REPORT OF WALKDOWN TO VERIFY SEISMIC ADEQUACY OF MAIN STEAM DRAIN LINE AND CONDENSER FOR USE AS THE ALTERNATE MSIV LEAKAGE TREATMENT SYSTEM

REPORT PREPARED FOR COMMONWEALTH EDISON COMPANY
LASALLE COUNTY NUCLEAR STATION - UNIT 1
PROJECT NO.: 09606-069
WIN NO.: 2214

SARGENT & LUNDY
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*The review of this report was accomplished by performing a review of the typographical changes made to Revision 2 only.

Note that the signatures for Revision 0 and Revision 1 are in file.

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1. INTRODUCTION

As a resolution to the Main Steam Isolation Valve (MSIV) leakage and Leakage Control System (LCS) performance issues, the BWR Owner's Group (BWROG) proposed to use the main steam piping and condenser as a method for MSIV leakage treatment. This method provides effective and reliable fission product attenuation for reducing the radiological consequences of MSIV leakage.

The BWROG has also evaluated the capability of main steam piping and condensers to process MSIV leakage following a design basis accident coincident with a seismic event. Based on this comprehensive evaluation, the BWROG has concluded there is reasonable assurance that the main steam piping and condenser will remain functional following a design basis accident coincident with a seismic event, as great as the design basis earthquake, to mitigate the radiological consequences of MSIV leakage. This conclusion is in part based on performing a plant-specific verification of seismic adequacy of the main steam piping and condenser to provide reasonable assurance of the structural integrity of these components. This document summarizes the results of the walkdown to verify seismic adequacy of these components which will replace the existing LCS of LaSalle County Nuclear Station-Unit 1 (Lasalle Unit 1).

2. PURPOSE AND SCOPE OF REVIEW

The purpose of this report is to document the field walkdown performed to verify seismic adequacy of the main steam piping and condenser for use as the alternate MSIV leakage treatment system for LaSalle Unit 1.

A seismic verification walkdown was performed based on the guidelines in NEDC-31858P (Reference 10.3) to provide reasonable assurance that the section of main steam piping between the outermost MSIV and High Pressure (HP) turbine stop valves including the condenser and associated unisolated branch lines, will maintain structural integrity with respect to the seismic event.

The condenser forms the ultimate boundary of the leakage pathway. Boundaries were established upstream of the condenser by utilizing existing valves to limit the extent of the seismic verification walkdown. The criteria used to define the scope of review follows.

1) Normally closed valves that will not open and can be assured to remain closed

2) Normally open valves that can be assured to close and remain closed

3) Valves that may require operator action to assure closure and are powered from a reliable power source (i.e., powered by non-essential power supplied by essential busses)

4) Drain lines connected to the condenser that will be utilized to carry the MSIV leakage to the condenser

There does not exist any of the isolation valves that meet the criteria outlined above for Main Steam sample line up to the sample panel. This line will be walked only to the sample panel and the lack of automatic or powered isolation will be identified as an outlier. MS LCS line was not included in the walkdown since this line will be cut and capped at the steam header as part of the system modification needed to initiate the alternative leakage control path.

A list of isolation valves used to define seismic verification boundary is provided in Table 1, along with type of power, category number as previously defined and pertinent information on the isolation capability following a Safe Shutdown Earthquake (SSE). Table 1A lists valves under category 4 defined above.

Drain lines, 1MS20AA/AB/AC/AD-2" and 1MS20BA/BB/BC/BD-1 1/2" are also within the boundary of the leakage pathway. However, these lines were excluded from the walkdown since these lines were previously analyzed as ASME Section III, class 1. These lines are bounded by valves 1B21-F067A/B/C/D and 1B21-F025A/B/C/D.

An Isometric sketch of LaSalle Unit 1 main steam system beyond the outboard MSIVs up to the condenser and some of the isolation valves is shown in Figure 1. It is to be noted that Figure 1 is only an overall representation of the alternate leakage control path and does not necessarily include all the MS branch lines. For a complete scope of seismic verification walkdown, a marked up P&ID in Figure 5 should be referred to.

The structural integrity of the turbine building was also reviewed to provide reasonable assurance that the capability of main steam and condenser fluid pathways are not degraded due to building structural damage.

3. DESIGN OF LASALLE PIPING AND SUPPORTS

Main steam and drain/by-pass piping including the warm-up and process sampling lines at the LaSalle plant were seismically analyzed in accordance with ASME Boiler and Pressure Vessel (B&PV) Code Section III, class 2 and 3 rules, and their supports were also designed for the seismic loads using the ANSI B31.1 code, although they are designated as non-safety-related.

One analysis model included the main steam piping to the turbine and the by-pass line. The main steam drain and warm-up lines were decoupled from the above mentioned main steam line and were analyzed up to the condenser and structural anchors, respectively. These piping subsystems consist of the majority of the piping and supports within the scope of review, and the design methods for these analyzed lines are consistent with seismic Category I qualification methods for LaSalle's safety-related piping and supports.

It is also to be noted that other non-safety-related piping at LaSalle had previously been analyzed and found to be rugged enough to survive the design basis earthquake through a Seismic Category II over Seismic Category I assessment previously performed (Reference 10.5). The same can be concluded for the non-safety-related piping in a Seismic Category II buildings, since the piping and support designs are similar.

Specific design parameters used for the design of the piping and supports within the scope of review are described in Table 2.

4. WALKDOWN

A field walkdown was performed based on the guidelines in NEDC-31858P (Reference 10.3) to provide supplemental verification that a reasonable assurance of the integrity of the subject systems and components exists, and was focused only on the realistic hazards to verify design attributes important to seismic performance and to identify non-typical commodities with uncertain seismic capacity. The walkdown also took into account the good seismic performance of conventional power plant condensers (that are similar in construction to nuclear power plant condensers) and the rugged design of the main steam piping and its branch lines.

Piping single line drawings falling under the scope of review were prepared for the walkdown by grouping and marking affected piping. The walkdown team consisted of one degreed and licensed structural engineer who has experience in structural seismic analysis and has completed EPRI sponsored courses: "A-46 Walkdown, Screening and Seismic Evaluation" and "Add-on Seismic IPE Training". A second team member is a degreed piping design engineer who is a licensed professional engineer experienced in piping seismic analysis.

The engineers in the walkdown team collectively possess the following knowledge and experience:

- Knowledge of the performance of equipment, systems, and structures during strong motion earthquakes in industrial process and power plants.

- Nuclear plant walkdown experience which includes: potential seismic interaction; II/I issues; A-46 walkdown; and IPE screening walk-through.

- Knowledge of nuclear design Codes and standards including the visual inspection requirements of ASME OM-3.

- Experience in seismic design, seismic analysis, and test qualification practices for nuclear power plants.

The main steam line was walked through from the outermost Main Steam Isolation Valves to the Main Steam Stop Valves, the Main Steam By-Pass Valves, and 1B21-F418A(B). The drain lines tapping off the MS piping within this boundary were walked through to the condenser and to the valves 1B21-F071(73). The warm-up lines were walked to the valve 1B21-F020.

Piping system anomalies (termed "outliers") that may lead to the loss of the system pressure boundary during a seismic event were identified, and they are discussed in Section 8.

5. TURBINE BUILDING

The turbine building seismic performance is of interest to the issue of MSIV leakage only to the extent that it will not degrade the capabilities of the selected main steam and condenser pathways. A BWROG survey of this type of industrial structure has, in general, confirmed that excellent seismic capability exists. There are no known cases of structural collapse of either turbine buildings at power stations or structures of similar construction. At the LaSalle Station, the turbine building shares the north-south wall with the auxiliary building and the diesel generator room as shown in Figure 2. The turbine building was included in the seismic models (Reference 10.1). The shear walls and slabs were designed for the seismic loads obtained from the seismic analysis. The structural project design criteria (Reference 10.2) requires that Class II structures be designed to ensure that a failure of any part of the Class II structures will not affect the structural integrity of Class I structures or systems. Furthermore, the criteria requires that Class II structures be designed to resist the forces determined from the combined Class I and Class II model.

The exterior walls of the turbine building are reinforced concrete, 3 feet thick below grade and 1 foot thick above grade similar to the Class I structures. The floor slabs with concrete framing are 18 inches thick and the floors supported on steel framing are 6 inches thick. These thicknesses are also similar to the Class I structures. The turbine building above grade were also designed for wind loads and seismic loads in accordance with the Uniform Building Code of 1970. For tornado loading condition, the siding of the turbine building is designed to blow off at a predetermined wind pressure (about 71 psf) so that the structural frame is protected from excessive tornado pressures. Structural integrity of the bare frame is then checked for vented tornado pressures. The tornado pressures considered were 300 psf for windward and 166 psf for leeward. The final design of the turbine building was controlled by the forces resulting from the tornado pressures. The initial design was modified to accommodate those forces.

Horizontal and vertical truss systems were provided to transmit these loads down to the reinforced concrete walls. The design of the shear walls was checked to assure the capability of transmitting the forces to the basemat and the foundation material.

Based on the above description of the structure and structural design criteria, it is concluded that turbine building will not collapse under SSE at LaSalle Station.

6. MAIN TURBINE CONDENSER

The LaSalle Unit 1 condenser is a single shell with three condenser extension necks, single pass construction with total effective tube surface area of 950,000 square feet. The shell is 7/8" thick A285 Grade C flange quality steel. Figure 3 contains the outline drawing for the condenser. The design basis for the LaSalle Unit 1 condenser follows:

6.1 Design Code

The condenser was designed based on the Heat Exchanges Institute Standards (HEI).

6.2 Design Pressure

a. Shell was designed for 15 psig pressure and tested for 20 psig.

b. Water boxes, tube sheets, etc. were designed for 25 psig and tested for 30 psig.

6.3 Manufacturer: Westinghouse Electric Corporation

6.4 Size, Weight, Dimensions

Size: Effective surface area of 950,000 square feet.

Weight: Empty = 2,880,000 lbs.

Operating = 6,026,000 lbs.

Test = 14,886,000 lbs.

Dimensions (shell):

Length = about 90'
Width = about 35'
Height = about 71' including condenser extension necks

Shell Material and Thickness: ASTM A-285C and 7/8" thick.

6.5 Anchorage Description

The condenser is seated on 8 reinforced concrete piers which are supported by the Turbine Building foundation. Each seat consists of a base plate with shear bars. The shear bars are grouted to the top of the pier. The condenser is connected to the piers by 6 1-5/8"Ø A36 anchor bolts at each pier for a total of 48 anchors. The holes in the base plate and the bottom of the condenser are arranged in a fashion to allow thermal growth.

6.6 Condenser Evaluation

a. Method of Evaluation

Appendix D of Reference 10.3 is used to compare the condenser to the "Experience Data Base". Because the condenser size and weight are larger than the condensers in the "Experience Data Base", additional anchorage evaluations were performed to determine their adequacy for the design basis earthquake and beyond.

The method of evaluation is summarized as follows.

1. The condenser capacity and demand parameters were compared to the "Experience Data Base" contained in Reference 10.3.
2. A simple anchorage review was performed to estimate the anchorage capacity for seismic loads.
3. Seismic capacity is compared to seismic demand to estimate the anchorage High Confidence of Low Probability of Failure (HCLPF) capacity using seismic margin methods provided in Reference 10.4.

b. Evaluation Results

1. The condenser seismic demand falls well within the bounds of the "Experience Data Base".
2. The condenser anchorage provides significantly greater "Resistance to Seismic Demand" than those in the "Experience Data Base".
3. The condenser anchorage has a HCLPF greater than 0.30g which is well above the design basis SSE of 0.20g.

7. <u>MAIN STEAM AND DRAIN LINE/BYPASS PIPING</u>

All of the piping systems within the scope of the review are classified as non-safety-related. However, majority of the piping were seismically analyzed (class D+) in accordance with ASME Section III class 2 and 3 rules using response spectrum analysis techniques. Seismically analyzed piping include main steam line (downstream piping from the most outboard main steam isolation valves to the main steam stop valves, the main steam bypass valves and 1B21-F418A(B)), drain lines from main steam piping to the condenser, and the warm-up lines to valve 1B21-F020 as shown in Figure 1. Small bore instrument lines such as process sampling lines have also been designed seismically using a simplified procedure to support the piping/tubing. The design methods for all these lines are consistent with Seismic Category I qualification methods and the design margins are expected to be adequate to assure good seismic performance.

Pressure sensing instrument lines from the main steam line to the pressure sensors in the turbine building are classified as non-seismic (class D) and are designed to the requirements of the B31.1 code. These lines appeared to be dead load supported in general conformance to the recommendations of the B31.1 code using rigid rods and U-bolts. Review of the piping and support design codes and piping design parameters demonstrated that piping and supports fall within the bounds of design characteristics found in "Earthquake Experience Data base".

To further verify the reasonable seismic adequacy of the piping and supports within the scope of the review, a walkdown has been performed to visually identify conditions of the piping and supporting configurations which may result in seismically induced pressure boundary failure and inventory release from the main steam and drain piping. The approach utilized in the walkdown for verifying seismic adequacy of the subject piping is as outlined in Reference 10.3 and is consistent with Reference 10.4. The walkdown was focused on identifying potential failure of non-seismically designed piping, poorly installed and/or deteriorated piping supports, falling of non-seismically designed plant features that may impact the above mentioned piping systems (II/I), seismic interaction, and differential seismic building movement on piping systems.

During the walkdown, the following items were visually inspected and no significant outliers were identified except those listed in Table 3.

7.1 Support and Anchorage:

The piping support and anchorage installation were visually inspected for (1) missing or disconnected parts such as bolts, nuts, pins, welds and anchors; (2) broken, grossly deformed, cracked or disconnected support components; (3) excessive corrosion; (4) spalling of concrete; (5) stanchion supports not being properly seated; and (6) potential for the pipe to fall off due to insufficient distance to the edge of the support. In addition to the above, non-seismically analyzed piping (Class D) were also checked for (1) heavy in-line components or long risers supported only by a spring hanger; (2) piping sections with a series of spring hangers without nearby rigid supports; (3) a long run of pipe (i.e., 4 to 5 vertical support spans) without any lateral support; and (4) Valve operator exceeding a cantilever length limit provided in Figure 4.

7.2 Seismic Interaction:

Motor/air operated valves (MOV/AOV) were checked for potential seismic impact by other plant features such as structure, cable trays, conduits, HVAC ducts, hangers, etc. due to inadequate seismic clearance. Small branch piping was checked for potential seismic impact or movement restriction due to a large and flexible header.

7.3 II Over I Review:

Piping and supports were checked for any potential damage due to impact caused by failure and falling of overhead or adjacent equipment, systems, or structures.

7.4 Differential Seismic Motions:

The following conditions, which may impose differential seismic motions on the piping, were also checked to ensure that adequate piping flexibility exists to preclude failure.

(1) Terminal end equipment with inadequate anchorage or supported on a vibration isolator.

(2) Small bore piping or tubing connected to an equipment, valve or instrumentation, with insufficient flexibility to accommodate seismic motion between the equipment and adjacent support or structure (Class D only).

(3) Pipe supports or anchors attached to adjacent and uncoupled buildings with inadequate piping flexibility (Class D only).

(4) Rigidly supported branch piping close to a flexible header (Class D only).

In summary, all of the piping within the scope of the review were seismically analyzed/designed in accordance with ASME section III, class 2 and 3 rules, except small bore pressure sensing instrument lines which are similar to or better than the piping found in "Earthquake Experience Data Base".

Minor issues concerning seismic anchor movements and support anchorage of process sampling line were identified during the walkdown, that could be potential sources of damage. These were evaluated and were found to be acceptable as shown in Table 3.

For the pressure sensing instrument lines, each 1" NPS or smaller line was supported by vertical rod hangers and U-bolts; the piping penetrates a block wall where the valves and pressure sensors are mounted. It was demonstrated by tug test that the piping position retention will be reasonably maintained by the system dead weight supports under normal and earthquake loading, if the seismic adequacy of the block wall from which the piping is supported is verified.

8. DESCRIPTION OF OUTLIERS AND RESOLUTION

The outliers identified during the walkdown are described below along with the method of resolution or recommended action:

- Process sampling line (1MSA1AB-3/4") branching off from the 26"Ø MS line runs close to the structural wall (about 2" from the insulation), which may restrict branch line seismic movement.

  Resolution: The combined thermal and seismic movement of the header at the branch connection was reviewed from the existing piping analysis and found to be less than 1". Therefore, the outlier is acceptable as is.

- Process sampling line (1MSA1AB-3/4") in the steam tunnel is supported by a block wall on column line 13 before it penetrates through the concrete wall on row line R.

  Resolution: The block wall is found to be class I and seismically designed based on Sargent & Lundy LLC (S&L) drawing No. A-91, Rev. AJ, note 4. Therefore, the outlier is acceptable as is.

- Process sampling line has no automatic or powered isolation valve to isolate leak path.

  Resolution: Not acceptable as is. One of the following actions needs to be taken.
  1. Radiological effect of leakage path should be evaluated.
  2. Automatic/reliable powered isolation should be installed.
  3. Manual isolation valve should be controlled closed administratively.

- Pressure sensing lines (1MS93AA/AB/AC/AD-1, 1MS68AB/BB-1 and 1MS69AB-1/2) penetrate a block wall, and valves and pressure sensors are mounted on the other side of the block wall. There are also block walls close to the pressure sensors. These walls may impact the sensors if they fail.

  Resolution: Not acceptable as is. Seismic adequacy of the block walls should be verified for these lines. The walls should be reinforced, or isolation method be provided.

9. CONCLUSION

LaSalle Unit 1 plant-specific verification of seismic adequacy of main steam piping, associated branch lines including drain, warm-up, process sampling lines and condenser has been performed based on the guidelines in NEDC-31858P (Reference 10.3), to provide reasonable assurance of the seismic integrity of these systems and components. The design method for the majority of the piping and supports under the scope of review is consistent with seismic Category I qualification method and design margins are expected to be adequate to assure good seismic performance.

All outliers identified during the field walkdown were resolved by review of existing analysis or design drawing. The two outliers requiring additional actions are listed below.:

1. One of the following actions needs to be taken for the process sampling line.

    1. Radiological effect of leakage path should be evaluated.
    2. Automatic/reliable powered isolation should be installed.
    3. Manual isolation valve should be controlled closed administratively.

2. Seismic adequacy of the block wall where pressure sensing instrument lines are supported and the block walls located close to the pressure sensors need to be verified. If this shows an unacceptable condition, the walls should be reinforced or isolation method be provided for these lines.

In addition, in all the areas walked down, the team observed that the cable trays, conduits, and HVAC ducts are well supported to consider them as seismically rugged.

The turbine building has been shown through design document review to be capable of resisting the safe shutdown earthquake.

Review of the condenser location, shell thickness and test qualification, and the seismic capability of the anchorage indicates that the condenser design is adequate to resist the safe shutdown earthquake.

Note: Since the walkdown, Reference 10.6 reported discrepancies between the as-built and analyzed configuration of a section of line 1MS14D-3".

10. REFERENCES

10.1 "Seismic Response Spectra Design Criteria", LaSalle County Nuclear Power Station Units 1 and 2, DC-SE-02-LS, Rev. 0, Sargent & Lundy Engineers

10.2 "Structural Department Project Design Criteria", LaSalle County Nuclear Power Station Units 1 and 2, DC-SE-01-LS, Rev. 6, Sargent & Lundy Engineers

10.3 "BWROG Report For Increasing MSIV Leakage Rate Limit and Elimination of Leakage Control Systems", NEDC-31858P, Rev. 2

10.4 "A Methodology for Assessment of Nuclear Plant Seismic Margin", EPRI NP-6041, Rev. 1

10.5 "Assessment of Non-Category I Piping for Protection of Safety-Related Components During Seismic and Pool Related Events", EMD-027211, Rev. 0, Sargent & Lundy Engineers

10.6 Design Information Transmittal, DIT No. LAS-MPED-0317-2, Sargent & Lundy Engineers

TABLE 1: LIST OF ISOLATION VALVES			
Valve No.	Operator Type	Category	Remarks
1B21-F418A	Motor Operator	3	M-55 Sh3; Line 1MS38AA-18; Powered from 1E MCC 136X-2 (D4)
1B21-F418B	Motor Operator	3	M-55 Sh3; Line 1MS38AB-18; Powered from 1E MCC 136X-2 (D5)
1B21-MSV1	Hydraulic Operator	3	M-55 Sh3; Line 1MS01CB-28; Non-1E Source, Fail Closed on Loss of Power
1B21-MSV2	Hydraulic Operator	3	M-55 Sh3; Line 1MS01CA-28; Non-1E Source, Fail Closed on Loss of Power
1B21-MSV3	Hydraulic Operator	3	M-55 Sh3; Line 1MS01CD-28; Non-1E Source, Fail Closed on Loss of Power
1B21-MSV4	Hydraulic Operator	3	M-55 Sh3; Line 1MS01CC-28; Non-1E Source, Fail Closed on Loss of Power
1B21-F339A	Manual	1	M-55 Sh3; Branch Line from 1MS01BA-26
1B21-F339B	Manual	1	M-55 Sh3; Branch Line from 1MS01BB-26
1B21-F339D	Manual	1	M-55 Sh3; Branch Line from 1MS01BD-26
1B21-MSBPV1	Hydraulic Operator	3	M-55 Sh3; Line 1MS33AA-12; Non-1E Source, Fail Closed on Loss of Power
1B21-MSBPV2	Hydraulic Operator	3	M-55 Sh3; Line 1MS33AB-12; Non-1E Source, Fail Closed on Loss of Power
1B21-MSBPV3	Hydraulic Operator	3	M-55 Sh3; Line 1MS33AC-12; Non-1E Source, Fail Closed on Loss of Power
1B21-MSBPV4	Hydraulic Operator	3	M-55 Sh3; Line 1MS33AD-12; Non-1E Source, Fail Closed on Loss of Power
1B21-MSBPV5	Hydraulic Operator	3	M-55 Sh3; Line 1MS33AE-12; Non-1E Source, Fail Closed on Loss of Power
1B21-F020	Motor Operator	1	M-55 Sh7; Line 1MS19B-3; Powered from 1E MCC 136Y-1 (A2)
1B21-F071	Motor Operator	3	M-55 Sh7; Line 1MS27A-1; Powered from 1E MCC 136X-3 (B3)
1B21-F073	Motor Operator	3	M-55 Sh7; Line 1MS30A-1; Powered from 1E MCC 136X-3 (C3)

TABLE 1: LIST OF ISOLATION VALVES			
Valve No.	Operator Type	Category	Remarks
1B21-F302A	Manual	1	M-55 Sh7; Branch Line from 1MS25AA-2
1B21-F302B	Manual	1	M-55 Sh7; Branch Line from 1MS25AB-2
1B21-F302C	Manual	1	M-55 Sh7; Branch Line from 1MS25AC-2
1B21-F302D	Manual	1	M-55 Sh7; Branch Line from 1MS25AD-2
1B21-F306A	Manual	1	M-55 Sh7; Branch Line from 1MS28AA-2
1B21-F306B	Manual	1	M-55 Sh7; Branch Line from 1MS28AB-2
1B21-F306C	Manual	1	M-55 Sh7; Branch Line from 1MS28AC-2
1B21-F306D	Manual	1	M-55 Sh7; Branch Line from 1MS28AD-2
1B21-F028A	Air Operated	2	M-55 Sh2; Line 1MS01BA-26; RPS BUS "B", Fail Closed on Loss of Air
1B21-F028B	Air Operated	2	M-55 Sh2; Line 1MS01BB-26; RPS BUS "B", Fail Closed on Loss of Air
1B21-F028C	Air Operated	2	M-55 Sh2; Line 1MS01BC-26; RPS BUS "B", Fail Closed on Loss of Air
1B21-F028D	Air Operated	2	M-55 Sh2; Line 1MS01BD-26; RPS BUS "B", Fail Closed on Loss of Air

TABLE 1A: LIST OF DRAIN PATH VALVES

Valve No.	Operator Type	Category	Remarks
1B21-F070	Motor Operator	4	M-55 Sh7; Line 1MS25B-3, Powered from 136X-2(F2)
1B21-F072	Motor Operator	4	M-55 Sh7; Line 1MS28B-3, Powered from136X-2(F3)

TABLE 2: PIPING SYSTEM DESIGN PARAMETERS

SYSTEM DESCRIPTION	PIPING DESIGN CODE	DESIGN TEMP. (°F)	DESIGN PRESSURE (psig)	PIPE SIZE	SCH. OR THICKNESS	D/T	SUPPORT TYPES	LOADINGS CONSIDERED
MSIVs to the MSVs, the MS Bypass Valves and 1B21-F418A(B)	ASME III ANSI B31.1	575	1250	36" 26" 28" 18"	1.335" .967" min. 1.041" min. Sch. 80	27 27 27 19	Springs Struts Concrete anchors	Weight Thermal Seismic Steam Hammer
MS Drain Lines to the Condenser and 1B21-F071 (073). MS Drain Branch Lines	ASME III ANSI B31.1	575	1250	2" 3" 12" 1"	Sch. 80	11 12 19 7	Springs Struts Box types U-bolts Snubber Structural anchor	Weight Thermal Seismic
MS Warm-up Bypass Lines to 1B21-F020	ASME III ANSI B31.1	575	1250	3" 2"	Sch. 80	12 11	Springs Struts Snubbers Rod Hanger	Weight Thermal Seismic
MS Process Sampling Line	ASME III ANSI B31.1	575	1250	3/4" 1/2"	Sch. 160 .109" min.	5 8	U-bolts Tube clamps	Weight Thermal Seismic
Pressure Sensing Line	ANSI B31.1	575	1250	1" 3/4" 1/2"	Sch. 80&160 Sch. 80 Sch. 160	7&5 7 4	Rod hanger U-bolts	Weight Thermal

TABLE 3: OUTLIER IDENTIFICATION AND RESOLUTION

SYSTEM DESCRIPTION	OUTLIER DESCRIPTION	RESOLUTION STATUS	REQUIRED ACTION
Main Steam Process Sampling	Sampling line (1MSA1AB-3/4") branching off from the 26"Ø MS line runs close to the structural wall (about 2" from insulation), which may impose a potential restriction on pipe seismic movement.	Acceptable as is by analysis. No interaction with the wall based on calculated displacements including seismic.	None
	Process sampling line has no automatic or powered isolation to isolate leak path.	Not acceptable as is.	Not acceptable as is. One of the following actions needs to be taken. 1. Radiological effect of leakage path should be evaluated. 2. Automatic/reliable powered isolation should be installed. 3. Manual isolation valve should be controlled closed administratively.
	Sampling line (1MSA1AB-3/4") in the steam tunnel is supported by a block wall on column line 13 before it penetrates through the concrete wall on row line R.	Acceptable as is. The block wall is found to be class I, seismically designed based on drawing No. A-91, Rev. AJ, note 4.	
Main Steam Pressure Sensing Line	Pressure sensing lines (1MS93AA/AB/AC/AD-1, 1MS68AB/BB-1 and 1MS69AB-1/2) penetrate the block wall where valves and pressure sensors are mounted on the other side.	Not acceptable as is.	Seismic adequacy of block walls has to be verified. Reinforcement or isolation method should be provided if necessary.

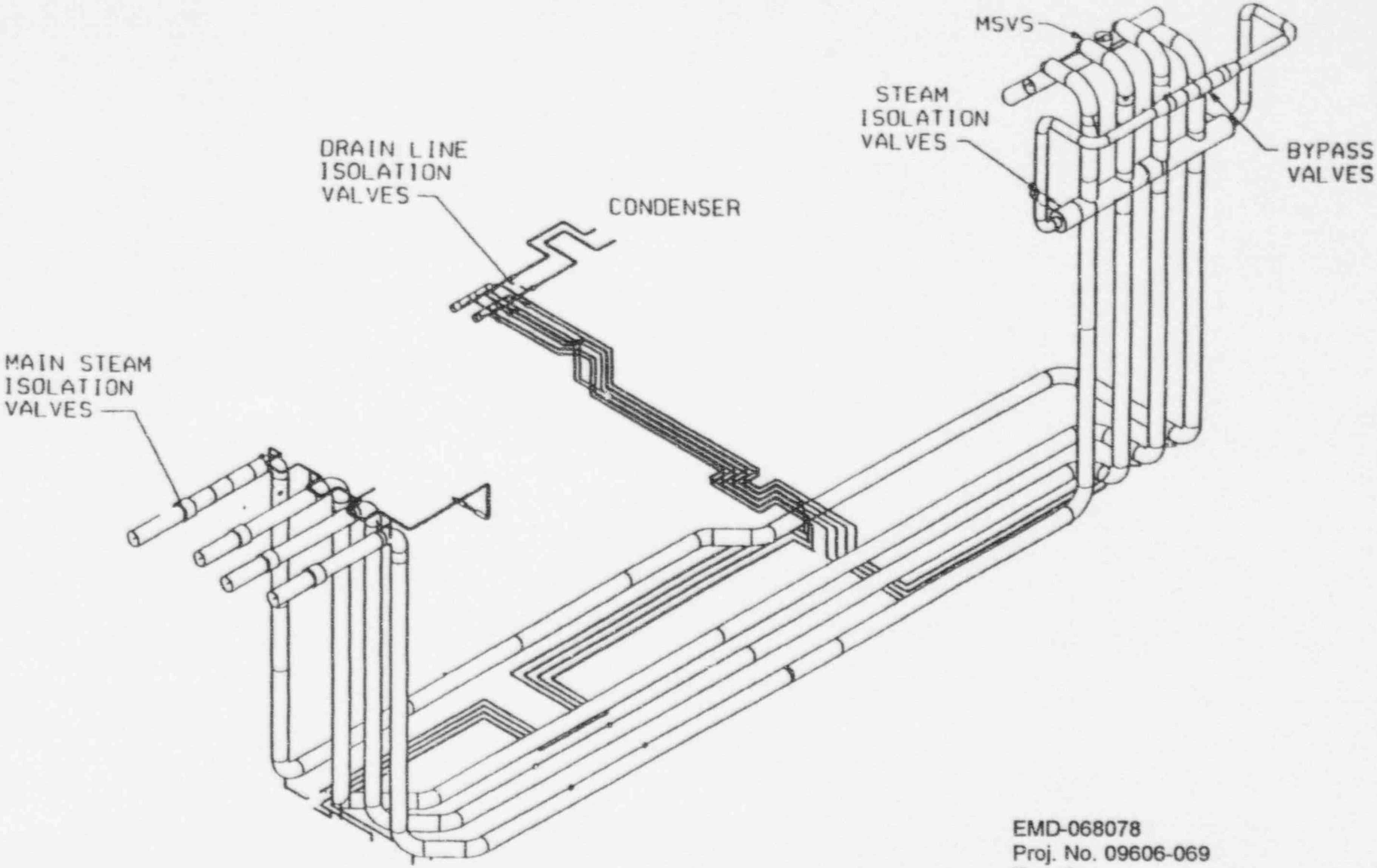
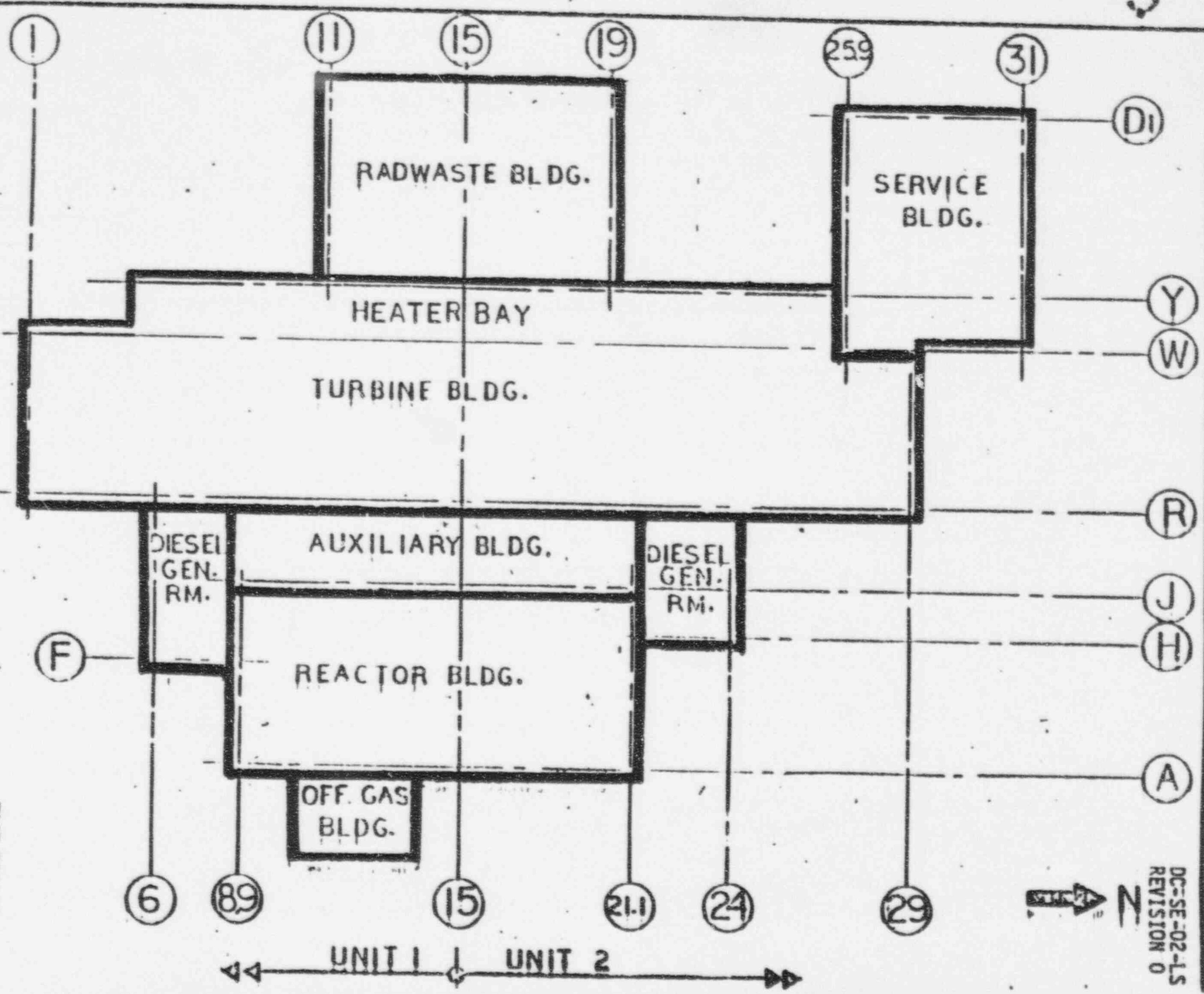


FIGURE 1: ISOMETRIC VIEW OF LEAKAGE CONTROL PATH

FIGURE 2 : KEY PLAN FOR LA SALLE COUNTY STATION

UNITS 1 AND 2



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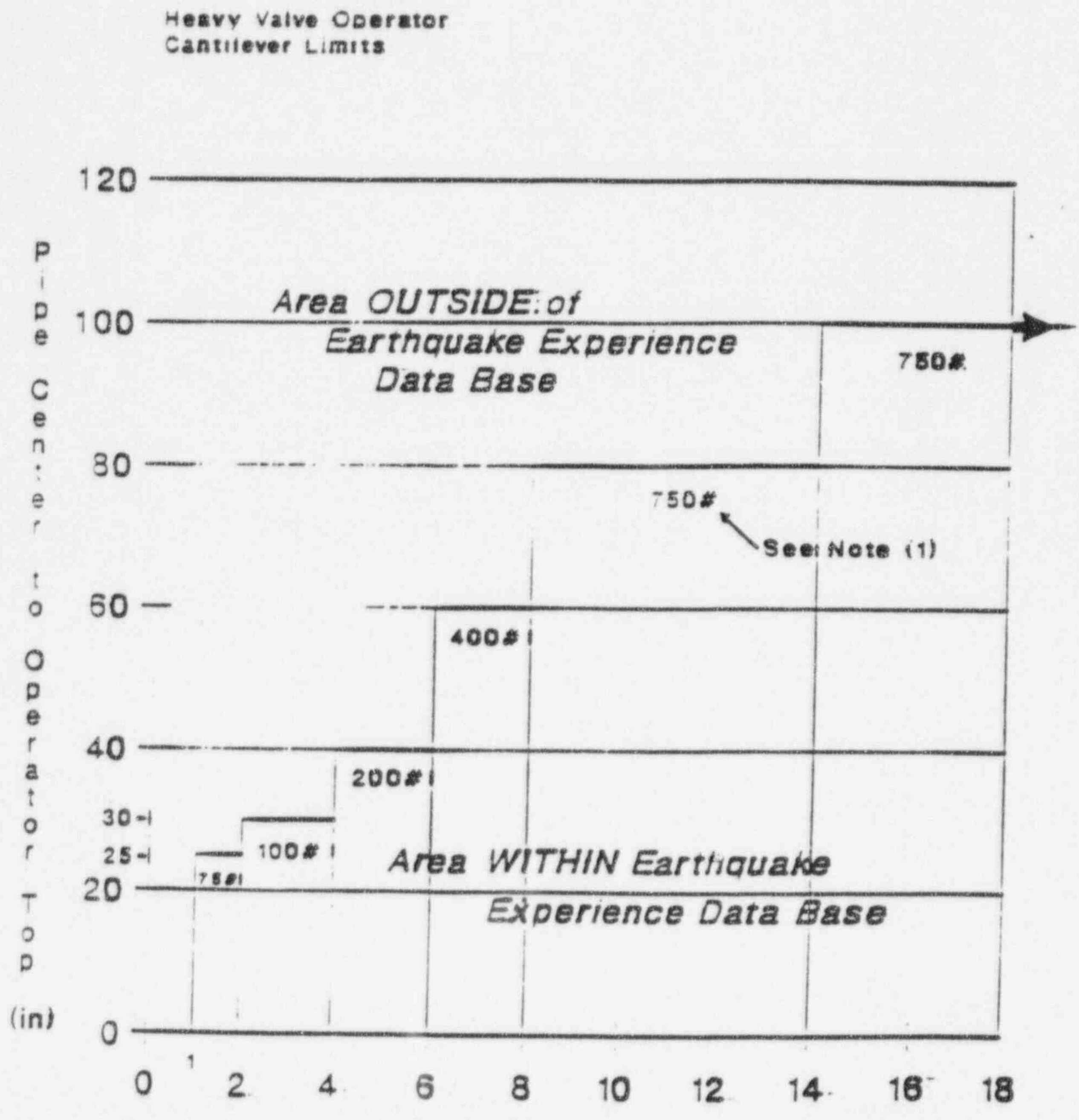

(1) Approximate Maximum Operator Weights Given for Various Ranges of Pipe Diameter

Figure 4: Valve Operator Cantilever Length Limits

ATTACHMENT H

SARGENT & LUNDY

SEISMIC WALKDOWN REPORT

FOR

LASALLE UNIT 1