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

Limerick Generating Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-39 and DPR-85
NRC Docket Nos. 50-352 and 50-353

Subject: Submittal of Relief Requests associated with the Fourth 10-Year Interval Inservice Inspection (ISI) Program

Attached for your review and approval are the proposed relief requests associated with the Fourth Inservice Inspection (ISI) Program for the Limerick Generating Station (LGS), Units 1 and 2. The Fourth ISI Program complies with the 2007 Edition through the 2008 Addenda of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code. LGS will be starting the Fourth 10-Year ISI interval on February 1, 2017.

Please note that all the attached relief requests were previously approved as part of the Third ISI Interval for LGS, Units 1 and 2, except for I4R-13.

There are no regulatory commitments contained in this letter. We request your approval by April 13, 2017.

Should you have any questions regarding this submittal, please contact Ms. Stephanie J. Hanson at (610) 765-5143.

Respectfully,

David P. Helker
Manager, Licensing and Regulatory Affairs
Exelon Generation Company, LLC

Attachment: Relief Requests

cc: USNRC Region I, Regional Administrator
USNRC Senior Resident Inspector, LGS
USNRC Project Manager, LGS
Director, Bureau of Radiation Protection – Pennsylvania Department of Environmental Protection

Attachment

Relief Requests Associated with the Fourth 10-Year Interval for Limerick Generating Station, Units 1 and 2

RELIEF REQUEST INDEX

Relief Request	Revision Date	Status	(Program) Description/ Approval Summary
I4R-01	0 02/05/16	Submitted	**(ISI)** Alternate Risk-Informed Selection and Examination Criteria for Examination Category B-F, B-J, C-F-1, and C-F-2 Pressure Retaining Piping Welds.
I4R-02	0 02/05/16	Submitted	**(ISI)** Use of BWRVIP Guidelines in Lieu of ASME Section XI Code Requirements on Reactor Pressure Vessel Internals and Components Inspection.
I4R-03	0 02/05/16	Not Submitted	**(ISI)** Exemption from Volumetric Examination of All Reactor Pressure Vessel Circumferential Welds. **Permanent relief was granted by NRC SER dated September 13, 1999 and thus applies to the balance of plant life.**
I4R-04		Reserved	
I4R-05	0 02/05/16	Submitted	**(System Pressure Testing (SPT))** Alternative Requirements for Pressure Testing the Drywell Pressure Instrumentation.
I4R-06	0 02/05/16	Submitted	**(SPT)** Alternative Requirements for Pressure Testing the Suppression Pool Pressure and Level Instrumentation.
I4R-07	0 02/05/16	Submitted	**(SPT)** Alternative Requirements for Pressure Testing the Hydrogen Recombiner and Combustible Gas Analyzer.
I4R-08	0 02/05/16	Submitted	**(SPT)** Alternative Requirements for Pressure Testing the Containment Atmospheric Control Penetration Piping.
I4R-09	0 02/05/16	Submitted	**(SPT)** Alternative Requirements for Pressure Testing of the Primary Containment Instrument Gas Piping.
I4R-10	0 02/05/16	Submitted	**(ISI)** Alternative Requirements for Nozzle-to-Vessel Weld and Inner Radii Examination Requirements.
I4R-11	0 02/05/16	Submitted	**(ISI)** Use of ASME Code Case N-789, Alternative Requirements for Pad Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping for Raw Water Service.
I4R-12	0 02/05/16	Submitted	**(ISI)** Use of ASME Code Case N-786, Alternative Requirements for Sleeve Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping.

RELIEF REQUEST INDEX

Relief Request	Revision Date	Status	(Program) Description/ Approval Summary
I4R-13	0 02/05/16	Submitted	**(SPT)** Alternative Requirements for Pressure Testing the High Pressure Coolant Injection and Reactor Core Isolation Cooling Vacuum Breaker Exhaust Piping.

Request for Relief for Alternate Risk-Informed Selection and Examination Criteria for Examination Category B-F, B-J, C-F-1, and C-F-2 Pressure Retaining Piping Welds In Accordance with 10CFR50.55a(z)(1) Alternative Provides Acceptable Level of Quality and Safety

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1. ASME Code Component(s) Affected

Code Class:	1 and 2
Reference:	Table IWB-2500-1, Table IWC-2500-1
Examination Category:	B-F, B-J, C-F-1, and C-F-2
Item Number:	B5.10, B5.20, B9.11, B9.21, B9.31, B9.32, B9.40, C5.11, C5.51, and C5.81
Description:	Alternate Risk-Informed Selection and Examination Criteria for Examination Category B-F, B-J, C-F-1, and C-F-2 Pressure Retaining Piping Welds
Component Number:	Unit 1 and Unit 2 Pressure Retaining Piping

2. Applicable Code Edition and Addenda

The Inservice Inspection (ISI) program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2007 Edition through the 2008 Addenda.

3. Applicable Code Requirement

Table IWB-2500-1, Examination Category B-F, requires volumetric and surface examinations on all welds for Item Number B5.10 and surface examinations on all welds for Item Number B5.20.

Table IWB-2500-1, Examination Category B-J, requires volumetric and surface examinations on a sample of welds for Item Numbers B9.11and B9.31, and surface examinations on a sample of welds for Item Numbers B9.21, B9.32, and B9.40. The weld population selected for inspection includes the following:

1. All terminal ends in each pipe or branch run connected to vessels.

2. All terminal ends and joints in each pipe or branch run connected to other components where the stress levels exceed either of the following limits under loads associated with specific seismic events and operational conditions:

    a. primary plus secondary stress intensity range of $2.4S_m$ for ferritic steel and austenitic steel.

    b. cumulative usage factor U of 0.4.

3. All dissimilar metal welds not covered under Examination Category B-F.

4. Additional piping welds so that the total number of circumferential butt welds (or branch connection or socket welds) selected for examination equals 25% of the circumferential butt welds (or branch connection or socket welds) in the reactor coolant piping system. This total does not include welds exempted by IWB-1220. These additional welds may be located as follows (for BWR plants):

a. One reactor coolant recirculation loop (where a loop or run branches, only one branch)
b. One branch run representative of an essentially symmetric piping configuration among each group of branch runs that are connected to a loop and that perform similar system functions
c. One steam line run representative of an essentially symmetric piping configuration among the runs
d. One feedwater line run representative of an essentially symmetric piping configuration among the runs (where a loop or run branches, only one branch)
e. Each piping and branch exclusive of the categories of loops and runs that are part of the system piping of (a) through (d) above

Table IWC-2500-1, Examination Categories C-F-1 and C-F-2 require volumetric and surface examinations on a sample of welds for Item Numbers C5.11 and C5.51, and surface examinations on a sample of welds for Item Number C5.81. The weld population selected for inspection includes the following:

1. The welds selected for examination shall include 7.5%, but not less than 28 welds, of all dissimilar metal, austenitic stainless steel or high alloy welds (Examination Category C-F-1) or of all carbon and low alloy steel welds (Examination Category C-F-2) not exempted by IWC-1220. (Some welds not exempted by IWC-1220 are not required to be nondestructively examined per Examination Categories C-F-1 and C-F-2. These welds, however, shall be included in the total weld count to which the 7.5% sampling rate is applied.) The examinations shall be distributed as follows:

   a. The examinations shall be distributed among the Class 2 systems prorated, to the degree practicable, on the number of nonexempt dissimilar metal, austenitic stainless steel and high alloy welds (Examination Category C-F-1) or carbon and low alloy welds (Examination Category C-F-2) in each system;

   b. Within a system, the examinations shall be distributed among terminal ends, dissimilar metal welds, and structural discontinuities prorated, to the degree practicable, on the number of nonexempt terminal ends, dissimilar metal welds, and structural discontinuities in the system; and

   c. Within each system, examinations shall be distributed between line sizes prorated to the degree practicable.

4. <u>Reason for Request</u>

Pursuant to 10CFR50.55a(z)(1), relief is requested on the basis that the proposed alternative utilizing Topical Report (TR) 112657 Rev. B-A (Reference 1) along with two enhancements from ASME Code Case N-578-1 (Reference 4) will provide an acceptable level of quality and safety.

As stated in “Safety Evaluation Report Related to EPRI Risk-Informed Inservice Inspection Evaluation Procedure (EPRI TR-112657, Revision B, July 1999)” (Reference 2):

> “The staff concludes that the proposed RI-ISI program as described in EPRI TR-112657, Revision B, is a sound technical approach and will provide an acceptable level of quality and safety pursuant to 10CFR50.55a for the proposed alternative to the piping ISI requirements with regard to the number of locations, locations of inspections, and methods of inspection.”

The initial Limerick Generating Station Risk-Informed Inservice Inspection (RI-ISI) Program was submitted during the Second Period of the Second ISI Interval for Unit 1 and during the First Period of the Second Interval for Unit 2. This initial RI-ISI program was developed in accordance with EPRI TR-112657, Revision B-A, as supplemented by ASME Code Case N-578-1. The initial program was approved for use by the Nuclear Regulatory Commission (NRC) via a Safety Evaluation as transmitted to Exelon Generation Company (EGC), LLC on March 3, 2003 (Reference 5).

The Limerick Generating Station RI-ISI Program was resubmitted using the same approach during the Third ISI Interval for both Units 1 and 2. The program was approved for use by the NRC via Safety Evaluation as transmitted to EGC on March 11, 2008 (Reference 6).

The transition from the 2001 Edition through the 2003 Addenda to the 2007 Edition through the 2008 Addenda of ASME Section XI for Limerick Generating Station's Fourth ISI Interval does not impact the currently approved RI-ISI evaluation methods and process used in the Third ISI Interval, and the requirements of the new Code Edition/Addenda will be implemented as detailed in the Limerick Generating Station ISI Program Plan. Therefore, with the exception of specific weld locations that may have changed due to maintenance or modification activities (e.g., Fukushima FLEX modification, etc), the proposed alternative RI-ISI Program for the Fourth ISI Interval is the same program methodology as approved in Reference 6 for the Third ISI Interval.

The Risk Impact Assessment completed as part of the original baseline RI-ISI Program was an implementation/transition check on the initial impact of converting from a traditional ASME Section XI program to the new RI-ISI methodology. For the Fourth Interval ISI update, there is no transition occurring between two different methodologies, but rather, the previously approved RI-ISI methodology and evaluation will be maintained for the new interval. The original methodology of the evaluation has not changed, and the change in risk was simply re-assessed using the initial 1989 Edition, No Addenda ASME Section XI Program prior to RI-ISI and the new element selection for the Fourth ISI Interval RI-ISI Program. This same process has been maintained in each revision to the Limerick Generating Station RI-ISI assessment that has been performed to date.

The actual "evaluation and ranking" procedure including the Consequence Evaluation and Degradation Mechanism Assessment processes of the currently approved (Reference 6) RI-ISI Program remain unchanged and are continually applied to maintain the Risk Categorization and Element Selection methods of EPRI TR-112657, Revision B-A. These portions of the RI-ISI Program have been and will continue to be reevaluated and revised as major revisions of the site Probabilistic Risk Assessment (PRA) occur and modifications to plant configuration are made. The Consequence Evaluation, Degradation Mechanism Assessment, Risk Ranking, Element Selection, and Risk Impact Assessment steps encompass the complete *living program* process applied under the Limerick Generating Station RI-ISI Program.

5. <u>Proposed Alternative and Basis for Use</u>

The proposed alternative originally implemented in the "Risk Informed Inservice Inspection Plan, Limerick Generating Station Units 1 and 2" (Reference 3), along with the two enhancements noted below, provide an acceptable level of quality and safety as required by 10CFR50.55a(z)(1). This same program, along with these enhancements, was resubmitted and is currently approved for Limerick Generating Station's Third ISI Interval as documented in Reference 6.

The Fourth Interval RI-ISI Program will be a continuation of the current application and will continue to be a living program as described in the "Reason For Request" section of this relief

request. No changes to the evaluation methodology as currently implemented under EPRI TR-112657, Revision B-A, are required as part of this interval update. The following two enhancements will continue to be implemented.

a. In lieu of the evaluation and sample expansion requirements in Section 3.6.6.2, "RI-ISI Selected Examinations" of EPRI TR-112657, Limerick Generating Station will utilize the requirements of Paragraph-2430, "Additional Examinations" contained in ASME Code Case N-578-1 (Reference 4). The alternative criteria for additional examinations contained in ASME Code Case N-578-1 provides a more refined methodology for implementing necessary additional examinations. The reason for this selection is that the guidance discussed in EPRI TR-112657 includes requirements for additional examinations at a high level, based on service conditions, degradation mechanisms, and the performance of evaluations to determine the scope of additional examinations, whereas ASME Code Case N-578-1 provides more specific and clearer guidance regarding the requirements for additional examinations that is structured similar to the guidance provided in ASME Section XI, IWB-2430 and IWC-2430. Additionally, similar to the current requirements of ASME Section XI, Limerick Generating Station intends to perform additional examinations that are required due to the identification of flaws or relevant conditions exceeding the acceptance standards, during the outage the flaws are identified.

b. To supplement the requirements listed in Table 4-1, "Summary of Degradation-Specific Inspection Requirements and Examination Methods" of EPRI TR-112657, Limerick Generating Station will utilize the provisions listed in Table 1, Examination Category R-A, "Risk-Informed Piping Examinations" contained in ASME Code Case N-578-1 (Reference 4). To implement Note 10 of this table, paragraphs and figures from the 2007 Edition through the 2008 Addenda of ASME Section XI (Limerick Generating Station's Code of Record for the Fourth ISI Interval) will be utilized which parallel those referenced in the Code Case. Table 1 of ASME Code Case N-578-1 will be used as it provides a detailed breakdown for "Examination Method" and "Categorization of Parts to be Examined." Based on these Methods and Categorization, the examination figures specified in Section 4 of EPRI TR-112657 will then be used to determine the examination volume/area based on the degradation mechanism and component configuration. For elements not subject to a degradation mechanism, Note 1 to Table 1 of ASME Code Case N-578-1 will be applied using the expanded examination volume.

The Limerick Generating Station RI-ISI Program, as developed in accordance with EPRI TR-112657, Rev. B-A (Reference 1), requires that 25% of the elements that are categorized as "High" risk (i.e., Risk Category 1, 2, and 3) and 10% of the elements that are categorized as "Medium" risk (i.e., Risk Categories 4 and 5) be selected for inspection. For this application, the guidance for the examination volume for a given degradation mechanism is provided by the EPRI TR-112657 while the guidance for the examination method and categorization of parts to be examined are provided by the EPRI TR-112657 as supplemented by ASME Code Case N-578-1.

For NRC staff consideration in the evaluation of this alternative RI-ISI Program, Attachment 1, "Limerick Generating Station 2014 PRA (LG113A/LG213A) Technical Capability Assessment for Risk-Informed Inservice Inspection", to this relief request contains a summary of the Regulatory Guide 1.200, Revision 2 (Reference 7), evaluation performed on the Limerick Generating Station LG-PRA-014, PRA models LG113A and LG213A, Quantification Notebook (Reference 8), and the impact of the identified gaps on the technical adequacy of the Limerick Generating Station PRA Model to support this RI-ISI application (see Attachment 1, Table 1).

In addition to this risk-informed evaluation, selection, and examination procedure, all ASME Section XI piping components, regardless of risk classification, will continue to receive Code-required system pressure testing as part of the current ASME Section XI Program. VT-2 visual examinations are scheduled in accordance with the Limerick Generating Station System Pressure Testing program, which remains unaffected by the RI-ISI Program.

6. Duration of Proposed Alternative

Relief is requested for the Fourth Ten-Year ISI Interval for Limerick Generating Station Units 1 and 2.

7. Precedents

Limerick Generating Station Units 1 and 2 Third ISI Interval Relief Request I3R-02 was authorized by NRC Safety Evaluation (SE) dated March 11, 2008. The Fourth ISI Interval Relief Request utilizes an identical RI-ISI methodology that was previously approved.

Relief Request I5R-02 was authorized for Dresden Station Units 2 and 3 by NRC SE dated September 30, 2013.

Relief Request I5R-02 was authorized for Quad Cities Units 1 and 2 by NRC SE dated September 30, 2013.

8. References

1. Electric Power Research Institute (EPRI) Topical Report (TR) 112657 Rev. B-A, “Revised Risk-Informed Inservice Inspection Evaluation Procedure,” December 1999.
2. Letter from W. H. Bateman (NRC) to G. L. Vine (EPRI) “Safety Evaluation Report Related to EPRI Risk-Informed Inservice Inspection Evaluation Procedure (EPRI TR-112657, Revision B, July 1999),” dated October 28, 1999.
3. Initial “Risk-Informed Inservice Inspection Evaluation - Limerick Generating Station Units 1 and 2,” dated March 2002.
4. American Society of Mechanical Engineers (ASME) Code Case N-578-1, “Risk-Informed Requirements for Class 1, 2, or 3 Piping, Method B, Section XI, Division 1.”
5. Letter from James W. Clifford (NRC) to John L. Skolds (EGC) “Safety Evaluation of Second Interval Risk-Informed Inservice Inspection Program Relief Requests RR-32 and RR-12-9,” dated March 3, 2003. (ML030620491)
6. Safety Evaluation from Harold Chernoff (NRC) to Charles Pardee (EGC) for the approval of Relief Request I3R-02, “Limerick Generating Station, Units 1 and 2 - Evaluation of Relief Requests I3R-02, I3R-05, I3R-06, I3R-07, I3R-08, I3R-09, I3R-10, I3R-11, I3R-12, Associated with the Third Inservice Inspection Interval (TAC Nos. MD5200 and MD5201),” dated March 11, 2008. (ML080500584)
7. Regulatory Guide 1.200, Revision 2, “An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities,” dated March 2009. (ML090410014)
8. Limerick Generating Stations Probabilistic Risk Assessment Quantification Notebook, LG-PRA-014, Revision 3, January 2014.

ATTACHMENT 1
LIMERICK GENERATING STATION 2014 PRA (LG113A/LG213A) TECHNICAL CAPABILITY ASSESSMENT FOR RISK-INFORMED INSERVICE INSPECTION

Introduction

Exelon Generation Company (EGC) employs a multi-faceted approach to establishing and maintaining the technical adequacy and plant fidelity of the PRA models for all operating EGC nuclear generation sites. This approach includes both a proceduralized PRA maintenance and update process, and the use of self-assessments and independent peer reviews. The following information describes this approach as it applies to the Limerick PRA.

PRA Maintenance and Update

The EGC risk management process ensures that the applicable PRA model remains an accurate reflection of the as-built and as-operated plants. This process is defined in the EGC Risk Management program, which consists of a governing procedure (ER-AA-600, "Risk Management") and subordinate implementation procedures. EGC procedure ER-AA-600-1015, "FPIE PRA Model Update" delineates the responsibilities and guidelines for updating the full power internal events PRA models at all operating EGC nuclear generation sites. The overall EGC Risk Management Program, including ER-AA-600-1015, defines the process for implementing regularly scheduled and interim PRA model updates, for tracking issues identified as potentially affecting the PRA models (e.g., due to changes in the plant, errors or limitations identified in the model, industry operating experience), and for controlling the model and associated computer files. To ensure that the current PRA model remains an accurate reflection of the as-built, as-operated plants, the following activities are routinely performed:

- Design changes and procedure changes are reviewed for their impact on the PRA model.
- New engineering calculations and revisions to existing calculations are reviewed for their impact on the PRA model.
- Maintenance unavailabilities are captured, and their impact on CDF is trended.
- Plant specific initiating event frequencies, failure rates, and maintenance unavailabilities for equipment that can have a significant impact on the PRA model are updated approximately every four years.

In addition to these activities, EGC risk management procedures provide the guidance for particular risk management and PRA quality and maintenance activities. This guidance includes:

- Documentation of the PRA model, PRA products, and bases documents.
- The approach for controlling electronic storage of Risk Management (RM) products including PRA update information, PRA models, and PRA applications.
- Guidelines for updating the full power, internal events PRA models for EGC nuclear generation sites.
- Guidance for use of quantitative and qualitative risk models in support of the On-Line Work Control Process Program for risk evaluations for maintenance tasks (corrective maintenance, preventive maintenance, minor maintenance, surveillance tests and modifications) on systems, structures, and components (SSCs) within the scope of the Maintenance Rule (10CFR50.65(a)(4)).

In accordance with this guidance, regularly scheduled PRA model updates nominally occur on an approximately 4-year cycle; longer intervals may be justified if it can be shown that the PRA continues to adequately represent the as-built, as-operated plant.

ATTACHMENT 1
LIMERICK GENERATING STATION 2014 PRA (LG113A/LG213A) TECHNICAL CAPABILITY ASSESSMENT FOR RISK-INFORMED INSERVICE INSPECTION

The most recent update of the Limerick PRA model (designated the LG113A and LG213A models) (Reference 6) was completed in January 2014 as a result of a regularly scheduled update to the previous LG108A and LG208A PRA models (Reference 8). The LG113A and LG213A models are the most recent evaluation of the risk profile at Limerick for internal event challenges, including internal flooding. The Limerick PRA modeling is highly detailed, including a wide variety of initiating events, modeled systems, operator actions, and common cause events. The PRA model quantification process used for the Limerick PRA is based on the event tree / fault tree methodology, which is a well-known methodology in the industry.

PRA Peer Review

Several assessments of technical capability have been made, and continue to be planned for the Limerick PRA model. A chronological list of the assessments performed includes the following:

- The Limerick PRA was subjected to a formal industry peer review in November 1998. The model was updated in 2001 to address all of the significant findings from this review.
- Following that update, Limerick was one of the five nuclear plants that piloted an application of Regulatory Guide (RG) 1.200. A site PRA gap analysis that compared the LGS PRA to the requirements of the NRC-endorsed ASME PRA Standard was completed in 2003 in support of the LGS pilot for Risk-Informed activities.
- The Limerick PRA model was subject to a Nuclear Regulatory Commission (NRC) RG 1.200 pilot assessment in July 2004.
- After the completion of the PRA model update in 2005, the 2004B version of the model was Peer Reviewed in October 2005 for internal events (Reference 7). That peer review of the Limerick PRA was against the requirements of the American Society of Mechanical Engineers (ASME)/American Nuclear Society (ANS) PRA standard (Reference 1) and any Clarifications and Qualifications provided in the NRC endorsement of the Standard contained in Revision 0 to RG 1.200 (Reference 12).
    - Of the 315 internal events (non-IF) supporting requirements reviewed
        - 254 were considered Met
            - 252 at Capability Category I/II or greater
            - 2 at Capability Category I
        - 54 were considered N/A
        - 7 were considered Not Met

According to EPRI TR-1021467-A (Reference 9), the two that meet Capability Category I are either sufficient for RISI or have been resolved in subsequent FPIE PRA Updates.

The seven Not-Met include the following items with a synopsis of the peer review finding:

- System Analysis
    - Include those failures that can cause flow diversion pathways that result in failure to meet the system success criteria.
- Data Analysis
    - Document and employ the methodology used for determining the standby component number of demands to include plant specific:

        - surveillance tests
        - maintenance acts
        - surveillance tests or maintenance on other components
        - operational demands
    - Base the number of tests, maintenance activities, and unplanned maintenance on actual plant experience.

- Quantification
    - Use min-cut upper bound or an exact solution. The rare event approximation may be used when basic event probabilities are below 0.1.Include those failures that can cause flow diversion pathways that result in failure to meet the system success criteria.
    - Set logic flags to either TRUE or FALSE (instead of setting the event probabilities to 1.0 or 0.0), as appropriate for each accident sequence, prior to the generation of cut sets.
    - Document limitations in the quantification process that would impact applications.
    - Document the quantitative definition used for significant basic event, significant cutset, and significant accident sequence.

- The PRA model was peer reviewed in May 2008 for internal flooding (Reference 10). That peer review of the Limerick PRA was against the requirements of the American Society of Mechanical Engineers (ASME)/American Nuclear Society (ANS) PRA standard (Reference 11) and any Clarifications and Qualifications provided in the NRC endorsement of the Standard contained in Revision 1 to RG 1.200 (Reference 13).
    - Of the 54 IF supporting requirements reviewed
        - 40 were considered Met
            - 38 at Capability Category I/II or greater
            - 2 at Capability Category I
        - 4 were considered N/A
        - 10 were considered Not Met

According to EPRI TR-1021467-A (Reference 9), one of the two that meet Capability Category I are sufficient for RISI (IF-C3b). See Table 1 for a synopsis and disposition of the other supporting requirement that meets Capability Category I but required to meet II/III (IF-D5a) and those supporting requirements that were considered to be Not Met by the peer review team.

The Peer Review findings, including both those items Not Met as well as those that meet Capability Category I, have negligible impact on the RISI analysis. Most of the findings relate to missing documentation rather than shortcomings in the PRA analysis.

A summary of this assessment of the current peer review Not Met and Capability Category I SRs relative to the RI-ISI relief request is provided in Table 1. Most of the Peer Review Not-Met and Capability Category I SRs have been resolved during subsequent FPIE and IF PRA model updates since the Peer Reviews. Any unaddressed gaps will be reviewed for consideration during the next Limerick model update (anticipated to be 2017) but are judged to have low impact on the PRA model or its ability to support a full range of PRA applications. These items are documented in the PRA URE database so that they can be tracked and their potential impacts accounted for in applications where appropriate. In addition, plant changes made since the last PRA update have been reviewed and determined to not have a significant PRA impact. These items are also documented in UREs for consideration in future PRA updates, as appropriate.

ATTACHMENT 1
LIMERICK GENERATING STATION 2014 PRA (LG113A/LG213A) TECHNICAL CAPABILITY ASSESSMENT FOR RISK-INFORMED INSERVICE INSPECTION

Guidance from EPRI Report on PRA Technical Adequacy for RI-ISI

EPRI report TR-1021467-A (Reference 9) provides guidance on the PRA Standard Capability Category necessary to support RI-ISI. This report received a Safety Evaluation (SE) from the NRC in January 2012. Reg. Guide 1.200 considers it a good practice to have, in general, SRs meet Capability Category II for applications. However, according to the EPRI report not all SRs require Capability Category II to adequately support RI-ISI applications. According to the EPRI report some of the Limerick gaps listed in Table 1 do not require Capability Category II, but instead only require Capability Category I, the most basic level. Therefore according to EPRI TR-1021467-A and the associated NRC SE, the Limerick PRA models LG113A and LG213A are adequate for use in the RI-ISI application.

General Conclusion Regarding PRA Capability

The Limerick PRA maintenance and update processes and technical capability evaluations described above provide a robust basis for concluding that the PRA is suitable for use in RI-ISI applications. As specific risk-informed PRA applications are performed, remaining gaps to specific requirements in the PRA standard will be reviewed to determine which, if any, would merit application-specific sensitivity studies in the presentation of the application results.

Conclusion Regarding PRA Capability for Risk-Informed ISI

The Limerick PRA model continues to be suitable for use in the risk-informed inservice inspection application. This conclusion is based on:

- PRA maintenance and update processes in place,
- PRA technical capability evaluations that have been performed and are being planned, and
- RI-ISI process considerations, as noted above, that demonstrate the relatively limited sensitivity of the EPRI RI-ISI process to PRA attribute capability beyond ASME PRA Standard Capability Category I.

In support of the PRA analyses for the Limerick 10-year interval evaluation using the LG113A and LG213A PRA models, the remaining gaps to the PRA standard have been reviewed to determine which, if any, would merit RI-ISI-specific sensitivity studies in the presentation of the application results. The result of this assessment concluded that no additional sensitivity studies are merited.

References

1. ASME/American Nuclear Society, “Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications,” ASME/ANS RA-S-2002, April 2002.
2. An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment results for Risk-Informed Activities, Regulatory Guide 1.200, U.S. Nuclear Regulatory Commission, March 2009, Revision 2.
3. U.S. Nuclear Regulatory Commission, *An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis*, Regulatory Guide 1.174, Revision 1, November 2002.
4. Reactor Oversight Program MSPI Bases Document, Limerick Generating Station, Revision 5, June 2014.
5. *Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed Inservice Inspection Programs*, EPRI TR-1021467-A, June 2012.

6. LG-PRA-014, Rev. 3, Limerick Generating Station Probabilistic Risk Assessment Quantification Notebook, January 2014.
7. Limerick Generating Station PRA Peer Review Report Using ASME PRA Standard Requirements, November 2005.
8. LG-PRA-014, Rev. 2, Limerick Generating Station Probabilistic Risk Assessment Quantification Notebook, September 2009.
9. Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed Inservice Inspection Programs, EPRI TR-1021467-A, June 2012.
10. Limerick Generating Station Internal Flood PRA Peer Review Report Using ASME PRA Standard Requirements, May 2008.
11. ASME/American Nuclear Society, "Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications," ASME/ANS RA-Sc-2007, August 2007.
12. An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment results for Risk-Informed Activities, Regulatory Guide 1.200, U.S. Nuclear Regulatory Commission, February 2004, Revision 0.
13. An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment results for Risk-Informed Activities, Regulatory Guide 1.200, U.S. Nuclear Regulatory Commission, January 2007, Revision 1.
14. ASME/American Nuclear Society, "Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications," ASME/ANS RA-Sa-2009, March 2009.
15. LG-PRA-013, Rev. 3, Limerick Generating Station Probabilistic Risk Assessment Summary Notebook, January 2014.

ATTACHMENT 1
LIMERICK GENERATING STATION 2014 PRA (LG113A/LG213A) TECHNICAL CAPABILITY ASSESSMENT FOR RISK-INFORMED INSERVICE INSPECTION

Table 1
Limerick Not Met and Capability Category I Supporting Requirements

Supporting Requirement (Note 1)	Capability Category	Risk-Informed ISI Evaluation Impact	EPRI TR-1021467 Requirement
IE-A9 (IE-A7)	CC I	CC I is sufficient for this RI-ISI application. This SR addresses review of plant-specific precursors to determine if potential initiating events are missing from the PRA. The components being evaluated here do not have an impact on the modeled Initiating Events. CC I is acceptable for RI-ISI applications. This SR was addressed in the 2013 Update (URE LG2006-010). Appendix D was added to the IE Notebook documenting a review of the Limerick LERs in order to determine if there are other initiating events that have not been identified previously.	CC I
SY-A13 (SY-A12b)	Not Met	This SR was addressed in the 2013 PRA Update (see UREs LG2006-053, LG2006-054, and LG2006-055). This SR suggests including those failures that can cause flow diversion pathways that result in failure to meet the system success criteria. Diversion paths were considered in the development of all of the system logic models. As a result of the multiple spurious operation analysis, potential diversion paths stemming from multiple valve failures have been added to the model. These failure combinations will likely truncate out of the FPIE PRA cutsets but are potentially important in the Fire PRA analysis.	CC I/II/III

ATTACHMENT 1
LIMERICK GENERATING STATION 2014 PRA (LG113A/LG213A) TECHNICAL CAPABILITY ASSESSMENT FOR RISK-INFORMED INSERVICE INSPECTION

Table 1
Limerick Not Met and Capability Category I Supporting Requirements

Supporting Requirement (Note 1)	Capability Category	Risk-Informed ISI Evaluation Impact	EPRI TR-1021467 Requirement
DA-C6	Not Met	This SR was addressed in the 2013 PRA Update (see URE LG2006-074). This SR suggests documenting and employ the methodology used for determining the standby component number of demands to include plant specific: • surveillance tests • maintenance acts • surveillance tests or maintenance on other components • operational demands The Data Notebook has been updated to clearly identify the MSPI as the primary data source for demands, runtime, etc, with the Maintenance rule providing functional failure data. The results of the MSPI and Maintenance Rule data collection was confirmed with system engineer interviews. See Appendix B of the Data Notebook for details of the discussions held with the system managers. These SRs are associated with the counting of failures and demands in the development of failure probabilities. Having failed to collapse failures and demands from a single post-maintenance event results in higher (more conservative) component failure rates. Thus the impact on the risk-informed consequence analysis is also conservative and acceptable.	CC I/II/III

ATTACHMENT 1
LIMERICK GENERATING STATION 2014 PRA (LG113A/LG213A) TECHNICAL CAPABILITY ASSESSMENT FOR RISK-INFORMED INSERVICE INSPECTION

Table 1
Limerick Not Met and Capability Category I Supporting Requirements

Supporting Requirement (Note 1)	Capability Category	Risk-Informed ISI Evaluation Impact	EPRI TR-1021467 Requirement
DA-C7	Not Met	This SR was addressed in the 2013 PRA Update (see URE LG2006-076). This SR suggests to base the number of tests, maintenance activities, and unplanned maintenance on actual plant experience. During the 2013 PRA Update system manager interviews, system unavailability was discussed with the respective system manager. The change in the UA value in comparison to the previous update (2008 PRA Update) was discussed. During this discussion, reasons for the UA values increasing or decreasing were provided. These notes are documented in Appendix H of the Data Notebook Volume 1.	CC I
IF-B3	Not Met	This SR was addressed in the 2013 PRA Update (see UREs LG2008-016 and LG2008-017). During the 2013 FPIE PRA Update, system volumes for these water sources are provided in Appendix B, Table B.2.3 of the Internal Flooding Notebook. Makeup to these systems was not deemed a significant source to flooding scenarios. Additionally, lood source temperatures and pressures were added to Table B.2-3 in Appendix B.	RI-ISI traditional analysis does not depend on the internal flooding analysis.
IF-C2b	Not Met	This SR was addressed in the 2013 PRA Update (see URE LG2008-021). In general, floor drains were not credited to conservatively estimate the time available for operator intervention. Appendix E provides a 60,000 gallon drain capacity for a flood scenario involving RB-FL09.	RI-ISI traditional analysis does not depend on the internal flooding analysis.

ATTACHMENT 1
LIMERICK GENERATING STATION 2014 PRA (LG113A/LG213A) TECHNICAL CAPABILITY ASSESSMENT FOR RISK-INFORMED INSERVICE INSPECTION

Table 1
Limerick Not Met and Capability Category I Supporting Requirements

Supporting Requirement (Note 1)	Capability Category	Risk-Informed ISI Evaluation Impact	EPRI TR-1021467 Requirement
IF-C3	Not Met	This SR was addressed as a part of the 2013 PRA Update (see URE LG2008-022). As a part of the 2013 FPIE PRA Update, pipe whip effects were investigated and shown to not be a concern for piping containing moderate energy water sources. Jet impingement effects were also shown to not be a concern for piping encapsulated by aluminum lagging. Although the explicit consideration of these failure mechanisms might ultimately introduce a few additional scenarios, the approach which initially utilizes bounding assumptions regarding the failure of all equipment in the flood area for the initial CCDP determination would tend to overshadow the potential risk increase associated with these low likelihood events.	RI-ISI traditional analysis does not depend on the internal flooding analysis.

ATTACHMENT 1
LIMERICK GENERATING STATION 2014 PRA (LG113A/LG213A) TECHNICAL CAPABILITY ASSESSMENT FOR RISK-INFORMED INSERVICE INSPECTION

Table 1
Limerick Not Met and Capability Category I Supporting Requirements

Supporting Requirement (Note 1)	Capability Category	Risk-Informed ISI Evaluation Impact	EPRI TR-1021467 Requirement
IF-C3b	CC I	This SR was addressed as a part of the 2013 Update (see UREs LG2008-023, LG2008-024, and LG2008-025). As a part of the 2013 PRA Update, the following observations were identified. There was no backflow through floor drains identified for any of the Limerick internal flood scenarios. Backflow through floor drains as discussed in Section 2.2.11 of the IF Notebook. Appendix D, section 2.5 discusses the presence of flood sources in HVAC ductwork. There were no flood sources or water located within the ventilation ductwork at Limerick that would pose a threat to any PRA equipment. Propagation pathways were investigated using plant drawings, with propagation flow path diagrams being generated and placed into Appendix D for each flood area. EDG room flooding events were judged to propagate into the corridor and then outside instead of between rooms through electrical penetrations. Flood barrier unavailability is controlled at the site, and would at most lead to short time frames where additional potential flood scenarios would exist. The short time frames involved ensure that these would be small or negligible risk contributors. Although the consideration of back flow through drains and electrical penetrations might lead to the identification of a few new flood scenarios, the added time associated with flood propagation through these mechanisms before additional equipment is failed would lead to small or negligible risk contributors.	RI-ISI traditional analysis does not depend on the internal flooding analysis.

ATTACHMENT 1
LIMERICK GENERATING STATION 2014 PRA (LG113A/LG213A) TECHNICAL CAPABILITY ASSESSMENT FOR RISK-INFORMED INSERVICE INSPECTION

Table 1
Limerick Not Met and Capability Category I Supporting Requirements

Supporting Requirement (Note 1)	Capability Category	Risk-Informed ISI Evaluation Impact	EPRI TR-1021467 Requirement
IF-D1	Not Met	This SR was addressed in 2008 update. Revision 1 of the flooding report re-established the appropriate initiating events for each scenario. The updated version was integrated in to the LG108A and LG208A models.	RI-ISI traditional analysis does not depend on the internal flooding analysis.
IF-D5a	CC I	The Limerick traditional (code case N-578) RI-ISI analysis does not depend on the internal flooding analysis initiating events. The risk-informed analysis instead makes use of non-flooding internal events initiators. Minimal impact. As noted by the peer reviewer, it is not expected that a revised assessment would appreciably change the overall pipe failure frequencies.	RI-ISI traditional analysis does not depend on the internal flooding analysis.
IF-E1	Not Met	This SR was addressed in 2008 update. Revision 1 of the flooding report ensured that the major flood sources were not credited in the subsequent accident progression modeling. The updated version was integrated into the LG108A and LG208A models.	RI-ISI traditional analysis does not depend on the internal flooding analysis.
IF-E5a	Not Met	This SR was addressed as a part of the 2013 Update (see URE LG2008-033). Previously, supporting detailed HEP evaluations were developed for the major flood contributors. As part of the 2013 update, an analysis on the dependencies between the FPIE and Internal Flood actions and related scenarios was added to Appendix G of the LGS HRA Notebook.	RI-ISI traditional analysis does not depend on the internal flooding analysis.
IF-E6	Not Met	This SR was addressed in 2008 update. The updated analysis was integrated in to the LG108A and LG208A models that include an evaluation of LERF.	RI-ISI traditional analysis does not depend on the internal flooding analysis.

ATTACHMENT 1
LIMERICK GENERATING STATION 2014 PRA (LG113A/LG213A) TECHNICAL CAPABILITY ASSESSMENT FOR RISK-INFORMED INSERVICE INSPECTION

Table 1
Limerick Not Met and Capability Category I Supporting Requirements

Supporting Requirement (Note 1)	Capability Category	Risk-Informed ISI Evaluation Impact	EPRI TR-1021467 Requirement
IF-E7	Not Met	This SR was addressed in 2008 update. The updated analysis was integrated in to the LG108A and LG208A models that include a specific evaluation of LERF including all of the impacts from the flood scenarios.	RI-ISI traditional analysis does not depend on the internal flooding analysis.
QU-B4	Not Met	This SR was addressed in the 2008 update with the conversion to the use of the CAFTA software. This SR suggests use of the min-cut upper bound or an exact solution. The rare event approximation may be used when basic event probabilities are below 0.1.	CC I/II/III
QU-B9 (QU-B8)	Not Met	This SR was addressed in the 2008 update. This SR suggests setting logic flags to either TRUE or FALSE (instead of setting the event probabilities to 1.0 or 0.0), as appropriate for each accident sequence, prior to the generation of cut sets. All HEP values that were evaluated in detail and were determined to be 1.0 and other 1.0 value basic events are set to TRUE in the model.	CC I/II/III
QU-D4 (QU-D3)	CC I	This SR was addressed in the 2008 update. This SR suggests comparing results to those from similar plants. A detailed comparison to other Exelon BWRs is included in section 4.6 of the Summary Notebook (Reference 15). Additional, the quantification notebook does provide comparison to a typical BWR to explain plusses and minuses of the Limerick features with respect to the calculated CDF and LERF values.	CC I/II/III

ATTACHMENT 1
LIMERICK GENERATING STATION 2014 PRA (LG113A/LG213A) TECHNICAL CAPABILITY ASSESSMENT FOR RISK-INFORMED INSERVICE INSPECTION

Table 1
Limerick Not Met and Capability Category I Supporting Requirements

Supporting Requirement (Note 1)	Capability Category	Risk-Informed ISI Evaluation Impact	EPRI TR-1021467 Requirement
QU-F5	Not Met	This SR was addressed in the 2008 update. This SR relates to documenting limitations in the quantification process that would impact applications. There are no limitations of CAFTA and the Limerick modeling that would significantly impact the results of the base model assessment or applications of the model.	CC I/II/III
QU-F6	Not Met	This SR was addressed in the 2008 update. This SR relates to documenting the quantitative definition used for significant basic event, significant cut set, and significant accident sequence. It was noted that other than in the HRA notebook, the documentation did not include the applied definition of “significant”. It is now noted here that the ASME Standard definition is generally applied.	CC I/II/III
IF-D6	Not Met	Does not need to be Met according to EPRI TR-1021467 requirement.	RI-ISI traditional analysis does not depend on the internal flooding analysis.
IF-F3	Not Met	This SR was addressed in the 2008 update. This SR is related to model uncertainty. An assessment based on the final EPRI guidance for the base PRA model has been performed and included in Appendix A of the Summary Notebook (Reference 15). The results of that assessment are factored into the identification of potentially key assumptions for applications of the model.	RI-ISI traditional analysis does not depend on the internal flooding analysis.

ATTACHMENT 1
LIMERICK GENERATING STATION 2014 PRA (LG113A/LG213A) TECHNICAL CAPABILITY ASSESSMENT FOR RISK-INFORMED INSERVICE INSPECTION

Notes:

1. The Limerick PRA peer review (non IF) was against the ASME/ANS 2002 standard whereas the IF peer review was against the ASME/ANS 2007 standard. The current 2009 ASME/ANS standard (Reference 14) SRs are provided with the equivalent peer reviewed SR listed in parentheses where applicable.

Request for Relief for the Use of BWRVIP Guidelines in Lieu of Specific ASME Section XI Code Requirements on Reactor Pressure Vessel Internals and Components Inspection In Accordance with 10CFR50.55a(z)(1) Alternative Provides Acceptable Level of Quality and Safety

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1. ASME Code Component(s) Affected

Code Class:	1
Reference:	IWB-2500, Table IWB-2500-1
Examination Category:	B-N-1 and B-N-2
Item Number:	B13.10, B13.20, B13.30, and B13.40
Description:	Use of BWRVIP Guidelines in Lieu of Specific ASME Section XI Code Requirements on Reactor Pressure Vessel Internals and Components Inspection
Component Number:	Vessel Interior, Interior Attachments within Beltline Region, Interior Attachments beyond Beltline Region, and Core Support Structure

2. Applicable Code Edition and Addenda

The Inservice Inspection Program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2007 Edition through the 2008 Addenda.

3. Applicable Code Requirements

ASME Section XI requires the examination of components within the Reactor Pressure Vessel. These examinations are included in Table IWB-2500-1 Examination Categories B-N-1 and B-N-2 and identified with the following item numbers:

B13.10 Examine accessible areas of the reactor vessel interior each period by the VT-3 method (B-N-1).

B13.20 Examine interior attachment welds within the beltline region each interval by the VT-1 method (B-N-2).

B13.30 Examine interior attachment welds beyond the beltline region each interval by the VT-3 method (B-N-2).

B13.40 Examine surfaces of the welded core support structure each interval by the VT-3 method.

These examinations are performed to assess the structural integrity of components within the boiling water reactor pressure vessel.

4. Reason for Request

Pursuant to 10CFR50.55a(z)(1), relief is requested for the proposed alternative to the Code requirements provided above on the basis that the use of the BWRVIP guidelines discussed below will provide an acceptable level of quality and safety.

The BWRVIP Inspection and Evaluation (I&E) guidelines have recommended aggressive specific inspection by BWR operators to completely identify material condition issues with BWR components. A wealth of inspection data has been gathered during these inspections across the BWR industry. I&E guidelines focus on specific and susceptible components, specify appropriate inspection methods capable of identifying real anticipated degradation mechanisms, and require re-examination at conservative intervals. In contrast, the code inspection requirements were prepared before the BWRVIP initiative and have not evolved with BWR inspection experience.

Use of this proposed alternative will maintain an adequate level of quality and safety and avoid unnecessary inspections.

5. Proposed Alternative and Basis for Use

In lieu of the requirements of ASME Section XI, the proposed alternative is detailed in Table 1 for Examination Categories B-N-1 and B-N-2.

Limerick Generating Station Units 1 and 2 will satisfy the Examination Category B-N-1 and B-N-2 requirements as described in Table 1 in accordance with the latest NRC approved BWRVIP guideline requirements. This relief request proposes to utilize the identified BWRVIP guidelines in lieu of the associated ASME Section XI Code requirements, including examination method, examination volume, frequency, training, successive and additional examinations, flaw evaluations, and reporting.

Not all components addressed by these guidelines are ASME Section XI Code components. The following guidelines are applicable to this Relief Request:

- BWRVIP-18, Rev. 1-A “BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines”
- BWRVIP-25, “BWR Core Plate Inspection and Flaw Evaluation Guidelines”
- BWRVIP-26-A, “BWR Top Guide Inspection and Flaw Evaluation Guidelines”
- BWRVIP-27-A, “BWR Standby Liquid Control System/Core Plate ΔP Inspection and Flaw Evaluation Guidelines”
- BWRVIP-38, “BWR Shroud Support Inspection and Flaw Evaluation Guidelines”
- BWRVIP-41, Rev. 3 “BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines”
- BWRVIP-42, Rev. 1 “LPCI Coupling Inspection and Flaw Evaluation Guidelines”
- BWRVIP-47-A, “BWR Lower Plenum Inspection and Flaw Evaluation Guidelines”
- BWRVIP-48-A, “Vessel ID Attachment Weld Inspection and Flaw Evaluation Guidelines”
- BWRVIP-49-A, “BWR Vessel and Internals Project, Instrument Penetration Inspection and Flaw Evaluation Guidelines”
- BWRVIP-76, Rev. 1-A “BWR Core Shroud Inspection and Flaw Evaluation Guidelines”
- BWRVIP-94NP, Rev. 2 “BWR Vessel and Internals Project Program Implementation Guide”
- BWRVIP-138, Rev. 1-A “Updated Jet Pump Beam Inspection and Flaw Evaluation”
- BWRVIP-139-A, “BWR Vessel and Internals Project, Steam Dryer Inspection and Flaw Evaluation Guidelines”
- BWRVIP-180, “BWR Vessel and Internals Project, Access Hole Cover Inspection and Flaw Evaluation Guidelines”

- BWRVIP-183-A, "BWR Vessel and Internals Project, Top Guide Grid Beam Inspection and Flaw Evaluation Guidelines"

Inspection services, by an Authorized Inspection Agency, will be applied to the proposed alternative actions of this relief request.

BWRs examine reactor internals in accordance with BWRVIP guidelines. These guidelines have been written to address the safety significant vessel internal components and to examine and evaluate the examination results for these components using appropriate methods and reexamination frequencies. The BWRVIP has established a reporting protocol for examination results and deviations. The NRC has agreed with the BWRVIP approach in principal and has issued Safety Evaluations for these guidelines (see References 1 - 16 below). Therefore, use of these guidelines, as an alternative to the subject Code requirements, provides an acceptable level of quality and safety and will not adversely impact the health and safety of the public.

As additional justification, Attachment 1 ("Comparison of Code Examination Requirements to BWRVIP Examination Requirements") provides specific examples which compare the inspection requirements of ASME Section XI Code Item Numbers B13.10, B13.20, B13.30, and B13.40 in Table IWB-2500-1, to the inspection requirements in the BWRVIP documents. Specific BWRVIP documents are provided as examples. This comparison also includes a discussion of the inspection methods. These comparisons demonstrate that use of these guidelines, as an alternative to the subject Code requirements, provides an acceptable level of quality and safety and will not adversely impact the health and safety of the public.

Table 1 compares present ASME Examination Category B-N-1 and B-N-2 requirements with the above current BWRVIP guideline requirements, as applicable, to Limerick Generating Station. Therefore, Table 1 only represents a current comparison. Any deviations from the BWRVIP guidelines referenced within this relief request for the duration of the proposed alternative will be appropriately documented and communicated to the NRC, per the BWRVIP Deviation Disposition Process.

Also, the Reactor Vessel Internals Inspection Program at Limerick Generating Station has been developed and implemented to satisfy the requirements of BWRVIP-94. It is recognized that the BWRVIP executive committee periodically revises the BWRVIP guidelines to include enhancements in inspection techniques and flaw evaluation methodologies. Where the revised version of a BWRVIP inspection guideline, continues to also meet the requirements of the version of the BWRVIP inspection guideline that forms the safety basis for an NRC-authorized proposed alternative to the requirements of 10CFR50.55a, it may be implemented. Otherwise, the revised guidelines will only be implemented after NRC approval of the revised BWRVIP guidelines or a plant-specific request for relief has been approved.

6. Duration of Proposed Alternative

Relief is requested for the Fourth Ten-Year ISI Interval for Limerick Generating Station Units 1 and 2.

7. Precedents

The Exelon Generation Company/Amergen Fleetwide Relief Request for BWRVIP was authorized conditionally by NRC Safety Evaluation (SE) dated April 30, 2008. The Fourth ISI Interval Relief Request utilizes an identical approach that was previously approved. (ML080980311) (Reference 17)

Relief Request was authorized for Perry Nuclear Power Plant Unit 1 by NRC SE dated January 31, 2012. (Reference 18)

Relief Request was authorized for Fermi 2 by NRC SE dated February 17, 2012. (Reference 19)

8. References

1. Letter NRC to BWRVIP, "Final Safety Evaluation for Electric Power Research Institute Boiling Water Reactor Vessel and Internals Project Technical Report 1016568, 'BWRVIP-18, Revision 1-A: BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines (TAC No. ME2189),'" dated January 30, 2012 (ML113620684).

2. Letter NRC to BWRVIP, "Final Safety Evaluation of BWRVIP Vessel and Internals Project, BWR Vessel and Internals Project, BWR Core Plate Inspection and Flaw Evaluation Guideline (BWRVIP-25)," EPRI Report TR-107284 (TAC No. M97802), dated December 19, 1999.

3. Letter NRC to BWRVIP, "NRC Approval Letter of BWRVIP-26-A, "BWR Vessel and Internals Project Boiling Water Reactor Top Guide Inspection and Flaw Evaluation Guidelines,'" dated September 9, 2005.

4. Letter NRC to BWRVIP, Proprietary Version of NRC Staff Review of BWRVIP-27-A, "BWR Standby Liquid Control System/Core Plate ΔP Inspection and Flaw Evaluation Guidelines," dated June 10, 2004.

5. Letter NRC to BWRVIP, "Final Safety Evaluation of the "BWR Vessel and Internals Project, BWR Shroud Support Inspection and Flaw Evaluation Guidelines (BWRVIP-38)," EPRI Report TR-108823 (TAC No. M99638)," dated July 24, 2000.

6. "BWRVIP-41, Revision 3, BWR Vessel and Internals Project, BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines," EPRI Technical Report 1021000, dated September, 2010.

7. "BWRVIP-42, Rev. 1: BWR Vessel and Internals Project, LPCI Coupling Inspection and Flaw Evaluation Guidelines," dated June, 2010.

8. Letter NRC to BWRVIP, "NRC Approval Letter of BWRVIP-47-A, "BWR Vessel and Internals Project Boiling Water Reactor Lower Plenum Inspection and Flaw Evaluation Guidelines,'" dated September 9, 2005.

9. Letter NRC to BWRVIP, "NRC Approval Letter of BWRVIP-48-A, "BWR Vessel and Internals Project Vessel ID Attachment Weld Inspection and Flaw Evaluation Guideline,'" dated July 25, 2005.

10. "BWRVIP-49-A: BWR Vessel and Internals Project, Instrument Penetration Inspection and Flaw Evaluation Guidelines", dated March, 2002.

11. Letter NRC to BWRVIP, "Final Safety Evaluations of the Boiling Water Reactor Vessel and Internals Project 76, Rev. 1-A Topical Report, "Boiling Water Reactor Core Shroud Inspection and Flaw Evaluation Guidelines" (TAC No. ME8317)," dated November 12, 2014.

12. Letter from Chairman, BWR Vessel and Internals Project to NRC, “Project No. 704 - BWRVIP Program Implementation Guide (BWRVIP-94NP, Revision 2),” dated September 22, 2011 (ML11271A058).

13. Letter NRC to BWRVIP, “Electric Power Research Institute Final Safety Evaluation for Technical Report 1016574 “BWRVIP-138, Revision 1-A: BWR [Boiling Water Reactor] Vessel and Internals Project ‘Updated Jet Pump Beam Inspection and Flaw Evaluation Guidelines’” (TAC No. ME2191),” dated May 14, 2012.

14. “BWRVIP-139-A: BWR Vessel and Internals Project, Steam Dryer Inspection and Flaw Evaluation Guidelines,” dated July 2009.

15. “BWRVIP-180: BWR Vessel and Internals Project, Access Hole Cover Inspection and Flaw Evaluation Guidelines,” dated November 2007.

16. Letter NRC to BWRVIP, “Final Safety Evaluation for Electric Power Research Institute Topical Report BWRVIP-183-A, “BWR Vessel and Internals Project, Top Guide Grid Beam Inspection and Flaw Evaluation Guidelines’” (TAC No. ME2178),” dated December 31, 2015.

17. Letter from NRC to Exelon Generation Company/Amergen, “Clinton Power Station; Dresden Nuclear Power Station, Units 2 and 3; LaSalle County Station, Units 1 and 2; Limerick Generating Station, Units 1 and 2; Oyster Creek Nuclear Generating Station; Peach Bottom Atomic Power Station, Units 2 and 3; and Quad Cities Nuclear Power Station, Units 1 and 2 – Relief Request to Use Boiling Water Reactor Vessel and Internals Project Guidelines in Lieu of Specific ASME Section XI Code Requirements (TAC Nos. MD5352 through MD5363),” dated April 30, 2008 (ML080980311).

18. Letter from NRC to FirstEnergy Nuclear Operating Company (Perry Nuclear Power Plant, Unit No. 1), “Perry Nuclear Power Plant, Unit No. 1, RE: Safety Evaluation in Support of 10CFR50.55a Requests for the Third 10-Year In-Service Inspection Interval (TAC Nos. ME5373, ME5376, ME5377, ME5379, and ME5380),” dated January 31, 2012 (ML120180372).

19. Letter from NRC to Detroit Edison Company (Fermi 2), “Fermi 2- Evaluation of Applicable 10-Year Interval Inservice Inspection Relief Request - Use of Boiling Water Reactor Vessel and Internals Project (BWRVIP) Guidelines in Lieu of Specific ASME Section XI Code Requirements (TAC No. ME6765),” dated February 17, 2012 (ML120370286).

TABLE 1
Comparison of ASME Examination Category B-N-1 and B-N-2 Requirements With BWRVIP Guidance Requirements[1]

ASME Item Number Table IWB-2500-1	Component	ASME Exam Scope	ASME Exam	ASME Frequency	Authorized Alternative	BWRVIP Exam Scope	BWRVIP Exam	BWRVIP Frequency
B13.10	Reactor Vessel Interior	Accessible Areas	VT-3	Each period	BWRVIP-18-R1-A, 26-A, 38, 41-R3, 42-R1, 47-A, 48-A, 76-R1-A, 138-R1-A, 180, and 183-A	Overview examinations of components during BWRVIP examinations are performed to satisfy ASME Section XI Code VT-3 visual examination requirements.		
B13.20	Interior Attachments Within Beltline Region - Riser Braces	Accessible Welds	VT-1	Each 10-year Interval	BWRVIP-48-A, Table 3-2	Riser Brace Attachment	EVT-1	100% in first 12 years, 25% during each subsequent 6 years.
	Lower Surveillance Specimen Holder Brackets				BWRVIP-48-A, Table 3-2	Bracket Attachment	VT-1	Each 10-year Interval.
B13.30	Interior Attachments Beyond Beltline - Steam Dryer Hold-down Brackets	Accessible Welds	VT-3	Each 10-year Interval	BWRVIP-48-A, Table 3-2	Bracket Attachment	VT-3	Each 10-year Interval.
	Guide Rod Brackets				BWRVIP-48-A, Table 3-2	Bracket Attachment	VT-3	Each 10-year Interval.
	Steam Dryer Support Brackets				BWRVIP-48-A, Table 3-2	Bracket Attachment	EVT-1	Each 10-year Interval.
	Feedwater Sparger Brackets				BWRVIP-48-A, Table 3-2	Bracket Attachment	EVT-1	Each 10-year Interval.
	Core Spray Piping Brackets				BWRVIP-48-A, Table 3-2	Bracket Attachment	EVT-1	Every 4 Refueling Cycles.
	Upper Surveillance Specimen Holder Brackets				BWRVIP-48-A, Table 3-2	Bracket Attachment	VT-3	Each 10-year Interval.

TABLE 1
Comparison of ASME Examination Category B-N-1 and B-N-2 Requirements With BWRVIP Guidance Requirements[1]

ASME Item Number Table IWB-2500-1	Component	ASME Exam Scope	ASME Exam	ASME Frequency	Authorized Alternative	BWRVIP Exam Scope	BWRVIP Exam	BWRVIP Frequency
	Shroud Support (Weld H9)				BWRVIP-38, 3.1.3.2, Figure 3-5	Weld H9[2]	EVT-1 or UT	Based on as-found conditions, to a maximum of 6 years for EVT-1, 10 years for UT.
	Shroud Support Legs (H12) Welds	(Rarely Accessible)			BWRVIP-38, 3.2.3	Weld H12	Per BWRVIP-38 NRC SER (7/24/00), inspect with appropriate method[3]	When accessible.
B13.40	Welded Core Support Structure	Accessible Surfaces	VT-3	Each 10-year Interval	BWRVIP-38, 3.1.3.2, Figure 3-5	Shroud Support and Leg Welds	EVT-1 or UT	Based on as-found conditions, to a maximum of 6 years for EVT-1, 10 years for UT.
	Shroud Horizontal welds				BWRVIP-76-R1-A, 2.2.1	Welds H1-H7	EVT-1 or UT	Maximum of 10 years.
	Shroud Vertical welds				BWRVIP-76-R1-A, Figure 3-3	Vertical and Ring Segment Welds	EVT-1 or UT	Maximum of 6 years for one-sided EVT-1, 10 years for UT.
	Shroud Repairs[3]				BWRVIP-76-R1-A, Section 3.5	Tie-Rod Repair	VT-3	Per repair designer recommendations per BWRVIP-76-R1-A.

NOTES:

1) This Table provides only an overview of the requirements. For more details, refer to ASME Section XI, Table IWB-2500-1, and the appropriate BWRVIP document.
2) In accordance with Appendix A of BWRVIP-38, a site specific evaluation will determine the minimum required weld length to be examined.
3) When inspection tooling and methodologies are available, they will be utilized to establish a baseline inspection of these welds.

ATTACHMENT 1
COMPARISON OF CODE EXAMINATION REQUIREMENTS TO BWRVIP EXAMINATION REQUIREMENTS

The following discussion provides a comparison of the examination requirements provided in ASME Section XI Code Item Numbers B13.10, B13.20, B13.30, and B13.40 in Table IWB-2500-1, to the examination requirements in the BWRVIP guidelines. Specific BWRVIP guidelines are provided as examples for comparisons. This comparison also includes a discussion of the examination methods.

1. ASME Section XI Code Requirement - B13.10 - Reactor Vessel Interior Accessible Areas (B-N-1)

   The ASME Section XI Code requires a VT-3 visual examination of reactor vessel accessible areas, which are defined as the spaces above and below the core made accessible during normal refueling outages. The frequency of these examinations is specified as the first refueling outage, and at intervals of approximately 3 years, during the first inspection interval, and each period during each successive 10-year Inspection Interval. Typically, these examinations are performed every other refueling outage of the Inspection Interval. This examination requirement is a non-specific requirement that is a departure from the traditional Section XI examinations of welds and surfaces. As such, this requirement has been interpreted and satisfied differently across the domestic fleet. The purpose of the examination is to identify relevant conditions such as distortion or displacement of parts; loose, missing, or fractured fasteners; foreign material, corrosion, erosion, or accumulation of corrosion products; wear; and structural degradation.

   Portions of the various examinations required by the applicable BWRVIP Guidelines require access to accessible areas of the reactor vessel during each refueling outage. Examination of core spray piping and spargers (BWRVIP-18-R1-A), top guide (BWRVIP-26-A), jet pump welds and components (BWRVIP-41-R3), interior attachments (BWRVIP-48-A), core shroud welds (BWRVIP-76-R1-A), shroud support (BWRVIP-38), LPCI couplings (BWRVIP-42-R1), and lower plenum components (BWRVIP-47-A) provides such access. Locating and examining specific welds and components within the reactor vessel areas above, below (if accessible), and surrounding the core (annulus area) entails access by remote camera systems that essentially perform equivalent VT-3 visual examination of these areas or spaces as the specific weld or component examinations are performed. This provides an equivalent method of visual examination on a more frequent basis than that required by the ASME Section XI Code. Evidence of wear, structural degradation, loose, missing, or displaced parts, foreign materials, and corrosion product buildup can be, and has been observed during the course of implementing these BWRVIP examination requirements. Therefore, the specified BWRVIP Guideline requirements meet or exceed the subject ASME Section XI Code requirements for examination method and frequency of the interior of the reactor vessel. Accordingly, these BWRVIP examination requirements provide an acceptable level of quality and safety as compared to the subject ASME Section XI Code requirements.

2. ASME Section XI Code Requirement - B13.20 - Interior Attachments Within the Beltline (B-N-2)

   The ASME Section XI Code requires a VT-1 visual examination of accessible reactor interior surface attachment welds within the beltline each 10-year interval. In the BWR/4 model, this includes the jet pump riser brace welds-to-vessel wall and the lower surveillance specimen support bracket welds-to-vessel wall. In comparison, the BWRVIP requires the same examination method and frequency for the lower surveillance specimen support bracket welds, and requires an EVT-1 visual examination on the remaining attachment welds in the beltline region in the first 12 years, and then 25% during each subsequent 6 years.

   The jet pump riser brace examination requirements are provided below to show a comparison between the ASME Section XI Code and the BWRVIP examination requirements.

ATTACHMENT 1
COMPARISON OF CODE EXAMINATION REQUIREMENTS TO BWRVIP EXAMINATION REQUIREMENTS

Comparison to BWRVIP Requirements - Jet Pump Riser Braces (BWRVIP-41-R3 and BWRVIP-48-A)

- The ASME Section XI Code requires a 100% VT-1 visual examination of the jet pump riser brace-to-reactor vessel wall pad welds each 10-year interval.
- The BWRVIP requires an EVT-1 visual examination of the jet pump riser brace-to-reactor vessel wall pad welds the first 12 years and then 25% during each subsequent 6 years.
- BWRVIP-48-A specifically defines the susceptible regions of the attachment that are to be examined.

The ASME Section XI Code VT-1 visual examination is conducted to detect discontinuities and imperfections on the surfaces of components, including such conditions as cracks, wear, corrosion, or erosion. The BWRVIP enhanced VT-1 (EVT-1) visual examination is conducted to detect discontinuities and imperfections on the surface of components and is additionally specified to detect potentially very tight cracks characteristic of fatigue and inter-granular stress corrosion cracking (IGSCC), the relevant degradation mechanisms for these components. General wear, corrosion, or erosion although generally not a concern for inherently tough, corrosion resistant stainless steel material, would also be detected during the process of performing a BWRVIP EVT-1 visual examination.

The ASME Section XI Code VT-1 visual examination method requires (depending on applicable Edition) that at a maximum distance of 2 feet or a letter character with a height of 0.044 inches can be read. The BWRVIP EVT-1 visual examination method requires resolution of 0.044 inch on the examination surface. BWRVIP-48-A includes a diagram for the configuration and prescribes examination for this plant.

The calibration standards used for BWRVIP EVT-1 visual examinations utilize the ASME Section XI Code characters, thus assuring at least equivalent resolution compared to the ASME Section XI Code. Although the BWRVIP examination may be less frequent, it is a more comprehensive method. Therefore, the enhanced flaw detection capability of an EVT-1 visual examination, with a less frequent examination schedule provides an acceptable level of quality and safety to that provided by the ASME Section XI Code.

3. ASME Section XI Code Requirement - B13.30 - Interior Attachment Beyond the Beltline Region (B-N-2)

The ASME Section XI Code requires a VT-3 visual examination of accessible reactor interior surface attachment welds beyond the beltline each 10-year interval. In the BWR/4 model, this includes the core spray piping primary and supplemental support bracket welds-to-vessel wall, the upper surveillance specimen support bracket welds-to-vessel wall, the feedwater sparger support bracket welds-to-reactor vessel wall, the steam dryer support and hold down bracket welds-to-reactor vessel wall, the guide rod support bracket weld-to-reactor vessel wall, and the shroud support plate-to-vessel wall. BWRVIP-48-A requires as a minimum the same VT-3 visual examination method as the ASME Section XI Code for some of the interior attachment welds beyond the beltline region, and in some cases specifies an enhanced visual examination technique EVT-1 for these welds. For those interior attachment welds that have the same VT-3 method of visual examination, the same scope of examination (accessible welds), the same examination frequency (each 10-year interval) and ASME Section XI flaw evaluation criteria, the level of quality and safety provided by the BWRVIP requirements are equivalent to that provide by the ASME Section XI Code.

For the core spray primary and secondary support bracket attachment welds, the steam dryer support bracket attachment welds, the feedwater sparger support bracket attachment welds, and the shroud

ATTACHMENT 1
COMPARISON OF CODE EXAMINATION REQUIREMENTS TO BWRVIP EXAMINATION REQUIREMENTS

support plate-to-vessel welds, as applicable, the BWRVIP Guidelines require an EVT-1 visual examination at the same frequency as the ASME Section XI Code. Therefore, the BWRVIP requirements provide the same level of quality and safety to that provided by the ASME Section XI Code.

The core spray piping bracket-to-vessel attachment weld is used as an example for comparison between the ASME Section XI Code and BWRVIP examination requirements as discussed below.

Comparison to BWRVIP Requirements - Core Spray piping Bracket Welds (BWRVIP-48-A)

- The ASME Section XI Code examination requirement is a VT-3 visual examination of each weld every 10 years.
- The BWRVIP visual examination requirement is an EVT-1 for the Core Spray piping bracket attachment welds with each weld examined every four cycles (8 years for units with a two year fuel cycle).

The BWRVIP visual examination method EVT-1 has superior flaw detection and sizing capability, the examination frequency is greater than the ASME Section XI Code requirements, and the same flaw evaluation criteria are used.

The ASME Section XI Code VT-3 visual examination is conducted to detect component structural integrity by ensuring the components general condition is acceptable. An enhanced EVT-1 visual examination is conducted to detect discontinuities and imperfections on the examination surfaces, including such conditions as tight cracks caused by IGSCC or fatigue, the relevant degradation mechanisms for BWR internal attachments.

Therefore, with the EVT-1 visual examination method, the same examination scope (accessible welds), an increased examination frequency (8 years instead of 10 years) in some cases, the same flaw evaluation criteria (Section XI), the level of quality and safety required by the BWRVIP criteria is superior to that required by the ASME Section XI Code.

4. ASME Section XI Code Requirement - B13.40 - Welded Core Support Structures (B-N-2)

The ASME Section XI Code requires a VT-3 visual examination of accessible surfaces of the welded core support structure each 10-year interval. In the BWR/4 model, the welded core support structure has primarily been considered the shroud support structure, including the shroud. In later designs, the shroud itself is considered part of the welded core support structure. Historically, this requirement has been interpreted and satisfied differently across the industry. The proposed alternate examination replaces this ASME requirement with specific BWRVIP guidelines that examine susceptible locations for known relevant degradation mechanisms.

Comparison to BWRVIP Requirements - Shroud Supports (BWRVIP-38)

- The ASME Section XI Code requires a VT-3 visual examination of accessible surfaces each 10-year interval.
- The BWRVIP requires either an enhanced visual examination technique (EVT-1) or volumetric examination (UT) every 10 years as compared to the ASME Section XI Code requirement (VT-3 visual examination). (Only 10% of the weld is required to be examined.)

ATTACHMENT 1
COMPARISON OF CODE EXAMINATION REQUIREMENTS TO BWRVIP EXAMINATION REQUIREMENTS

BWRVIP recommended examinations of welded core support structures are focused on the known susceptible areas of this structure, including the welds and associated weld heat affected zones. In many locations, the BWRVIP guidelines require a volumetric examination of the susceptible welds at a frequency identical to the ASME Section XI Code requirement.

For other welded core support structure components, the BWRVIP requires an EVT-1 visual examination or UT of core support structures. The core shroud is used as an example for comparison between the ASME Section XI Code and BWRVIP examination requirements as shown below.

Comparison to BWRVIP Requirements - BWR Core Shroud Examination and Flaw Evaluation Guideline (BWRVIP-76, Rev. 1-A)

- The ASME Section XI Code requires a VT-3 visual examination of accessible surfaces each every 10-year interval.
- The BWRVIP requires an EVT-1 visual examination from the inside and outside surface where accessible or ultrasonic examination of each core shroud circumferential weld that has not been structurally replaced with a shroud repair at a calculated “end of interval” (EOI) that will vary depending upon the amount of flaws present, but not to exceed ten years.

The BWRVIP recommended examinations specify locations that are known to be vulnerable to BWR relevant degradation mechanisms rather than accessible surfaces. The BWRVIP examination methods (EVT-1 or UT) are superior to the ASME Section XI Code required VT-3 visual examination for flaw detection and characterization. The superior flaw detection and characterization capability and the same flaw evaluation criteria, results in the BWRVIP criteria providing a level of quality and safety equivalent to or superior to that required by the ASME Section XI Code requirements.

Request for Relief for Alternative Requirements for Pressure Testing the Drywell Pressure Instrumentation In Accordance with 10CFR50.55a(z)(1) Alternative Provides Acceptable Level of Quality and Safety

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1. ASME Code Component(s) Affected

Code Class:	2 and 3
Reference:	IWC-2500, Table IWC-2500-1, IWD-2500, Table IWD-2500-1
Examination Category:	C-H and D-B
Item Number:	C7.10 and D2.10
Description:	Alternative Requirements for Pressure Testing the Drywell Pressure Instrumentation
Component Number:	Drywell Pressure Instrumentation from Penetrations X-22, X-30B, X-40E, and X-50A
Drawing Number:	M-42 Sht. 1; M-57 Sht. 1; M-59 Sht. 1 (Unit 1) M-42 Sht. 3; M-57 Sht. 4; M-59 Sht. 3 (Unit 2)

See Enclosure 1 for M-42 Sheets 1 and 3, M-57 Sheets 1 and 4, and M-59 Sheets 1 and 3.

2. Applicable Code Edition and Addenda

The Inservice Inspection program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2007 Edition through the 2008 Addenda.

3. Applicable Code Requirement

Table IWC-2500-1, Examination Category C-H, Item Number C7.10, requires all Class 2 pressure retaining components be subject to a system leakage test with a VT-2 visual examination in accordance with IWC-5220. This pressure test is to be conducted once each inspection period.

Table IWD-2500-1, Examination Category D-B, Item Number D2.10, requires all Class 3 pressure retaining components be subject to a system leakage test with a VT-2 visual examination in accordance with IWD-5220. This pressure test is to be conducted once each inspection period.

4. Reason for Request

Pursuant to 10CFR50.55a(z)(1), relief is requested on the basis that the proposed alternative will provide an acceptable level of quality and safety.

The Limerick normal drywell pressure is less than 1 psig during normal operation. The pressurizing fluid in the drywell and drywell pressure instrumentation is nitrogen gas. A VT-2 visual examination looking for a nitrogen gas leak with less than 1 psig driving pressure would be inconclusive.

Limerick Generating Station Technical Specifications require channel checks every 12 hours to verify drywell pressure instrumentation operability. This is performed by verifying proper pressure readings. A significant tubing leak will cause an improper reading, and will be corrected and retested. The tubing and components are also included in the Integrated Leak Rate Test

(ILRT) boundary. Valves HV-42-1(2)47A, B, C, and D are open to perform the ILRT. Therefore, the instrument tubing is subject to the pressure required by the ILRT (44 psig).

In addition, there are no test taps on the subject instrument tubing and plant modifications would be required in order to perform the ASME Section XI pressure tests resulting in a hardship. An additional pressure test once every inspection period to satisfy ASME Section XI requirements is also a hardship in that they would present a redundant testing situation that would result in additional radiation exposure to examination personnel without a compensating increase in the level of quality and safety. The proposed alternative to perform channel checks of the remote pressure indicators to verify drywell pressure instrumentation operability every 12 hours in accordance with the plant Technical Specifications, and the use of 10CFR50 Appendix J, Option B Integrated Leak Rate Testing provides adequate assurance of structural integrity of the tubing and components, and therefore an acceptable level of quality and safety.

5. Proposed Alternative and Basis for Use

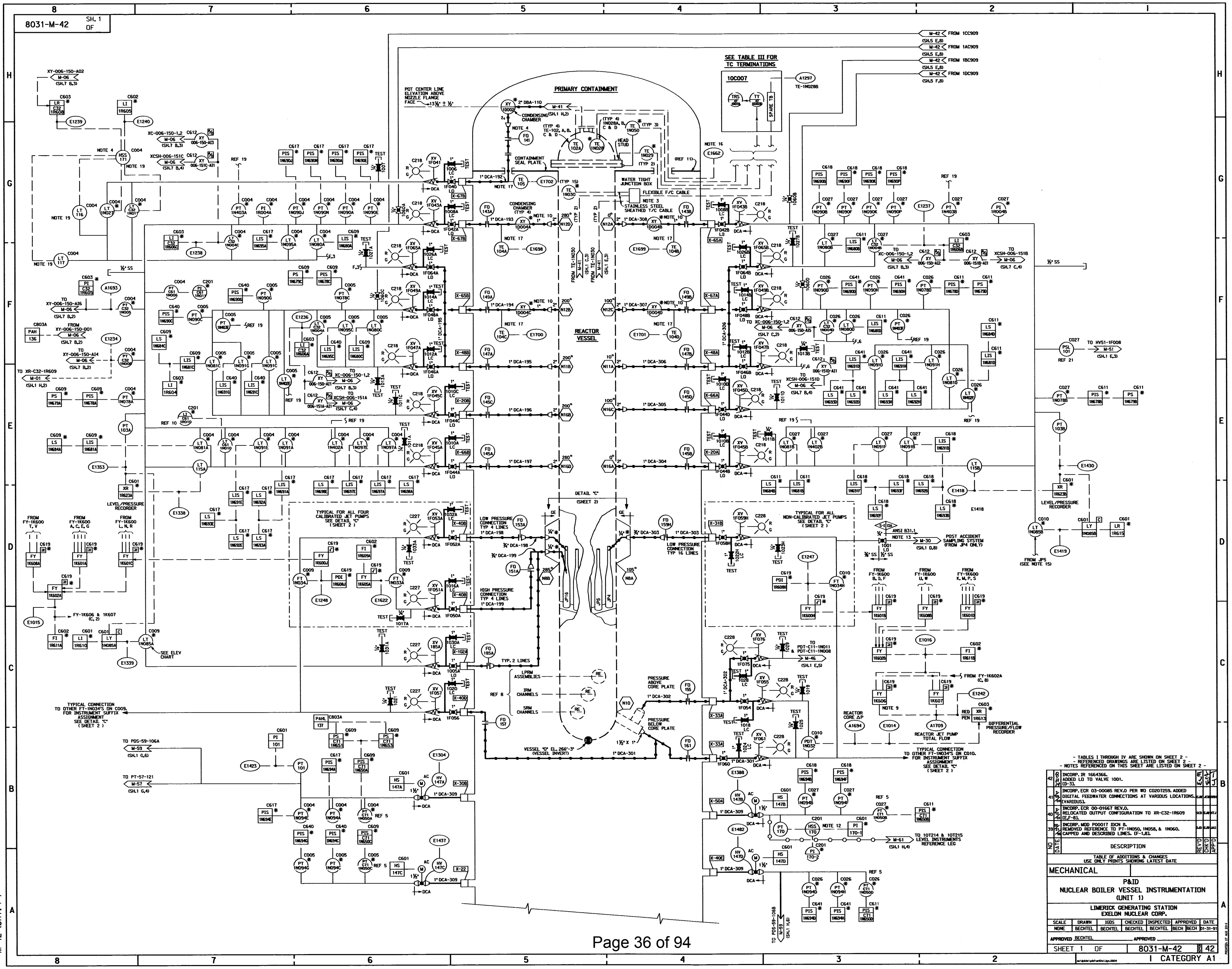
Drywell pressure instrumentation operability checks will be performed per station Technical Specifications and Integrated Leak Rate Testing will be performed in accordance with the station Appendix J Program both of which are maintained and controlled independent of the ASME Section XI program.

6. Duration of Proposed Alternative

Relief is requested for the Fourth Ten-Year ISI Interval for Limerick Generating Station Units 1 and 2.

7. Precedents

Limerick Generating Station Third ISI Interval Relief Request I3R-09 was authorized by NRC Safety Evaluation (SE) dated March 11, 2008. The Fourth ISI Interval Relief Request utilizes an identical approach that was previously approved. (ML080500584)



8031-M-42
SH. 1 OF
PRIMARY CONTAINMENT
REACTOR VESSEL
SEE TABLE III FOR TC TERMINATIONS
10C007
CONDENSING CHAMBER
CONTAINMENT SEAL PLATE
HEAD STUD
WATER TIGHT JUNCTION BOX
FLEXIBLE F/C CABLE
STAINLESS SHEATHED T/C CABLE
DETAIL "C" (SHEET 2)
TYPICAL FOR ALL FOUR CALIBRATED JET PUMPS SEE DETAIL "C" (SHEET 2)
TYPICAL FOR ALL NON-CALIBRATED JET PUMPS SEE DETAIL "C" (SHEET 2)
LOW PRESSURE CONNECTION TYP 4 LINES
HIGH PRESSURE CONNECTION TYP 4 LINES
LOW PRESSURE CONNECTION TYP 16 LINES
LPRM ASSEMBLIES
IRM CHANNELS
SRM CHANNELS
PRESSURE ABOVE CORE PLATE
PRESSURE BELOW CORE PLATE
VESSEL "O" EL. 266'-3" (VESSEL INVERT)
POST ACCIDENT SAMPLING SYSTEM (FROM JP4 ONLY)
LEVEL/PRESSURE RECORDER
REACTOR CORE ΔP
REACTOR JET PUMP TOTAL FLOW
DIFFERENTIAL PRESSURE/FLOW RECORDER
TYPICAL CONNECTION TO OTHER FT-1N034'S ON C009. FOR INSTRUMENT SUFFIX ASSIGNMENT SEE DETAIL "C" (SHEET 2)
TYPICAL CONNECTION TO OTHER FT-1N034'S ON C010. FOR INSTRUMENT SUFFIX ASSIGNMENT SEE DETAIL "C" (SHEET 2)
TO 10T214 & 10T215 LEVEL INSTRUMENTS REFERENCE LEG
- TABLES I THROUGH IV ARE SHOWN ON SHEET 2 -
- REFERENCED DRAWINGS ARE LISTED ON SHEET 2 -
- NOTES REFERENCED ON THIS SHEET ARE LISTED ON SHEET 2 -
42 INCORP. IR 1664366. ADDED LO TO VALVE 1001. [D-3].
41 INCORP. ECR 03-00085 REV.0 PER WO C0207259. ADDED DIGITAL FEEDWATER CONNECTIONS AT VARIOUS LOCATIONS. [VARIOUS].
40 INCORP. ECR 00-01667 REV.0. RELOCATED OUTPUT CONFIGURATION TO XR-C32-1R609 [E,F-8].
39 INCORP. MOD P00017 IDCN B. REMOVED REFERENCE TO PT-1N050, 1N058, & 1N060. CAPPED AND DESCRIBED LINES. [F-1,8].
NO DATE DESCRIPTION REV'D CHK'D APP'D
TABLE OF ADDITIONS & CHANGES USE ONLY PRINTS SHOWING LATEST DATE
MECHANICAL
P&ID
NUCLEAR BOILER VESSEL INSTRUMENTATION
(UNIT 1)
LIMERICK GENERATING STATION
EXELON NUCLEAR CORP.
SCALE NONE DRAWN BECHTEL IGDS BECHTEL CHECKED BECHTEL INSPECTED BECHTEL APPROVED BECH BECH DATE 01-31-91
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SHEET 1 OF 8031-M-42 REV 42
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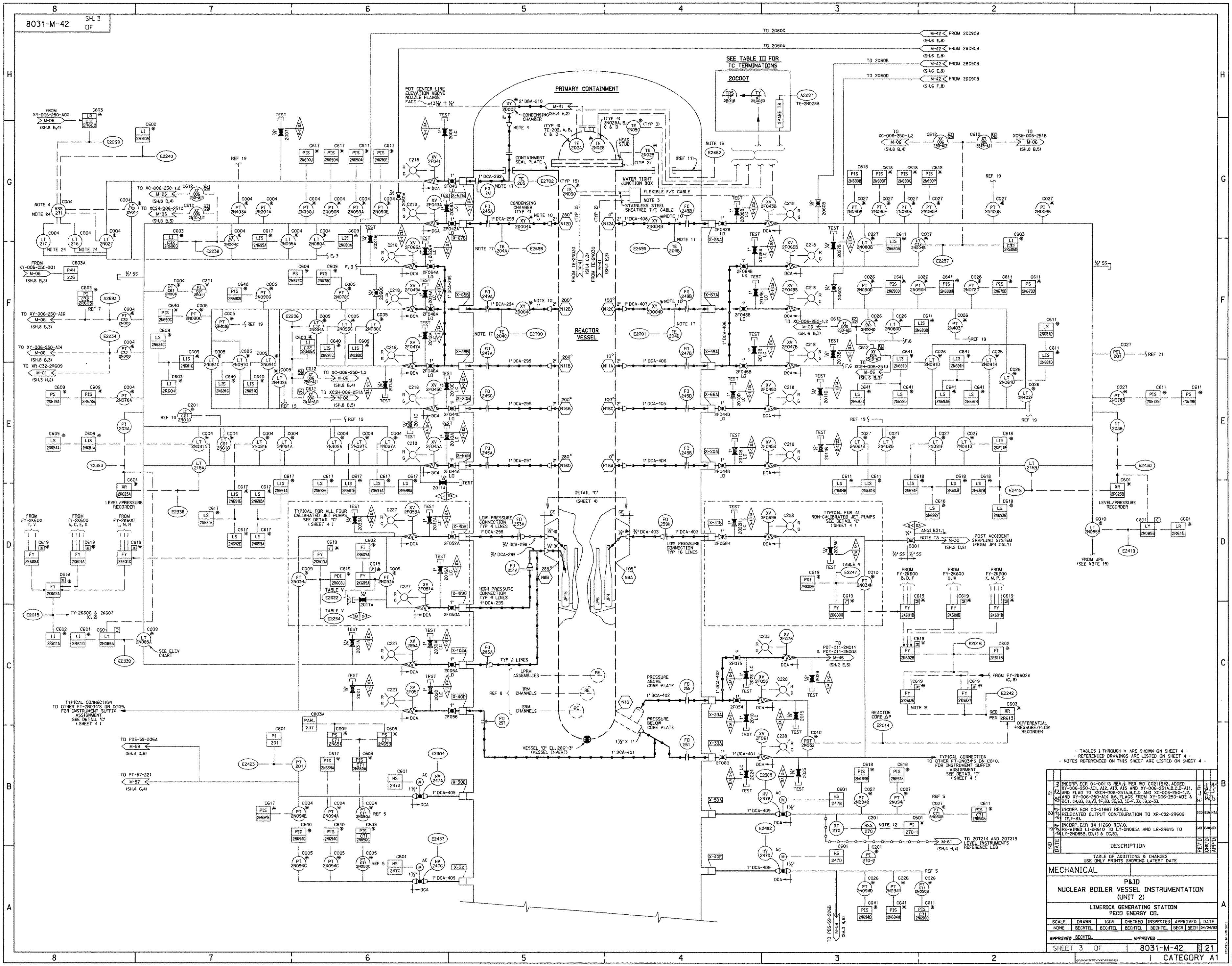
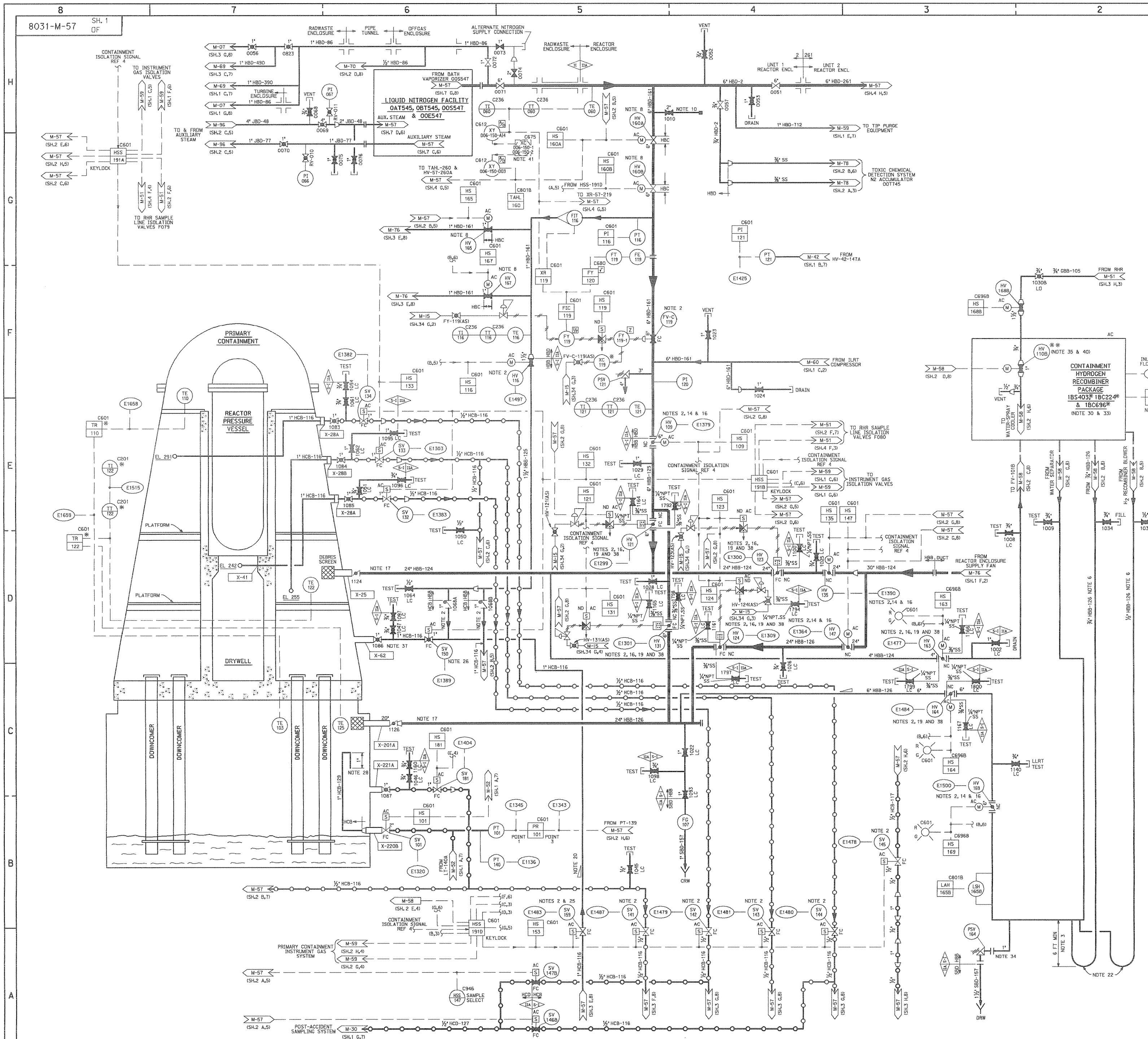
M-42 (SHT. 1)


8031-M-42 SH. 3 OF
PRIMARY CONTAINMENT
REACTOR VESSEL
SEE TABLE III FOR TC TERMINATIONS
- TABLES I THROUGH V ARE SHOWN ON SHEET 4 -
- REFERENCED DRAWINGS ARE LISTED ON SHEET 4 -
- NOTES REFERENCED ON THIS SHEET ARE LISTED ON SHEET 4 -
TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE
MECHANICAL
P&ID
NUCLEAR BOILER VESSEL INSTRUMENTATION
(UNIT 2)
LIMERICK GENERATING STATION
PECO ENERGY CO.
APPROVED BECHTEL
SHEET 3 OF
8031-M-42
21
CATEGORY A1
M-42 (SHT. 3)

8031-M-57 SH. 1 OF



REF No.	REFERENCE DRAWINGS	BECHTEL No.	GE No.
3	P&ID LEGEND	M-00	
4	NSS SHUTOFF SYSTEM ELEMENTARY DIAGRAM	M1-B21-1090-E-	791E401TN

- NOTES REFERENCED ON THIS SHEET ARE LISTED ON SHEET 2 -

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
47	10/23/09	INCORP. ECR 09-00427 REV. 0. CHANGED PR-101 PEN 2 AND PEN 1 TO POINT 1 AND POINT 3 RESPECTIVELY. [B,5].	EJW	ESY	DLZ
46	3/19/04	INCORP. ECR 01-00394 REV. 2. CHANGED SV-146B & SV-147B TO GLOBE VALVES. ADDED HBC CLASS TO HV-165 & 167. [A,5] AND [F&G,6].	EJW	JCW	MSD
45	3/09/04	INCORP. ECR 03-00085 REV. 0 PER WO C0207259. ADDED XY-006-150-A14 & D03 AND XC-006-150-1,-2 AND REF TO NOTE 41. [D,6].	EJW	JCW	RNH
44	2/13/97	INCORP. ECR 96-04500 REV. 0 CHANGED VALVE SV-150 FROM GATE TO GLOBE. [D,6].	DJD	JVM	PAG FOR SJB

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
CONTAINMENT ATMOSPHERIC CONTROL
(UNIT 1 AND COMMON)

LIMERICK GENERATING STATION
EXELON NUCLEAR CORP.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	04-06-90

APPROVED BECHTEL APPROVED

SHEET 1 OF | 8031-M-57 | 47

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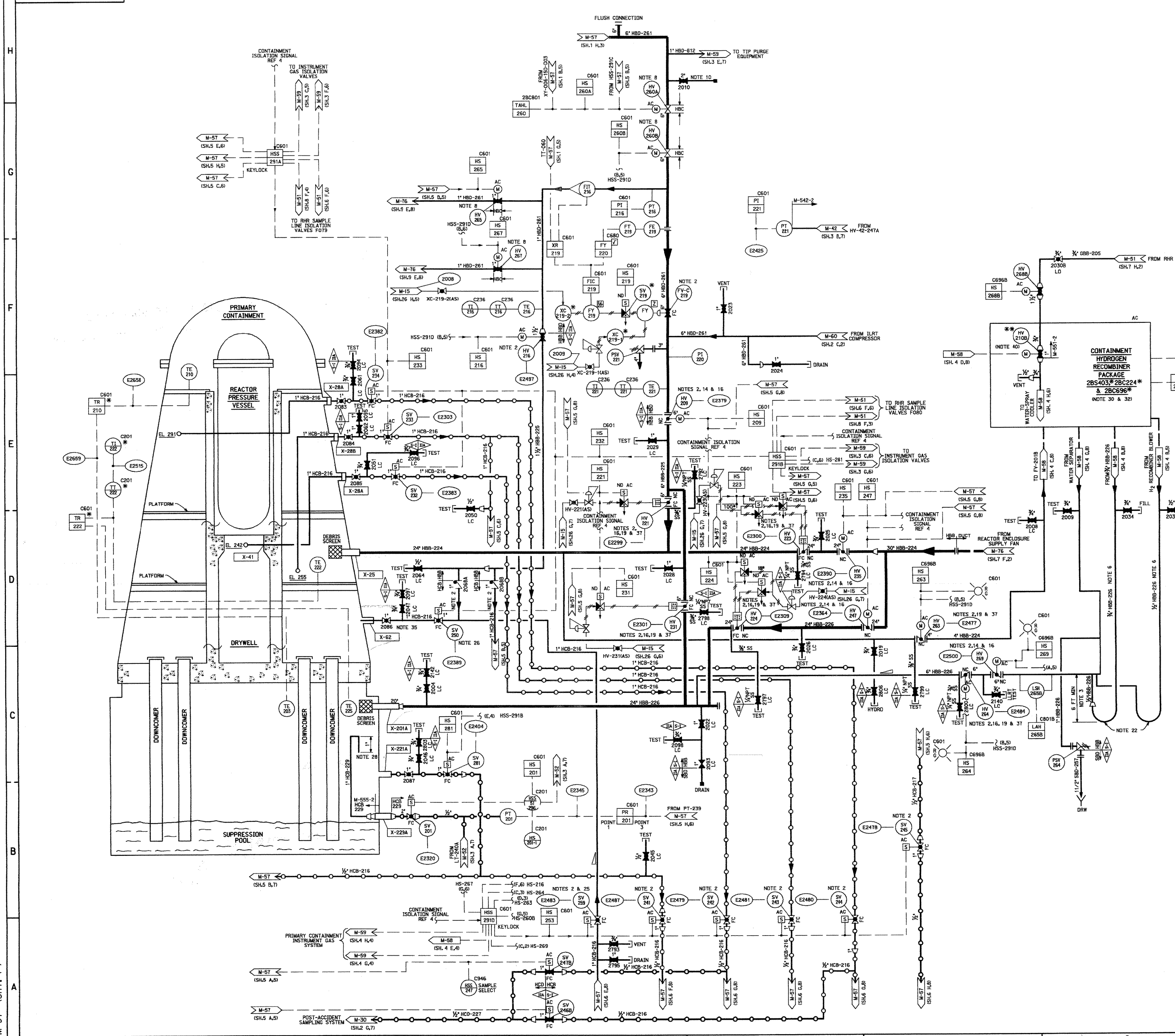
PRINTED: 19 OCT 2009

M-57 (SHT. 1)

8031-M-57 SH. 4

REF No.	REFERENCE DRAWINGS	BECHTEL No.	GE No.
1	NITROGEN INERTING SUPPLY SYSTEM FLOW SHEET	M-95-1-41	
3	P&ID LEGEND	M-00	
4	NSS SHUTOFF SYSTEM ELEMENTARY DIAGRAM	M1-B21-1090-E-	791E401TN



- NOTES REFERENCED ON THIS SHEET ARE LISTED ON SHEET 5 -

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
13	11/11/09	INCORP. ECR 09-00378 REV 0. ADDED POINT 1 AND 3 TO PR-201. [B,5].			
12		INCORP. ECR 04-00118 REV 0 PER WO C0211342. CHANGED REFERENCE FLAG DESIGNATION. [H,5].	EJW	JCW	MSD
11	7/24/00	INCORP. ECR 97-01615 REV 0. REMOVED REFERENCE TO PEN 1 AND PEN 2 AT PR-201. [B,5].	RDR	SCD	MSD
10		ADDED NOTATION "CATEGORY A1" BELOW TITLE BLOCK.	DJD	EJW	JEK

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
CONTAINMENT ATMOSPHERIC CONTROL
(UNIT 2)

LIMERICK GENERATING STATION
EXELON NUCLEAR CORP.

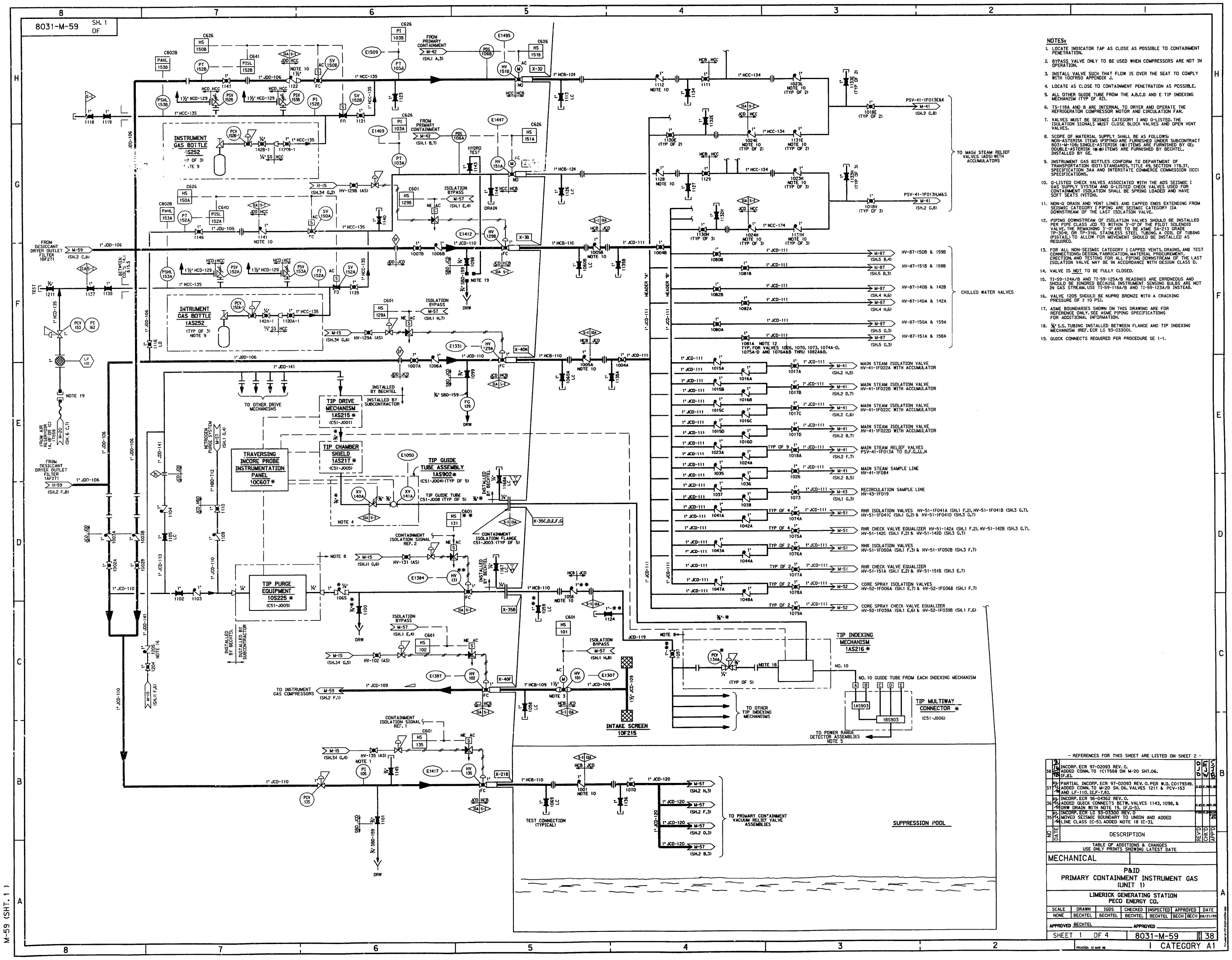
SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	10/17/89

APPROVED BECHTEL APPROVED

SHEET 4 OF 8031-M-57 13

I CATEGORY A1

M-57 (SHT. 4)


8031-M-59 SH. 1 OF
NOTES:
1. LOCATE INDICATOR TAP AS CLOSE AS POSSIBLE TO CONTAINMENT PENETRATION.
2. BYPASS VALVE ONLY TO BE USED WHEN COMPRESSORS ARE NOT IN OPERATION.
3. INSTALL VALVE SUCH THAT FLOW IS OVER THE SEAT TO COMPLY WITH 10CFR50 APPENDIX J.
4. LOCATE AS CLOSE TO CONTAINMENT PENETRATION AS POSSIBLE.
5. ALL OTHER GUIDE TUBE FROM THE A,B,C,D AND E TIP INDEXING MECHANISM (TYP OF 42).
6. TS-118A AND B ARE INTERNAL TO DRYER AND OPERATE THE REFRIGERATOR COMPRESSOR MOTOR AND CIRCULATION FAN.
7. VALVES MUST BE SEISMIC CATEGORY I AND Q-LISTED. THE ISOLATION SIGNALS MUST CLOSE BLOCK VALVES AND OPEN VENT VALVES.
8. SCOPE OF MATERIAL SUPPLY SHALL BE AS FOLLOWS: NON-ASTERISK ITEMS (PIPING) ARE FURNISHED UNDER SUBCONTRACT 8031-M-108; SINGLE-ASTERISK (*) ITEMS ARE FURNISHED BY GE; DOUBLE-ASTERISK (**) ITEMS ARE FURNISHED BY BECHTEL, INSTALLED BY GE.
9. INSTRUMENT GAS BOTTLES CONFORM TO DEPARTMENT OF TRANSPORTATION (DOT) STANDARDS, TITLE 49, SECTION 178.37, SPECIFICATION 3AA AND INTERSTATE COMMERCE COMMISSION (ICC) SPECIFICATIONS.
10. Q-LISTED CHECK VALVES ASSOCIATED WITH THE ADS SEISMIC I GAS SUPPLY SYSTEM AND Q-LISTED CHECK VALVES USED FOR CONTAINMENT ISOLATION SHALL BE SPRING LOADED AND HAVE SOFT SEATS (VITON).
11. NON-Q DRAIN AND VENT LINES AND CAPPED ENDS EXTENDING FROM SEISMIC CATEGORY I PIPING ARE SEISMIC CATEGORY IIA DOWNSTREAM OF THE LAST ISOLATION VALVE.
12. PIPING DOWNSTREAM OF ISOLATION VALVES SHOULD BE INSTALLED PER PIPE CLASS JCD TO WITHIN 3'-0" OF THE PILOT SOLENOID VALVE. THE REMAINING 3'-0" ARE TO BE ASME SA-213 GRADE TP-304L OR TP-316L STAINLESS STEEL TUBING. A COIL OF TUBING (PIGTAIL) TO ALLOW FOR MOVEMENT SHOULD BE INSTALLED AS REQUIRED.
13. FOR ALL NON-SEISMIC CATEGORY I CAPPED VENTS, DRAINS, AND TEST CONNECTIONS: DESIGN, FABRICATION, MATERIAL PROCUREMENT, ERECTION, AND TESTING FOR ALL PIPING DOWNSTREAM OF THE LAST ISOLATION VALVE MAY BE IN ACCORDANCE WITH DESIGN CLASS D.
14. VALVE IS NOT TO BE FULLY CLOSED.
15. TI-59-124A/B AND TI-59-125A/B READINGS ARE ERRONEOUS AND SHOULD BE IGNORED BECAUSE INSTRUMENT SENSING BULBS ARE NOT IN GAS STREAM. USE TI-59-118A/B AND TI-59-123A/B INSTEAD.
16. VALVE 1205 SHOULD BE NUPRO BRONZE WITH A CRACKING PRESSURE OF ≥ 10 PSI.
17. ASME BOUNDARIES SHOWN ON THIS DRAWING ARE FOR REFERENCE ONLY. SEE ASME PIPING SPECIFICATIONS FOR ADDITIONAL INFORMATION.
18. 3/8" S.S. TUBING INSTALLED BETWEEN FLANGE AND TIP INDEXING MECHANISM (REF. ECR LG 93-03300).
19. QUICK CONNECTS REQUIRED PER PROCEDURE SE 1-1.
- REFERENCES FOR THIS SHEET ARE LISTED ON SHEET 2 -
38 INCORP. ECR 97-02093 REV. 0. ADDED CONN. TO 1C1T558 ON M-20 SHT.06. [F,8].
37 PARTIAL INCORP. ECR 97-02093 REV. 0. PER W.O. C0179349. ADDED CONN. TO M-20 SH. 06, VALVES 1211 & PCV-153 AND LF-110. [E,F-7,8].
36 INCORP. ECR 96-04362 REV. 0. ADDED QUICK CONNECTS BETW. VALVES 1143, 1098, & DRW DRAIN WITH NOTE 19. [F,G-5].
35 INCORP. ECR LG 93-03300 REV. 0 MOVED SEISMIC BOUNDARY TO UNION AND ADDED LINE CLASS [C-5]. ADDED NOTE 18 [C-3].
NO DATE DESCRIPTION REV'D CHK'D APP'D
TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE
MECHANICAL
P&ID
PRIMARY CONTAINMENT INSTRUMENT GAS
(UNIT 1)
LIMERICK GENERATING STATION
PECO ENERGY CO.
SCALE NONE DRAWN BECHTEL IGDS BECHTEL CHECKED BECHTEL INSPECTED BECHTEL APPROVED BECH BECH DATE 08/21/89
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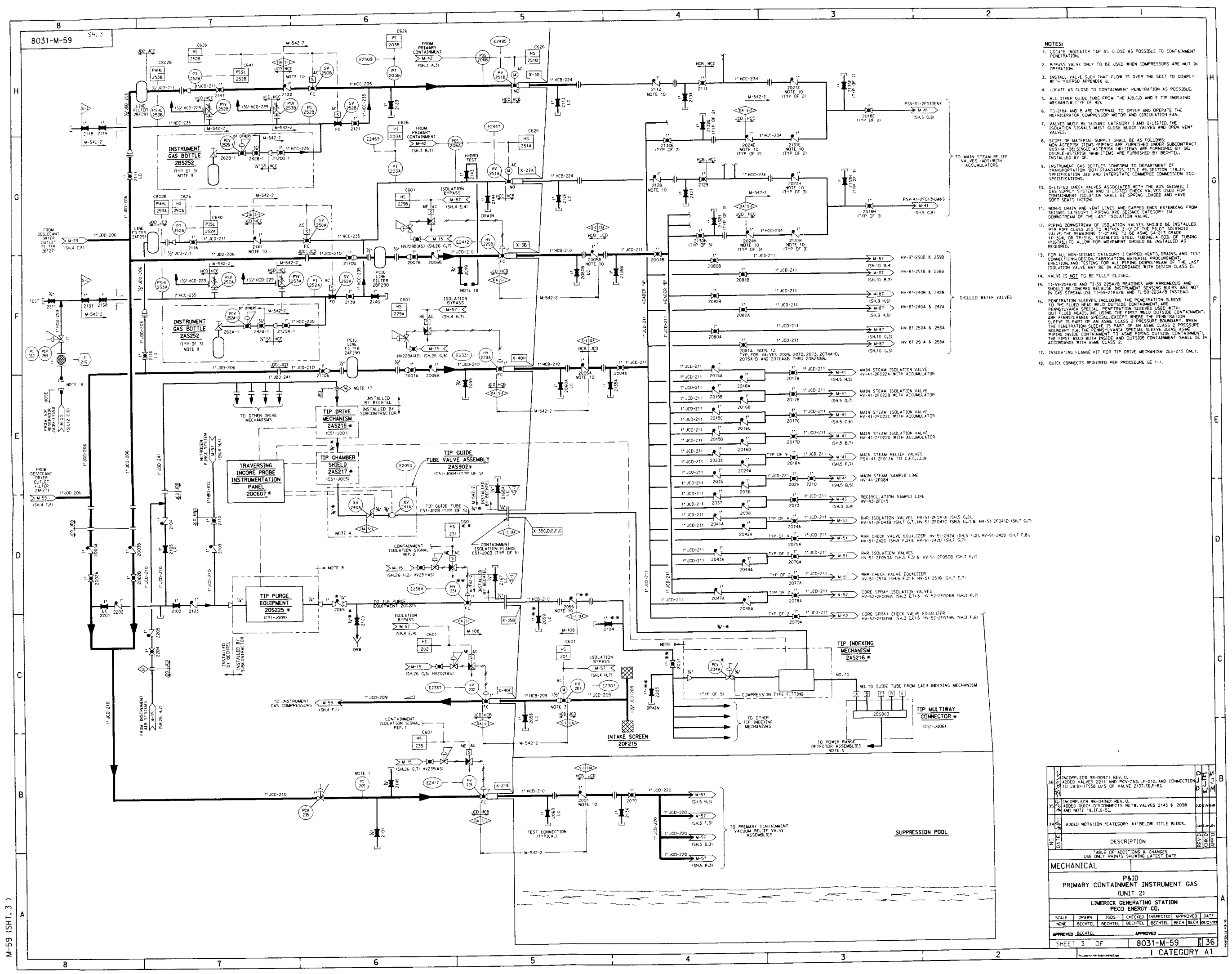
SHEET 1 OF 4 8031-M-59 38
PRINTED: 12 MAR 98
I CATEGORY A1
M-59 (SHT. 1)
SUPPRESSION POOL
TIP INDEXING MECHANISM 1AS216 *
TIP MULTIWAY CONNECTOR *
TIP PURGE EQUIPMENT 10S225 *
TRAVERSING INCORE PROBE INSTRUMENTATION PANEL 10C607 *
TIP DRIVE MECHANISM 1AS215 *
TIP CHAMBER SHIELD 1AS217 *
TIP GUIDE TUBE ASSEMBLY 1AS902 *
INTAKE SCREEN 10F215
INSTRUMENT GAS BOTTLE 1S252
INTRUMENT GAS BOTTLE 1AS252
MAIN STEAM ISOLATION VALVE
CHILLED WATER VALVES
TO INSTRUMENT GAS COMPRESSORS
TO PRIMARY CONTAINMENT VACUUM RELIEF VALVE ASSEMBLIES


8031-M-59
NOTES:
1. LOCATE INDICATOR TAP AS CLOSE AS POSSIBLE TO CONTAINMENT PENETRATION.
2. BYPASS VALVE ONLY TO BE USED WHEN COMPRESSORS ARE NOT IN OPERATION.
3. INSTALL VALVE SUCH THAT FLOW IS OVER THE SEAT TO COMPLY WITH 10CFR50 APPENDIX J.
4. LOCATE AS CLOSE TO CONTAINMENT PENETRATION AS POSSIBLE.
5. ALL OTHER GUIDE TUBE FROM THE A,B,C,D AND E TIP INDEXING MECHANISM (TYP OF 42).
6. TS-218A AND B ARE INTERNAL TO DRYER AND OPERATE THE REFRIGERATOR COMPRESSOR MOTOR AND CIRCULATION FAN.
7. VALVES MUST BE SEISMIC CATEGORY I AND Q-LISTED. THE ISOLATION SIGNALS MUST CLOSE BLOCK VALVES AND OPEN VENT VALVES.
8. SCOPE OF MATERIAL SUPPLY SHALL BE AS FOLLOWS: NON-ASTERISK ITEMS (PIPING) ARE FURNISHED UNDER SUBCONTRACT 8031-M-108; SINGLE-ASTERISK (*) ITEMS ARE FURNISHED BY GE; DOUBLE-ASTERISK (**) ITEMS ARE FURNISHED BY BECHTEL, INSTALLED BY GE.
9. INSTRUMENT GAS BOTTLES CONFORM TO DEPARTMENT OF TRANSPORTATION (DOT) STANDARDS, TITLE 49, SECTION 178.37, SPECIFICATION 3AA AND INTERSTATE COMMERCE COMMISSION (ICC) SPECIFICATIONS.
10. Q-LISTED CHECK VALVES ASSOCIATED WITH THE ADS SEISMIC I GAS SUPPLY SYSTEM AND Q-LISTED CHECK VALVES USED FOR CONTAINMENT ISOLATION SHALL BE SPRING LOADED AND HAVE SOFT SEATS (VITON).
11. NON-Q DRAIN AND VENT LINES AND CAPPED ENDS EXTENDING FROM SEISMIC CATEGORY I PIPING ARE SEISMIC CATEGORY IIA DOWNSTREAM OF THE LAST ISOLATION VALVE.
12. PIPING DOWNSTREAM OF ISOLATION VALVES SHOULD BE INSTALLED PER PIPE CLASS JCD TO WITHIN 3'-0" OF THE PILOT SOLENOID VALVE. THE REMAINING 3'-0" ARE TO BE ASME SA-213 GRADE TP-304L OR TP-316L STAINLESS STEEL TUBING. A COIL OF TUBING (PIGTAIL) TO ALLOW FOR MOVEMENT SHOULD BE INSTALLED AS REQUIRED.
13. FOR ALL NON-SEISMIC CATEGORY I CAPPED VENTS, DRAINS, AND TEST CONNECTIONS: DESIGN, FABRICATION, MATERIAL PROCUREMENT, ERECTION, AND TESTING FOR ALL PIPING DOWNSTREAM OF THE LAST ISOLATION VALVE MAY BE IN ACCORDANCE WITH DESIGN CLASS D.
14. VALVE IS NOT TO BE FULLY CLOSED.
15. TI-59-224A/B AND TI-59-225A/B READINGS ARE ERRONEOUS AND SHOULD BE IGNORED BECAUSE INSTRUMENT SENSING BULBS ARE NOT IN GAS STREAM. USE TI-59-218A/B AND TI-59-223A/B INSTEAD.
16. PENETRATION SLEEVES, INCLUDING THE PENETRATION SLEEVE TO THE FLUED HEAD WELD OUTSIDE CONTAINMENT, ARE PENNSYLVANIA SPECIAL. PENETRATION SLEEVES USED WITHOUT FLUED HEADS, INCLUDING THE FIRST WELD OUTSIDE CONTAINMENT, ARE PENNSYLVANIA SPECIAL, EXCEPT WHERE THE PENETRATION SLEEVE IS PART OF AN ASME CLASS 2 PRESSURE BOUNDARY. WHEN THE PENETRATION SLEEVE IS PART OF AN ASME CLASS 2 PRESSURE BOUNDARY (i.e. THE PENNSYLVANIA SPECIAL SLEEVE JOINS ASME PIPING INSIDE CONTAINMENT TO ASME PIPING OUTSIDE CONTAINMENT), THE FIRST WELD BOTH INSIDE AND OUTSIDE CONTAINMENT SHALL BE IN ACCORDANCE WITH ASME CLASS 2.
17. INSULATING FLANGE KIT FOR TIP DRIVE MECHANISM 2ES-215 ONLY.
18. QUICK CONNECTS REQUIRED PER PROCEDURE SE 1-1.
SUPPRESSION POOL
MECHANICAL
P&ID
PRIMARY CONTAINMENT INSTRUMENT GAS
(UNIT 2)
LIMERICK GENERATING STATION
PECO ENERGY CO.
SHEET 3 OF
8031-M-59
36
CATEGORY A1
M-59 (SHT. 3)

Request for Relief for Alternative Requirements for Pressure Testing the Suppression Pool Pressure and Level Instrumentation In Accordance with 10CFR50.55a(z)(1) Alternative Provides Acceptable Level of Quality and Safety

---

1. ASME Code Component(s) Affected

Code Class:	3
Reference:	IWD-2500, Table IWD-2500-1
Examination Category:	D-B
Item Number:	D2.10
Description:	Alternative Requirements for Pressure Testing the Suppression Pool Pressure and Level Instrumentation
Component Number:	Containment Atmospheric Control Tubing to Suppression Pool Pressure and Level Instrumentation Outboard of SV-57-101 (Unit 1) and SV-57-201 (Unit 2)
Drawing Number:	M-57, Sht. 1 and M-52, Sht. 1 (Unit 1) M-57, Sht. 4 and M-52, Sht. 3 (Unit 2)

See Enclosure 1 for M-57 Sheets 1 and 4, and M-52 Sheets 1 and 3.

2. Applicable Code Edition and Addenda

The Inservice Inspection program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2007 Edition through the 2008 Addenda.

3. Applicable Code Requirement

Table IWD-2500-1, Examination Category D-B, Item Number D2.10, requires all Class 3 pressure retaining components be subject to a system leakage test with a VT-2 visual examination in accordance with IWD-5220. This pressure test is to be conducted once each inspection period.

4. Reason for Request

Pursuant to 10CFR50.55a(z)(1), relief is requested on the basis that the proposed alternative will provide an acceptable level of quality and safety.

The Limerick Generating Station Suppression Pool pressure is less than one (1) psig during normal operation. The pressurizing fluid in the Suppression Pool and level instrumentation is nitrogen gas. A VT-2 visual examination looking for a nitrogen gas leak with less than one (1) psig driving pressure would be inconclusive.

Limerick Generating Station Technical Specifications require monitoring suppression pool pressure every 12 hours to verify proper pressure. Additionally, Technical Specifications require channel checks every 24 hours to verify operability of the suppression pool level indicators. This is performed by verifying proper level readings. A significant tubing leak will give an improper reading, and will be corrected and retested. Also, the tubing and components are also included in the Integrated Leak Rate Test (ILRT) boundary. Valves SV-57-101 and SV-57-201 are open to

perform the ILRT. Therefore, the instrument tubing is subject to the pressure required by the ILRT (44 psig).

In addition, there are no test taps on the subject instrument tubing and plant modifications would be required in order to perform the ASME Section XI pressure tests resulting in a hardship. An additional pressure test once every inspection period to satisfy ASME Section XI requirements is also a hardship in that they would present a redundant testing situation that would result in additional radiation exposure to examination personnel without a compensating increase in the level of quality and safety. The proposed alternative to perform channel checks of the remote pressure indicators to verify drywell pressure instrumentation operability every 12 hours in accordance with the plant Technical Specifications, and the use of 10CFR50 Appendix J, Option B Integrated Leak Rate Testing provides adequate assurance of structural integrity of the tubing and components, and therefore an acceptable level of quality and safety.

5. Proposed Alternative and Basis for Use

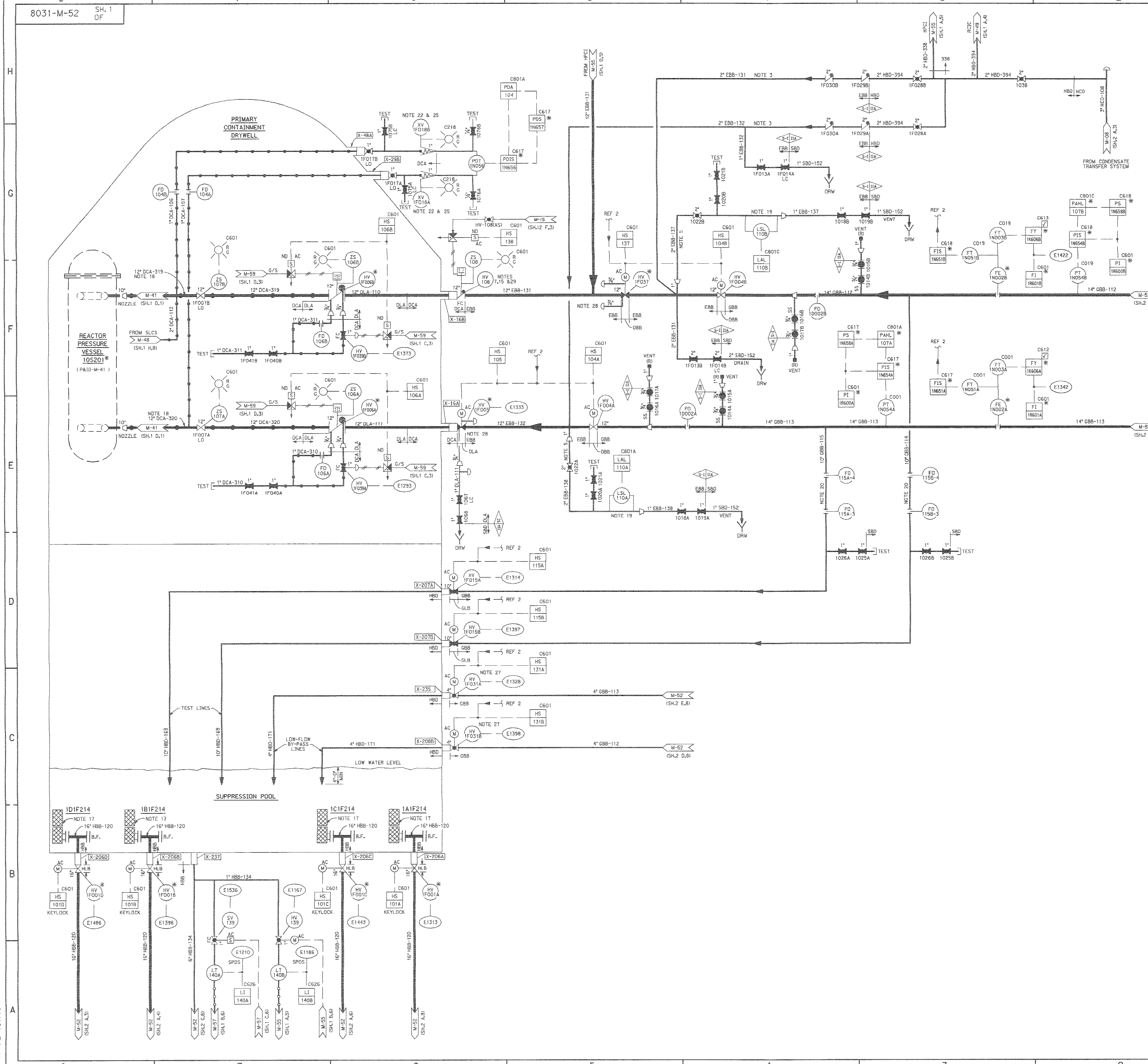
Suppression pool instrumentation operability checks will be performed per station Technical Specifications and Integrated Leak Rate Testing will be performed in accordance with the station Appendix J Program both of which are maintained and controlled independent of the ASME Section XI program.

6. Duration of Proposed Alternative

Relief is requested for the Fourth Ten-Year ISI Interval for Limerick Generating Station Units 1 and 2.

7. Precedents

Limerick Generating Station Third ISI Interval Relief Request I3R-10 was authorized by NRC Safety Evaluation (SE) dated March 11, 2008. The Fourth ISI Interval Relief Request utilizes an identical approach that was previously approved. (ML080500584)



REF No.	REFERENCE DRAWINGS	BECHTEL No.	GE No.
1	P&ID LEGEND	M-00	
2	CORE SPRAY SYSTEM FUNCTIONAL CONTROL DIAGRAM	M1-E21-1030-F	729E613AD
3	CONDENSATE AND REFUELING WATER STORAGE AND TRANSFER	M-08	
4	EMERGENCY SERVICE WATER	M-11	
5	NUCLEAR BOILER P&ID	M-41	
6	NUCLEAR BOILER FUNCTIONAL CONTROL DIAGRAM	M1-B21-1030-F	761E557AD
7	NUCLEAR BOILER VESSEL INSTRUMENTATION	M-42	
8	RESIDUAL HEAT REMOVAL	M-51	
9	LIQUID RADWASTE - COLLECTION	M-61	
10	HPCI SYSTEM	M-55	
11	CORE SPRAY SYSTEM DESIGN SPECIFICATION	M1-E21-4010-L-1	22A3787
12	ELECTRICAL EQUIPMENT SEPARATION FOR SAFEGUARD SYSTEMS	M1-A61-4050-L	22A4027
13	CORE SPRAY SYSTEM P&ID	M1-E21-1010-D-1	731E764A
14	PROCESS INSTRUMENTATION PIPING AND TUBING DESIGN SPECIFICATION	M1-A61-4070-L	22A3732
15	INSTRUMENT INSTALLATION DETAILS	8031-M-830	NA
16	CORE SPRAY SYSTEM FUNCTIONAL DESC.	M-52FD	

NOTES:

1. CORE SPRAY COOLING IS A SEISMIC CLASS I SYSTEM EXCEPT AS NOTED.
2. CHECK VALVES 1F003A THRU D SHALL BE LOCATED BELOW THE SUPPRESSION POOL WATER LEVEL.
3. FILL LINES FROM CONDENSATE SYSTEM SHOULD BE CONNECTED TO PUMP DISCHARGE LINES AS CLOSE TO PRIMARY CONTAINMENT AS PRACTICAL.
4. PIPING HIGH POINT VENTS AND LOW POINT DRAINS ARE TO BE ADDED AS NECESSARY.
5. VENT CONNECTION SHOULD BE LOCATED AT HIGH POINT.
6. THE G.E. MPL NUMBER FOR THIS SYSTEM IS E-21.
7. AIR FAILURE WILL NOT CLOSE THIS VALVE AGAINST NORMAL FLOW.
8. ALL LIQUID LINES INSIDE THE PRIMARY CONTAINMENT SHALL BE SLOPED WHERE PRACTICAL.
9. ALL INSTRUMENT PIPING AND TUBING SHALL BE INSTALLED IN ACCORDANCE WITH REFERENCE 14. FOR DEVIATIONS FROM SLOPE CRITERIA SEE REFERENCE 15.
10. THIS 1½" SCREWED CAP SHALL BE WELDED AFTER TEST.
11. DRAIN LINE FOR THIS VALVE BODY IS TESTED PER ANSI REQUIREMENTS.
12. DELETED.
13. DELETED.
14. DELETED.
15. G.E. MPL INDICATES THIS VALVE AS E21-F038.
16. NON-Q DRAIN AND VENT LINES AND CAPPED ENDS EXTENDING FROM SEISMIC CATEGORY I PIPING ARE SEISMIC CATEGORY IIA DOWNSTREAM OF THE LAST ISOLATION VALVE.
17. THE MAXIMUM DIFFERENTIAL PRESSURE ACROSS THE SUCTION STRAINERS SHALL NOT EXCEED THE AVAILABLE MARGIN ABOVE THE REQUIRED NPSH WHEN THE STRAINERS ARE FULLY FOULED.
18. THIS PORTION OF DCA PIPE IS 316L SS WITH 0.02% CARBON MAXIMUM.
19. THIS PORTION OF EBB-137(-138) SHALL BE A VERTICAL SECTION, ABOVE THE PROCESS LINE. MINIMUM 3 FEET LONG. LSL TAPS SHALL BE PLACED 2 FEET APART. THE LINE FROM THE BOTTOM OF THE VERTICAL SECTION SHALL BE SLOPED DOWN TOWARD THE PROCESS LINE.
20. A STRAIGHT LENGTH OF EIGHT TO TEN PIPE DIAMETERS SHALL BE PROVIDED BETWEEN FO-115A-3 & FO-115A-4 AND BETWEEN FO-115B-3 & FO-115B-4. SINGLE PUMP TEST CONFIGURATION IS SHOWN. ADDITIONAL ORIFICES FO-52-115A-1 & A-2 AND FO-52-115B-1 & B-2 ARE PROVIDED FOR TWO PUMP (LOOP) TEST IF NECESSARY.
21. THIS EQUIPMENT IS BEING MONITORED BY THE VIBRATION MONITORING SYSTEM (VMS). FOR THE TYPE OF SENSORS BEING USED, SEE THE VMS I/O SUMMARY, V.P. 8031-M-247-106. THE PUMP SEAL PIPING, INCLUDING THE SEPARATOR, ARE SHOWN ON V.P. 8031-M-1-E21-C001-B-7.
22. A COMMON TROUBLE ALARM IS PROVIDED IN CONTROL ROOM PANEL 1BC802 FOR THE EXCESS FLOW CHECK VALVES ASSOCIATED WITH LOCAL PANEL C218. THIS ALARM IS INITIATED BY CLOSURE OF ANY OF THESE VALVES.
23. FOR ALL NON-SEISMIC CATEGORY I CAPPED VENTS, DRAINS AND TEST CONNECTIONS: DESIGN, FABRICATION, MATERIAL PROCUREMENT, ERECTION, AND TESTING FOR ALL PIPING DOWNSTREAM OF THE LAST ISOLATION VALVE MAY BE IN ACCORDANCE WITH DESIGN CLASS D.
24. DELETED.
25. THE EXCESS FLOW CHECK VALVE INTERNAL BYPASS IS TO BE LOCKED CLOSED PER LOCKED VALVE-LISTING; PECO ADMIN. PROCEDURE A-8.
26. THERMOCOUPLES TE-52-100A,B,C, AND D ARE BEARING THERMOCOUPLES; THERMOCOUPLES TE-52-102A,B,C, AND D ARE WINDING THERMOCOUPLES.
27. MIN FLOW VALVES HV-52-1F031A,B LIMIT SWITCHES ARE SET SUCH THAT THE VALVE IS IN THE 20% OPEN POSITION SO THAT SYSTEM RESPONSE TIME CAN BE SATISFIED.
28. THE DISC FOR VALVE HV-052-1F005 HAS BEEN MODIFIED TO ELIMINATE PRESSURE LOCKING. REFER TO ECR 97-02606 FOR DETAILS. THE DISC FOR VALVE HV-052-1F037 HAS BEEN MODIFIED TO ELIMINATE PRESSURE LOCKING. REFER TO ECR 99-02161 FOR DETAILS.
29. HV-108 IS A POWER ASSISTED CHECK VALVE. SYSTEM FLOW ALONE WILL OPEN THE VALVE. THE SPRING LOADED PISTON ASSISTS IN CLOSURE ONLY. APPLICATION OF AIR TO COMPRESS THE SPRING REMOVES THE SPRING CLOSURE FORCE BUT DOES NOT LIFT THE DISC.
30. PUMP IS MAINTAINED IN A DE-ENERGIZED POSITION BY LOCKING OPEN THE CIRCUIT BREAKER AND USING ADMINISTRATIVE CONTROLS TO ASSURE THAT THE PUMP REMAINS DE-ENERGIZED WHEN NOT IN USE.

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
51	11/1/12	INCORP. ECR 10-00413 REV. 0. ADDED NOTE 30. [C,1-2].	EJW	EJC	TJJ
50	4/08/10	INCORP. ECR 09-00271 REV. 1 PER C0230877. ADDED VENTS AND VALVES 1014A, 1015A, 1016A, 1017A. [E&F,4&5].	EJW	JCW	RAS
49	3/25/10	PARTIAL INCORP. OF ECR 09-00271 REV. 0. ADDED VENTS AND VALVES 1014B, 1015B, 1016B, 1017B. [F&G,3&4].	EJW	JCW	MJM
48	8/24/06	INCORP. ECR 06-00334 REV. 0. REVISED OPERATOR FOR HV-108 AND ADDED NOTE 29. [F-6].	EJW	JCW	JAL

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
CORE SPRAY
(UNIT 1)

LIMERICK GENERATING STATION
EXELON NUCLEAR CORP.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	09/01/89

APPROVED BECHTEL APPROVED

SHEET 1 OF 8031-M-52 REV 51

I CATEGORY A1

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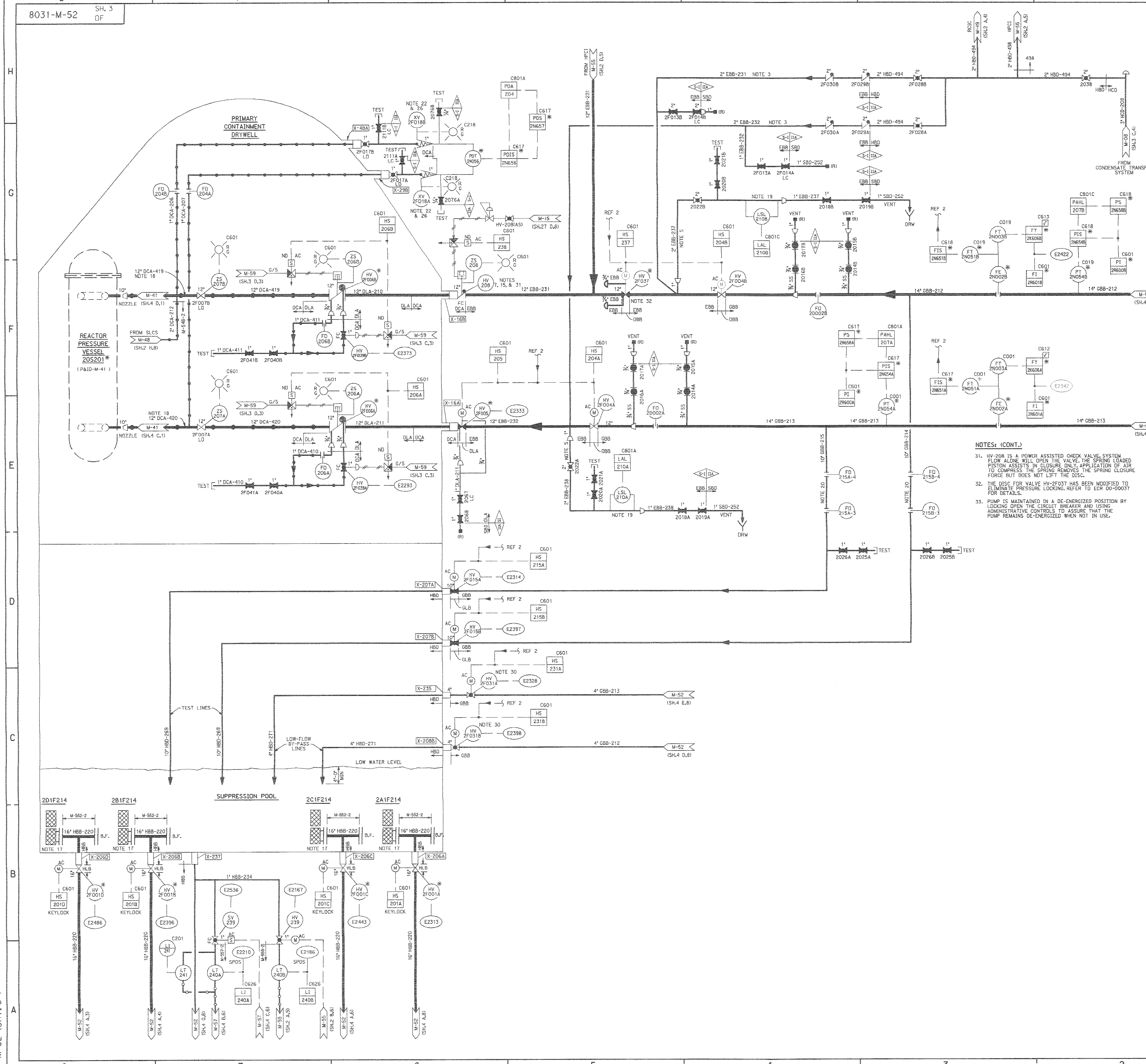
PRINTED: 26 OCT 2012

M-52 (SHT. 1)

8031-M-52 SH. 3 OF



NOTES: (CONT.)

31. HV-208 IS A POWER ASSISTED CHECK VALVE. SYSTEM FLOW ALONE WILL OPEN THE VALVE. THE SPRING LOADED PISTON ASSISTS IN CLOSURE ONLY. APPLICATION OF AIR TO COMPRESS THE SPRING REMOVES THE SPRING CLOSURE FORCE BUT DOES NOT LIFT THE DISC.
32. THE DISC FOR VALVE HV-2F037 HAS BEEN MODIFIED TO ELIMINATE PRESSURE LOCKING. REFER TO ECR 00-00037 FOR DETAILS.
33. PUMP IS MAINTAINED IN A DE-ENERGIZED POSITION BY LOCKING OPEN THE CIRCUIT BREAKER AND USING ADMINISTRATIVE CONTROLS TO ASSURE THAT THE PUMP REMAINS DE-ENERGIZED WHEN NOT IN USE.

REF No.	REFERENCE DRAWINGS	BECHTEL No.	GE No.
1	P&ID LEGEND	M-00	
2	CORE SPRAY SYSTEM FUNCTIONAL CONTROL DIAGRAM	M1-E21-1030-F	729E613AD
3	CONDENSATE AND REFUELING WATER STORAGE AND TRANSFER	M-08	
4	EMERGENCY SERVICE WATER	M-11	
5	NUCLEAR BOILER P&ID	M-41	
6	NUCLEAR BOILER FUNCTIONAL CONTROL DIAGRAM	M1-B21-1030-F	761E557AD
7	NUCLEAR BOILER VESSEL INSTRUMENTATION	M-42	
8	RESIDUAL HEAT REMOVAL	M-51	
9	LIQUID RADWASTE - COLLECTION	M-61	
10	HPCI SYSTEM	M-55	
11	CORE SPRAY SYSTEM DESIGN SPECIFICATION	M1-E21-4010-L-1	22A3787
12	ELECTRICAL EQUIPMENT SEPARATION FOR SAFEGUARD SYSTEMS	M1-A61-4050-L	22A4027
13	CORE SPRAY SYSTEM P&ID	M1-E21-1010-D-1	731E764A
14	PROCESS INSTRUMENTATION PIPING AND TUBING DESIGN SPECIFICATION	M1-A61-4070-L	22A3732
15	INSTRUMENT INSTALLATION DETAILS	8031-M-830	NA
16	CORE SPRAY SYSTEM FUNCTIONAL DESC.	M-52FD	

NOTES:

1. CORE SPRAY COOLING IS A SEISMIC CLASS I SYSTEM EXCEPT AS NOTED.
2. CHECK VALVES 2F003A THRU D SHALL BE LOCATED BELOW THE SUPPRESSION POOL WATER LEVEL.
3. FILL LINES FROM CONDENSATE SYSTEM SHOULD BE CONNECTED TO PUMP DISCHARGE LINES AS CLOSE TO PRIMARY CONTAINMENT AS PRACTICAL.
4. PIPING HIGH POINT VENTS AND LOW POINT DRAINS ARE TO BE ADDED AS NECESSARY.
5. VENT CONNECTION SHOULD BE LOCATED AT HIGH POINT.
6. THE G.E. MPL NUMBER FOR THIS SYSTEM IS E-21.
7. AIR FAILURE WILL NOT CLOSE THIS VALVE AGAINST NORMAL FLOW.
8. ALL LIQUID LINES INSIDE THE PRIMARY CONTAINMENT SHALL BE SLOPED WHERE PRACTICAL.
9. ALL INSTRUMENT PIPING AND TUBING SHALL BE INSTALLED IN ACCORDANCE WITH REFERENCE 14. FOR DEVIATIONS FROM SLOPE CRITERIA SEE REFERENCE 15.
10. DELETED.
11. DRAIN LINE FOR THIS VALVE BODY IS TESTED PER ANSI REQUIREMENTS.
12. DELETED.
13. DELETED.
14. DELETED.
15. G.E. MPL INDICATES THIS VALVE AS E21-F038.
16. NON-Q DRAIN AND VENT LINES AND CAPPED ENDS EXTENDING FROM SEISMIC CATEGORY I PIPING ARE SEISMIC CATEGORY IIA DOWNSTREAM OF THE LAST ISOLATION VALVE.
17. THE MAXIMUM DIFFERENTIAL PRESSURE ACROSS THE SUCTION STRAINERS SHALL NOT EXCEED THE AVAILABLE MARGIN ABOVE THE REQUIRED NPSH WHEN THE STRAINERS ARE FULLY FOULED.
18. THIS PORTION OF DCA PIPE IS 316L SS WITH 0.02% CARBON MAXIMUM.
19. THIS PORTION OF EBB-237(-238) SHALL BE A VERTICAL SECTION, ABOVE THE PROCESS LINE. MINIMUM 3 FEET LONG. LSL TAPS SHALL BE PLACED 2 FEET APART. THE LINE FROM THE BOTTOM OF THE VERTICAL SECTION SHALL BE SLOPED DOWN TOWARD THE PROCESS LINE.
20. A STRAIGHT LENGTH OF EIGHT TO TEN PIPE DIAMETERS SHALL BE PROVIDED BETWEEN FO-215A-3 & FO-215A-4 AND BETWEEN FO-215B-3 & FO-215B-4. SINGLE PUMP TEST CONFIGURATION IS SHOWN. ADDITIONAL ORIFICES FO-52-215A-1 & A-2 AND FO-52-215B-1 & B-2 ARE PROVIDED FOR TWO PUMP (LOOP) TEST IF NECESSARY.
21. THIS EQUIPMENT IS BEING MONITORED BY THE VIBRATION MONITORING SYSTEM (VMS). FOR THE TYPE OF SENSORS BEING USED, SEE THE VMS I/O SUMMARY, V.P. 8031-M-247-108. THE PUMP SEAL PIPING, INCLUDING THE SEPARATOR, ARE SHOWN ON V.P. 8031-M-1-E21-C001-B-7.
22. A COMMON TROUBLE ALARM IS PROVIDED IN CONTROL ROOM PANEL 2BC802 FOR THE EXCESS FLOW CHECK VALVES ASSOCIATED WITH LOCAL PANEL C218. THIS ALARM IS INITIATED BY CLOSURE OF ANY OF THESE VALVES.
23. FOR ALL NON-SEISMIC CATEGORY I CAPPED VENTS, DRAINS AND TEST CONNECTIONS: DESIGN, FABRICATION, MATERIAL PROCUREMENT, ERECTION, AND TESTING FOR ALL PIPING DOWNSTREAM OF THE LAST ISOLATION VALVE MAY BE IN ACCORDANCE WITH DESIGN CLASS D.
24. DELETED.
25. UNLESS OTHERWISE INDICATED, ALL ASME PIPING ON THIS P&ID IS IN THE SCOPE OF NUCLEAR PIPING DESIGN SPECIFICATION 8031-M-552-2.
26. THE INTERNAL BYPASS VALVES AROUND EXCESS FLOW CHECK VALVES ARE LOCKED CLOSED.
27. PENETRATION SLEEVES, INCLUDING THE PENETRATION SLEEVE TO FLUED HEAD WELD OUTSIDE CONTAINMENT ARE PENNSYLVANIA SPECIAL. PENETRATION SLEEVES USED WITHOUT FLUED HEADS, INCLUDING THE FIRST WELD OUTSIDE CONTAINMENT, ARE PENNSYLVANIA SPECIAL EXCEPT WHERE THE PENETRATION SLEEVE IS PART OF AN ASME CLASS 2 PRESSURE BOUNDARY. WHEN THE PENETRATION SLEEVE IS PART OF AN ASME CLASS 2 PRESSURE BOUNDARY, (I.E. THE PENNSYLVANIA SPECIAL SLEEVE JOINS ASME PIPING INSIDE CONTAINMENT TO ASME PIPING OUTSIDE CONTAINMENT) THE FIRST WELD BOTH INSIDE/OUTSIDE CONTAINMENT SHALL BE IN ACCORDANCE WITH ASME CLASS 2.
28. EXISTING TEST CONNECTION PIPE CAPS (OF ¾" OR 1") UP-STREAM OF THE EXCESS FLOW CHECK VALVES (XV), MAY BE REPLACED BY REDUCED SIZE SWAGE-LOCK FITTINGS AND ⅜" PLUG.
29. SPACER IS INSTALLED BETWEEN FLANGES.
30. MIN FLOW VALVES HV-52-2F031A,B LIMIT SWITCHES ARE SET SUCH THAT THE VALVE IS IN THE 20% OPEN POSITION SO THAT SYSTEM RESPONSE TIME CAN BE SATISFIED.

(NOTES CONTINUED ABOVE)

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
20	11/1/12	INCORP. ECR 10-00413 REV. 0. ADDED NOTE 33. [E,2-3].	EJW	EJC	TJ
19	4/05/09	FINAL INCORP. ECR 08-00457 REV. 0, PER WO C0227508. ADDED VENTS AND VALVES 2014B, 2015B, 2016B, 2017B, UPSTREAM OF HV-2F004B. [F&G,4].	EJW	JCW	TJ
18	3/27/09	PARTIAL INCORP. ECR 08-00457 REV. 0, PER WO C0227509. ADDED VENTS AND VALVES 2014A, 2015A, 2016A, 2017A, UPSTREAM OF HV-2F004A. [E&F,4&5].	EJW	JCW	TJ
17	8/24/06	INCORP. ECR 06-00334 REV. 0. CORRECTED SYMBOL USED FOR OPERATOR ON HV-208. [F,6].	EJW	JCW	JAL

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
CORE SPRAY
(UNIT 2)

LIMERICK GENERATING STATION
EXELON NUCLEAR CORP.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	11/01/89

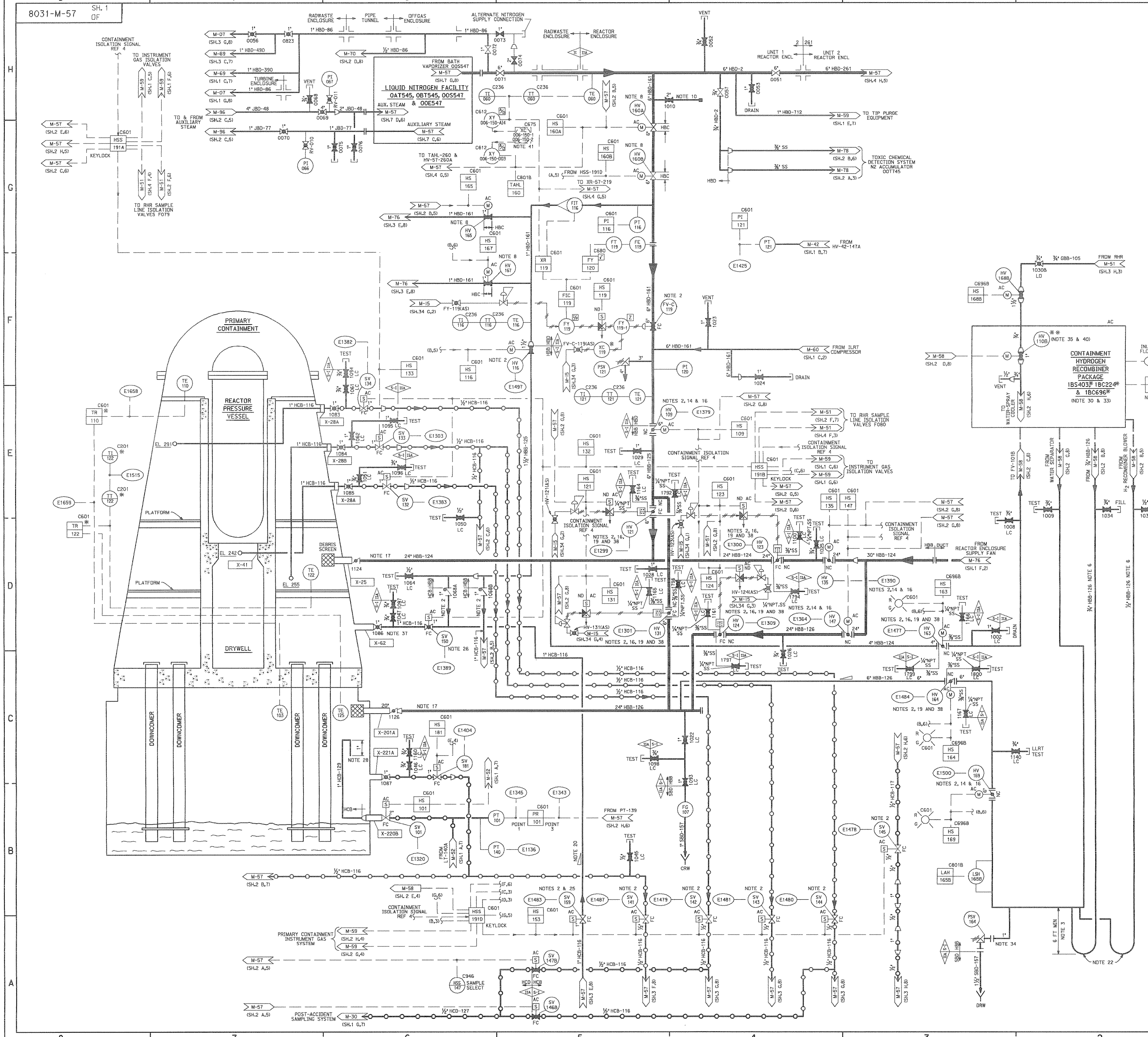
APPROVED BECHTEL APPROVED

SHEET 3 OF 8031-M-52 REV 20

I CATEGORY A1

M-52 (SHT. 3)

8031-M-57 SH. 1 OF



REF No.	REFERENCE DRAWINGS	BECHTEL No.	GE No.
3	P&ID LEGEND	M-00	
4	NSS SHUTOFF SYSTEM ELEMENTARY DIAGRAM	M1-B21-1090-E-	791E401TN

- NOTES REFERENCED ON THIS SHEET ARE LISTED ON SHEET 2 -

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
47	10/23/09	INCORP. ECR 09-00427 REV. 0. CHANGED PR-101 PEN 2 AND PEN 1 TO POINT 1 AND POINT 3 RESPECTIVELY. [B,5].	EJW	ESY	DLZ
46	3/19/04	INCORP. ECR 01-00394 REV. 2. CHANGED SV-146B & SV-147B TO GLOBE VALVES. ADDED HBC CLASS TO HV-165 & 167. [A,5] AND [F&G,6].	EJW	JCW	MSD
45	3/09/04	INCORP. ECR 03-00085 REV. 0 PER WO C0207259. ADDED XY-006-150-A14 & D03 AND XC-006-150-1,-2 AND REF TO NOTE 41. [D,6].	EJW	JCW	RNH
44	2/13/97	INCORP. ECR 96-04500 REV. 0 CHANGED VALVE SV-150 FROM GATE TO GLOBE. [D,6].	DJD	JVM	PAG FOR SJB

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
CONTAINMENT ATMOSPHERIC CONTROL (UNIT 1 AND COMMON)

LIMERICK GENERATING STATION
EXELON NUCLEAR CORP.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	04-06-90

APPROVED BECHTEL APPROVED

SHEET 1 OF | 8031-M-57 | 47

I CATEGORY A1

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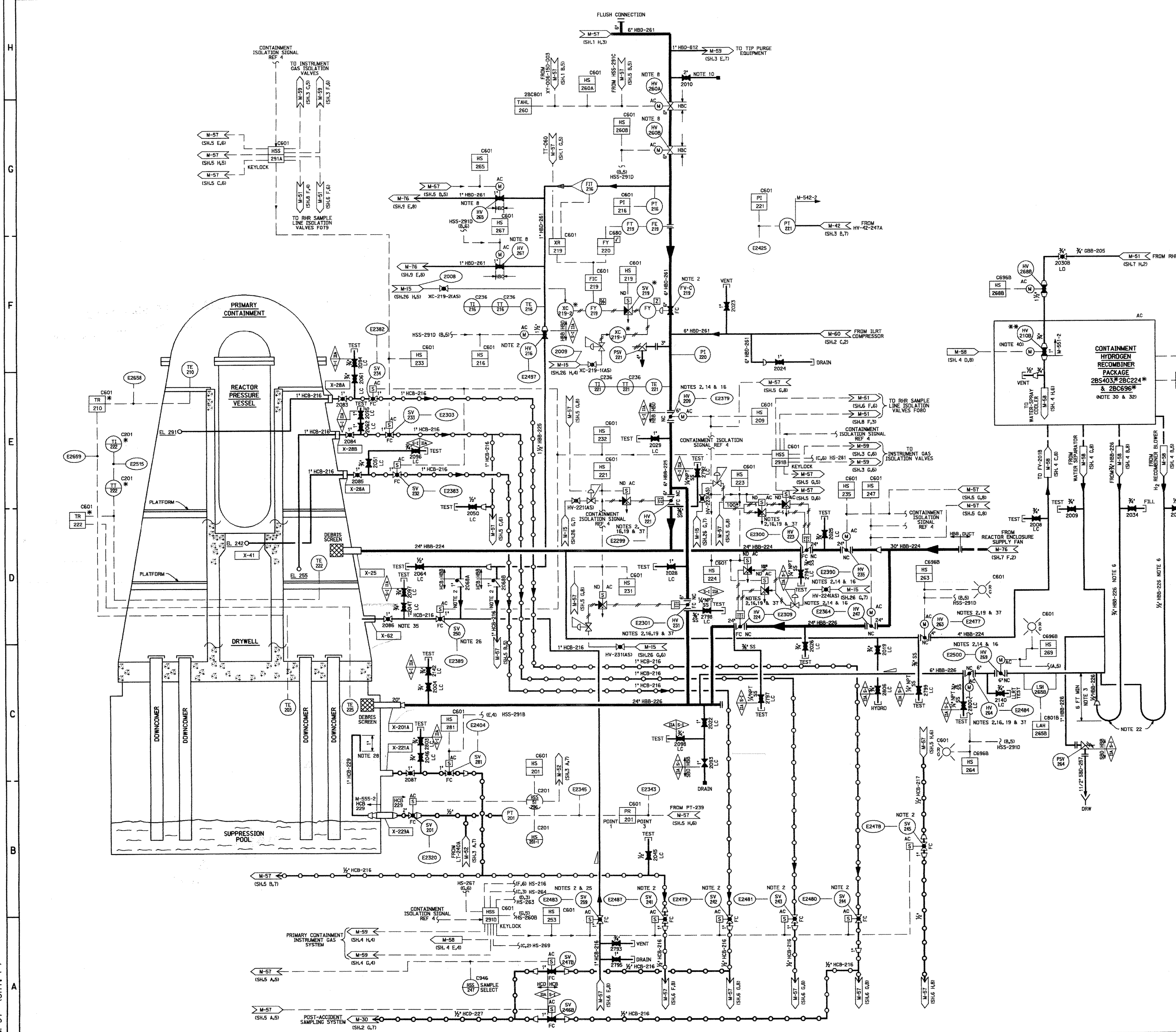
PRINTED: 19 OCT 2009

M-57 (SHT. 1)

8031-M-57 SH. 4



REF No.	REFERENCE DRAWINGS	BECHTEL No.	GE No.
1	NITROGEN INERTING SUPPLY SYSTEM FLOW SHEET	M-95-1-41	
3	P&ID LEGEND	M-00	
4	NSS SHUTOFF SYSTEM ELEMENTARY DIAGRAM	M1-B21-1090-E-	791E401TN

- NOTES REFERENCED ON THIS SHEET ARE LISTED ON SHEET 5 -

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
13	11/11/09	INCORP. ECR 09-00378 REV 0. ADDED POINT 1 AND 3 TO PR-201. [B,5].	EJW		
12	3/12/05	INCORP. ECR 04-00118 REV 0 PER WO C0211342. CHANGED REFERENCE FLAG DESIGNATION. [H,5].	EJW	JCW	MSD
11	7/24/00	INCORP. ECR 97-01615 REV 0. REMOVED REFERENCE TO PEN 1 AND PEN 2 AT PR-201. [B,5].	RBR	SCD	MSD
10	[illegible] 95	ADDED NOTATION "CATEGORY A1" BELOW TITLE BLOCK.	DJD	EJW	JEK

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
CONTAINMENT ATMOSPHERIC CONTROL
(UNIT 2)

LIMERICK GENERATING STATION
EXELON NUCLEAR CORP.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	10/17/89

APPROVED BECHTEL APPROVED

SHEET 4 OF 8031-M-57 13

I CATEGORY A1

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PRINTED: 06 NOV 2009

M-57 (SHT. 4)

Request for Relief for Alternative Requirements for Pressure Testing the Hydrogen Recombiner and Combustible Gas Analyzer In Accordance with 10CFR50.55a(z)(1) Alternative Provides Acceptable Level of Quality and Safety

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1. ASME Code Component(s) Affected

Code Class:	2
Reference:	IWC-2500, Table IWC-2500-1
Examination Category:	C-H
Item Number:	C7.10
Description:	Alternative Requirements for Pressure Testing the Hydrogen Recombiner and Combustible Gas Analyzer
Component Number:	Post LOCA Recombiner piping HBB-127 and HBB-128 and H2/O2 sampling lines HCB-116 and HCB-117 (Unit 1) Post LOCA Recombiner piping HBB-227 and HBB-228 and H2/O2 sampling lines HCB-216 and HCB-217 (Unit 2) See Note 1 below for more details.
Drawing Number:	M-57, Shts. 1, 2, and 3 (Unit 1) M-57, Shts. 4, 5, and 6 (Unit 2)

Note 1: A more detailed description of the pressure testing boundary is identified below.

LGS Unit 1: Class 2 Post LOCA Recombiner piping HBB 128 and HBB 127 between and including “A” Recombiner and valves HV 57 161 and HV 57 162. HBB 126 and HBB 124 between and including “B” Recombiner and valves HV 57 163 and HV 57 164.

Class 2 hydrogen/oxygen sampling lines HCB-116 and HCB-117, between connections on the Combustible Gas Analyzer Package 10-S205, and valves SV-57-159, SV-57-141, SV-57-142 and SV-57-147B, SV-57-143, SV-57-144 and SV-57-146B, and SV-57-145 (HCB-117). HCB-116 and HCB-117, between connections on the Combustible Gas Analyzer Package 10-S206, and valves SV-57-184 and SV-57-146A, SV-57-186 and SV-57-147A, SV-57-195, SV-57-190 and 57-1090, and SV-57-185 (HCB-117).

LGS Unit 2: Class 2 Post LOCA Recombiner piping HBB 228 and HBB 227 between and including “A” Recombiner and valves HV 57 261 and HV 57 262. HBB 226 and HBB 224 between and including “B” Recombiner and valves HV 57 263 and HV 57 264.

Class 2 hydrogen/oxygen sampling lines HCB-216 and HCB-217, between connections on the Combustible Gas Analyzer Package 20-S205, and valves SV-57-259, SV-57-241, SV-57-242 and SV-57-247B, SV-57-243, SV-57-244 and SV-57-246B, and SV-57-245 (HCB-217). HCB-216 and HCB-217, between connections on the Combustible Gas Analyzer Package 20-S206, and valves SV-57-284 and SV-57-246A, SV-57-286 and SV-57-247A, SV-57-295, SV-57-290 and 57-2090, and SV-57-285 (HCB-217).

See Enclosure 1 for M-57 Sheets 1, 2, 3, 4, 5, and 6.

2. Applicable Code Edition and Addenda

The Inservice Inspection program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2007 Edition through the 2008 Addenda.

3. Applicable Code Requirement

Table IWC-2500-1, Examination Category C-H, Item Number C7.10, requires all Class 2 pressure retaining components be subject to a system leakage test with a VT-2 visual examination in accordance with IWC-5220. This pressure test is to be conducted once each inspection period.

4. Reason for Request

Pursuant to 10CFR50.55a(z)(1), relief is requested on the basis that the proposed alternative will provide an acceptable level of quality and safety.

During normal plant operation, this piping is either isolated or less than one (1) psig (normal containment pressure). The pressurizing fluid is essentially nitrogen gas. A VT-2 visual examination looking for a nitrogen gas leak with less than one (1) psig driving pressure would be inconclusive.

System Contaminated Pipe Inspection (CPI) is currently performed once per Refuel Outage on post-LOCA Recombiner piping. During CPI testing associated with the Leak Reduction Program (UFSAR 6.2.8), this piping is pressurized to 44 psig. CPIs for this system are performed similar to 10CFR50 Appendix J Local Leak Rate Testing and, as such, offer the following advantages over system pressure tests:

A. CPIs have the ability to quantify leakage that is not feasible with a VT-2 visual examination on this air filled piping.

B. CPIs conservatively include through valve leakage that would not be identified in a VT-2 visual examination.

In addition, for the hydrogen/oxygen sampling lines the combustible gas analyzer continuously samples containment. A tubing leak will cause improper (high) readings that would be corrected and retested.

IWC-5210(b)(2) allows for gas tests which permit location and detection of through-wall leakage. In the event the CPI fails to meet its acceptance criteria, further testing would be performed to determine the location of the leaks, appropriate corrective maintenance, and an appropriate retest would be performed.

5. Proposed Alternative and Basis for Use

System Contaminated Pipe Inspection (CPI) will be utilized to meet the ASME Section XI IWC-5000 pressure testing requirements and will be maintained and controlled independent of the ASME Section XI program.

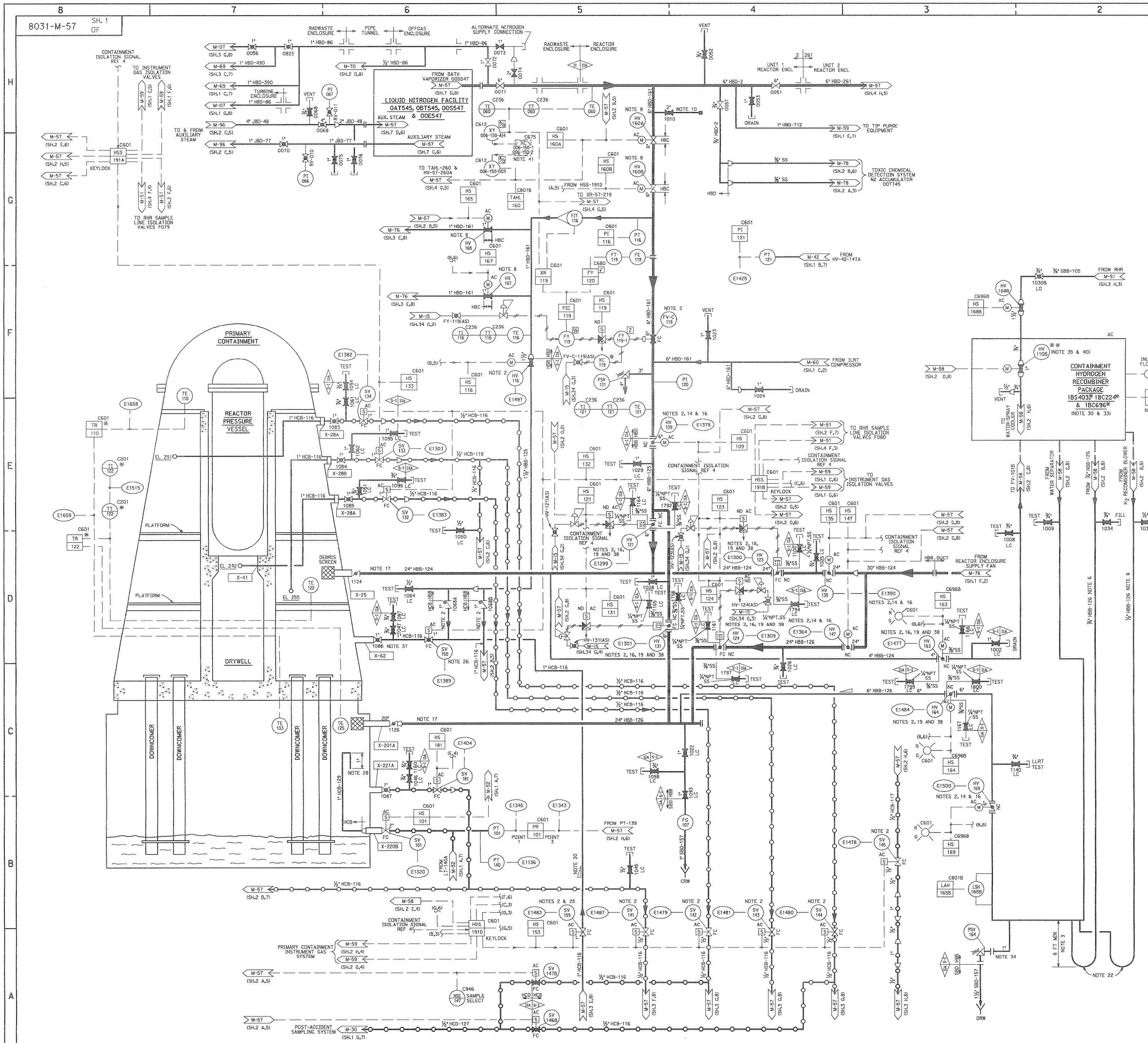
6. Duration of Proposed Alternative

Relief is requested for the Fourth Ten-Year ISI Interval for Limerick Generating Station Units 1 and 2.

7. Precedents

Limerick Generating Station Third ISI Interval Relief Request I3R-11 was authorized by NRC Safety Evaluation (SE) dated March 11, 2008. The Fourth ISI Interval Relief Request utilizes an identical approach that was previously approved. (ML080500584)

8031-M-57 SH. 1 OF



REF No.	REFERENCE DRAWINGS	BECHTEL No.	GE No.
3	P&ID LEGEND	M-00	
4	NSS SHUTOFF SYSTEM ELEMENTARY DIAGRAM	M1-B21-1090-E-	791E401TN

- NOTES REFERENCED ON THIS SHEET ARE LISTED ON SHEET 2 -

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
47	10/23/09	INCORP. ECR 09-00427 REV. 0. CHANGED PR-101 PEN 2 AND PEN 1 TO POINT 1 AND POINT 3 RESPECTIVELY. [B,5].	EJW	ESY	DEZ
46	3/19/04	INCORP. ECR 01-00394 REV. 2. CHANGED SV-146B & SV-147B TO GLOBE VALVES. ADDED HBC CLASS TO HV-165 & 167. [A,5] AND [F&G,6].	EJW	JCW	MSD
45	3/09/04	INCORP. ECR 03-00085 REV. 0 PER WD C0207259. ADDED XY-006-150-A14 & D03 AND XC-006-150-1,-2 AND REF TO NOTE 41. [D,6].	EJW	JCW	RHH
44	2/13/97	INCORP. ECR 96-04500 REV. 0 CHANGED VALVE SV-150 FROM GATE TO GLOBE. [D,6].	DJD	JVM	PAG FOR SJB

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
CONTAINMENT ATMOSPHERIC CONTROL
(UNIT 1 AND COMMON)

LIMERICK GENERATING STATION
EXELON NUCLEAR CORP.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	04-06-90

APPROVED BECHTEL APPROVED

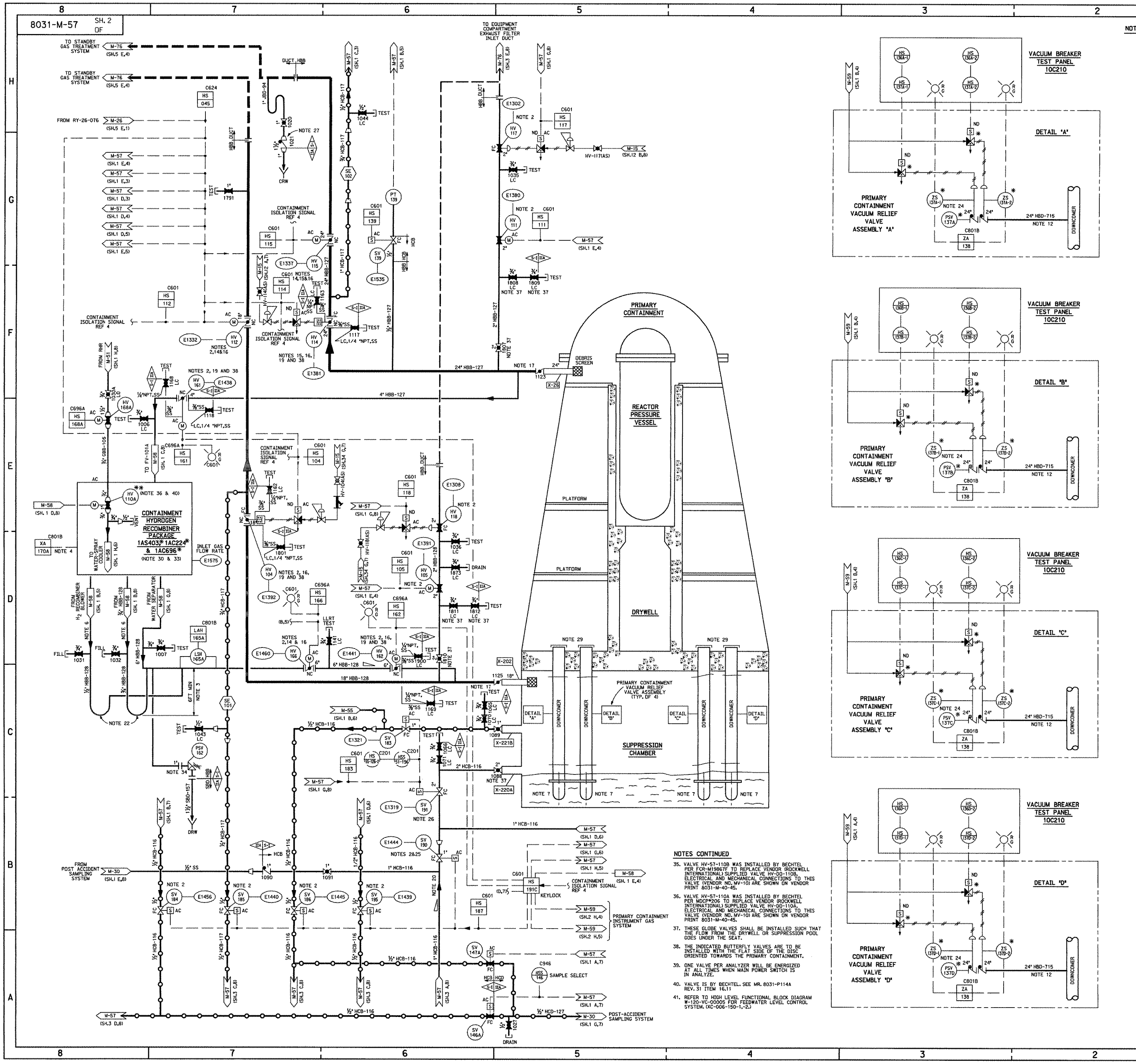
SHEET 1 OF 8031-M-57 47

I CATEGORY A1

PRINTED: 19 OCT 2009

M-57 (SHT. 1)

8031-M-57 SH. 2 OF



NOTES:

1. THIS SYSTEM IS A SEISMIC CLASS I SYSTEM EXCEPT AS NOTED.
2. LOCATE AS NEAR AS PRACTICAL TO PRIMARY CONTAINMENT.
3. THE CONNECTION POINTS BETWEEN ½" AND ¾" RECOMBINER DRAIN LINES AND THE 6" RECOMBINER EXHAUST LINE ARE TO BE LOCATED 12 FEET OR MORE BELOW THE ELEVATION OF THE DRAIN CONNECTIONS ON THE RECOMBINER SKID.
4. ALARMS XA-170A AND XA-170B INDICATE RECOMBINER TROUBLE. THE INDIVIDUAL CONDITIONS INVOLVED ARE ANNUNCIATED AT THE RECOMBINER CONTROL CABINETS, EXCEPT FOR LOSS OF POWER TO THE TRICKLE HEATERS AND LOSS OF ALL POWER TO THE RECOMBINER. THE AVAILABILITY OF THE TRICKLE HEAT POWER IS INDICATED BY A LIGHT ON THE RECOMBINER CONTROL CABINETS; NO INDICATION IS PROVIDED FOR LOSS OF POWER TO THE RECOMBINER.
5. HEAT TRACING ON SAMPLE LINES IS TO BE POWERED FROM A SAFEGUARD AC SOURCE.
6. ¾" HBB-126 AND HBB-128 DRAIN THE PIPING UPSTREAM OF THE RECOMBINER BLOWER. ½" HBB-126 AND HBB-128 DRAIN THE RECOMBINER BLOWER CASING. BOTH DRAIN LINES SHALL CONNECT TO THE BOTTOM OF A HORIZONTAL RUN OF THE 6" RECOMBINER EXHAUST LINE.
7. THE DOWNCOMER CAP DRAIN LINE SHALL EXTEND APPROXIMATELY 8 FEET ABOVE THE DOWNCOMER CAP AND APPROXIMATELY 4 FEET BELOW THE DOWNCOMER CAP. THE DRAIN LINE SHALL BE CONSTRUCTED OF 3" SCHEDULE 160 CARBON STEEL PIPE AND SHALL BE SUPPORTED INSIDE THE DOWNCOMER BY BUMPER GUSSETS. ONLY THE FOUR DOWNCOMERS THAT HAVE PRIMARY CONTAINMENT VACUUM RELIEF VALVE ASSEMBLIES ARE CAPPED.
8. VALVES HV-165 AND HV-167 OPEN UPON RECIEPT OF A CONTAINMENT ISOLATION SIGNAL. THESE TWO VALVES, PLUS VALVES HV-160A, HV-160B ARE Q-LISTED AND SEISMIC CLASS I.
9. REAGENT GAS CYLINDERS AND SPAN GAS CYLINDERS ARE SUPPLIED BY PECO.
10. THE INDICATED HOSE CONNECTION IS TO BE USED FOR ILRT PURPOSES IN CONJUNCTION WITH THE HOSE CONNECTION SHOWN ON P&ID M-41, SHEET 2, AT ZONE D,3.
11. THE INDICATED HOSE CONNECTIONS ARE FOR TEMPORARY CONNECTION OF CYLINDERS CONTAINING 07% H2 FOR H2 ANALYZER CALIBRATION.
12. THE DESIGN OF THE MOUNTING TEES FOR THE PRIMARY CONTAINMENT VACUUM RELIEF VALVE ASSEMBLIES IS IN ACCORDANCE WITH SPECIAL CERTIFICATION REQUIREMENTS OF THE STATE OF PENNSYLVANIA.
13. FOR TEST CONNECTIONS ATTACHED TO SEISMIC CATEGORY I PIPING, THE PIPING BETWEEN THE SHUTOFF VALVE AND THE CAPPED END OF THE TEST CONNECTIONS IS DESIGNATED AS SEISMIC CATEGORY IIA.
14. THE INDICATED BUTTERFLY VALVES ARE TO BE INSTALLED WITH THE FLAT SIDE OF THE DISC ORIENTED AWAY FROM THE PRIMARY CONTAINMENT.
15. VALVES HV-114 AND HV-115 ARE TO BE LOCATED OUTSIDE THE RWCU ISLOATION VALVE COMPARTMENT.
16. THE MINIMUM SEPARATION BETWEEN ADJACENT BUTTERFLY VALVES IN A PIPING RUN SHALL BE AS SPECIFIED BY THE VALVE VENDOR, BUT SHALL BE AT LEAST ONE NOMINAL PIPE DIAMETER.
17. VALVES 1123, 1124, 1125 AND 1126 ARE WELDED OPEN AND INOPERABLE. THE MOTOR OPERATORS HAVE BEEN REMOVED.
18. FOR ALL NON-SEISMIC CATEGORY I CAPPED VENTS, DRAINS, AND TEST CONNECTIONS: DESIGN, FABRICATION, MATERIAL PROCUREMENT, ERECTION, AND TESTING FOR ALL PIPING BEYOND THE LAST ISOLATION VALVE MAY BE IN ACCORDANCE WITH DESIGN CLASS D.
19. EACH OF THE INDICATED VALVES IS PROVIDED WITH A SEPARATE TESTABLE SEAL ASSEMBLY, WITH DOUBLE CONCENTRIC O-RING SEALS, INSTALLED BETWEEN THE PIPE FLANGE AND VALVE FLANGE AT THE END OF THE VALVE THAT FACES THE PRIMARY CONTAINMENT. THESE SEAL ASSEMBLIES ARE PROCURED UNDER P.O. M-182, AS NON-Q FOR A Q-LISTED SERVICE, AND ARE USED IN LIEU OF "FLEXITALLIC" GASKETS. THE PIPE FLANGE ADJACENT TO THE TESTABLE SEAL ASSEMBLY HAS A ⅛" NPT PRESSURE TAP FOR PRESSURE TESTING THE SEAL.
20. AS-BUILT CONFIGURATION OF LINES SHOWN ON THE PIPING ISOMETRICS REFERENCED IN FCR-17,213 IS ACCEPTABLE.
21. THE DIFFERENTIAL MOVEMENT LOOPS (PIGTAILS) IN TUBING ASSOCIATED WITH THE SPAN GAS AND REAGENT GAS CYLINDERS SHALL EACH CONSIST OF A 720° SPIRAL. THE SPIRAL SHALL HAVE A MINIMUM DIAMETER OF 6 INCHES AND POINTS ON THE SPIRAL THAT ARE 360° APART SHALL BE SEPARATED BY A GAP OF APPROXIMATELY 1 INCH.
22. THE LOCATIONS OF THE LOOP SEALS ARE ACCEPTABLE.
23. INSTALLATION IS TO BE IN ACCORDANCE WITH ANSI B31.1 REQUIREMENTS. THE GAS SUPPLY TUBING SHALL BE PNEUMATICALLY TESTED TO ANSI B31.1 BASED ON A DESIGN PRESSURE OF 60 PSIG.
24. PRIMARY CONTAINMENT VACUUM RELIEF VALVE ASSEMBLIES CONSIST OF AN UPSTREAM VALVE DESIGNATED BY THE SUFFIX -1 AND A DOWNSTREAM VALVE DESIGNATED BY SUFFIX -2.
25. THE INDICATED VALVES SEAT AGAINST FLOW IN ONE DIRECTION ONLY AND SHALL BE ORIENTED SO AS TO PROVIDE CONTAINMENT ISOLATION AGAINST FLOW FROM THE PRIMARY CONTAINMENT OUTWARD.
26. THE INDICATED VALVE SHALL BE CAPABLE OF SEATING AGAINST FLOW IN BOTH DIRECTIONS.
27. FOR CHECK VALVE 1021, REMOVE SPRING TO ACHIEVE OPENING AT LOW DIFFERENTIAL PRESSURE.
28. 1" HCB-129 GOOSENECK SHALL BE LOCATED AS HIGH AS PRACTICAL INSIDE THE SUPPRESSION CHAMBER, BUT THE ELEVATION OF THE OPEN END SHALL NOT BE LESS THAN 230'-6". AS-BUILT ELEVATION OF GOOSENECK OPEN END IS USED IN EPG/SAG CALCULATIONS.
29. A WEIR OF 1" X ⅛" CARBON STEEL PLATE WILL BE WELDED TO THE TOP OF THE CAPPED DOWNCOMERS TO PRECLUDE WATER OF A DRYWELL FLOOD FROM ENTERING THESE DOWNCOMERS PRIOR TO ENTERING THE OTHER DOWNCOMERS.
30. IN THE CONTAINMENT HYDROGEN RECOMBINER ASSEMBLIES (1AS403 & 1BS403) BECHTEL HAS REPLACED TRANSMITTERS PT-DO-102A&B, FT-DO-102A&B, FT-DO-101A&B AS WELL AS THERMOCOUPLES AND INSTRUMENT TUBING. DETAILS OF THE TUBING INSTALLATION, INCLUDING ASME CODE BOUNDARIES, ARE DESCRIBED IN 8031-M-58 SHTS. 1&2 AS MODIFIED BY FCR M-19263F, REV. 1.
31. DELETED.
32. DELETED.
33. DETAILS OF THE OUTBOARD, INLET LINE, CONTAINMENT ISOLATION VALVES (FV-DO-101A AND 101B) AND ASSOCIATED LOGIC ARE SHOWN ON VENDOR PRINTS 8031-M-40-45,78, AND 80 (4). THESE VALVES ARE SUPPLIED BY THE VENDOR AND ARE PART OF THE RECOMBINER PACKAGE.
34. THE UPSTREAM TRANSITION PIECES BETWEEN FLANGE AND VALVE AND THE VALVE INLET BASES FOR PSV-57-162 AND PSV-57-164 ARE STAINLESS STEEL CLASS HCB.
(NOTES CONTINUE AT COORDINATE B,4)

NOTES CONTINUED

35. VALVE HV-57-110B WAS INSTALLED BY BECHTEL PER FCR-M19867F TO REPLACE VENDOR (ROCKWELL INTERNATIONAL) SUPPLIED VALVE HV-DO-110B. ELECTRICAL AND MECHANICAL CONNECTIONS TO THIS VALVE (VENDOR NO. MV-10) ARE SHOWN ON VENDOR PRINT 8031-M-40-45.
36. VALVE HV-57-110A WAS INSTALLED BY BECHTEL PER MDCP*206 TO REPLACE VENDOR (ROCKWELL INTERNATIONAL) SUPPLIED VALVE HV-DO-110A. ELECTRICAL AND MECHANICAL CONNECTIONS TO THIS VALVE (VENDOR NO. MV-10) ARE SHOWN ON VENDOR PRINT 8031-M-40-45.
37. THESE GLOBE VALVES SHALL BE INSTALLED SUCH THAT THE FLOW FROM THE DRYWELL OR SUPPRESSION POOL GOES UNDER THE SEAT.
38. THE INDICATED BUTTERFLY VALVES ARE TO BE INSTALLED WITH THE FLAT SIDE OF THE DISC ORIENTED TOWARDS THE PRIMARY CONTAINMENT.
39. ONE VALVE PER ANALYZER WILL BE ENERGIZED AT ALL TIMES WHEN MAIN POWER SWITCH IS IN ANALYZE.
40. VALVE IS BY BECHTEL. SEE MR. 8031-P114A REV. 31 ITEM 16.11
41. REFER TO HIGH LEVEL FUNCTIONAL BLOCK DIAGRAM W-120-VC-00005 FOR FEEDWATER LEVEL CONTROL SYSTEM. (XC-006-150-1,-2.)

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
47	[illegible]	INCORP. ECR 04-00404 REV. 0. CHANGED 1" HBC-116 TO 1" HCB-116. [B,5].	[illegible]	[illegible]	[illegible]
46	3/19/04	INCORP. ECR 01-00394 REV. 2. CHANGED SV-146A AND SV-147A TO GLOBE VALVES. [A,6].	EJW	JCW	MSD
45	3/09/04	INCORP. ECR 01-00523 REV. 1 PER WO C0197680. CHANGED REFERENCE TO NOTE 25 TO NOTE 26 AT SV-191. [B,6].	EJW	JCW	MSD
44	3/09/04	INCORP. ECR 03-00085 REV. 0 PER WO C0207259. ADDED NOTE 41. [A,4].	EJW	JCW	MSD

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
CONTAINMENT ATMOSPHERIC CONTROL
(UNIT 1)

LIMERICK GENERATING STATION
PECO ENERGY CO.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	03-22-91

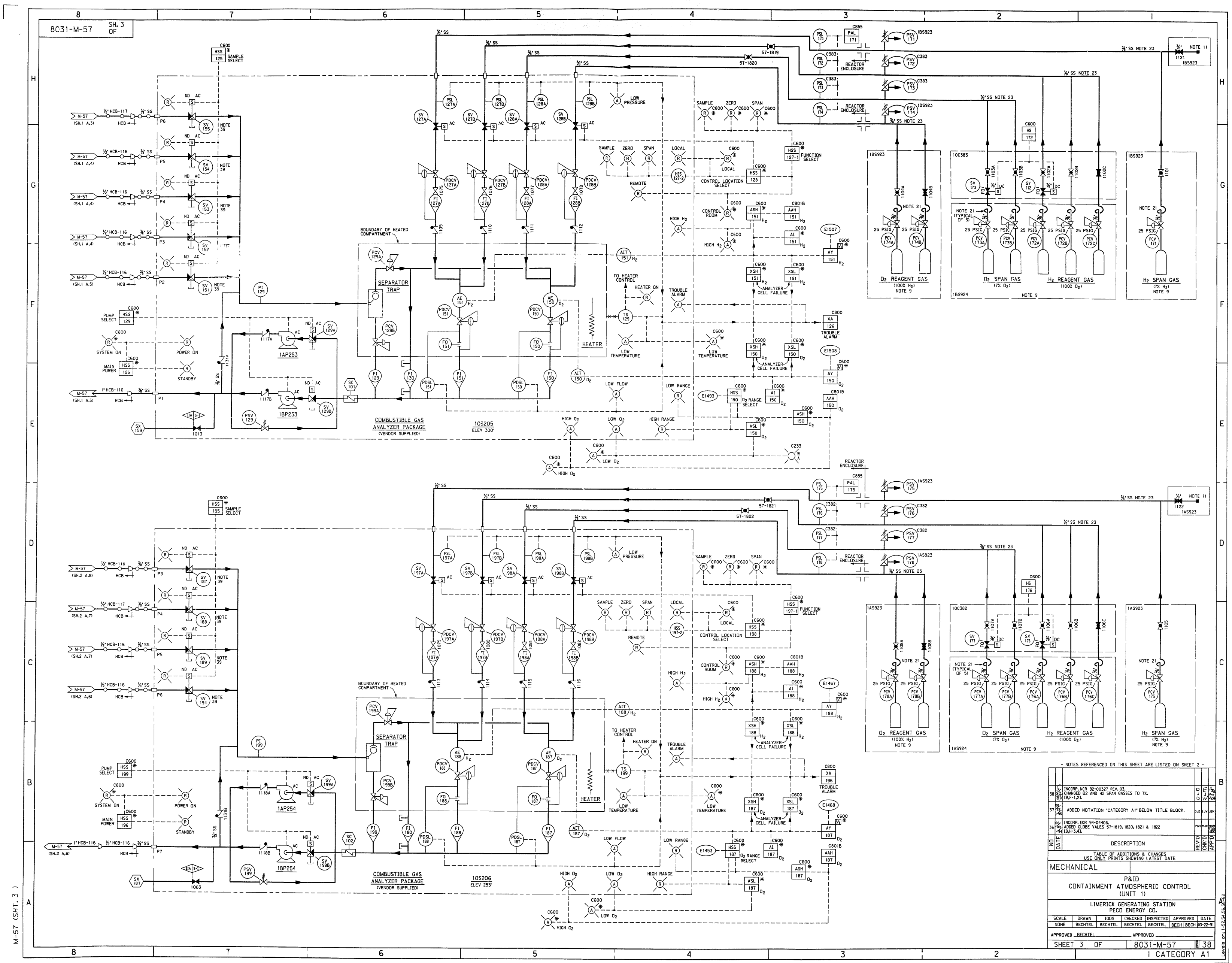
APPROVED BECHTEL APPROVED

SHEET 2 OF 8031-M-57 47

I CATEGORY A1

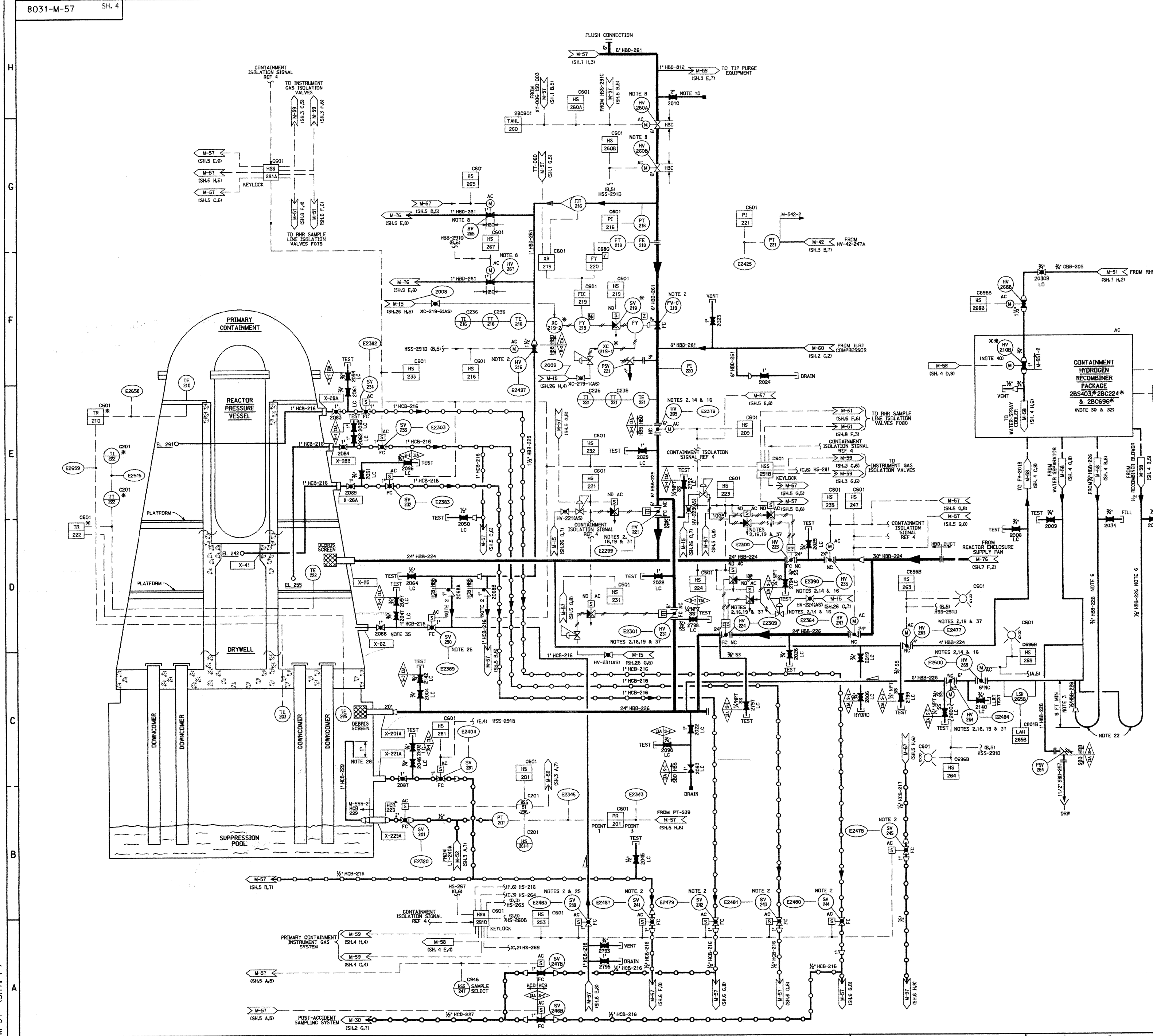
PRINTED: 12 AUG 2004

M-57 (SHT. 2)


8031-M-57 SH. 3 OF
COMBUSTIBLE GAS ANALYZER PACKAGE (VENDOR SUPPLIED)
10S205 ELEV 300'
10S206 ELEV 253'
BOUNDARY OF HEATED COMPARTMENT
SEPARATOR TRAP
HEATER
O2 REAGENT GAS
O2 SPAN GAS
H2 REAGENT GAS
H2 SPAN GAS
- NOTES REFERENCED ON THIS SHEET ARE LISTED ON SHEET 2 -
38 INCORP. NCR 92-00327 REV. 03. CHANGED O2 AND H2 SPAN GASSES TO 7%. [B,F-1,2].
37 08/22/95 ADDED NOTATION 'CATEGORY A1' BELOW TITLE BLOCK. DJD EJW JEK
36 06/09/94 INCORP. ECR 94-04406. ADDED GLOBE VALES 57-1819, 1820, 1821 & 1822 [D,H-3,4]. PGH MJH HAM FOR JEK
NO DATE DESCRIPTION REV'D CHK'D APP'D
TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE
MECHANICAL
P&ID
CONTAINMENT ATMOSPHERIC CONTROL
(UNIT 1)
LIMERICK GENERATING STATION
PECO ENERGY CO.
SCALE NONE DRAWN BECHTEL IGDS BECHTEL CHECKED BECHTEL INSPECTED BECHTEL APPROVED BECH BECH DATE 03-22-91
APPROVED BECHTEL APPROVED
SHEET 3 OF 8031-M-57 REV 38
I CATEGORY A1
Levels on: 1-52,54,56,58-62
M-57 (SHT. 3)

8031-M-57 SH. 4

REF No.	REFERENCE DRAWINGS	BECHTEL No.	GE No.
1	NITROGEN INERTING SUPPLY SYSTEM FLOW SHEET	M-95-1-41	
3	P&ID LEGEND	M-00	
4	NSS SHUTOFF SYSTEM ELEMENTARY DIAGRAM	M1-B21-1090-E-	791E401TN



- NOTES REFERENCED ON THIS SHEET ARE LISTED ON SHEET 5 -

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
13	11/11/09	INCORP. ECR 09-00378 REV 0. ADDED POINT 1 AND 3 TO PR-201. [B,5].	JW		
12	3/12/05	INCORP. ECR 04-00118 REV 0 PER WO C0211342. CHANGED REFERENCE FLAG DESIGNATION. [H,5].	EJW	JCW	MSD
11	7/24/00	INCORP. ECR 97-01615 REV 0. REMOVED REFERENCE TO PEN 1 AND PEN 2 AT PR-201. [B,5].	RBR	SCD	MSD
10	95	ADDED NOTATION "CATEGORY A1" BELOW TITLE BLOCK.	DJD	EJW	JEK

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
CONTAINMENT ATMOSPHERIC CONTROL
(UNIT 2)

LIMERICK GENERATING STATION
EXELON NUCLEAR CORP.

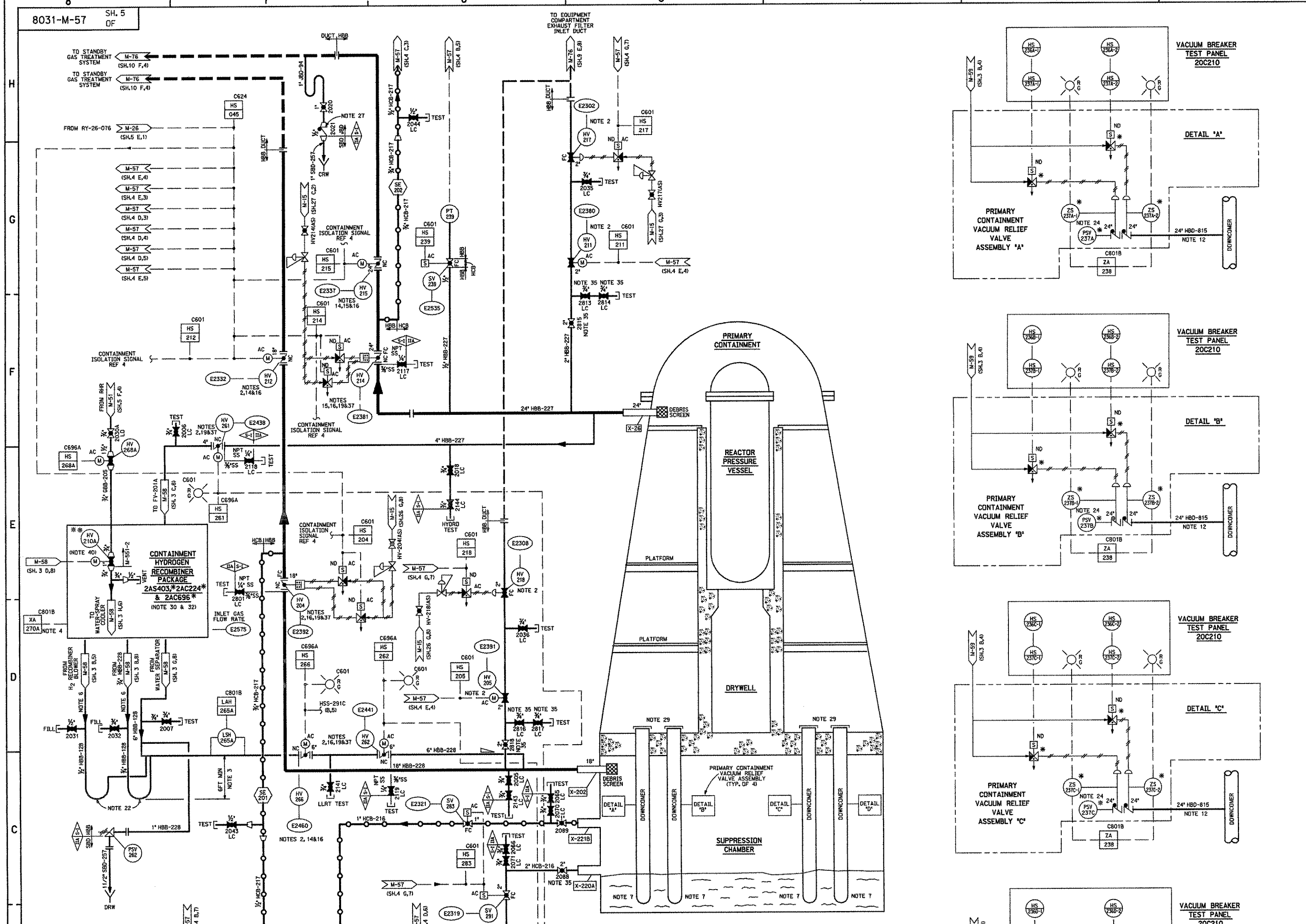
SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	10/17/89

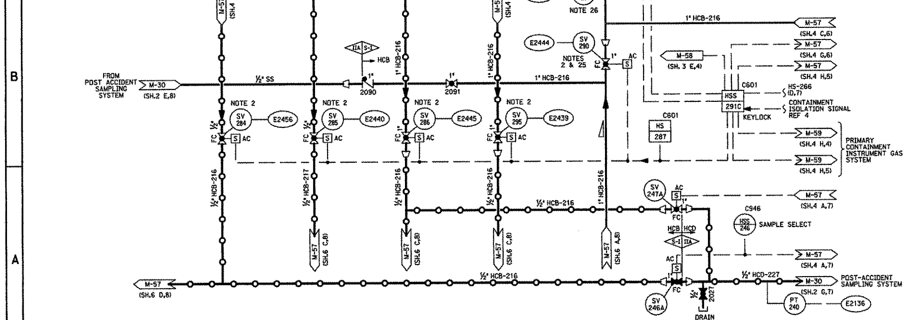
APPROVED BECHTEL APPROVED

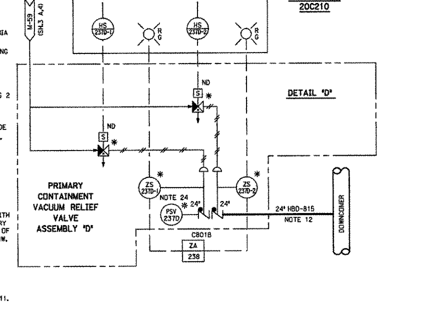
SHEET 4 OF | 8031-M-57 | 13

I CATEGORY A1

M-57 (SHT. 4)







NOTES:

1. THIS SYSTEM IS A SEISMIC CLASS I SYSTEM EXCEPT AS NOTED.
2. LOCATE AS NEAR AS PRACTICAL TO PRIMARY CONTAINMENT.
3. THE CONNECTION POINTS BETWEEN ½" AND ¾" RECOMBINER DRAIN LINES AND THE 6" RECOMBINER EXHAUST LINE ARE TO BE LOCATED 12 FEET OR MORE BELOW THE ELEVATION OF THE DRAIN CONNECTIONS ON THE RECOMBINER SKID.
4. ALARMS XA-270A AND XA-270B INDICATE RECOMBINER TROUBLE. THE INDIVIDUAL CONDITIONS INVOLVED ARE ANNUNCIATED AT THE RECOMBINER CONTROL CABINETS, EXCEPT FOR LOSS OF POWER TO THE TRICKLE HEATERS AND LOSS OF ALL POWER TO THE RECOMBINER. THE AVAILABILITY OF THE TRICKLE HEAT POWER IS INDICATED BY A LIGHT ON THE RECOMBINER CONTROL CABINETS; NO INDICATION IS PROVIDED FOR LOSS OF POWER TO THE RECOMBINER.
5. HEAT TRACING ON SAMPLE LINES IS TO BE POWERED FROM A SAFEGUARD AC SOURCE.
6. ¾" HBB-226 AND HBB-228 DRAIN THE PIPING UPSTREAM OF THE RECOMBINER BLOWER. ½" HBB-226 AND HBB-228 DRAIN THE RECOMBINER BLOWER CASING. BOTH DRAIN LINES SHALL CONNECT TO THE BOTTOM OF A HORIZONTAL RUN OF THE 6" RECOMBINER EXHAUST LINE.
7. THE DOWNCOMER CAP DRAIN LINE SHALL EXTEND APPROXIMATELY 8 FEET ABOVE THE DOWNCOMER CAP AND APPROXIMATELY 4 FEET BELOW THE DOWNCOMER CAP. THE DRAIN LINE SHALL BE CONSTRUCTED OF 3" SCHEDULE 160 CARBON STEEL PIPE AND SHALL BE SUPPORTED INSIDE THE DOWNCOMER BY BUMPER GUSSETS. ONLY THE FOUR DOWNCOMERS THAT HAVE PRIMARY CONTAINMENT VACUUM RELIEF VALVE ASSEMBLIES ARE CAPPED.
8. VALVES HV-265 AND HV-267 OPEN UPON RECEIPT OF A CONTAINMENT ISOLATION SIGNAL. THESE TWO VALVES, PLUS VALVES HV-260A,HV-260B ARE Q-LISTED AND SEISMIC CLASS I.
9. REAGENT GAS CYLINDERS AND SPAN GAS CYLINDERS ARE SUPPLIED BY PECO.
10. THE INDICATED HOSE CONNECTION IS TO BE USED FOR ILRT PURPOSES IN CONJUNCTION WITH THE HOSE CONNECTION SHOWN ON P&ID M-41, SHEET 5, AT ZONE D,3.
11. THE INDICATED HOSE CONNECTIONS ARE FOR TEMPORARY CONNECTION OF CYLINDERS CONTAINING 07% H2 FOR H2 ANALYZER CALIBRATION.
12. THE DESIGN OF THE MOUNTING TEES FOR THE PRIMARY CONTAINMENT VACUUM RELIEF VALVE ASSEMBLIES IS IN ACCORDANCE WITH SPECIAL CERTIFICATION REQUIREMENTS OF THE STATE OF PENNSYLVANIA.
13. FOR TEST, FILL, VENT AND DRAIN CONNECTIONS ATTACHED TO SEISMIC CATEGORY I PIPING. THE PIPING BETWEEN THE SHUTOFF VALVE AND THE CAPPED END OF THE TEST, FILL, VENT OR DRAIN CONNECTIONS IS DESIGNATED AS SEISMIC CATEGORY IIA.
14. THE INDICATED BUTTERFLY VALVES ARE TO BE INSTALLED WITH THE FLAT SIDE OF THE DISC ORIENTED AWAY FROM THE PRIMARY CONTAINMENT.
15. VALVES HV-214 AND HV-215 ARE TO BE LOCATED OUTSIDE THE RWCU ISOLATION VALVE COMPARTMENT.
16. THE MINIMUM SEPARATION BETWEEN ADJACENT BUTTERFLY VALVES IN A PIPING RUN SHALL BE AS SPECIFIED BY THE VALVE VENDOR, BUT SHALL BE AT LEAST ONE NOMINAL PIPE DIAMETER.
17. DELETED.
18. FOR ALL NON-SEISMIC CATEGORY I CAPPED VENTS, DRAINS, TEST, AND FILL CONNECTIONS: DESIGN, FABRICATION, MATERIAL PROCUREMENT, ERECTION, AND TESTING FOR ALL PIPING BEYOND THE LAST ISOLATION VALVE MAY BE IN ACCORDANCE WITH DESIGN CLASS D.
19. EACH OF THE INDICATED VALVES IS PROVIDED WITH A SEPARATE TESTABLE SEAL ASSEMBLY, WITH DOUBLE CONCENTRIC O-RING SEALS, INSTALLED BETWEEN THE PIPE FLANGE AND VALVE FLANGE AT THE END OF THE VALVE THAT FACES THE PRIMARY CONTAINMENT. THESE SEAL ASSEMBLIES ARE PROCURED UNDER P.O. M-182, AS NON-Q FOR A Q-LISTED SERVICE, AND ARE USED IN LIEU OF "FLEXITALLIC" GASKETS. THE PIPE FLANGE ADJACENT TO THE TESTABLE SEAL ASSEMBLY HAS A ⅛" NPT PRESSURE TAP FOR PRESSURE TESTING THE SEAL.
20. DELETED.
21. THE DIFFERENTIAL MOVEMENT LOOPS (PIGTAILS) IN TUBING ASSOCIATED WITH THE SPAN GAS AND REAGENT GAS CYLINDERS SHALL EACH CONSIST OF A 720° SPIRAL. THE SPIRAL SHALL HAVE A MINIMUM DIAMETER OF 6 INCHES AND POINTS ON THE SPIRAL THAT ARE 360° APART SHALL BE SEPARATED BY A GAP OF APPROXIMATELY 1 INCH.
22. LOOP SEALS SHALL BE LOCATED AT LEAST 5 FEET FROM ANY SAFETY-RELATED ELECTRICAL EQUIPMENT.
23. INSTALLATION IS TO BE IN ACCORDANCE WITH ANSI B31.1 REQUIREMENTS. THE GAS SUPPLY TUBING SHALL BE PNEUMATICALLY TESTED TO ANSI B31.1 BASED ON A DESIGN PRESSURE OF 60 PSIG.
24. PRIMARY CONTAINMENT VACUUM RELIEF VALVE ASSEMBLIES CONSIST OF AN UPSTREAM VALVE DESIGNATED BY THE SUFFIX -1 AND A DOWNSTREAM VALVE DESIGNATED BY SUFFIX -2.
25. THE INDICATED VALVES SEAT AGAINST FLOW IN ONE DIRECTION ONLY AND SHALL BE ORIENTED SO AS TO PROVIDE CONTAINMENT ISOLATION AGAINST FLOW FROM THE PRIMARY CONTAINMENT OUTWARD.
26. THE INDICATED VALVE SHALL BE CAPABLE OF SEATING AGAINST FLOW IN BOTH DIRECTIONS.
27. FOR CHECK VALVE 2021, REMOVE SPRING TO ACHIEVE OPENING AT LOW DIFFERENTIAL PRESSURE.
28. 1" HCB-229 GOOSENECK SHALL BE LOCATED AS HIGH AS PRACTICAL INSIDE THE SUPPRESSION CHAMBER, BUT THE ELEVATION OF THE OPEN END SHALL NOT BE LESS THAN 230'-6". AS-BUILT ELEVATION OF GOOSENECK OPEN END IS USED IN EPG/SAG CALCULATIONS.
29. A WEIR OF 1" X ⅛" CARBON STEEL PLATE WILL BE WELDED TO THE TOP OF THE CAPPED DOWNCOMERS TO PRECLUDE WATER OF A DRYWELL FLOOD FROM ENTERING THESE DOWNCOMERS PRIOR TO ENTERING THE OTHER DOWNCOMERS.
30. IN THE CONTAINMENT HYDROGEN RECOMBINER ASSEMBLIES (2AS403 & 2BS403) BECHTEL HAS REPLACED TRANSMITTERS PT-DO-202A&B, FT-DO-202A&B, FT-DO-201A&B AS WELL AS THERMOCOUPLES AND INSTRUMENT TUBING. DETAILS OF THE TUBING INSTALLATION, INCLUDING ASME CODE BOUNDARIES, ARE DESCRIBED IN 8031-M-58 SHT'S. 3 & 4.
31. DELETED.
32. DETAILS OF THE OUTBOARD, INLET LINE, CONTAINMENT ISOLATION VALVES (FV-DO-201A AND 201B) AND ASSOCIATED LOGIC ARE SHOWN ON VENDOR PRINTS 8031-M-40-45, 8031-M-40-78 AND 8031-M-40-86 (4). THESE VALVES ARE SUPPLIED BY THE VENDOR AND ARE PART OF THE RECOMBINER PACKAGE.
33. UNLESS OTHERWISE INDICATED, ALL ASME PIPING INCLUDED ON THIS P&ID IS INCLUDED IN THE SCOPE OF NUCLEAR PIPING DESIGN SPECIFICAITONS 8031-M-557-2.

NOTES CONTINUED AT COORD. (B-4)
-REFERENCED DRAWINGS ARE LISTED ON SHEET 4-

34. PENETRATION SLEEVES, INCLUDING THE PENETRATION SLEEVE TO FLUED HEAD WELD OUTSIDE CONTAINMENT ARE PENSYLVANIA SPECIAL.

    PENETRATION SLEEVES USED WITHOUT FLUED HEADS, INCLUDING THE FIRST WELD OUTSIDE CONTAINMENT ARE PENNSYLVANIA SPECIAL, EXCEPT WHERE THE PENETRATION SLEEVE IS PART OF AN ASME CLASS 2 PRESSURE BOUNDRY.

    WHEN THE PENETRATION SLEEVE IS PART OF AN ASME CLASS 2 PRESSURE BOUNDRY, (I.E. THE PENNSYLVANIA SPECIAL SLEEVE JOINS ASME PIPING INSIDE CONTAINMENT TO ASME PIPING OUTSIDE CONTAINMENT) THE FIRST WELD BOTH INSIDE/OUTSIDE CONTAINMENT SHALL BE IN ACCORDANCE WITH ASME CLASS 2.
35. ENSURE VALVES ARE ORIENTED SUCH THAT CONTAINMENT PRESSURE IS UNDERNEATH THE VALVE SEAT WHEN VALVE IS CLOSED.
36. INSTALLATION IS IN ACCORDANCE WITH ASME SECTION III, CLASS 2 REQUIREMENTS.
37. THE INDICATED BUTTERFLY VALVES ARE TO BE INSTALLED WITH THE FLAT SIDE OF THE DISC ORIENTED TOWARDS THE PRIMARY CONTAINMENT. THE FLOW DIRECTION ARROW ON THE OUTSIDE OF THE VALVE BODY MAY BE REVERSE TO THE ACTUAL PIPE FLOW.
38. ONE VALVE PER ANALYZER WILL BE ENERGIZED AT ALL TIMES WHEN MAIN POWER SWITCH IS IN ANALYZE.
39. ASME BOUNDARIES SHOWN ON THIS DRAWING ARE FOR REFERENCE ONLY. SEE ASME PIPING SPECIFICATIONS FOR ADDITIONAL INFORMATION.
40. VALVE IS BY BECHTEL SEE MR. 8031-P114A REV. 31 ITEM 16.11.

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
43	3/19/04	INCORP. ECR 01-00394 REV. 2. CHANGED REFERENCE TO NOTE 25 TO NOTE 26 AT SV-291. (B,6).	[illegible]	[illegible]	[illegible]
42	05/06/03	REVISED PER A/R A1415849 E01 AND CR 152922. CORRECTED CONT. ZONE AT ½" HCB-216 FLAG M-57 SHT.6, DOWNSTEAM OF SV-206. (C,8) WAS (D,8). (A,7).	EJW	KLW	CMC
41	11/17/98	INCORP. ECR 98-01633 REV. 0. REVISED NOTE 28. (C,1).	DJD	EJW	MJM FOR SJB
40	01/30/98	INCORP. ECR 98-00054 REV. 0. CHANGED POSITION OF 247A TO OPEN. (F,1).	DJD	EJW	SJB

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
CONTAINMENT ATMOSPHERIC CONTROL
(UNIT 2)

LIMERICK GENERATING STATION
PECO ENERGY CO.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	03-22-91

APPROVED BECHTEL APPROVED

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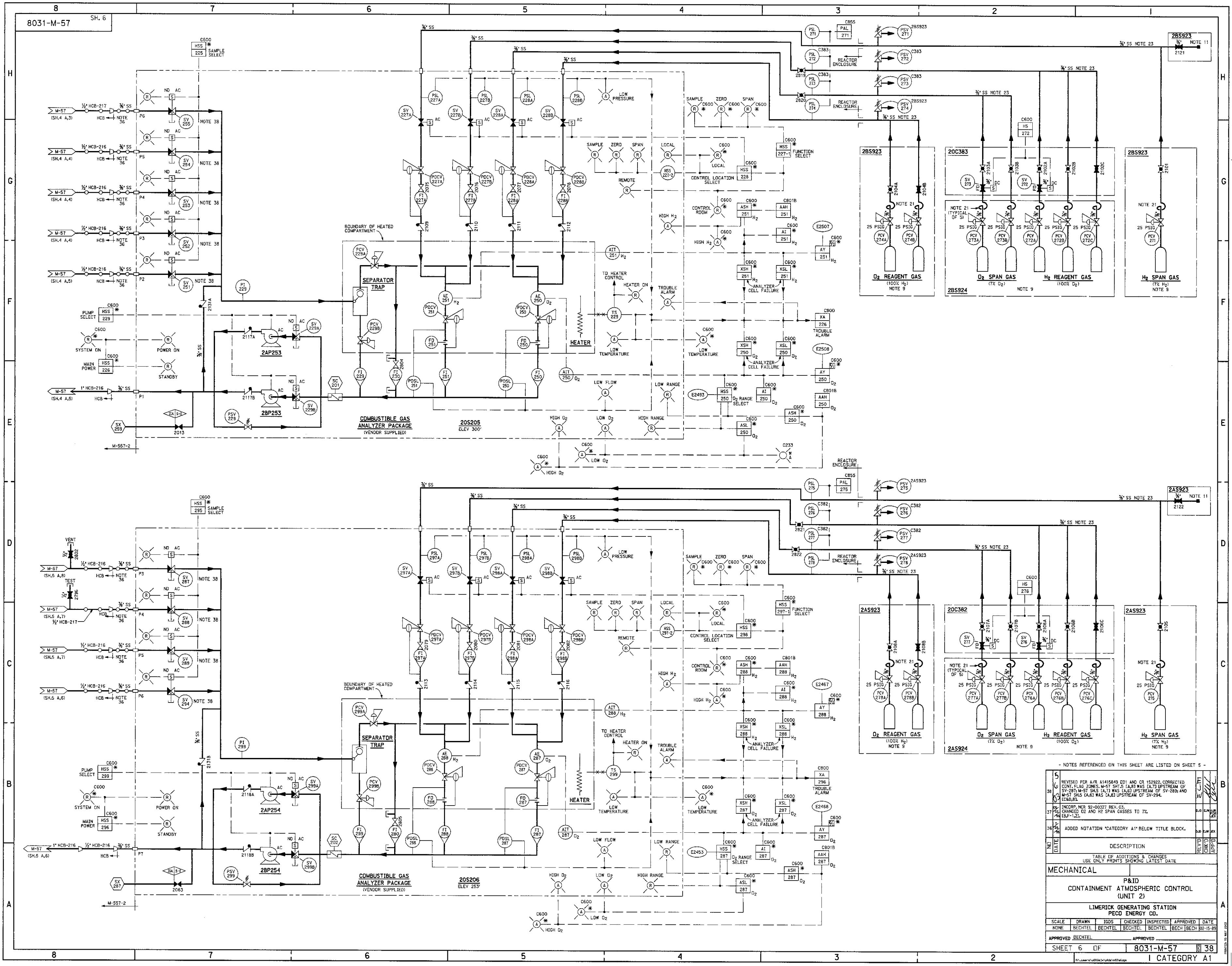
PRINTED: 17 MAR 2004

M-57 (SHT. 5)



NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
38	5/6/03	REVISED PER A/R A1415849 E01 AND CR 152922. CORRECTED CONT. FLAG ZONES. M-57 SHT.5 [A,8] WAS [A,7] UPSTREAM OF SV-287; M-57 SH.5 [A,7] WAS [A,6] UPSTREAM OF SV-289; AND M-57 SH.5 [A,6] WAS [A,8] UPSTREAM OF SV-294. [C&D,8].	EJM		
37	05/02/96	INCORP. NCR 92-00327 REV. 03. CHANGED O2 AND H2 SPAN GASSES TO 7%. [B,F-1,2].	DJO	EJW	HJR FOR JEK
36	7/26/95	ADDED NOTATION "CATEGORY A1" BELOW TITLE BLOCK.	DJO	EJW	JEK

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
CONTAINMENT ATMOSPHERIC CONTROL
(UNIT 2)

LIMERICK GENERATING STATION
PECO ENERGY CO.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	02-15-89

APPROVED BECHTEL APPROVED

SHEET 6 OF | 8031-M-57 | REV 38

PRINTED: 05 MAY 2003

I CATEGORY A1

M-57 (SHT. 6)

Request for Relief for Alternative Requirements for Pressure Testing the Containment Atmospheric Control Penetration Piping In Accordance with 10CFR50.55a(z)(1) Alternative Provides Acceptable Level of Quality and Safety

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1. ASME Code Component(s) Affected

Code Class:	2
Reference:	IWC-2500, Table IWC-2500-1
Examination Category:	C-H
Item Number:	C7.10
Description:	Alternative Requirements for Pressure Testing the Containment Atmospheric Control Penetration Piping
Component Number:	Multiple lines (See Note 1 below)
Drawing Number:	M-57, Shts. 1 and 2; and M-55, Sht. 1 (Unit 1) M-57, Shts. 4 and 5 (Unit 2)

Note 1: A more detailed description of the pressure testing boundary is identified below.

<u>LGS Unit 1:</u> Class 2 Primary Containment Atmospheric Control (CAC) piping, as follows:

- Hydrogen/oxygen sample lines HCB-116, between and including containment penetrations X-28A and X-28B and valves SV-57-142, SV-57-143, SV-57-144 and SV-57-195. Reference P&ID M-57, Sheets 1 and 2.

- Drywell low flow nitrogen makeup line HCB-116, between and including containment penetration X-62 and valves HV-57-116 and SV-57-159. Reference P&ID M-57, Sheet 1.

- Hydrogen/oxygen sample lines HCB-116, between and including containment penetrations X-221A and valves SV-57-141 and SV-57-184. Reference P&ID M-57, Sheets 1 and 2.

- Nitrogen purge line HBB-125, between and including valves HV-57-109, HV-57-121 and HV-57-131. Reference P&ID M-57, Sheet 1.

- Drywell air purge line HBB-124, between and including valves HV-57-123 and HV-57-135. Reference P&ID M-57, Sheet 1.

- Suppression pool air purge line HBB-126, between and including valves HV-57-124 and HV-57-147. Reference P&ID M-57, Sheet 1.

- Drywell purge to standby gas treatment line HBB-127, between and including valves HV-57-114 and HV-57-115, and line HCB-117, between and including connection to line HBB-127 and valve SV-57-145. Reference P&ID M-57, Sheets 1 and 2.

- Suppression pool low flow nitrogen makeup line HCB-116, between and including containment penetration X-220A, valve SV-57-190 and connection to drywell low flow nitrogen makeup line HCB-116. Reference P&ID M-57, Sheets 1 and 2.

- Hydrogen/oxygen sample line HCB-116, between and including containment penetration X-221B and valves SV-57-186 and HV-55-126. Reference P&ID M-57, Sheet 2, and M-55, Sheet 1.

- Drywell purge exhaust bypass line HBB-127, between and including valves 57-1807 and HV-57-117. Reference P&ID M-57, Sheet 2.

- Suppression pool purge exhaust bypass line HBB-128, between and including valves 57-1810 and HV-57-118. Reference P&ID M-57, Sheet 2.

- Suppression pool purge air exhaust lines HBB-128 and HCB-117, between and including valves HV-57-104, HV-57-112 and SV-57-185. Reference P&ID M-57, Sheet 2.

<u>LGS Unit 2:</u> Class 2 Primary Containment Atmospheric Control piping, as follows:

- Hydrogen/oxygen sample lines HCB-216, between and including containment penetrations X-28A and X-28B and valves SV-57-242, SV-57-243, SV-57-244 and SV-57-295. Reference P&ID M-57, Sheets 4 and 5.

- Drywell low flow nitrogen makeup line HCB-216, between and including containment penetration X-62 and valves HV-57-216 and SV-57-259. Reference P&ID M-57, Sheet 4.

- Hydrogen/oxygen sample lines HCB-216, between and including containment penetrations X-221A and valves SV-57-241 and SV-57-284. Reference P&ID M-57, Sheets 4 and 5.

- Nitrogen purge line HBB-225, between and including valves HV-57-209, HV-57-221 and HV-57-231. Reference P&ID M-57, Sheet 4.

- Drywell air purge line HBB-224, between and including valves HV-57-223 and HV-57-235. Reference P&ID M-57, Sheet 4.

- Suppression pool air purge line HBB-226, between and including valves HV-57-224 and HV-57-247. Reference P&ID M-57, Sheet 4.

- Drywell purge to standby gas treatment line HBB-227, between and including valves HV-57-214 and HV-57-215, and line HCB-217, between and including connection to line HBB-227 and valve SV-57-245. Reference P&ID M-57, Sheets 4 and 5.

- Suppression pool low flow nitrogen makeup line HCB-216, between and including containment penetration X-220A, valve SV-57-290 and connection to drywell low flow nitrogen makeup line HCB-216. Reference P&ID M-57, Sheets 4 and 5.

- Hydrogen/oxygen sample line HCB-216, between and including containment penetration X-221B and valves SV-57-286. Reference P&ID M-57, Sheet 5.

- Drywell purge exhaust bypass line HBB-227, between and including valves 57-2815 and HV-57-217. Reference P&ID M-57, Sheet 5.

- Suppression pool purge exhaust bypass line HBB-228, between and including valves 57-2818 and HV-57-218. Reference P&ID M-57, Sheet 5.

- Suppression pool purge air exhaust lines HBB-228 and HCB-217, between and including valves HV-57-204, HV-57-212 and SV-57-285. Reference P&ID M-57, Sheet 5.

See Enclosure 1 for M-57 Sheets 1, 2, 4, and 5, and M-55 Sheet 1.

2. Applicable Code Edition and Addenda

The Inservice Inspection program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2007 Edition through the 2008 Addenda.

3. Applicable Code Requirement

Table IWC-2500-1, Examination Category C-H, Item Number C7.10, requires all Class 2 pressure retaining components be subject to a system leakage test with a VT-2 visual examination in accordance with IWC-5220. This pressure test is to be conducted once each inspection period.

4. Reason for Request

Pursuant to 10CFR50.55a(z)(1), relief is requested on the basis that the proposed alternative will provide an acceptable level of quality and safety.

During normal plant operation, this piping is either isolated or less than one (1) psig (normal containment pressure). The pressurizing fluid is essentially nitrogen gas. A VT-2 visual examination looking for a nitrogen gas leak with less than one (1) psig driving pressure would be inconclusive.

10CFR50 Appendix J, Option B, Local Leak Rate Testing (LLRTs) is currently performed once per Refuel Outage. During LLRTs, the subject piping is pressurized to 44 psig, a substantially higher pressure than that developed during a periodic system functional test. As such, the LLRT offers the following advantages over system pressure tests:

A. LLRTs have the ability to quantify leakage that is not feasible with a VT-2 visual examination on this essentially gas-filled piping.

B. LLRTs conservatively include through valve leakage that would not be identified in a VT-2 visual examination.

IWC-5210(b)(2) allows for gas tests which permit location and detection of through-wall leakage. In the event the LLRT fails to meets its acceptance criteria, further testing would be performed to determine the location of the leaks, appropriate corrective maintenance and an appropriate retest would be performed.

5. Proposed Alternative and Basis for Use

10CFR50 Appendix J, Option B, Local Leak Rate Testing (LLRT) will be utilized to meet the ASME Section XI IWC-5000 pressure testing requirements, and will be maintained and controlled independent of the ASME Section XI program.

6. <u>Duration of Proposed Alternative</u>

Relief is requested for the Fourth Ten-Year ISI Interval for Limerick Generating Station Units 1 and 2.

7. <u>Precedents</u>

Limerick Generating Station Third ISI Interval Relief Request I3R-12 was authorized by NRC Safety Evaluation (SE) dated March 11, 2008. The Fourth ISI Interval Relief Request utilizes an identical approach that was previously approved. (ML080500584)

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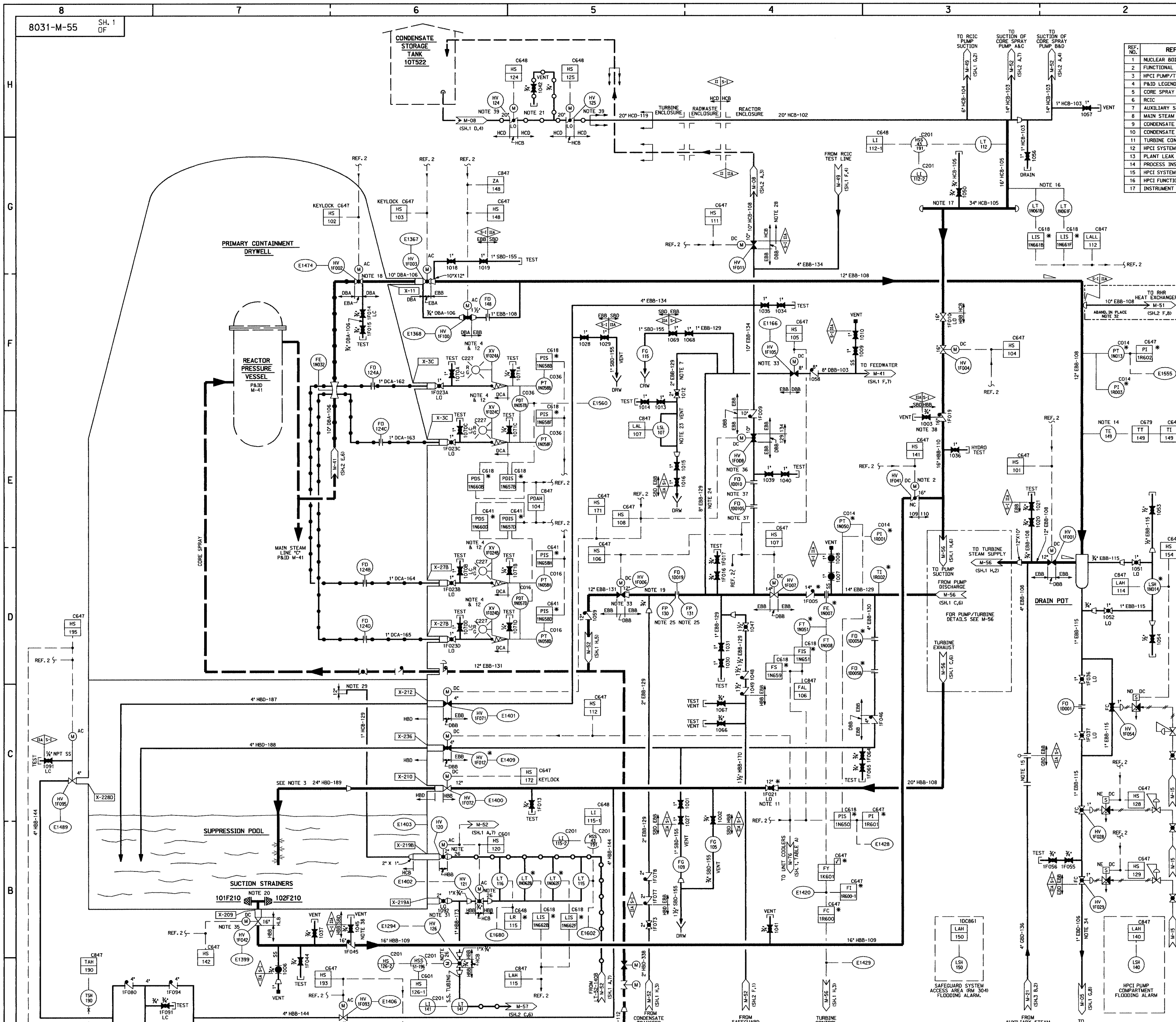

REF. NO.	REFERENCE DRAWINGS	BECHTEL NO.	GE NO.
1	NUCLEAR BOILER	M-41	
2	FUNCTIONAL CONTROL DIAGRAM HPCI	8031-M-E41-1030-F	729E627AD
3	HPCI PUMP/TURBINE	M-56	
4	P&ID LEGEND	M-00	
5	CORE SPRAY	M-52	
6	RCIC	M-49	
7	AUXILIARY STEAM	M-21	
8	MAIN STEAM	M-01	
9	CONDENSATE	M-05	
10	CONDENSATE & REFUELING WATER STORAGE	M-08	
11	TURBINE CONTROLS DIAGRAM	8031-M1-E41-C002-K	JPF2763-92-1
12	HPCI SYSTEM P&ID	8031-M1-E41-1010-D	761E230AD
13	PLANT LEAK DETECTION	M-25	
14	PROCESS INST PIPING & TUBING DESIGN SPEC	8031-M1-A61-4070-L	22A3732
15	HPCI SYSTEM DESIGN SPECIFICATION	8031-M1-EV1-4010-L	22A3021
16	HPCI FUNCTIONAL DESCRIPTION	M-55FD	
17	INSTRUMENT INSTALLATION DETAILS	8031-M-830	NA

NOTES:

1. THE HPCI SYSTEM IS A SEISMIC CATEGORY I SYSTEM EXCEPT AS NOTED. SEISMIC CATEGORY I CLASSIFICATION SHALL EXTEND UP TO THE FIRST WALL PENETRATION BEYOND POINT INDICATED AND SHALL INCLUDE THE FIRST ANCHOR POINT IN OR BEYOND THIS WALL.
2. LOCATE VALVE 1F041 (ZONE E-3) AS CLOSE AS POSSIBLE TO PUMP SUCTION LINE FROM CONDENSATE STORAGE TANK.
3. PENETRATION LOCATION TO BE ABOVE MAXIMUM EXPECTED WATER LEVEL, WITH SPARGER LOCATED 4 FEET BELOW LOW WATER LEVEL (ZONE C-7).
4. A COMMON TROUBLE ALARM IS PROVIDED IN CONTROL ROOM PANEL 1BC802 FOR THE EXCESS FLOW CHECK VALVES ASSOCIATED WITH LOCAL PANEL C227. THIS ALARM IS INITIATED BY CLOSURE OF ANY OF THESE VALVES (ZONE D,5).
5. AC POWER FOR HPCI INSTRUMENTS SHALL BE DERIVED FROM THE PLANT DC POWER SYSTEM, VIA AN INVERTER. THE DC SOURCE IS TO BE SEPARATE FROM THAT WHICH SUPPLIES THE RCIC SYSTEM.
6. THE GE MPL NUMBER FOR THIS SYSTEM IS E-41.
7. VENT CONNECTION SHOULD BE LOCATED AT A HIGH POINT (ZONE F,5).
8. TEMPERATURE LEAK DETECTION FOR THIS SYSTEM IS SHOWN ON REF 13. THE TEMPERATURE INSTRUMENTS ARE INDEXED AS PART OF P&ID M-55.
9. ALL INSTRUMENT PIPING & TUBING SHALL BE INSTALLED IN ACCORDANCE WITH REFERENCE 14. FOR DEVIATIONS TO SLOPE CRITERIA SEE REFERENCE 17.
10. ALL STEAM LINES SHALL BE SLOPED. ALL LIQUID LINES INSIDE THE PRIMARY CONTAINMENT SHALL BE SLOPED WHERE PRACTICAL.
11. VALVE 1F021 SHOULD BE LOCATED AT A HIGH POINT (ZONE C,4).
12. THE BYPASS VALVES AROUND EXCESS FLOW CHECK VALVES XV-1F024A,B,C,D ARE LOCKED CLOSED.
13. DELETED.
14. TEMPERATURE ELEMENT TO BE MOUNTED ON OUTSIDE SURFACE (ZONE E,2).
15. AFTER TESTING, BLIND PORTION OF THE SPECTACLE FLANGE SHALL BE INSTALLED (ZONE C,3).
16. LT-1N061 B,F SHOULD BE LOCATED ABOVE EL.201'-0" ON 16" HCB-105 (ZONE G,2).
17. 34" SECTION OF PIPING SHALL CONTAIN AT LEAST 1100 GALLONS (ZONE G,3).
18. INSTALL VALVE IN REVERSE DIRECTION SUCH THAT FLOW IS OVER THE SEAT (ZONE F,6).
19. VALVE HV-1F006 TO BE LOCATED AS CLOSE AS POSSIBLE TO JUNCTURE WITH CORE SPRAY LINE (ZONE D,5).
20. THE MAXIMUM ΔP ACROSS THE SUCTION STRAINERS SHALL NOT EXCEED THE AVAILABLE MARGIN ABOVE THE REQUIRED NPSH WHEN THE STRAINERS ARE 50% PLUGGED (ZONE B,7).
21. TO BE DRAINED WITHIN DIKED AREA (ZONE H,5).
22. NON-Q DRAIN AND VENT LINES AND CAPPED ENDS EXTENDING FROM SEISMIC CATEGORY I PIPING ARE SEISMIC CATEGORY IIA DOWNSTREAM OF THE LAST ISOLATION VALVE.
23. THIS PORTION OF EBB-129 SHALL BE A VERTICAL SECTION ABOVE THE PROCESS LINE, MINIMUM 3 FEET LONG. LSL TAPS SHALL BE PLACED 2 FEET APART. THE LINE FROM THE BOTTOM OF THE VERTICAL SECTION SHALL SLOPE DOWN TOWARDS THE PROCESS LINE (E,5 & F,5).
24. PENETRATION INTO STEAM TUNNEL AT COLUMN LINE J (ZONE E,4).
25. FLOW TAPS ARE PROVIDED ONLY FOR STARTUP FLOW VERIFICATION. THE INSTRUMENTATION WILL BE PROVIDED BY PECO (ZONE D,5).
26. VALVES HV-55-120, 121 & 126 SHALL BE INSTALLED SUCH THAT FLOW IS FROM THE CONTAINMENT (ZONE B,6).
27. FOR ALL NON-SEISMIC CATEGORY I CAPPED VENTS, DRAIN & TEST CONNECTIONS: DESIGN, FABRICATION, MATERIAL PROCUREMENT, ERECTION & TESTING FOR ALL PIPING DOWNSTREAM OF THE LAST ISOLATION VALVE, MAY BE IN ACCORDANCE WITH DESIGN CODE D.
28. DESIGN, FABRICATION, MATERIAL, PROCUREMENT, ERECTION AND TESTING FOR ALL PIPING, VALVES & EQUIPMENT SHOWN WITHIN THE SYMBOL (NOTE 28) ON THIS P&ID, MAY BE IN ACCORDANCE WITH THE REQUIREMENTS OF PIPING CLASS DESIGNATION, DESIGN CODE D, WITH THE FOLLOWING EXCEPTIONS:
   a) CLEANING REQUIREMENTS SHALL BE PER ORIGINAL LINE CLASS DESIGNATION.
   b) WELDING PROCEDURES TO BE USED SHALL BE AS REQUIRED PER THE ORIGINAL LINE CLASS DESIGNATION. (ZONE F-5)
29. 1" HCB-129 GOOSENECK SHALL BE LOCATED AS HIGH AS PRACTICAL INSIDE THE SUPPRESSION CHAMBER BUT THE ELEVATION OF THE OPEN END SHALL NOT BE LESS THAN EL.230'-6" (ZONE C,6).
30. DELETED.
31. VALVE NO. 1092 IS TO BE LOCKED OPEN W/MANUAL OPERATOR PER LOCKED VALVE LISTING; PECO ADMIN. PROCEDURE A-8.
32. 10" EBB-108 FLOW PATH HAS BEEN PLUGGED. BOTH THE PIPE AND THE SUPPORTS ARE FOR STRUCTURAL COUPLING OF SEISMIC I PIPING AND ARE DESIGNED AS HANGER CRITICAL SEISMIC I. SEE ISO EBB-108-01 FOR DETAILS.
33. VALVES HV-055-1F105 & 1F006 HAVE BEEN MODIFIED TO ELIMINATE PRESSURE LOCKING BY DRILLING A HOLE IN THE RPV SIDE OF THE WEDGE. REFER TO ECRS NO. 95-02335 & 95-02336 FOR DETAILS.
34. PIPING VALVES AND EQUIPMENT SHOWN WITHIN THIS SYMBOL (NOTE 34) AS WELL AS THEIR SUPPORTS SHALL BE REPAIRED, REPLACED OR MODIFIED IN ACCORDANCE WITH THE ORIGINAL DESIGN REQUIREMENTS AS MODIFIED BY SPECIFICATION NE-214 AND ASME SECTION XI. THE REQUIREMENTS OF ASME SECTION XI IWA-4000 AND IWA-7000 SHALL APPLY IN ACCORDANCE WITH PECO'S REPAIR AND REPLACEMENT PROGRAM WITH THE FOLLOWING EXCEPTIONS:
    - PRESERVICE/INSERVICE INSPECTIONS ARE NOT REQUIRED.
    - NIS-2 FORMS ARE NOT REQUIRED.
    - ANII INVOLVEMENT IS NOT REQUIRED.
35. VALVE HV-055-1F042 HAS BEEN MODIFIED TO ELIMINATE PRESSURE LOCKING BY DRILLING A HOLE IN THE SUPPRESSION POOL SIDE OF THE WEDGE. SEE ECR LG 96-03080 FOR DETAILS.
36. INSTALL VALVE HV-1F008 IN REVERSE DIRECTION SUCH THAT FLOW IS OVER THE SEAT.
37. DIRECTION OF FLOW THROUGH FO-1D010 AND FO-1D010S WILL NOT AFFECT ITS PERFORMANCE, RELIABILITY, OR METHOD OF OPERATION.
38. BONNET VENT VALVE ADDED TO 1F019 & 1F045 PER ECR 04-00428.
39. PER MSD ECR 11-00105, MCC D114-D-G-16 COMPARTMENT 1D IS LOCKED OPEN AND MCC D124-D-G-16 COMPARTMENT 1D IS LOCKED OPEN WITH RESPECT TO VALVES HV-055-124 AND HV-055-125.

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
58	6/18/12	INCORP. ECR 11-00105 REV.1 PER WO C0241062 & C0241071. CHANGED VALVES HV-055-124 AND HV-055-125 FROM "NO" TO "LO". ADDED NOTE 39. [H,5-6]	EJW	[illegible]	RAS
57	3/30/10	INCORP. ECR 09-00430 REV.1 PER WO C0230986 & C0230987. ADDED SS VENTS AND SS BALL VALVES 1006, 1007, AND 1008. [A,7] & [D,4]	EJW	JCW	RAS
56	3/27/10	PARTIAL INCORP. OF ECR 09-00430 REV.0 PER WO C0230984. ADDED SS VENT AND SS VALVES 1009 AND 1010. [F,4].	EJW	JCW	RAS
55	3/13/06	INCORP. ECR 04-00428 REV.2 PER WO C0211324. ADDED VENT AND VALVE 1003 TO BONNET OF 1F019. REVISED NOTE 38. [F,3].	EJW	SAC	JB

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
HIGH PRESSURE COOLANT INJECTION
(UNIT 1)

LIMERICK GENERATING STATION
EXELON NUCLEAR CORP.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	01-31-91

APPROVED BECHTEL APPROVED

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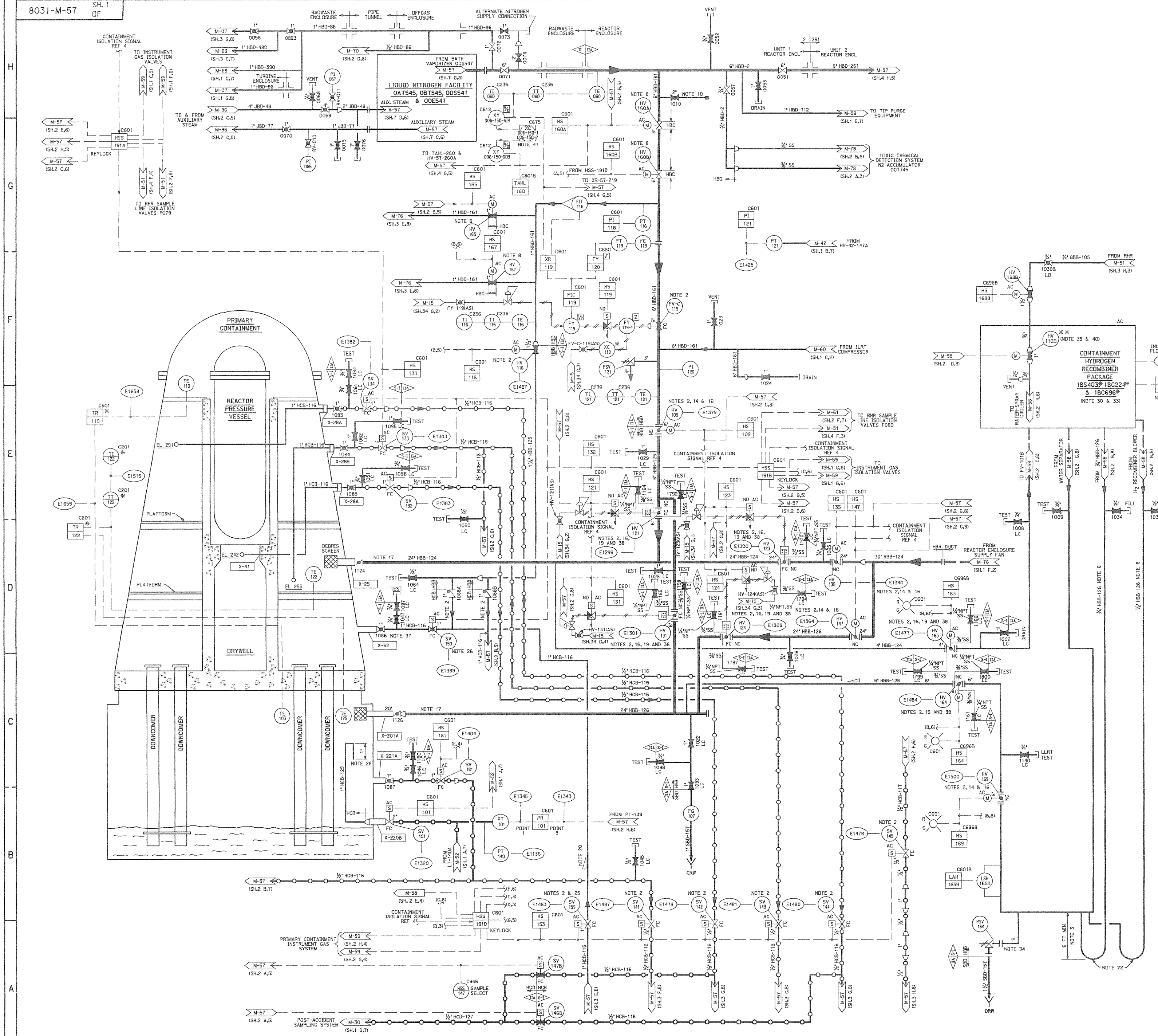
PRINTED: 18 JUN 2012

M-55 (SHT. 1)

8031-M-57 SH. 1 OF



REF No.	REFERENCE DRAWINGS	BECHTEL No.	GE No.
3	P&ID LEGEND	M-00	
4	NSS SHUTOFF SYSTEM ELEMENTARY DIAGRAM	M1-B21-1090-E-	791E401TN

- NOTES REFERENCED ON THIS SHEET ARE LISTED ON SHEET 2 -

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
47	10/23/09	INCORP. ECR 09-00427 REV. 0. CHANGED PR-101 PEN 2 AND PEN 1 TO POINT 1 AND POINT 3 RESPECTIVELY. [B,5].	EJW	ESY	DEZ
46	3/19/04	INCORP. ECR 01-00394 REV. 2. CHANGED SV-146B & SV-147B TO GLOBE VALVES. ADDED HBC CLASS TO HV-165 & 167. [A,5] AND [F&G,6].	EJW	JCW	MSD
45	3/09/04	INCORP. ECR 03-00085 REV. 0 PER WO C0207259. ADDED XY-006-150-A14 & D03 AND XC-006-150-1,-2 AND REF TO NOTE 41. [D,6].	EJW	JCW	RNH
44	2/13/97	INCORP. ECR 96-04500 REV. 0 CHANGED VALVE SV-150 FROM GATE TO GLOBE. [D,6].	DJD	JVM	PAG FOR SJB

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
CONTAINMENT ATMOSPHERIC CONTROL
(UNIT 1 AND COMMON)

LIMERICK GENERATING STATION
EXELON NUCLEAR CORP.

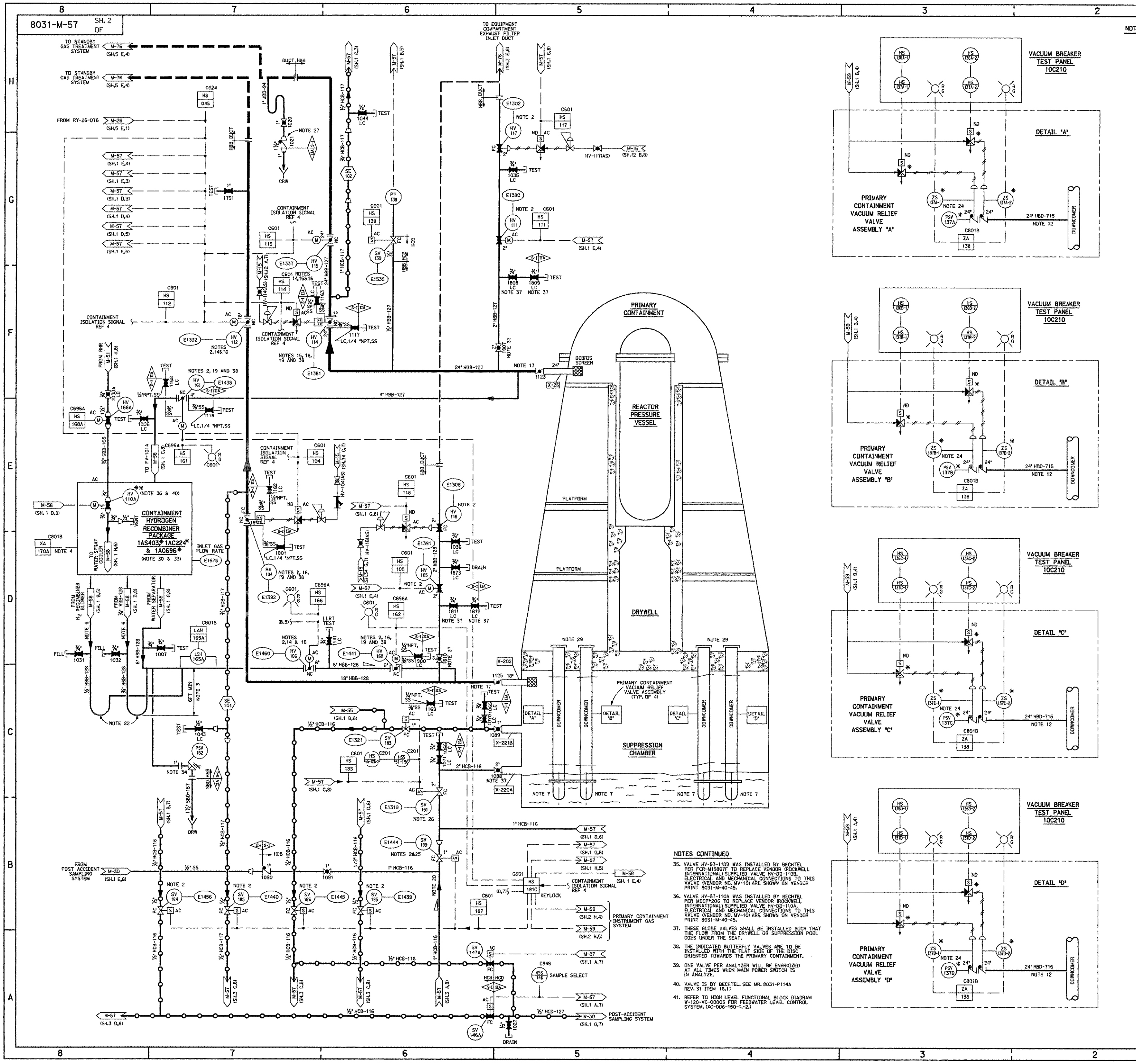
SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	04-06-90

APPROVED BECHTEL APPROVED

SHEET 1 OF | 8031-M-57 | 47

I CATEGORY A1

M-57 (SHT. 1)



NOTES:

1. THIS SYSTEM IS A SEISMIC CLASS I SYSTEM EXCEPT AS NOTED.
2. LOCATE AS NEAR AS PRACTICAL TO PRIMARY CONTAINMENT.
3. THE CONNECTION POINTS BETWEEN ½" AND ¾" RECOMBINER DRAIN LINES AND THE 6" RECOMBINER EXHAUST LINE ARE TO BE LOCATED 12 FEET OR MORE BELOW THE ELEVATION OF THE DRAIN CONNECTIONS ON THE RECOMBINER SKID.
4. ALARMS XA-170A AND XA-170B INDICATE RECOMBINER TROUBLE. THE INDIVIDUAL CONDITIONS INVOLVED ARE ANNUNCIATED AT THE RECOMBINER CONTROL CABINETS, EXCEPT FOR LOSS OF POWER TO THE TRICKLE HEATERS AND LOSS OF ALL POWER TO THE RECOMBINER. THE AVAILABILITY OF THE TRICKLE HEAT POWER IS INDICATED BY A LIGHT ON THE RECOMBINER CONTROL CABINETS; NO INDICATION IS PROVIDED FOR LOSS OF POWER TO THE RECOMBINER.
5. HEAT TRACING ON SAMPLE LINES IS TO BE POWERED FROM A SAFEGUARD AC SOURCE.
6. ¾" HBB-126 AND HBB-128 DRAIN THE PIPING UPSTREAM OF THE RECOMBINER BLOWER. ½" HBB-126 AND HBB-128 DRAIN THE RECOMBINER BLOWER CASING. BOTH DRAIN LINES SHALL CONNECT TO THE BOTTOM OF A HORIZONTAL RUN OF THE 6" RECOMBINER EXHAUST LINE.
7. THE DOWNCOMER CAP DRAIN LINE SHALL EXTEND APPROXIMATELY 8 FEET ABOVE THE DOWNCOMER CAP AND APPROXIMATELY 4 FEET BELOW THE DOWNCOMER CAP. THE DRAIN LINE SHALL BE CONSTRUCTED OF 3" SCHEDULE 160 CARBON STEEL PIPE AND SHALL BE SUPPORTED INSIDE THE DOWNCOMER BY BUMPER GUSSETS. ONLY THE FOUR DOWNCOMERS THAT HAVE PRIMARY CONTAINMENT VACUUM RELIEF VALVE ASSEMBLIES ARE CAPPED.
8. VALVES HV-165 AND HV-167 OPEN UPON RECIEPT OF A CONTAINMENT ISOLATION SIGNAL. THESE TWO VALVES, PLUS VALVES HV-160A,HV-160B ARE Q-LISTED AND SEISMIC CLASS I.
9. REAGENT GAS CYLINDERS AND SPAN GAS CYLINDERS ARE SUPPLIED BY PECO.
10. THE INDICATED HOSE CONNECTION IS TO BE USED FOR ILRT PURPOSES IN CONJUNCTION WITH THE HOSE CONNECTION SHOWN ON P&ID M-41, SHEET 2, AT ZONE D,3.
11. THE INDICATED HOSE CONNECTIONS ARE FOR TEMPORARY CONNECTION OF CYLINDERS CONTAINING 07% H2 FOR H2 ANALYZER CALIBRATION.
12. THE DESIGN OF THE MOUNTING TEES FOR THE PRIMARY CONTAINMENT VACUUM RELIEF VALVE ASSEMBLIES IS IN ACCORDANCE WITH SPECIAL CERTIFICATION REQUIREMENTS OF THE STATE OF PENNSYLVANIA.
13. FOR TEST CONNECTIONS ATTACHED TO SEISMIC CATEGORY I PIPING, THE PIPING BETWEEN THE SHUTOFF VALVE AND THE CAPPED END OF THE TEST CONNECTIONS IS DESIGNATED AS SEISMIC CATEGORY IIA.
14. THE INDICATED BUTTERFLY VALVES ARE TO BE INSTALLED WITH THE FLAT SIDE OF THE DISC ORIENTED AWAY FROM THE PRIMARY CONTAINMENT.
15. VALVES HV-114 AND HV-115 ARE TO BE LOCATED OUTSIDE THE RWCU ISLOATION VALVE COMPARTMENT.
16. THE MINIMUM SEPARATION BETWEEN ADJACENT BUTTERFLY VALVES IN A PIPING RUN SHALL BE AS SPECIFIED BY THE VALVE VENDOR, BUT SHALL BE AT LEAST ONE NOMINAL PIPE DIAMETER.
17. VALVES 1123,1124,1125 AND 1126 ARE WELDED OPEN AND INOPERABLE. THE MOTOR OPERATORS HAVE BEEN REMOVED.
18. FOR ALL NON-SEISMIC CATEGORY I CAPPED VENTS, DRAINS,AND TEST CONNECTIONS: DESIGN, FABRICATION, MATERIAL PROCUREMENT, ERECTION, AND TESTING FOR ALL PIPING BEYOND THE LAST ISOLATION VALVE MAY BE IN ACCORDANCE WITH DESIGN CLASS D.
19. EACH OF THE INDICATED VALVES IS PROVIDED WITH A SEPARATE TESTABLE SEAL ASSEMBLY, WITH DOUBLE CONCENTRIC O-RING SEALS, INSTALLED BETWEEN THE PIPE FLANGE AND VALVE FLANGE AT THE END OF THE VALVE THAT FACES THE PRIMARY CONTAINMENT. THESE SEAL ASSEMBLIES ARE PROCURED UNDER P.O. M-182, AS NON-Q FOR A Q-LISTED SERVICE, AND ARE USED IN LIEU OF "FLEXITALLIC" GASKETS. THE PIPE FLANGE ADJACENT TO THE TESTABLE SEAL ASSEMBLY HAS A ⅛" NPT PRESSURE TAP FOR PRESSURE TESTING THE SEAL.
20. AS-BUILT CONFIGURATION OF LINES SHOWN ON THE PIPING ISOMETRICS REFERENCED IN FCR-17,213 IS ACCEPTABLE.
21. THE DIFFERENTIAL MOVEMENT LOOPS (PIGTAILS) IN TUBING ASSOCIATED WITH THE SPAN GAS AND REAGENT GAS CYLINDERS SHALL EACH CONSIST OF A 720° SPIRAL. THE SPIRAL SHALL HAVE A MINIMUM DIAMETER OF 6 INCHES AND POINTS ON THE SPIRAL THAT ARE 360° APART SHALL BE SEPARATED BY A GAP OF APPROXIMATELY 1 INCH.
22. THE LOCATIONS OF THE LOOP SEALS ARE ACCEPTABLE.
23. INSTALLATION IS TO BE IN ACCORDANCE WITH ANSI B31.1 REQUIREMENTS. THE GAS SUPPLY TUBING SHALL BE PNEUMATICALLY TESTED TO ANSI B31.1 BASED ON A DESIGN PRESSURE OF 60 PSIG.
24. PRIMARY CONTAINMENT VACUUM RELIEF VALVE ASSEMBLIES CONSIST OF AN UPSTREAM VALVE DESIGNATED BY THE SUFFIX -1 AND A DOWNSTREAM VALVE DESIGNATED BY SUFFIX -2.
25. THE INDICATED VALVES SEAT AGAINST FLOW IN ONE DIRECTION ONLY AND SHALL BE ORIENTED SO AS TO PROVIDE CONTAINMENT ISOLATION AGAINST FLOW FROM THE PRIMARY CONTAINMENT OUTWARD.
26. THE INDICATED VALVE SHALL BE CAPABLE OF SEATING AGAINST FLOW IN BOTH DIRECTIONS.
27. FOR CHECK VALVE 1021, REMOVE SPRING TO ACHIEVE OPENING AT LOW DIFFERENTIAL PRESSURE.
28. 1" HCB-129 GOOSENECK SHALL BE LOCATED AS HIGH AS PRACTICAL INSIDE THE SUPPRESSION CHAMBER, BUT THE ELEVATION OF THE OPEN END SHALL NOT BE LESS THAN 230'-6". AS-BUILT ELEVATION OF GOOSENECK OPEN END IS USED IN EPG/SAG CALCULATIONS.
29. A WEIR OF 1" X ⅛" CARBON STEEL PLATE WILL BE WELDED TO THE TOP OF THE CAPPED DOWNCOMERS TO PRECLUDE WATER OF A DRYWELL FLOOD FROM ENTERING THESE DOWNCOMERS PRIOR TO ENTERING THE OTHER DOWNCOMERS.
30. IN THE CONTAINMENT HYDROGEN RECOMBINER ASSEMBLIES (1AS403 & 1BS403) BECHTEL HAS REPLACED TRANSMITTERS PT-DO-102A&B, FT-DO-102A&B, FT-DO-101A&B AS WELL AS THERMOCOUPLES AND INSTRUMENT TUBING. DETAILS OF THE TUBING INSTALLATION, INCLUDING ASME CODE BOUNDARIES, ARE DESCRIBED IN 8031-M-58 SHTS. 1&2 AS MODIFIED BY FCR M-19263F, REV. 1.
31. DELETED.
32. DELETED.
33. DETAILS OF THE OUTBOARD, INLET LINE, CONTAINMENT ISOLATION VALVES (FV-DO-101A AND 101B) AND ASSOCIATED LOGIC ARE SHOWN ON VENDOR PRINTS 8031-M-40-45,78,AND 80 (4). THESE VALVES ARE SUPPLIED BY THE VENDOR AND ARE PART OF THE RECOMBINER PACKAGE.
34. THE UPSTREAM TRANSITION PIECES BETWEEN FLANGE AND VALVE AND THE VALVE INLET BASES FOR PSV-57-162 AND PSV-57-164 ARE STAINLESS STEEL CLASS HCB.
(NOTES CONTINUE AT COORDINATE B,4)

NOTES CONTINUED

35. VALVE HV-57-110B WAS INSTALLED BY BECHTEL PER FCR-M19867F TO REPLACE VENDOR (ROCKWELL INTERNATIONAL) SUPPLIED VALVE HV-DO-110B. ELECTRICAL AND MECHANICAL CONNECTIONS TO THIS VALVE (VENDOR NO. MV-10) ARE SHOWN ON VENDOR PRINT 8031-M-40-45.
36. VALVE HV-57-110A WAS INSTALLED BY BECHTEL PER MDCP*206 TO REPLACE VENDOR (ROCKWELL INTERNATIONAL) SUPPLIED VALVE HV-DO-110A. ELECTRICAL AND MECHANICAL CONNECTIONS TO THIS VALVE (VENDOR NO. MV-10) ARE SHOWN ON VENDOR PRINT 8031-M-40-45.
37. THESE GLOBE VALVES SHALL BE INSTALLED SUCH THAT THE FLOW FROM THE DRYWELL OR SUPPRESSION POOL GOES UNDER THE SEAT.
38. THE INDICATED BUTTERFLY VALVES ARE TO BE INSTALLED WITH THE FLAT SIDE OF THE DISC ORIENTED TOWARDS THE PRIMARY CONTAINMENT.
39. ONE VALVE PER ANALYZER WILL BE ENERGIZED AT ALL TIMES WHEN MAIN POWER SWITCH IS IN ANALYZE.
40. VALVE IS BY BECHTEL. SEE MR. 8031-P114A REV. 31 ITEM 16.11
41. REFER TO HIGH LEVEL FUNCTIONAL BLOCK DIAGRAM W-120-VC-00005 FOR FEEDWATER LEVEL CONTROL SYSTEM. (XC-006-150-1,-2.)

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
47	8/12/04	INCORP. ECR 04-00404 REV. 0. CHANGED 1" HBC-116 TO 1" HCB-116. [B,5].	EJW	[illegible]	MSD
46	3/19/04	INCORP. ECR 01-00394 REV. 2. CHANGED SV-146A AND SV-147A TO GLOBE VALVES. [A,6].	EJW	JCW	MSD
45	3/09/04	INCORP. ECR 01-00523 REV. 1 PER WO C0197680. CHANGED REFERENCE TO NOTE 25 TO NOTE 26 AT SV-191. [B,6].	EJW	JCW	MSD
44	3/09/04	INCORP. ECR 03-00085 REV. 0 PER WO C0207259. ADDED NOTE 41. [A,4].	EJW	JCW	MSD

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
CONTAINMENT ATMOSPHERIC CONTROL
(UNIT 1)

LIMERICK GENERATING STATION
PECO ENERGY CO.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	03-22-91

APPROVED BECHTEL APPROVED

SHEET 2 OF | 8031-M-57 | 47

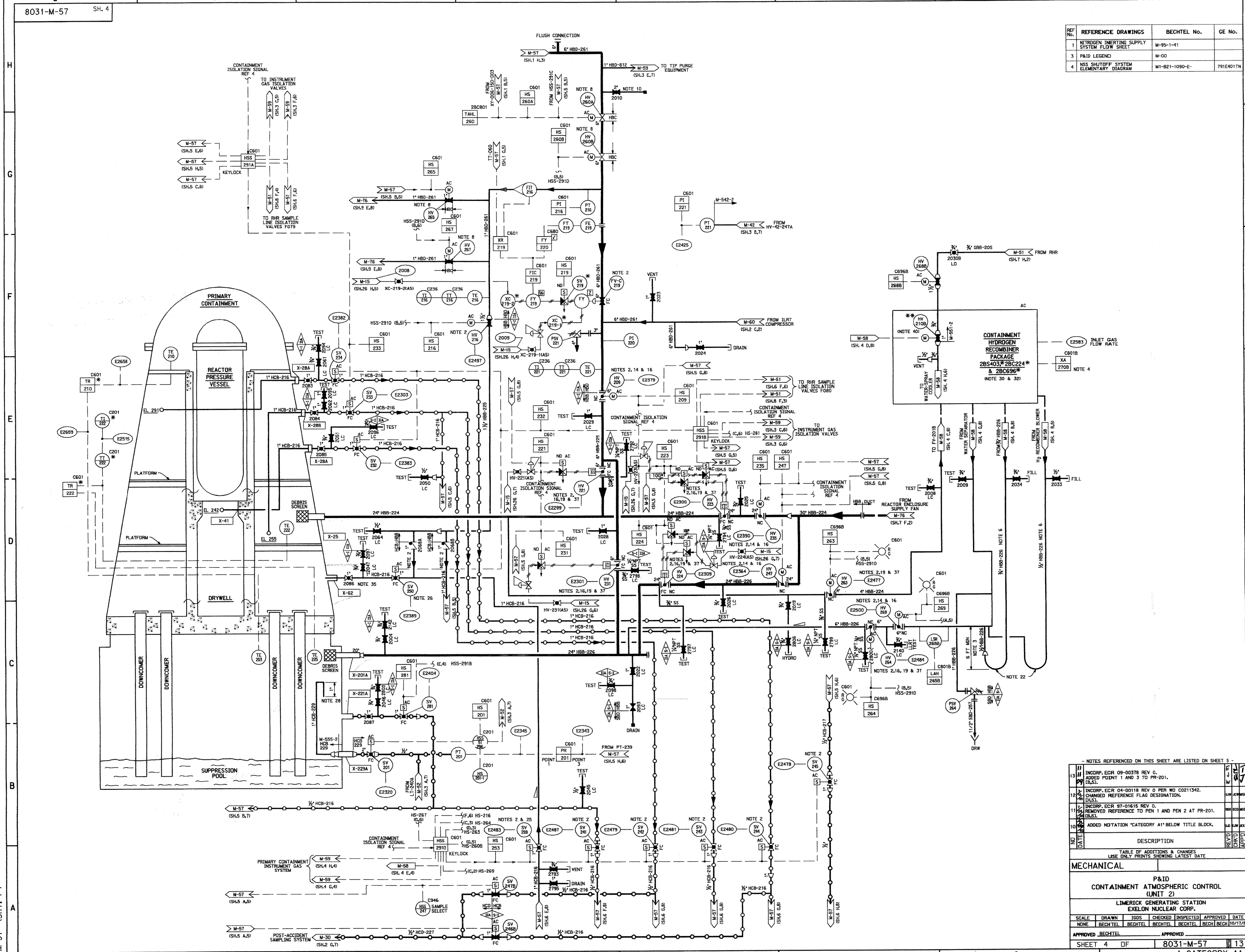
I CATEGORY A1

PRINTED: 12 AUG 2004

M-57 (SHT. 2)

8031-M-57 SH. 4

REF No.	REFERENCE DRAWINGS	BECHTEL No.	GE No.
1	NITROGEN INERTING SUPPLY SYSTEM FLOW SHEET	M-95-1-41	
3	P&ID LEGEND	M-00	
4	NSS SHUTOFF SYSTEM ELEMENTARY DIAGRAM	M1-B21-1090-E-	791E401TN



- NOTES REFERENCED ON THIS SHEET ARE LISTED ON SHEET 5 -

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
13	11/11/09	INCORP. ECR 09-00378 REV 0. ADDED POINT 1 AND 3 TO PR-201. [B,5].	EJW		
12	3/12/05	INCORP. ECR 04-00118 REV 0 PER WO C0211342. CHANGED REFERENCE FLAG DESIGNATION. [H,5].	EJW	JCW	MSD
11	7/24/00	INCORP. ECR 97-01615 REV 0. REMOVED REFERENCE TO PEN 1 AND PEN 2 AT PR-201. [B,5].	RDR	SCD	MSD
10	95	ADDED NOTATION "CATEGORY A1" BELOW TITLE BLOCK.	DJD	EJW	JEK

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
CONTAINMENT ATMOSPHERIC CONTROL
(UNIT 2)

LIMERICK GENERATING STATION
EXELON NUCLEAR CORP.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	10/17/85

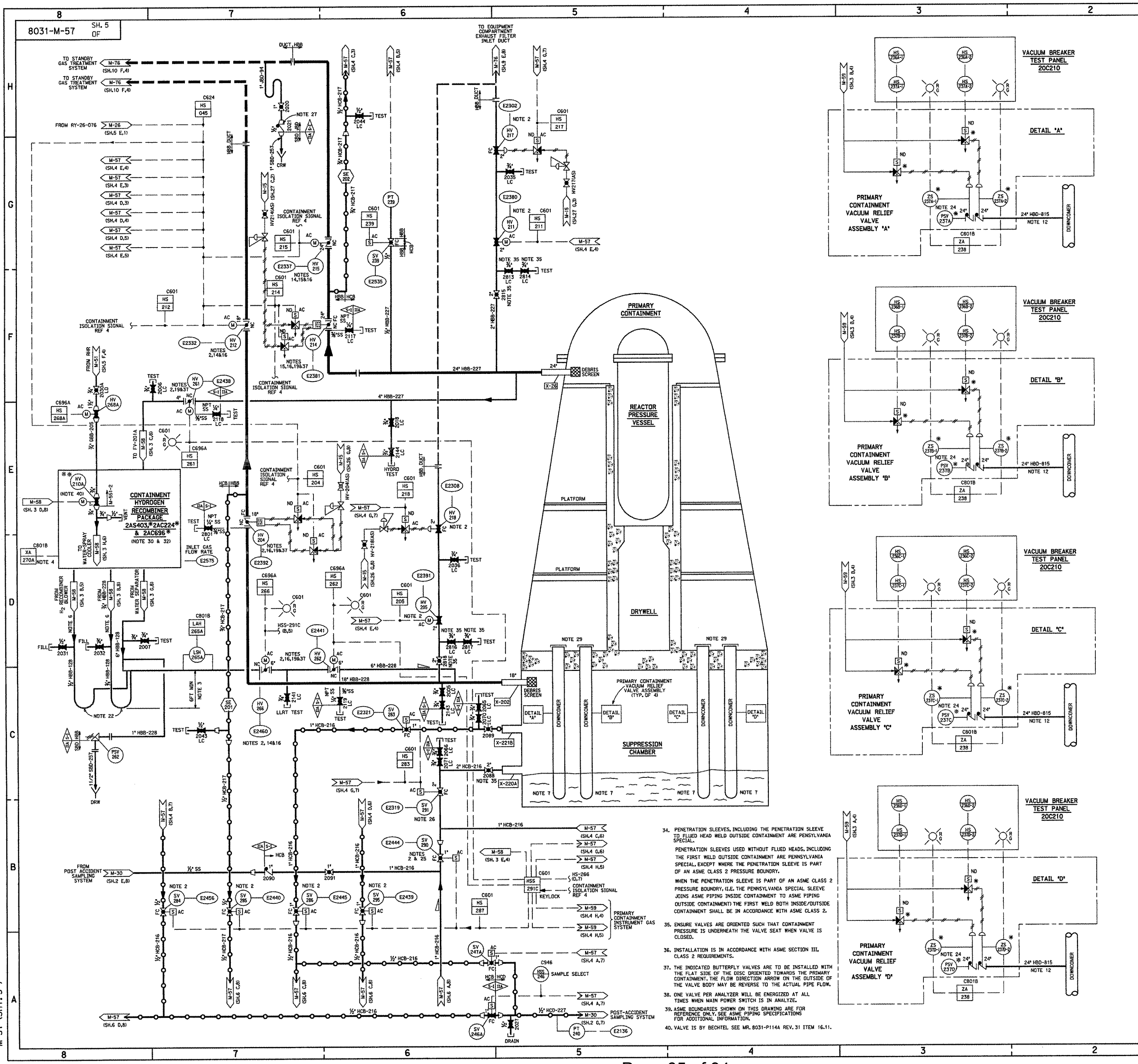
APPROVED BECHTEL APPROVED

SHEET 4 OF 8031-M-57 13

I CATEGORY A1

PRINTED: 06 NOV 2009

M-57 (SHT. 4)



34. PENETRATION SLEEVES, INCLUDING THE PENETRATION SLEEVE TO FLUED HEAD WELD OUTSIDE CONTAINMENT ARE PENSYLVANIA SPECIAL.

PENETRATION SLEEVES USED WITHOUT FLUED HEADS, INCLUDING THE FIRST WELD OUTSIDE CONTAINMENT ARE PENNSYLVANIA SPECIAL, EXCEPT WHERE THE PENETRATION SLEEVE IS PART OF AN ASME CLASS 2 PRESSURE BOUNDRY.

WHEN THE PENETRATION SLEEVE IS PART OF AN ASME CLASS 2 PRESSURE BOUNDRY, (I.E. THE PENNSYLVANIA SPECIAL SLEEVE JOINS ASME PIPING INSIDE CONTAINMENT TO ASME PIPING OUTSIDE CONTAINMENT) THE FIRST WELD BOTH INSIDE/OUTSIDE CONTAINMENT SHALL BE IN ACCORDANCE WITH ASME CLASS 2.

35. ENSURE VALVES ARE ORIENTED SUCH THAT CONTAINMENT PRESSURE IS UNDERNEATH THE VALVE SEAT WHEN VALVE IS CLOSED.

36. INSTALLATION IS IN ACCORDANCE WITH ASME SECTION III, CLASS 2 REQUIREMENTS.

37. THE INDICATED BUTTERFLY VALVES ARE TO BE INSTALLED WITH THE FLAT SIDE OF THE DISC ORIENTED TOWARDS THE PRIMARY CONTAINMENT. THE FLOW DIRECTION ARROW ON THE OUTSIDE OF THE VALVE BODY MAY BE REVERSE TO THE ACTUAL PIPE FLOW.

38. ONE VALVE PER ANALYZER WILL BE ENERGIZED AT ALL TIMES WHEN MAIN POWER SWITCH IS IN ANALYZE.

39. ASME BOUNDARIES SHOWN ON THIS DRAWING ARE FOR REFERENCE ONLY. SEE ASME PIPING SPECIFICATIONS FOR ADDITIONAL INFORMATION.

40. VALVE IS BY BECHTEL SEE MR. 8031-P114A REV. 31 ITEM 16.11.

NOTES:

1. THIS SYSTEM IS A SEISMIC CLASS I SYSTEM EXCEPT AS NOTED.
2. LOCATE AS NEAR AS PRACTICAL TO PRIMARY CONTAINMENT.
3. THE CONNECTION POINTS BETWEEN ½" AND ¾" RECOMBINER DRAIN LINES AND THE 6" RECOMBINER EXHAUST LINE ARE TO BE LOCATED 12 FEET OR MORE BELOW THE ELEVATION OF THE DRAIN CONNECTIONS ON THE RECOMBINER SKID.
4. ALARMS XA-270A AND XA-270B INDICATE RECOMBINER TROUBLE. THE INDIVIDUAL CONDITIONS INVOLVED ARE ANNUNCIATED AT THE RECOMBINER CONTROL CABINETS, EXCEPT FOR LOSS OF POWER TO THE TRICKLE HEATERS AND LOSS OF ALL POWER TO THE RECOMBINER. THE AVAILABILITY OF THE TRICKLE HEAT POWER IS INDICATED BY A LIGHT ON THE RECOMBINER CONTROL CABINETS; NO INDICATION IS PROVIDED FOR LOSS OF POWER TO THE RECOMBINER.
5. HEAT TRACING ON SAMPLE LINES IS TO BE POWERED FROM A SAFEGUARD AC SOURCE.
6. ¾" HBB-226 AND HBB-228 DRAIN THE PIPING UPSTREAM OF THE RECOMBINER BLOWER. ½" HBB-226 AND HBB-228 DRAIN THE RECOMBINER BLOWER CASING. BOTH DRAIN LINES SHALL CONNECT TO THE BOTTOM OF A HORIZONTAL RUN OF THE 6" RECOMBINER EXHAUST LINE.
7. THE DOWNCOMER CAP DRAIN LINE SHALL EXTEND APPROXIMATELY 8 FEET ABOVE THE DOWNCOMER CAP AND APPROXIMATELY 4 FEET BELOW THE DOWNCOMER CAP. THE DRAIN LINE SHALL BE CONSTRUCTED OF 3" SCHEDULE 160 CARBON STEEL PIPE AND SHALL BE SUPPORTED INSIDE THE DOWNCOMER BY BUMPER GUSSETS. ONLY THE FOUR DOWNCOMERS THAT HAVE PRIMARY CONTAINMENT VACUUM RELIEF VALVE ASSEMBLIES ARE CAPPED.
8. VALVES HV-265 AND HV-267 OPEN UPON RECEIPT OF A CONTAINMENT ISOLATION SIGNAL. THESE TWO VALVES, PLUS VALVES HV-260A,HV-260B ARE Q-LISTED AND SEISMIC CLASS I.
9. REAGENT GAS CYLINDERS AND SPAN GAS CYLINDERS ARE SUPPLIED BY PECO.
10. THE INDICATED HOSE CONNECTION IS TO BE USED FOR ILRT PURPOSES IN CONJUNCTION WITH THE HOSE CONNECTION SHOWN ON P&ID M-41, SHEET 5, AT ZONE D,3.
11. THE INDICATED HOSE CONNECTIONS ARE FOR TEMPORARY CONNECTION OF CYLINDERS CONTAINING 07% H2 FOR H2 ANALYZER CALIBRATION.
12. THE DESIGN OF THE MOUNTING TEES FOR THE PRIMARY CONTAINMENT VACUUM RELIEF VALVE ASSEMBLIES IS IN ACCORDANCE WITH SPECIAL CERTIFICATION REQUIREMENTS OF THE STATE OF PENNSYLVANIA.
13. FOR TEST, FILL, VENT AND DRAIN CONNECTIONS ATTACHED TO SEISMIC CATEGORY I PIPING. THE PIPING BETWEEN THE SHUTOFF VALVE AND THE CAPPED END OF THE TEST, FILL, VENT OR DRAIN CONNECTIONS IS DESIGNATED AS SEISMIC CATEGORY IIA.
14. THE INDICATED BUTTERFLY VALVES ARE TO BE INSTALLED WITH THE FLAT SIDE OF THE DISC ORIENTED AWAY FROM THE PRIMARY CONTAINMENT.
15. VALVES HV-214 AND HV-215 ARE TO BE LOCATED OUTSIDE THE RWCU ISOLATION VALVE COMPARTMENT.
16. THE MINIMUM SEPARATION BETWEEN ADJACENT BUTTERFLY VALVES IN A PIPING RUN SHALL BE AS SPECIFIED BY THE VALVE VENDOR, BUT SHALL BE AT LEAST ONE NOMINAL PIPE DIAMETER.
17. DELETED.
18. FOR ALL NON-SEISMIC CATEGORY I CAPPED VENTS, DRAINS, TEST, AND FILL CONNECTIONS: DESIGN, FABRICATION, MATERIAL PROCUREMENT, ERECTION, AND TESTING FOR ALL PIPING BEYOND THE LAST ISOLATION VALVE MAY BE IN ACCORDANCE WITH DESIGN CLASS D.
19. EACH OF THE INDICATED VALVES IS PROVIDED WITH A SEPARATE TESTABLE SEAL ASSEMBLY, WITH DOUBLE CONCENTRIC O-RING SEALS, INSTALLED BETWEEN THE PIPE FLANGE AND VALVE FLANGE AT THE END OF THE VALVE THAT FACES THE PRIMARY CONTAINMENT. THESE SEAL ASSEMBLIES ARE PROCURED UNDER P.O. M-182, AS NON-Q FOR A Q-LISTED SERVICE, AND ARE USED IN LIEU OF "FLEXITALLIC" GASKETS. THE PIPE FLANGE ADJACENT TO THE TESTABLE SEAL ASSEMBLY HAS A ⅛" NPT PRESSURE TAP FOR PRESSURE TESTING THE SEAL.
20. DELETED.
21. THE DIFFERENTIAL MOVEMENT LOOPS (PIGTAILS) IN TUBING ASSOCIATED WITH THE SPAN GAS AND REAGENT GAS CYLINDERS SHALL EACH CONSIST OF A 720° SPIRAL. THE SPIRAL SHALL HAVE A MINIMUM DIAMETER OF 6 INCHES AND POINTS ON THE SPIRAL THAT ARE 360° APART SHALL BE SEPARATED BY A GAP OF APPROXIMATELY 1 INCH.
22. LOOP SEALS SHALL BE LOCATED AT LEAST 5 FEET FROM ANY SAFETY-RELATED ELECTRICAL EQUIPMENT.
23. INSTALLATION IS TO BE IN ACCORDANCE WITH ANSI B31.1 REQUIREMENTS. THE GAS SUPPLY TUBING SHALL BE PNEUMATICALLY TESTED TO ANSI B31.1 BASED ON A DESIGN PRESSURE OF 60 PSIG.
24. PRIMARY CONTAINMENT VACUUM RELIEF VALVE ASSEMBLIES CONSIST OF AN UPSTREAM VALVE DESIGNATED BY THE SUFFIX -1 AND A DOWNSTREAM VALVE DESIGNATED BY SUFFIX -2.
25. THE INDICATED VALVES SEAT AGAINST FLOW IN ONE DIRECTION ONLY AND SHALL BE ORIENTED SO AS TO PROVIDE CONTAINMENT ISOLATION AGAINST FLOW FROM THE PRIMARY CONTAINMENT OUTWARD.
26. THE INDICATED VALVE SHALL BE CAPABLE OF SEATING AGAINST FLOW IN BOTH DIRECTIONS.
27. FOR CHECK VALVE 2021, REMOVE SPRING TO ACHIEVE OPENING AT LOW DIFFERENTIAL PRESSURE.
28. 1" HCB-229 GOOSENECK SHALL BE LOCATED AS HIGH AS PRACTICAL INSIDE THE SUPPRESSION CHAMBER, BUT THE ELEVATION OF THE OPEN END SHALL NOT BE LESS THAN 230'-6". AS-BUILT ELEVATION OF GOOSENECK OPEN END IS USED IN EPG/SAG CALCULATIONS.
29. A WEIR OF 1" X ⅛" CARBON STEEL PLATE WILL BE WELDED TO THE TOP OF THE CAPPED DOWNCOMERS TO PRECLUDE WATER OF A DRYWELL FLOOD FROM ENTERING THESE DOWNCOMERS PRIOR TO ENTERING THE OTHER DOWNCOMERS.
30. IN THE CONTAINMENT HYDROGEN RECOMBINER ASSEMBLIES (2AS403 & 2BS403) BECHTEL HAS REPLACED TRANSMITTERS PT-DO-202A&B, FT-DO-202A&B, FT-DO-201A&B AS WELL AS THERMOCOUPLES AND INSTRUMENT TUBING. DETAILS OF THE TUBING INSTALLATION, INCLUDING ASME CODE BOUNDARIES, ARE DESCRIBED IN 8031-M-58 SHT'S. 3 & 4.
31. DELETED.
32. DETAILS OF THE OUTBOARD, INLET LINE, CONTAINMENT ISOLATION VALVES (FV-DO-201A AND 201B) AND ASSOCIATED LOGIC ARE SHOWN ON VENDOR PRINTS 8031-M-40-45, 8031-M-40-78 AND 8031-M-40-86 (4). THESE VALVES ARE SUPPLIED BY THE VENDOR AND ARE PART OF THE RECOMBINER PACKAGE.
33. UNLESS OTHERWISE INDICATED, ALL ASME PIPING INCLUDED ON THIS P&ID IS INCLUDED IN THE SCOPE OF NUCLEAR PIPING DESIGN SPECIFICAITONS 8031-M-557-2.

NOTES CONTINUED AT COORD. (B-4)
-REFERENCED DRAWINGS ARE LISTED ON SHEET 4-

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
43	3/19/04	INCORP. ECR 01-00394 REV. 2. CHANGED REFERENCE TO NOTE 25 TO NOTE 26 AT SV-291. [B,6].	JFW		
42	05/06/03	REVISED PER A/R A1415849 E01 AND CR 152922. CORRECTED CONT. ZONE AT ½" HCB-216 FLAG M-57 SHT.6, DOWNSTEAM OF SV-206. [C,8] WAS [D,8]. [A,7].	EJW	KLW	CMC
41	11/17/98	INCORP. ECR 98-01633 REV. 0. REVISED NOTE 28. [C,1].	DJD	EJW	MJM FOR SJB
40	01/30/98	INCORP. ECR 98-00054 REV. 0. CHANGED POSITION OF 247A TO OPEN. [F,1].	DJD	EJW	SJB

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
CONTAINMENT ATMOSPHERIC CONTROL
(UNIT 2)

LIMERICK GENERATING STATION
PECO ENERGY CO.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	03-22-91

APPROVED BECHTEL APPROVED

SHEET 5 OF 8031-M-57 43

CATEGORY A1

PRINTED: 17 MAR 2004

Request for Relief for Alternative Requirements for Pressure Testing of the Primary Containment Instrument Gas Piping In Accordance with 10CFR50.55a(z)(1) Alternative Provides Acceptable Level of Quality and Safety

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1. ASME Code Component(s) Affected

Code Class:	3
Reference:	IWD-2500, Table IWD-2500-1
Examination Category:	D-B
Item Number:	D2.10
Description:	Primary Containment Instrument Gas (see Note 1 below)
Component Number:	HCC-135, HCC-235

Note 1: A more detailed description of the pressure testing boundary is identified below

Class 3 Primary Containment Instrument Gas Piping (PCIG), as follows:

- Instrument gas lines HCC-135 between and including valves HV-059-151A, SV-059-150A, 059-1138, 059-1120A-1, 059-1120A-2, and 059-1120A-3. (P&ID M-59, Sheet 1)
- Instrument gas lines HCC-135 between and including valves HV-059-151B, SV-059-150B, 059-1119, 059-1120B-1, 059-1120B-2, and 059-1120B-3. (P&ID M-59, Sheet 1)
- Instrument gas lines HCC-235 between and including valves HV-059-251A, SV-059-250A, 059-2138, 059-2120A-1, 059-2120A-2, and 059-2120A-3. (P&ID M-59, Sheet 3)
- Instrument gas lines HCC-235 between and including valves HV-059-251B, SV-059-250B, 059-2119, 059-2120B-1, 059-2120B-2, and 059-2120B-3. (P&ID M-59, Sheet 3)

See Enclosure 1 for M-59, Sheets 1 and 3.

2. Applicable Code Edition and Addenda

The Inservice Inspection program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2007 Edition through the 2008 Addenda.

3. Applicable Code Requirements

Table IWD-2500-1, Examination Category D-B, Item Number D2.10, requires all Class 3 pressure retaining components be subject to a system leakage test with a VT-2 visual examination in accordance with Paragraph IWD-5220. This pressure test is to be conducted once each inspection period.

4. Reason for Request

Pursuant to 10CFR50.55a(z)(1), relief is requested on the basis that the proposed alternative will provide an acceptable level of quality and safety.

The PCIG system is pneumatic; therefore, the Code-required VT-2 visual examination would require the application of a leak detection solution to the subject piping and components. Much of this piping is 20 to 30 feet above floor level and is inaccessible as a result of it being routed through walls, in close proximity to sensitive plant equipment and other equipment obstructions, resulting in an inability to perform a complete VT-2 visual examination of the pressurized piping.

During the Third ISI Interval, a system leakage test and VT-2 visual examination of the Unit 2 PCIG piping, which includes approximately 500 feet of small bore piping, was performed on December 17, 2009. Approximately 39% of the “A” loop and 68% of the “B” loop piping was inaccessible for inspection. No scaffolding was used for this inspection; however, even with scaffolding, 100% inspection could not be obtained. No indications were identified during the VT-2 visual examinations. A walkdown performed on the Unit 1 piping determined that the inaccessible piping configuration for Unit 1 is similar to Unit 2.

5. Proposed Alternative and Basis for Use

As an alternative to the examination requirements of Table IWD-2500-1, Limerick Generating Station, Units 1 and 2 will perform pressure decay testing once per inspection period, which is equivalent to the Code-required frequency.

The pressure decay test is performed by isolating and pressurizing the associated piping to the nominal operating pressure. The decay in pressure is then monitored through calibrated pressure instrumentation. If the acceptable pressure decay criterion is exceeded, additional investigation is performed to locate the leak.

The proposed pressure decay test will provide the same level of quality and safety as the VT-2 visual examination for pressure testing required by the Code. The proposed pressure decay test will ensure an acceptable level of system reliability and structural integrity of the piping, which is the intent of the Code-required VT-2 visual examination pressure test.

6. Duration of Proposed Alternative

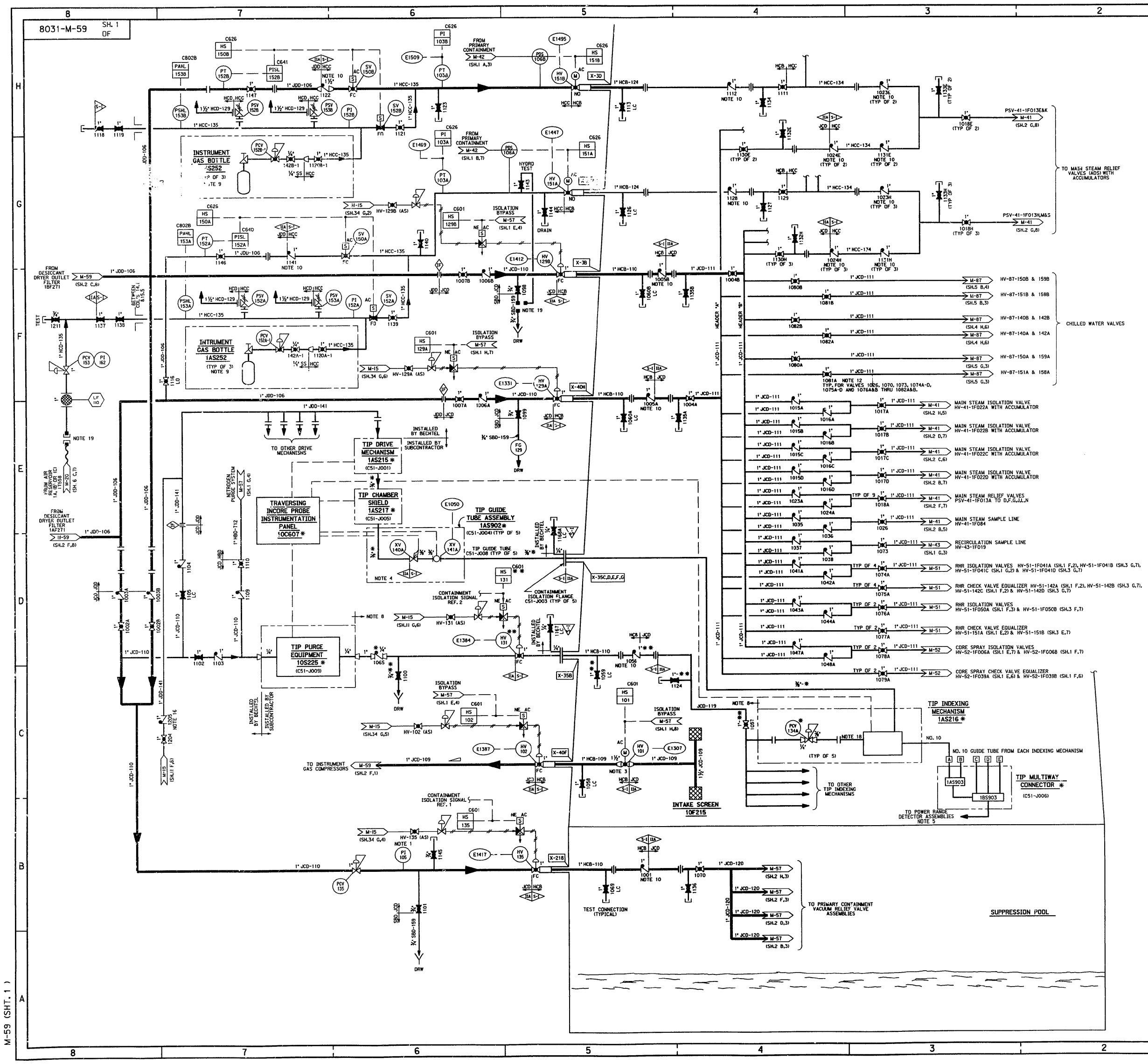
Relief is requested for the Fourth Ten-Year ISI Interval for Limerick Generating Station Units 1 and 2.

7. Precedents

Limerick Generating Station Units 1 and 2 Third ISI Interval Relief Request I3R-13 was authorized by NRC Safety Evaluation (SE) dated December 2, 2010. The Fourth ISI Interval Relief Request utilizes an identical approach that was previously approved. (ML103330539)

Relief Request 13R-07 was authorized for Clinton Power Station Unit 1 by NRC SE dated November 21, 2011. (TAC No. ME4985)

Relief Request 13R-10 was authorized for LaSalle County Station Units 1 and 2 by NRC SE dated January 30, 2008. (TAC Nos. MD5459, MD5460, MD5390, MD5463, MD5464, MD5465, MD5466, MD5467, and MD5468)



NOTES:

1. LOCATE INDICATOR TAP AS CLOSE AS POSSIBLE TO CONTAINMENT PENETRATION.
2. BYPASS VALVE ONLY TO BE USED WHEN COMPRESSORS ARE NOT IN OPERATION.
3. INSTALL VALVE SUCH THAT FLOW IS OVER THE SEAT TO COMPLY WITH 10CFR50 APPENDIX J.
4. LOCATE AS CLOSE TO CONTAINMENT PENETRATION AS POSSIBLE.
5. ALL OTHER GUIDE TUBE FROM THE A,B,C,D AND E TIP INDEXING MECHANISM (TYP OF 42).
6. TS-118A AND B ARE INTERNAL TO DRYER AND OPERATE THE REFRIGERATOR COMPRESSOR MOTOR AND CIRCULATION FAN.
7. VALVES MUST BE SEISMIC CATEGORY I AND Q-LISTED. THE ISOLATION SIGNALS MUST CLOSE BLOCK VALVES AND OPEN VENT VALVES.
8. SCOPE OF MATERIAL SUPPLY SHALL BE AS FOLLOWS: NON-ASTERISK ITEMS (PIPING) ARE FURNISHED UNDER SUBCONTRACT 8031-M-108; SINGLE-ASTERISK (*) ITEMS ARE FURNISHED BY GE; DOUBLE-ASTERISK (**) ITEMS ARE FURNISHED BY BECHTEL, INSTALLED BY GE.
9. INSTRUMENT GAS BOTTLES CONFORM TO DEPARTMENT OF TRANSPORTATION (DOT) STANDARDS, TITLE 49, SECTION 178.37, SPECIFICATION 3AA AND INTERSTATE COMMERCE COMMISSION (ICC) SPECIFICATIONS.
10. Q-LISTED CHECK VALVES ASSOCIATED WITH THE ADS SEISMIC I GAS SUPPLY SYSTEM AND Q-LISTED CHECK VALVES USED FOR CONTAINMENT ISOLATION SHALL BE SPRING LOADED AND HAVE SOFT SEATS (VITON).
11. NON-Q DRAIN AND VENT LINES AND CAPPED ENDS EXTENDING FROM SEISMIC CATEGORY I PIPING ARE SEISMIC CATEGORY IIA DOWNSTREAM OF THE LAST ISOLATION VALVE.
12. PIPING DOWNSTREAM OF ISOLATION VALVES SHOULD BE INSTALLED PER PIPE CLASS JCD TO WITHIN 3'-0" OF THE PILOT SOLENOID VALVE. THE REMAINING 3'-0" ARE TO BE ASME SA-213 GRADE TP-304L OR TP-316L STAINLESS STEEL TUBING. A COIL OF TUBING (PIGTAIL) TO ALLOW FOR MOVEMENT SHOULD BE INSTALLED AS REQUIRED.
13. FOR ALL NON-SEISMIC CATEGORY I CAPPED VENTS, DRAINS, AND TEST CONNECTIONS: DESIGN, FABRICATION, MATERIAL PROCUREMENT, ERECTION, AND TESTING FOR ALL PIPING DOWNSTREAM OF THE LAST ISOLATION VALVE MAY BE IN ACCORDANCE WITH DESIGN CLASS D.
14. VALVE IS NOT TO BE FULLY CLOSED.
15. TI-59-124A/B AND TI-59-125A/B READINGS ARE ERRONEOUS AND SHOULD BE IGNORED BECAUSE INSTRUMENT SENSING BULBS ARE NOT IN GAS STREAM. USE TI-59-118A/B AND TI-59-123A/B INSTEAD.
16. VALVE 1205 SHOULD BE NUPRO BRONZE WITH A CRACKING PRESSURE OF ≥ 10 PSI.
17. ASME BOUNDARIES SHOWN ON THIS DRAWING ARE FOR REFERENCE ONLY. SEE ASME PIPING SPECIFICATIONS FOR ADDITIONAL INFORMATION.
18. 3/8" S.S. TUBING INSTALLED BETWEEN FLANGE AND TIP INDEXING MECHANISM (REF. ECR LG 93-03300).
19. QUICK CONNECTS REQUIRED PER PROCEDURE SE 1-1.

- REFERENCES FOR THIS SHEET ARE LISTED ON SHEET 2 -

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
38	3/16/98	INCORP. ECR 97-02093 REV. 0. ADDED CONN. TO 1C1T558 ON M-20 SHT.06. [F,8].	DJD	EJW	SJB
37	03/12/98	PARTIAL INCORP. ECR 97-02093 REV. 0. PER W.O. C0179349. ADDED CONN. TO M-20 SH. 06, VALVES 1211 & PCV-153 AND LF-110. [E,F-7,8].	DJD	EJW	SJB
36	03/03/97	INCORP. ECR 96-04362 REV. 0. ADDED QUICK CONNECTS BETW. VALVES 1143, 1098, & DRW DRAIN WITH NOTE 19. [F,G-5].	DJD	EJW	SJB
35	07/14/94	INCORP. ECR LG 93-03300 REV. 0 MOVED SEISMIC BOUNDARY TO UNION AND ADDED LINE CLASS [C-5]. ADDED NOTE 18 [C-3].	[illegible]	[illegible]	[illegible]

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
PRIMARY CONTAINMENT INSTRUMENT GAS
(UNIT 1)

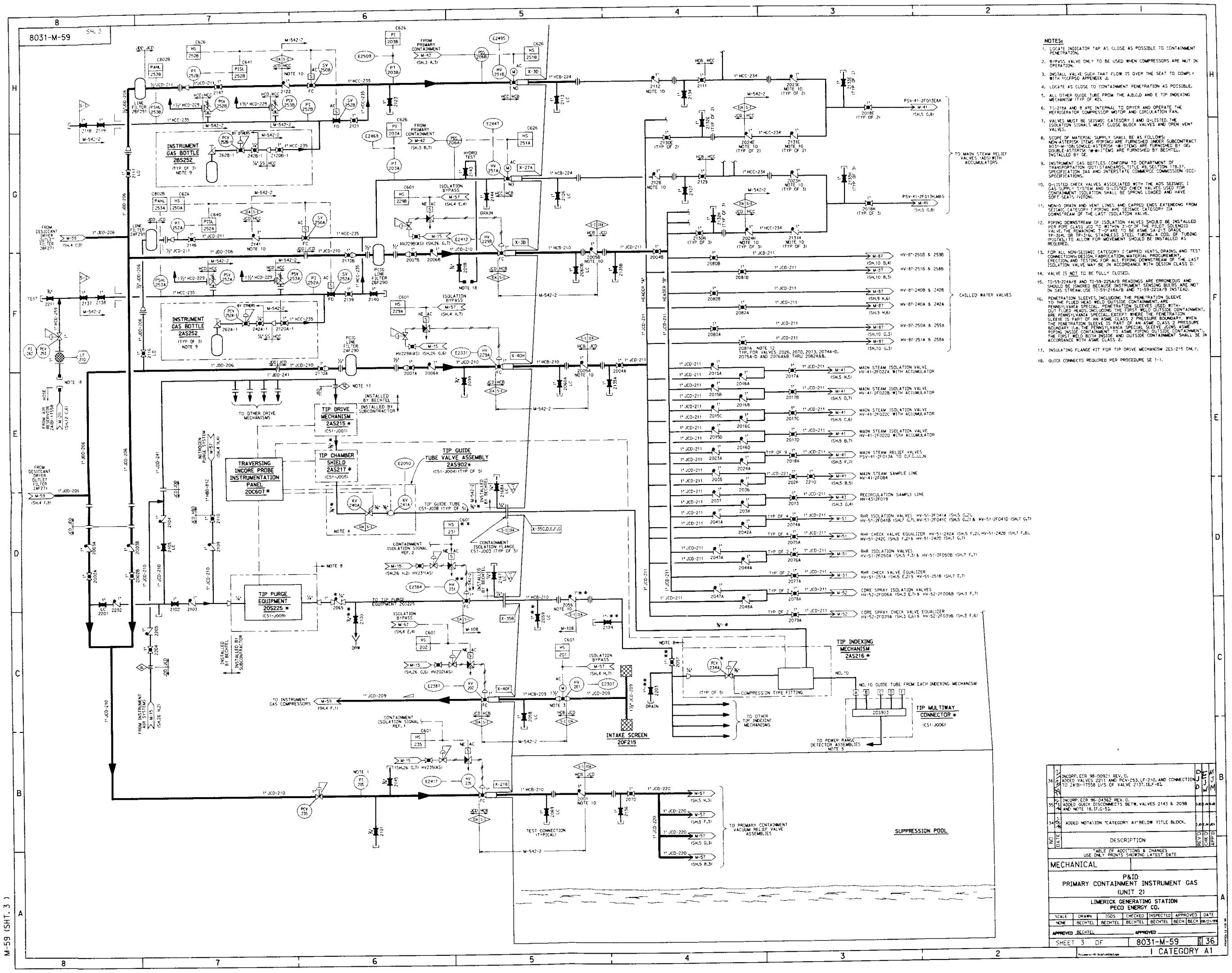
LIMERICK GENERATING STATION
PECO ENERGY CO.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	08/21/89

APPROVED BECHTEL APPROVED

SHEET 1 OF 4 8031-M-59 38

PRINTED: 12 MAR 98 I CATEGORY A1


8031-M-59
NOTES:
TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE
36 INCORP. ECR 98-00921 REV. 0.
ADDED VALVES 2211 AND PCV-253, LF-210, AND CONNECTION TO 2A(B)-17558 U/S OF VALVE 2137. (E,F-8)
35 INCORP. ECR 96-04362 REV. 0.
ADDED QUICK DISCONNECTS BETW. VALVES 2143 & 2098 AND NOTE 18. (F,G-5)
34 ADDED NOTATION "CATEGORY A1" BELOW TITLE BLOCK.
NO
DATE
DESCRIPTION
REV'D
CHK'D
APP'D
MECHANICAL
P&ID
PRIMARY CONTAINMENT INSTRUMENT GAS
(UNIT 2)
LIMERICK GENERATING STATION
PECO ENERGY CO.
SCALE NONE
DRAWN BECHTEL
IGDS BECHTEL
CHECKED BECHTEL
INSPECTED BECHTEL
APPROVED BECH BECH
DATE 08/21/89
APPROVED BECHTEL
APPROVED
SHEET 3 OF
8031-M-59
36
CATEGORY A1
SUPPRESSION POOL
TIP DRIVE MECHANISM 2AS215
TIP CHAMBER SHIELD 2AS217
TRAVERSING INCORE PROBE INSTRUMENTATION PANEL 20C607
TIP PURGE EQUIPMENT 20S225
TIP INDEXING MECHANISM 2AS216
TIP MULTIWAY CONNECTOR
INTAKE SCREEN 20F215
INSTRUMENT GAS BOTTLE 2BS252
INSTRUMENT GAS BOTTLE 2AS252
CHILLED WATER VALVES
M-59 (SHT. 3)

Request for Relief for Alternative Requirements for Nozzle-to-Vessel Weld and Inner Radii Examination Requirements In Accordance with 10CFR50.55a(z)(1) Alternative Provides Acceptable Level of Quality and Safety

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1. ASME Code Component(s) Affected

Code Class:	1
Reference:	IWB-2500, Table IWB-2500-1
Examination Category:	B-D
Item Number:	B3.90 and B3.100
Description:	Alternative Requirements for Nozzle-to-Vessel Weld and Inner Radii Examination Requirements
Component Number:	Reactor Vessel Nozzles: N2, N3, N5, N6, N7, N8, and N17 (See Table 1 for complete list of nozzle identifications)

2. Applicable Code Edition and Addenda

The Inservice Inspection program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2007 Edition through the 2008 Addenda. Additionally, for ultrasonic examinations, ASME Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," of the 2007 Edition through the 2008 Addenda is implemented.

3. Applicable Code Requirements

The applicable requirement is contained in Table IWB-2500-1, "Examination Category B-D, Full Penetration Welded Nozzle in Vessels." Class 1 Reactor Vessel nozzle-to-vessel weld and nozzle inner radii examination requirements are delineated in Item Number B3.90, "Nozzle-to-Vessel Welds," and B3.100, "Nozzle Inside Radius Section." The required method of examination is volumetric. All nozzles with full penetration welds to the reactor vessel shell (or head) and integrally cast nozzles are examined each interval.

All of the nozzle assemblies identified in Table 1 are full penetration welds.

4. Reason for Request

The Federal Register Notice (FRN) published November 5, 2014, contains the rulemaking that amends 10 CFR 50.55a to incorporate by reference Regulatory Guide (RG) 1.147, Revision 17, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1." As stated in the FRN, licensees may use the Code Cases listed in RG 1.147 as alternatives to engineering standards for the construction, inservice inspection, and inservice testing of nuclear power plant components. Code Case N-702, "Alternative Requirements for Boiling Water Reactor (BWR) Nozzle Inner Radius and Nozzle-to-Shell Welds, Section XI, Division 1," is listed in RG 1.147, Table 2, "Conditionally Acceptable Section XI Code Cases." The Condition associated with Code Case N-702 is as follows:

> The applicability of Code Case N-702 must be shown by demonstrating that the criteria in Section 5.0 of NRC Safety Evaluation regarding BWRVIP-108 dated December 18,

2007 (ML073600374) or Section 5.0 of NRC Safety Evaluation regarding BWRVIP-241 dated April 19, 2013 (ML13071A240) are met. The evaluation demonstrating the applicability of the Code Case shall be reviewed and approved by the NRC prior to the application of the Code Case.

In the section of the FRN associated with *NRC Responses to Public Comments on Draft Regulatory Guides,* the NRC responses to comments specific to Code Case N-702 start on page 9 of 40 (79 FR 65783). An excerpt from the FRN is included as follows:

> Licensees who plan to request relief from the ASME Code, Section XI requirements for RPV nozzle-to-vessel shell welds and nozzle inner radius sections may reference the BWRVIP–241 report as the technical basis for the use of ASME Code Case N–702 as an alternative. However, licensees should demonstrate the plant-specific applicability of the BWRVIP–241 report to their units in the relief request by addressing the conditions and limitations specified in Section 5.0 of the NRC Safety Evaluation for BWRVIP–241.

The proposed alternative provides an acceptable level of quality and safety based on the technical content of BWRVIP-108 and BWRVIP-241, as endorsed by the NRC SEs.

5. <u>Proposed Alternative and Basis for Use</u>

As an alternative for all welds and inner radii identified in Tables 5-1 and 5-2, Limerick Generating Station purposes to examine a minimum of 25 percent of the nozzle-to-vessel welds and inner radii sections, including at least one nozzle from each system and nominal pipe size, in accordance with ASME Code Case N-702. For the nozzle assemblies identified in Table 1, this would mean 25 percent from each of the groups identified below:

Table 5-1
Limerick Generating Station, Unit 1 Summary

Group	Total Number	Minimum Number to be Examined
Recirculation Inlet (N2)	10	3
Main Steam (N3)	4	1
Core Spray (N5)	2	1
Nozzles On Top Head (N6 and N7)	3	1
Jet Pump Instrument (N8)	2	1
Residual Heat Removal (N17)	4	1

Table 5-2
Limerick Generating Station, Unit 2 Summary

Group	Total Number	Minimum Number to be Examined
Recirculation Inlet (N2)	10	3
Main Steam (N3)	4	1
Core Spray (N5)	2	1
Nozzles On Top Head (N6 and N7)	3	1
Jet Pump Instrument (N8)	2	1
Residual Heat Removal (N17)	4	1

The examinations in Tables 5-1 and 5-2 will be scheduled in accordance with Table IWB-2411-1, Inspection Program.

ASME Code Case N-702 stipulates that a VT-1 visual examination may be used in lieu of the volumetric examination for the inner radii (i.e., Item Number B3.100, "Nozzle Inside Radius Section"). Limerick Generating Station is not currently using ASME Code Case N-648-1 for the identified components which would require enhanced magnification visual examination per NRC position established in Regulatory Guide 1.147, and has no plans of using ASME Code Case N-648-1 on these components in the future. Therefore, Limerick Generating Station will perform volumetric examinations of the nozzle inside radius sections selected per this relief request.

Electric Power Research Institute (EPRI) Technical Report 1003557, "BWRVIP-108: Boiling Water Reactor Vessel and Internals Project Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Blend Radii," provides the basis for ASME Code Case N-702. The evaluation found that failure probabilities at the nozzle blend radius region and nozzle-to-vessel shell weld due to a Low Temperature Overpressure event are very low (i.e., $<1 \times 10^{-6}$ for 40 years) with or without inservice inspection. The report concludes that inspection of 25 percent of each nozzle type is technically justified.

This EPRI report was approved by the NRC in a Safety Evaluation (SE) dated December 19, 2007 (i.e., ADAMS Accession No. ML073600374). Section 5.0, "Plant-Specific Applicability," of the SE indicates that each licensee who plans to request relief from ASME Code, Section XI requirements for RPV nozzle-to-vessel shell welds and nozzle inner radii sections may reference the BWRVIP-108 report as the technical basis for the use of ASME Code Case N-702 as an alternative. However, each licensee should demonstrate the plant specific applicability criteria from the BWRVIP-108 report to its units in the relief request by showing that all the general and nozzle-specific criteria addressed below are satisfied (i.e., as described in Enclosure 1).

(1) The maximum RPV heatup/cooldown rate is limited to less than 115°F/hour.

Limerick Generating Station, Units 1 and 2 Technical Specification (TS) 3.4.6, "Pressure/Temperature Limits," provides a limiting condition for operation (LCO) of 100°F per hour. The heatup/cooldown rate is referenced in the Limerick Generating

Station operating procedures where applicable, such as scrams and start-ups. This heatup/cooldown rate is also described in the Limerick Generating Station Updated Final Safety Analysis Report (UFSAR), Section 5.3.3.6, “Operating Conditions.”

(2) For the Recirculation Inlet Nozzles, the following criteria must be met:

a. $(pr/t)/C_{RPV}<1.15$; the calculation for the Limerick Generating Station, Units 1 and 2 N2 Nozzle results in 1.032, which is less than 1.15.

b. $[p(r_o^2 + r_i^2)/(r_o^2 - r_i^2)]/C_{NOZZLE}<1.15$; the calculation for the Limerick Generating Station, Units 1 and 2 N2 Nozzle results in 0.950, which is less than 1.15.

(3) For the Recirculation Outlet Nozzles, the following criteria must be met:

c. $(pr/t)/C_{RPV}< 1.15$; the calculation for the Limerick Generating Station, Units 1 and 2 N1 Nozzle results in 1.234, which is higher than 1.15.

d. $[p(r_o^2+r_i^2)/(r_o^2-r_i^2)]/C_{NOZZLE}<1.15$; the calculation for the Limerick Generating Station, Units 1 and 2 N1 Nozzle results in 1.023, which is less than 1.15.

Based upon the above information, all Limerick Generating Station RPV nozzle-to-vessel shell full penetration welds and nozzle inner radii sections, with the exception of the Recirculation Outlet Nozzles, meet the general and nozzle-specific criteria in BWRVIP-108. Therefore, ASME Code Case N-702 is applicable.

ASME Code Case N-702 provides an acceptable level of quality and safety in accordance with 10CFR50.55a(z)(1) for all the RPV nozzle-to-vessel shell full penetration welds and nozzle inner radii sections, with the exception of the Recirculation Outlet Nozzles.

6. Duration of Proposed Alternative

Relief is requested for the Fourth Ten-Year ISI Interval for Limerick Generating Station Units 1 and 2.

7. Precedents

Limerick Generating Station Units 1 and 2 Third ISI Interval Relief Request I3R-14 was authorized by NRC Safety Evaluation (SE) dated September 9, 2010. The Fourth ISI Interval Relief Request utilizes an identical approach that was previously approved. (ML102390467)

Relief Request I4R-16 was conditionally authorized for Dresden Nuclear Power Station Units 2 and 3 by NRC SE dated November 3, 2009.

Relief Request I4R-17 was conditionally authorized for Quad Cities Nuclear Power Station Units 1 and 2 by NRC SE dated February 2, 2010.

Table 1
Limerick Generating Station, Unit 1 Applicable Nozzles

Component ID	Category Number	Item Number	System	Nominal Pipe Size
N2A Nozzle	B-D	B3.90	Recirc Inlet	12"
N2A IRS*	B-D	B3.100	Recirc Inlet	12"
N2B Nozzle	B-D	B3.90	Recirc Inlet	12"
N2B IRS	B-D	B3.100	Recirc Inlet	12"
N2C Nozzle	B-D	B3.90	Recirc Inlet	12"
N2C IRS	B-D	B3.100	Recirc Inlet	12"
N2D Nozzle	B-D	B3.90	Recirc Inlet	12"
N2D IRS	B-D	B3.100	Recirc Inlet	12"
N2E Nozzle	B-D	B3.90	Recirc Inlet	12"
N2E IRS	B-D	B3.100	Recirc Inlet	12"
N2F Nozzle	B-D	B3.90	Recirc Inlet	12"
N2F IRS	B-D	B3.100	Recirc Inlet	12"
N2G Nozzle	B-D	B3.90	Recirc Inlet	12"
N2G IRS	B-D	B3.100	Recirc Inlet	12"
N2H Nozzle	B-D	B3.90	Recirc Inlet	12"
N2H IRS	B-D	B3.100	Recirc Inlet	12"
N2J Nozzle	B-D	B3.90	Recirc Inlet	12"
N2J IRS	B-D	B3.100	Recirc Inlet	12"
N2K Nozzle	B-D	B3.90	Recirc Inlet	12"
N2K IRS	B-D	B3.100	Recirc Inlet	12"
N3A Nozzle	B-D	B3.90	Main Steam	26"
N3A IRS	B-D	B3.100	Main Steam	26"
N3B Nozzle	B-D	B3.90	Main Steam	26"
N3B IRS	B-D	B3.100	Main Steam	26"
N3C Nozzle	B-D	B3.90	Main Steam	26"
N3C IRS	B-D	B3.100	Main Steam	26"
N3D Nozzle	B-D	B3.90	Main Steam	26"
N3D IRS	B-D	B3.100	Main Steam	26"
N5A Nozzle	B-D	B3.90	Core Spray	10"
N5A IRS	B-D	B3.100	Core Spray	10"
N5B Nozzle	B-D	B3.90	Core Spray	10"
N5B IRS	B-D	B3.100	Core Spray	10"
N6A Nozzle	B-D	B3.90	Head Spray	6"
N6A IRS	B-D	B3.100	Head Spray	6"
N6B Nozzle	B-D	B3.90	Head Spray	6"
N6B IRS	B-D	B3.100	Head Spray	6"
N7A Nozzle	B-D	B3.90	Head Vent	6"
N7A IRS	B-D	B3.100	Head Vent	6"
N8A Nozzle	B-D	B3.90	J/P Instrument	6"
N8A IRS	B-D	B3.100	J/P Instrument	6"
N8B Nozzle	B-D	B3.90	J/P Instrument	6"
N8B IRS	B-D	B3.100	J/P Instrument	6"

Table 1
Limerick Generating Station, Unit 1 Applicable Nozzles

Component ID	Category Number	Item Number	System	Nominal Pipe Size
N17A IRS	B-D	B3.100	RHR	12"
N17A Nozzle	B-D	B3.90	RHR	12"
N17B IRS	B-D	B3.100	RHR	12"
N17B Nozzle	B-D	B3.90	RHR	12"
N17C IRS	B-D	B3.100	RHR	12"
N17C Nozzle	B-D	B3.90	RHR	12"
N17D IRS	B-D	B3.100	RHR	12"
N17D Nozzle	B-D	B3.90	RHR	12"

Table 1
Limerick Generating Station, Unit 2 Applicable Nozzles

Component ID	Category Number	Item Number	System	Nominal Pipe Size
N2A Nozzle	B-D	B3.90	Recirc Inlet	12"
N2A IRS	B-D	B3.100	Recirc Inlet	12"
N2B Nozzle	B-D	B3.90	Recirc Inlet	12"
N2B IRS	B-D	B3.100	Recirc Inlet	12"
N2C Nozzle	B-D	B3.90	Recirc Inlet	12"
N2C IRS	B-D	B3.100	Recirc Inlet	12"
N2D Nozzle	B-D	B3.90	Recirc Inlet	12"
N2D IRS	B-D	B3.100	Recirc Inlet	12"
N2E Nozzle	B-D	B3.90	Recirc Inlet	12"
N2E IRS	B-D	B3.100	Recirc Inlet	12"
N2F Nozzle	B-D	B3.90	Recirc Inlet	12"
N2F IRS	B-D	B3.100	Recirc Inlet	12"
N2G Nozzle	B-D	B3.90	Recirc Inlet	12"
N2G IRS	B-D	B3.100	Recirc Inlet	12"
N2H Nozzle	B-D	B3.90	Recirc Inlet	12"
N2H IRS	B-D	B3.100	Recirc Inlet	12"
N2J Nozzle	B-D	B3.90	Recirc Inlet	12"
N2J IRS	B-D	B3.100	Recirc Inlet	12"
N2K Nozzle	B-D	B3.90	Recirc Inlet	12"
N2K IRS	B-D	B3.100	Recirc Inlet	12"
N3A Nozzle	B-D	B3.90	Main Steam	26"
N3A IRS	B-D	B3.100	Main Steam	26"
N3B Nozzle	B-D	B3.90	Main Steam	26"
N3B IRS	B-D	B3.100	Main Steam	26"
N3C Nozzle	B-D	B3.90	Main Steam	26"
N3C IRS	B-D	B3.100	Main Steam	26"
N3D Nozzle	B-D	B3.90	Main Steam	26"
N3D IRS	B-D	B3.100	Main Steam	26"
N5A Nozzle	B-D	B3.90	Core Spray	10"
N5A IRS	B-D	B3.100	Core Spray	10"
N5B Nozzle	B-D	B3.90	Core Spray	10"
N5B IRS	B-D	B3.100	Core Spray	10"
N6A Nozzle	B-D	B3.90	Head Spray	6"
N6A IRS	B-D	B3.100	Head Spray	6"
N6B Nozzle	B-D	B3.90	Head Spray	6"
N6B IRS	B-D	B3.100	Head Spray	6"
N7A Nozzle	B-D	B3.90	Head Vent	6"
N7A IRS	B-D	B3.100	Head Vent	6"
N8A Nozzle	B-D	B3.90	J/P Instrument	6"
N8A IRS	B-D	B3.100	J/P Instrument	6"
N8B Nozzle	B-D	B3.90	J/P Instrument	6"
N8B IRS	B-D	B3.100	J/P Instrument	6"

Table 1
Limerick Generating Station, Unit 2 Applicable Nozzles

Component ID	Category Number	Item Number	System	Nominal Pipe Size
N17A IRS	B-D	B3.100	RHR	12"
N17A Nozzle	B-D	B3.90	RHR	12"
N17B IRS	B-D	B3.100	RHR	12"
N17B Nozzle	B-D	B3.90	RHR	12"
N17C IRS	B-D	B3.100	RHR	12"
N17C Nozzle	B-D	B3.90	RHR	12"
N17D IRS	B-D	B3.100	RHR	12"
N17D Nozzle	B-D	B3.90	RHR	12"

Enclosure 1
BWRVIP-108 Plant Specific Applicability Criteria

(1) The maximum Reactor Pressure Vessel (RPV) heatup/cooldown rate is limited to less than 115 °F/hour.
Response: LGS Technical Specification (TS) 3.4.6 "Pressure/ Temperature Limits" provides a limiting condition for operation (LCO) of 100 °F per hour. The heatup/cooldown rate is referenced in the LGS operating procedures where applicable such as scrams and start-ups. This heatup/cooldown rate is also described in the LGS Updated Final Safety Analysis Report (UFSAR), Section 5.3.3.6 "Operating Conditions."

For Recirculation Inlet Nozzles (N2)

(2) $(pr/t)/C_{RPV} < 1.15$

p=RPV $_{\text{Normal Operating Pressure}}$	1045
r=RPV $_{\text{inner radius}}$	126.5
t=RPV $_{\text{wall thickness}}$	6.625
C_{RPV}=	19332

$\mathbf{(pr/t)/C_{RPV} = 1.032 < 1.15}$

(3) $[p(r_o^2 + r_i^2)/(r_o^2 - r_i^2)]/C_{NOZZLE} < 1.15$

p=RPV $_{\text{Normal Operating Pressure}}$	1045
r_o=$_{\text{nozzle outer radius}}$	13.125
r_i=$_{\text{nozzle inner radius}}$	5.8125
C_{NOZZLE}	1637

$\mathbf{[p(r_o^2 + r_i^2)/(r_o^2 - r_i^2)]/C_{NOZZLE} = 0.950 < 1.15}$

For Recirculation Outlet Nozzles (N1)

(4) $(pr/t)/C_{RPV} < 1.15$

p=RPV $_{\text{Normal Operating Pressure}}$	1045
r=RPV $_{\text{inner radius}}$	126.5
t=RPV $_{\text{wall thickness}}$	6.625
C_{RPV}=	16171

$\mathbf{(pr/t)/C_{RPV} = 1.234 > 1.15}$

(5) $[p(r_o^2 + r_i^2)/(r_o^2 - r_i^2)]/C_{NOZZLE} < 1.15$

p=RPV $_{\text{Normal Operating Pressure}}$	1045
r_o=$_{\text{nozzle outer radius}}$	22.875
r_i=$_{\text{nozzle inner radius}}$	12.916
C_{NOZZLE}	1977

$\mathbf{[p(r_o^2 + r_i^2)/(r_o^2 - r_i^2)]/C_{NOZZLE} = 1.023 < 1.15}$

Request for Relief for Use of ASME Code Case N-789, Alternative Requirements for Pad Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping for Raw Water Service In Accordance with 10CFR50.55a(z)(2) Hardship or Unusual Difficulty Without Compensating Increase In Level of Quality or Safety

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1. ASME Code Component(s) Affected

All ASME Class 2 and 3 moderate energy carbon steel raw water piping systems. Raw water is defined as water such as from a river, lake, or well or brackish/salt water - used in plant equipment, area coolers, and heat exchangers. In many plants it is referred to as “Service Water.” This Code Case applies to Class 2 and 3 moderate energy (i.e., less than or equal to 200°F (93°C) and less than or equal to 275 psig (1.9 MPa) maximum operating conditions) carbon steel raw water piping.

2. Applicable Code Edition and Addenda

The Inservice Inspection (ISI) Program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2007 Edition through the 2008 Addenda.

3. Applicable Code Requirement

ASME Section Xl, IWA-4400 of the 2007 Edition through 2008 Addenda provides requirements for welding, brazing, metal removal, and installation of repair/replacement activities.

4. Reason for Request

Pursuant to 10CFR50.55a(z)(2), relief is requested on the basis that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

In accordance with 10CFR50.55a(z)(2), Limerick Generating Station is requesting a proposed alternative from the requirement for replacement or internal weld repair of wall thinning conditions resulting from degradation in Class 2 and 3 moderate energy carbon steel raw water piping systems in accordance with IWA-4000. Such degradation may be the result of mechanisms such as erosion, corrosion, cavitation, and pitting – but excluded are conditions involving flow-accelerated corrosion (FAC), corrosion-assisted cracking, or any other form of cracking. IWA-4000 requires repair or replacement in accordance with the Owner’s Requirements and the original or later Construction Code. Other alternative repair or evaluation methods are not always practicable because of wall thinness and/or moisture issues.

The primary reason for this request is to permit installation of a technically sound temporary repair to provide adequate time for evaluation, design, material procurement, planning and scheduling of appropriate permanent repair or replacement of the defective piping, considering the impact on system availability, maintenance rule applicability, and availability of replacement materials.

Performing code repair/replacement in lieu of implementing this relief request would in some cases necessitate extending Technical Specification actions to install a permanent repair/replacement, putting the plant at higher safety risks compared with the short time necessary to install a technically sound pad repair. Use of this Code Case may avoid a plant shutdown in situations where it may be necessary to shut the plant down for a code repair/replacement activity. This could result in an unnecessary plant transient and the loss of safety system availability as compared to maintaining the plant online.

Implementing this relief request during refueling outages will enable a greater number of scheduled corrosion inspections during the outages. The ability to install non-intrusive repair pads rather than scheduling contingency plans for piping replacement will enable longer corrosion inspection windows, increased scope of inspection, and improved overall plant safety.

5. Proposed Alternative and Basis for Use

In accordance with 10CFR50.55a(z)(2), Limerick Generating Station proposes to implement the requirements of ASME Code Case N-789, "Alternative Requirements for Pad Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping for Raw Water Service, Section XI, Division 1", as a temporary repair of degradation in Class 2 and 3 moderate energy raw water piping systems resulting from mechanisms such as erosion, corrosion, cavitation, or pitting, but excluding conditions involving flow-accelerated corrosion (FAC), corrosion-assisted cracking, or any other form of cracking. These types of defects are typically identified by small leaks in the piping system or by pre-emptive non-code required examinations performed to monitor the degradation mechanisms.

The alternative repair technique described in ASME Code Case N-789 involves the application of a metal reinforcing pad welded to the exterior of the piping system, which reinforces the weakened area and restores pressure integrity. This repair technique will be utilized when it is determined that this temporary repair method is suitable for the particular defect or degradation being resolved.

The Code Case requires that the cause of the degradation be determined, and that the extent and rate of degradation in the piping be evaluated to ensure that there are no other unacceptable locations within the surrounding area that could affect the integrity of the repaired piping. The area of evaluation will be dependent on the degradation mechanism present. A baseline thickness examination will be performed for a completed structural pad, attachment welds, and surrounding area, followed by monthly thickness monitoring for the first three months, with subsequent frequency based on the results of this monitoring, but at a minimum of quarterly. Areas containing pressure pads shall be visually observed at least once per month to monitor for evidence of leakage. If the areas containing pressure pads are not accessible for direct observation, then monitoring will be accomplished by visual assessment of surrounding areas or ground surface areas above pressure pads on buried piping, or monitoring of leakage collection systems, if available.

For the pressure pad design, the higher of 2 times the actual measured corrosion rate or 4 times the estimated maximum corrosion rate for the system will be used. If the actual measured corrosion rate in the degraded location is unavailable, the estimated maximum corrosion rate for the system assumed in the design will be calculated based on the same degradation mechanism as the degraded location.

The repair will be considered to have a maximum service life of the time until the next refueling outage, when a permanent repair or replacement must be performed. Additional requirements for design of reinforcement pads, installation, examination, pressure testing, and inservice monitoring are provided in ASME Code Case N-789.

Based on the above justification, the use of ASME Code Case N-789 as a proposed alternative to the requirements of ASME Section XI will provide an acceptable level of quality and safety that does not impose an undue hardship.

All other ASME Section XI requirements for which relief was not specifically requested and authorized by the NRC staff will remain applicable including third party review by the Authorized Nuclear Inservice Inspector.

ASME Code Case N-789 was approved by the ASME Board on Nuclear Codes and Standards on June 25, 2011; however, it has not been incorporated into NRC Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI Division 1," and thus is not available for application at nuclear power plants without specific NRC approval. Therefore, Limerick Generating Station requests use of this alternative repair technique described in the Code Case via this relief request. NRC Draft Regulatory Guide DG-1296 proposes to approve use of Code Case N-789 with two conditions. Both of the proposed conditions are included as requirements in this relief request.

6. Duration of Proposed Alternative

Relief is requested for the Fourth Ten-Year ISI Interval for Limerick Generating Station Units 1 and 2. When Code Case N-789 is approved for use by the NRC this relief request will no longer be applied and the Code Case, including Regulatory Guide 1.147 conditions, will be used in lieu of this relief request.

7. Precedents

Limerick Generating Station Units 1 and 2 Third ISI Interval Relief Request I3R-11 was authorized by NRC Safety Evaluation (SE) dated May 10, 2012. The Fourth ISI Interval Relief Request utilizes an identical approach that was previously approved. (ML12121A637) This relief request was part of an EGC fleet-wide submittal. Use of N-789 was authorized for Dresden, Quad Cities, and Oyster Creek Station's that were under ASME Section XI, 2007 Edition through the 2008 Addenda.

Relief Request BV3-N-789 was authorized for Beaver Valley Units 1 and 2 by NRC SE dated June 19, 2015, (ML15163A147).

Relief Request RR-3-43 was authorized for Indian Point Nuclear Generating Unit 3 by NRC SE on February 22, 2008, (ML080280073).

10CRF50.55a Relief Request I4R-12
Revision 0

Request for Relief for Use of ASME Code Case N-786, Alternative Requirements for Sleeve Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping In Accordance with 10CFR50.55a(z)(2) Hardship or Unusual Difficulty without Compensating Increase in Level of Quality or Safety

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1. ASME Code Component(s) Affected

All ASME Class 2 and 3 moderate energy (i.e., less than or equal to 200°F (93°C) and less than or equal to 275 psig (1.9 MPa) maximum operating conditions) carbon steel piping systems.

2. Applicable Code Edition and Addenda

The Inservice Inspection (ISI) Program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2007 Edition through the 2008 Addenda.

3. Applicable Code Requirement

ASME Section Xl, IWA-4400 of 2007 Edition through 2008 Addenda provides requirements for welding, brazing, metal removal, and installation of repair/replacement activities.

4. Reason for Request

Pursuant to 10CFR50.55a(z)(2), relief is requested on the basis that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

In accordance with 10CFR50.55a(z)(2), Limerick Generating Station is requesting relief from the requirement for replacement or internal weld repair of wall thinning conditions resulting from degradation in Class 2 and Class 3 moderate energy carbon steel piping systems in accordance with IWA-4000. Such degradation may be the result of mechanisms such as localized erosion, corrosion, cavitation, and pitting, but excluded are conditions involving any form of cracking. IWA-4000 requires repair or replacement in accordance with the Owner's Requirements and the original or later Construction Code.

One reason for this request is to permit installation of technically sound temporary repairs, in the form of Type A or partial-structural Type B reinforcing sleeves, to provide adequate time for evaluation, design, material procurement, planning and scheduling of appropriate permanent repair or replacement of the defective piping, considering the impact on system availability, maintenance rule applicability, and availability of replacement materials.

The other reason for this request is to permit installation of long-term repairs, in the form of full-structural Type B reinforcing sleeves, for locally degraded portions of piping systems. The design, construction, and inservice monitoring of such sleeves provide a technically sound equivalent replacement for the segment of degraded piping that is encompassed.

5. Proposed Alternative and Basis for Use

Limerick Generating Station proposes to implement the requirements of ASME Code Case N-786, “Alternative Requirements for Sleeve Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping Section XI, Division 1,” for repair of degradation in Class 2 and 3 moderate energy carbon steel piping systems resulting from mechanisms such as localized erosion, corrosion, cavitation, or pitting, but excluding conditions involving any form of cracking. These types of defects are typically identified by small leaks in the piping system or by pre-emptive non-code required examinations performed to monitor the degradation mechanisms.

This Code Case invokes the design requirements of the original Construction Code or ASME Code, Section III. Reconciliation and use of editions and addenda of ASME Section III will be in accordance with ASME Section XI, IWA-4220, and only editions and addenda of ASME Section Ill that have been accepted by 10CFR50.55a may be used. The Code of Record for the specific 10-year ISI interval at each nuclear unit as identified under Section 2 above, will be used when applying the various Subsection IWA paragraphs of ASME Section XI unless specific regulatory relief to use other editions or addenda is approved.

The alternative repair technique described in ASME Code Case N-786 involves the application of Type A and Type B full encirclement sleeve halves welded together with full penetration longitudinal seam welds to reinforce structural integrity in the degraded area. In the case of Type B reinforcing sleeves, the ends are also welded to the piping in order to restore pressure integrity. This repair technique will be utilized when it is determined that this repair method is suitable for the particular defect or degradation being resolved without flaw removal. Use of this repair method will be limited to pipe and fittings; as a result the following condition shall apply to the application of ASME Code Case N-786:

> Reinforcing sleeves may not be applied to pumps, valves, expansion joints, vessels, heat exchangers, tubing, or flanges; and may not be applied over flanged joints, socket welded or threaded joints, or branch connection welds.

The Code Case requires that the cause of the degradation be determined and that the extent and rate of degradation in the piping be evaluated to ensure that there are no other unacceptable locations within the surrounding area that could affect the integrity of the repaired piping. Surrounding areas showing signs of degradation shall be identified and included in the Owner's plan for thickness monitoring for full-structural reinforcing sleeves. The area of evaluation will be dependent on the degradation mechanism present, but shall extend at least $0.75 \sqrt{RT_{nom}}$ beyond the edge of any sleeve attachment weld. If the cause of the degradation is not determined, the maximum permitted service life of any reinforcing sleeve shall be the time until the next refueling outage. In addition, the following condition shall apply to the application of ASME Code Case N-786:

> The initial degradation rate selected for design of all sleeves shall be equal to or greater than two (2) times the maximum rate observed at the location of the repair. If the degradation rate for that location is unknown, four (4) times the estimated maximum degradation rate for that or a similar system at the same plant site for the same degradation mechanism shall be applied. If both the degradation rate for that location and the cause of the degradation are not conclusively determined, four (4) times the maximum degradation rate observed for all degradation mechanisms for that or a similar system at the same plant site shall be applied.

"Full-structural Type B" means that the sleeve and attachment welds alone maintain full capability to withstand structural (mechanical) and pressure loading for which the piping is presently designed without need for additional support or reinforcement, and without reliance on any piping that is encased by the sleeve. Type A and partial-structural Type B sleeves rely on the encased underlying piping to provide some structural (mechanical) and/or pressure retaining integrity.

Type B reinforcing sleeves may be applied to leaking systems by installing a gasket or sealant between the sleeve and the pipe as permitted by the Code Case, and then clamping the reinforcing sleeve halves to the piping prior to welding. Residual moisture is then removed by heating prior to welding. If welding of any type of sleeve occurs on a wet surface, the maximum permitted life of the sleeve shall be the time until the next refueling outage.

The Code Case requires that the Owner shall prepare and implement a plan for thickness monitoring by inspection of full-structural reinforcing sleeves and their attachment welds. To accomplish this, a baseline thickness examination will be performed for completed full-structural Type B reinforcing sleeves, partial penetration attachment welds, and surrounding areas, followed by similar thickness monitoring inspections performed at a minimum of every refueling outage for the life of the repair. More frequent thickness monitoring examinations will be scheduled based on the maximum degradation rates observed during these inspections, such that the required design thicknesses will not be infringed upon before each subsequently scheduled thickness monitoring examination.

Partial-structural Type B reinforcing sleeves and Type A reinforcing sleeves completely encompass the degraded areas. These sleeves are designed to accommodate predicted maximum degradation and must be removed at the next refueling outage. Accordingly, the Code Case does not require inservice monitoring for these sleeves. However, because of NRC concerns discussed in the May 10, 2012, NRC Safety Evaluation (SE) for the Exelon Generation Company (EGC), LLC, sites concerning the approval to apply ASME Code Case N-789 (ML12121A637), the following condition shall apply to the application of ASME Code Case N-786:

> Type A reinforcing sleeves and partial-structural Type B reinforcing sleeves shall be visually observed at least once per month to monitor for evidence of leakage. If the areas containing these sleeves are not accessible for direct observation, then monitoring will be accomplished by visual assessment of surrounding areas or ground surface areas above such sleeves on buried piping, or monitoring of leakage collection systems, if available.

When used on buried piping, the area of full-structural Type B reinforcing sleeves will need to be physically accessible for the required examinations, which could necessitate installation of removable barriers at the repair location in lieu of backfilling the pipe at that location. For Type A and partial-structural Type B reinforcing sleeves installed on buried piping, the monitoring will be based on visual assessment as discussed above.

Type A reinforcing sleeves and partial-structural Type B reinforcing sleeves shall have a maximum permitted service life of the time until the next refueling outage, when a permanent repair or replacement must be performed. Neither the Type A nor the partial-structural Type B reinforcing sleeve may remain in service beyond the end of the next refueling outage after they are installed, unless specific regulatory relief is obtained. This means that if such a repair is performed in mid-cycle (e.g., one month before the scheduled refueling outage) the reinforcing sleeve would be removed no later than the upcoming refueling outage (e.g., in one month) unless specific regulatory relief is obtained. Even if removal during the next scheduled refueling outage

becomes challenging (e.g., it is installed on a system required to be functional during the refueling outage), it would still need to be removed when the system is not required to be functional and prior to the conclusion of the next scheduled refueling outage after it was installed.

A similar situation exists with common cooling lines that require a dual unit outage in order to remove them from service. Unless a full-structural Type B reinforcing sleeve is installed, specific regulatory approval would need to be obtained in order to defer removal of a Type A or partial-structural Type B reinforcing sleeve beyond the next upcoming refueling outage of either unit.

Full-structural Type B reinforcing sleeves will be removed and an IWA-4000 repair or replacement will be performed prior to the time that inservice monitoring indicates that pressure integrity (leak tightness) or structural integrity could be impaired based on measured degradation between monitoring activities. Additional requirements for design, installation, examination (including volumetric examination in accordance with ASME Section III, NC-5200 and NC-5300, or ND-5200 and ND-5300), pressure testing, and inservice examination of reinforcing sleeves are provided in ASME Code Case N-786, with the following additional condition:

> Branch connections may be installed on reinforcing sleeves only for filling or venting purposes during installation or leakage testing of the sleeve, and shall be limited to Nominal Pipe Size (NPS) 1 or smaller in size.

All other ASME Section XI requirements for which relief was not specifically requested and authorized by the NRC staff will remain applicable including third party review by the Authorized Nuclear Inservice Inspector.

Performing code repair/replacement in lieu of implementing this Relief Request would in some cases necessitate extending Technical Specification Actions to install a permanent repair/replacement, putting the plant at higher safety risks than warranted compared with the short time necessary to install a technically sound sleeve repair. Without the use of this Code Case in some situations, it may be necessary to shut the plant down in order to perform a code repair/replacement activity; however, this results in an unnecessary plant transient and the loss of safety system availability as compared to maintaining the plant online.

Implementing this Relief Request during refueling outages will enable a greater number of scheduled corrosion inspections during the outages. The ability to install non-intrusive repair sleeves rather than scheduling contingency plans for piping replacement, will enable longer corrosion inspection windows, increased scope of inspection, and improved overall plant safety.

Based on the above, the use of ASME Code Case N-786 for full-structural Type B reinforcing sleeves and for Type A and partial-structural Type B reinforcing sleeves will apply when compliance with the specified Code requirements of ASME Section XI would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

ASME Code Case N-786 was approved by the ASME Board on Nuclear Codes and Standards on March 24, 2011; however, it has not been incorporated into NRC Regulatory Guide 1.147 "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," and thus is not available for application at nuclear power plants without specific NRC approval. Therefore, Limerick Generating Station requests use of the alternative repair techniques described in the Code Case via this relief request. NRC Draft Regulatory Guide DG-1296 proposes to approve use of Code Case N-786 without conditions.

6. Duration of Proposed Alternative

Relief is requested for the Fourth Ten-Year ISI Interval for Limerick Generating Station Units 1 and 2. When Code Case N-786 is approved for use by the NRC this relief request will no longer be applied and the Code Case, including Regulatory Guide 1.147 conditions, will be used in lieu of this relief request.

7. Precedents

Limerick Generating Station Units 1 and 2 Third ISI Interval Relief Request I3R-21 was authorized by NRC Safety Evaluation (SE) dated July 31, 2014. The Fourth ISI Interval Relief Request utilizes an identical approach that was previously approved. (ML13059A498) This relief request was part of an EGC fleet-wide submittal. Use of N-786 was authorized for Dresden, Quad Cities, and Oyster Creek Station's that were under ASME Section XI, 2007 Edition through the 2008 Addenda.

EGC fleet-wide Relief Request for ASME Code Case N-786 (Alternative Requirements for Sleeve Reinforcement for Class 2 and Class 3 Moderate Energy Raw Water Systems) was authorized by NRC SE dated July 31, 2014. (ML13059A498)

10CRF50.55a Relief Request I4R-13
Revision 0

Request for Relief for Alternative Requirements for Pressure Testing the High Pressure Coolant Injection and Reactor Core Isolation Cooling Vacuum Breaker Exhaust Piping In Accordance with 10CFR50.55a(z)(1) Alternative Provides Acceptable Level of Quality and Safety

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1. ASME Code Component(s) Affected

Code Class:	2
Reference:	IWC-2500, Table IWC-2500-1
Examination Category:	C-H
Item Number:	C7.10
Description:	Alternative Requirements for Pressure Testing the High Pressure Coolant Injection and Reactor Core Isolation Cooling Vacuum Breaker Exhaust Piping
Component Number:	Multiple lines (See Note 1 below)
Drawing Number:	M-49, Sht. 1; and M-55, Sht. 1 (Unit 1) M-49, Sht. 2; and M-55, Sht. 2 (Unit 2)

Note 1: A more detailed description of the pressure testing boundary is identified below.

LGS Unit 1: Class 2 High Pressure Coolant Injection (HPCI) Exhaust Vacuum Breaker Piping, as follows:

- Vacuum breaker piping lines HBB-144, between and including valves HV-1F095, 1091, 1F092, 1026, 1F094, and 1F091. Reference P&ID M-55, Sheet 1.

LGS Unit 1: Class 2 Reactor Core Isolation Cooling (RCIC) Exhaust Vacuum Breaker Piping, as follows:

- Vacuum breaker piping lines HBB-145, between and including valves HV-1F084, 1076, 1F085, 1F081, 1F083, and 1018. Reference P&ID M-49, Sheets 1.

LGS Unit 2: Class 2 HPCI Exhaust Vacuum Breaker Piping, as follows:

- Vacuum breaker piping lines HBB-244, between and including valves HV-2F095, 2091, 2F092, 2026, 2F094, and 2F091. Reference P&ID M-55, Sheet 2.

LGS Unit 2: Class 2 RCIC Exhaust Vacuum Breaker Piping, as follows:

- Vacuum breaker piping lines HBB-245, between and including valves HV-2F084, 2076, 2F085, 2F081, 2F083, and 2018. Reference P&ID M-49, Sheets 2.

See Enclosure 1 for M-49 Sheets 1and 2, and M-55 Sheets 1 and 2.

2. Applicable Code Edition and Addenda

The Inservice Inspection program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2007 Edition through the 2008 Addenda.

3. Applicable Code Requirement

Table IWC-2500-1, Examination Category C-H, Item Number C7.10, requires all Class 2 pressure retaining components be subject to a system leakage test with a VT-2 visual examination in accordance with IWC-5220. This pressure test is to be conducted once each inspection period.

4. Reason for Request

Pursuant to 10CFR50.55a(z)(1), relief is requested on the basis that the proposed alternative will provide an acceptable level of quality and safety.

During normal plant operation, this piping is either isolated or less than one (1) psig (normal containment pressure). The pressurizing fluid is essentially nitrogen gas. A VT-2 visual examination looking for a nitrogen gas leak with less than one (1) psig driving pressure would be inconclusive.

10CFR50 Appendix J, Option B, Local Leak Rate Testing (LLRTs) is currently performed once per Refuel Outage. During LLRTs, the subject piping is pressurized to 44 psig, a substantially higher pressure than that developed during a periodic system functional test. As such, the LLRT offers the following advantages over system pressure tests:

A. LLRTs have the ability to quantify leakage that is not feasible with a VT-2 visual examination on this essentially gas-filled piping.

B. LLRTs conservatively include through valve leakage that would not be identified in a VT-2 visual examination.

IWC-5210(b)(2) allows for gas tests which permit location and detection of through-wall leakage. In the event the LLRT fails to meets its acceptance criteria, further testing would be performed to determine the location of the leaks, appropriate corrective maintenance and an appropriate retest would be performed.

5. Proposed Alternative and Basis for Use

10CFR50 Appendix J, Option B, Local Leak Rate Testing (LLRT) of the vacuum breakers will be utilized to meet the ASME Section XI IWC-5000 pressure testing requirements, and will be maintained and controlled independent of the ASME Section XI program.

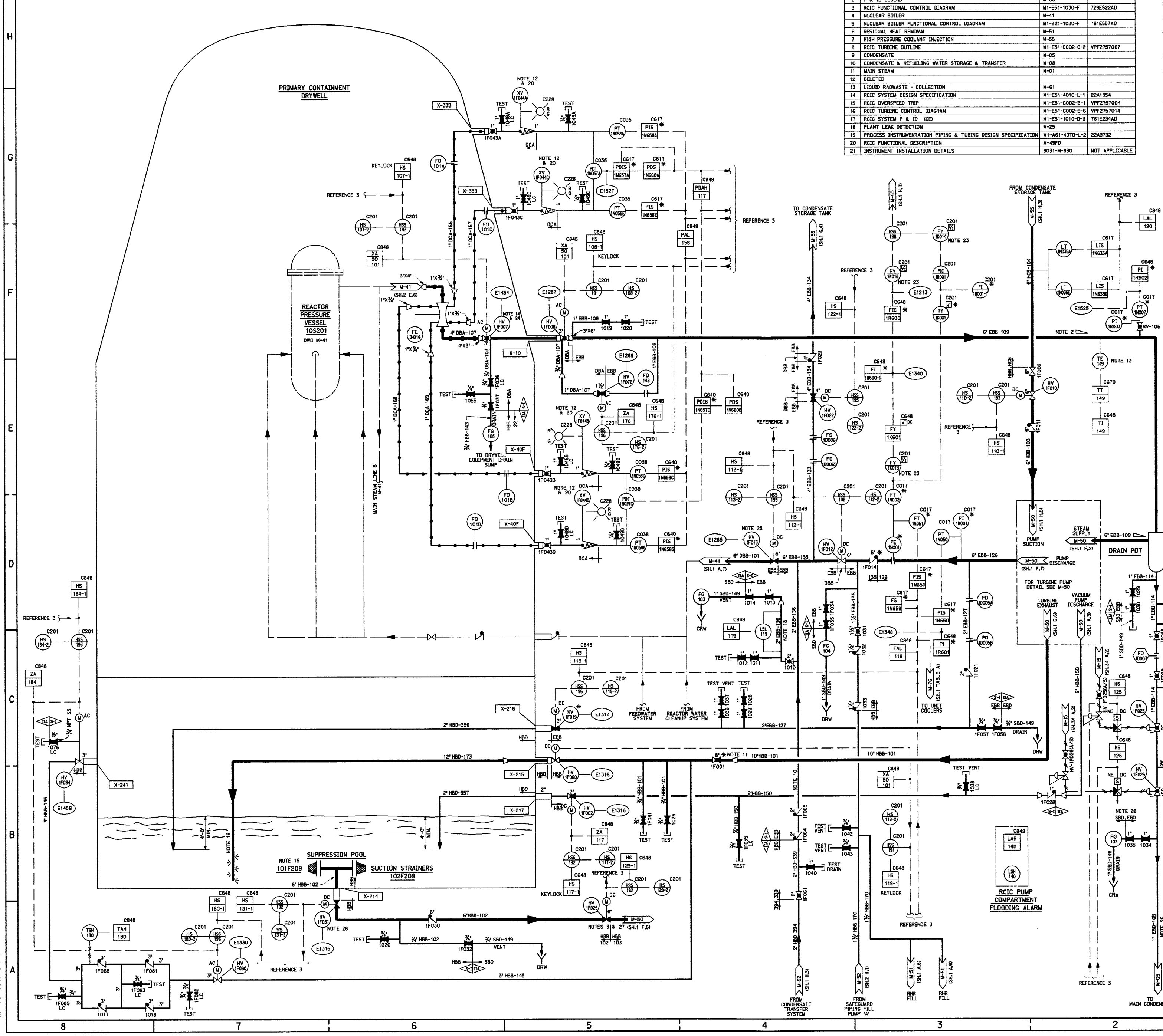
6. Duration of Proposed Alternative

Relief is requested for the Fourth Ten-Year ISI Interval for Limerick Generating Station Units 1 and 2.

7. Precedents

This is a new Relief Request for Limerick Generating Station; the testing methodology utilizes an identical approach used in the Third ISI Interval Relief Request I3R-12. The NRC authorized the Third ISI Interval Relief Request I3R-12 in NRC Safety Evaluation (SE) dated March 11, 2008. (ML080500584)

8031-M-49 SH. 1 OF



REF NO.	REFERENCE DRAWINGS	BECHTEL NO.	G E NO.
1	RCIC PUMP TURBINE	M-50	
2	P & ID LEGEND	M-00	
3	RCIC FUNCTIONAL CONTROL DIAGRAM	M1-E51-1030-F	729E622AD
4	NUCLEAR BOILER	M-41	
5	NUCLEAR BOILER FUNCTIONAL CONTROL DIAGRAM	M1-B21-1030-F	761E557AD
6	RESIDUAL HEAT REMOVAL	M-51	
7	HIGH PRESSURE COOLANT INJECTION	M-55	
8	RCIC TURBINE OUTLINE	M1-E51-C002-C-2	VPF2757067
9	CONDENSATE	M-05	
10	CONDENSATE & REFUELING WATER STORAGE & TRANSFER	M-08	
11	MAIN STEAM	M-01	
12	DELETED		
13	LIQUID RADWASTE - COLLECTION	M-61	
14	RCIC SYSTEM DESIGN SPECIFICATION	M1-E51-4010-L-1	22A1354
15	RCIC OVERSPEED TRIP	M1-E51-C002-B-1	VPF2757004
16	RCIC TURBINE CONTROL DIAGRAM	M1-E51-C002-E-6	VPF2757014
17	RCIC SYSTEM P & ID (GE)	M1-E51-1010-D-3	761E234AD
18	PLANT LEAK DETECTION	M-25	
19	PROCESS INSTRUMENTATION PIPING & TUBING DESIGN SPECIFICATION	M1-A61-4070-L-2	22A3732
20	RCIC FUNCTIONAL DESCRIPTION	M-49FD	
21	INSTRUMENT INSTALLATION DETAILS	8031-M-830	NOT APPLICABLE

1. RCIC IS A SEISMIC CATEGORY I SYSTEM EXCEPT AS NOTED.
2. SLOPE STEAM LINE DOWN ALL THE WAY FROM MAIN STEAM LINE TO DRAIN POT JUST AHEAD OF TURBINE (F,2).
3. LOCATE VALVE HV1F029 (ZONE A,5) AS CLOSE AS POSSIBLE TO PUMP SUCTION LINE FROM CONDENSATE STORAGE TANK.
4. AC POWER FOR RCIC INSTRUMENTS SHALL BE DERIVED FROM A DC SOURCE SEPARATE FROM THAT WHICH SUPPLIES THE HPCI SYSTEM, VIA THE UNINTERRUPTIBLE AC OR COMPARABLE DC TO AC CONVERSION SYSTEM.
5. PIPING HIGH POINT VENTS AND LOW POINT DRAINS TO BE ADDED AS NECESSARY.
6. THE GE MPL NUMBER FOR THIS SYSTEM IS E-51.
7. TEMPERATURE LEAK DETECTION FOR THIS SYSTEM IS SHOWN ON REFERENCE 18. THE TEMPERATURE INSTRUMENTS ARE INDEXED AS PART OF THIS P&ID (M-49).
8. ALL INSTRUMENT PIPING AND TUBING SHALL BE INSTALLED IN ACCORDANCE WITH REFERENCE 19. FOR DEVIATION TO SLOPE CRITERIA SEE REFERENCE 21.
9. ALL STEAM LINES SHALL BE SLOPED. ALL LIQUID LINES INSIDE THE PRIMARY CONTAINMENT SHALL BE SLOPED WHERE PRACTICAL.
10. FILL LINE SHOULD BE LOCATED AT HIGH POINT (B,4).
11. VALVE F001 SHOULD BE LOCATED AT HIGH POINT (B,4).
12. THE BYPASS VALVES AROUND EXCESS FLOW CHECK VALVES XV-1F044A, B,C,D ARE LOCKED CLOSED.
13. TEMPERATURE ELEMENT TO BE MOUNTED ON OUTSIDE SURFACE (E,2).
14. INSTALL VALVE IN REVERSE DIRECTION SUCH THAT FLOW IS OVER THE SEAT TO COMPLY WITH 10CFR50 APPENDIX J (F,6).
15. THE MAXIMUM ΔP ACROSS THE SUCTION STRAINERS SHALL NOT EXCEED THE AVAILABLE MARGIN ABOVE THE REQUIRED NPSH WHEN THE STRAINERS ARE 50% PLUGGED (B,7).
16. DELETED.
17. NON-Q DRAIN AND VENT LINES AND CAPPED ENDS EXTENDING FROM SEISMIC CATEGORY I PIPING ARE SEISMIC CATEGORY IIA DOWNSTREAM OF THE LAST ISOLATION VALVE.
18. THIS PORTION OF EBB-136 SHALL BE A VERTICAL SECTION ABOVE THE PROCESS LINE, MINIMUM 3 FEET LONG (D,4). LSL TAPS SHALL BE PLACED 2 FEET APART. THE LINE FROM THE BOTTOM OF THE VERTICAL SECTION SHALL SLOPE DOWN TOWARDS THE PROCESS LINE.
19. SPARGER HOLES TO BE LOCATED 4 FEET BELOW LOW WATER LEVEL (LWL IS ELEV. 203'-11")(B,7).
20. A COMMON TROUBLE ALARM IS PROVIDED IN CONTROL ROOM PANEL 10C802 FOR THE EXCESS FLOW CHECK VALVES ASSOCIATED WITH LOCAL PANEL C228. THIS ALARM IS INITIATED BY CLOSURE OF ANY OF THESE VALVES (F-D,5).
21. FOR ALL NON-SEISMIC CATEGORY I CAPPED VENTS, DRAINS AND TEST CONNECTIONS: DESIGN, FABRICATION, MATERIAL PROCUREMENT, ERECTION AND TESTING FOR ALL PIPING DOWNSTREAM OF THE LAST ISOLATION VALVE, MAY BE IN ACCORDANCE WITH DESIGN CLASS D.
22. DESIGN FABRICATION, MATERIAL PROCUREMENT, ERECTION AND TESTING FOR ALL PIPING, VALVES AND EQUIPMENT SHOWN WITHIN THE SYMBOL (NOTE 22) ON THIS P&ID, MAY BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE PIPING CLASS DESIGNATION, DESIGN CODE "D" WITH THE FOLLOWING EXCEPTIONS:
   a) CLEANING REQUIREMENTS SHALL BE PER THE ORIGINAL LINE CLASS DESIGNATION;
   b) WELDING PROCEDURES TO BE USED SHALL BE AS REQUIRED PER THE ORIGINAL LINE CLASS DESIGNATION.
23. THE "FY" IS A TEC ANALOG SIGNAL ISOLATOR.
24. VALVE HV-1F007 IS NORMALLY POWERED FROM DIVISION 3 MCC 10B223. IF THIS POWER SUPPLY BECOMES UNAVAILABLE, A DIVISION 1 POWER SUPPLY TO THE VALVE CAN BE ESTABLISHED BY MANUALLY CLOSING THE CIRCUIT BREAKER IN CIRCUIT 31 OF MCC 10B213 AND BY ACTUATING MANUAL TRANSFER SWITCH 43-CB22313/TI (LOCATED IN TERMINAL BOX 10TB49-1F007) TO THE EMERGENCY POSITION. THE CIRCUIT BREAKER IS NORMALLY LOCKED OPEN AND THE DOOR TO THE TERMINAL BOX IS NORMALLY LOCKED CLOSED. ACTUATION OF THE MANUAL TRANSFER SWITCH ILLUMINATES AN INDICATING LIGHT ON PANEL 10C648 AND ALSO IS ANNUNCIATED IN THE CONTROL ROOM.
25. VALVE HV-049-1F013 HAS BEEN MODIFIED TO ELIMINATE PRESSURE LOCKING AND THERMAL BINDING. A REPLACEMENT DISC (SCN 114-99571) HAS BEEN INSTALLED. REFER TO ECR LG-94-06389 FOR DETAILS.
26. PIPING, VALVES AND EQUIPMENT SHOWN WITHIN THIS SYMBOL (NOTE 26) AS WELL AS THEIR SUPPORTS SHALL BE REPAIRED, REPLACED OR MODIFIED IN ACCORDANCE WITH THE ORIGINAL DESIGN REQUIREMENTS AS MODIFIED BY SPECIFICATION NE-214 AND ASME SECTION XI. THE REQUIREMENTS OF ASME SECTION XI IWA-4000 AND IWA-7000 SHALL APPLY IN ACCORDANCE WITH PECO'S REAPAIR AND REPLACEMENT PROGRAM WITH THE FOLLOWING EXCEPTIONS:
   - PRESERVICE/INSERVICE INSPECTIONS ARE NOT REQUIRED.
   - NIS-2 FORMS ARE NOT REQUIRED.
   - ANII INVOLVEMENT IS NOT REQUIRED.

NOTES CONTINUED AT COORDINATE [C-1].

NOTES: (CONT.)

27. VALVE HV-049-1F029 HAS BEEN MODIFIED TO ELIMINATE THERMALLY INDUCED PRESSURE LOCKING. SEE ECR 96-02839 FOR DETAILS.
28. VALVE HV-049-1F031 HAS BEEN MODIFIED TO ELIMINATE THERMALLY INDUCED PRESSURE LOCKING. SEE ECR LG 96-03081 FOR DETAILS.

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
55	[illegible]	INCORP. ECR LG 12-00449 REV.0. MOVED E1213 TO OTHER SIDE OF FY-1K015. [F,3].	[illegible]	[illegible]	[illegible]
54	8/29/12	INCORP. ECR LG 12-00210 REV.0 PER WO C0243533. CHANGED ST-1D003 TO FO-1D003. [C,2].	EJW	DCH	TJ
53	10/08/07	REVISED PER IR 660395. CORRECTED PIPE CLASS CHANGE, DBA/EBB, TO DOWNSTREAM OF HV-1F008, WAS DOWNSTREAM OF 3X6 REDUCER. [F,5].	EJW	JCW	JAL
52	?/11/08	INCORP. ECR 04-00437 REV.0 PER WO C0213789. ADDED HBB-102/HBB-103 CLASS BREAK AT 1F029. [A,5].	EJW	JCW	NSD

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
REACTOR CORE ISOLATION COOLING
(UNIT 1)

LIMERICK GENERATING STATION
EXELON NUCLEAR CORP.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	01-31-91

APPROVED BECHTEL APPROVED

SHEET 1 OF 8031-M-49 55

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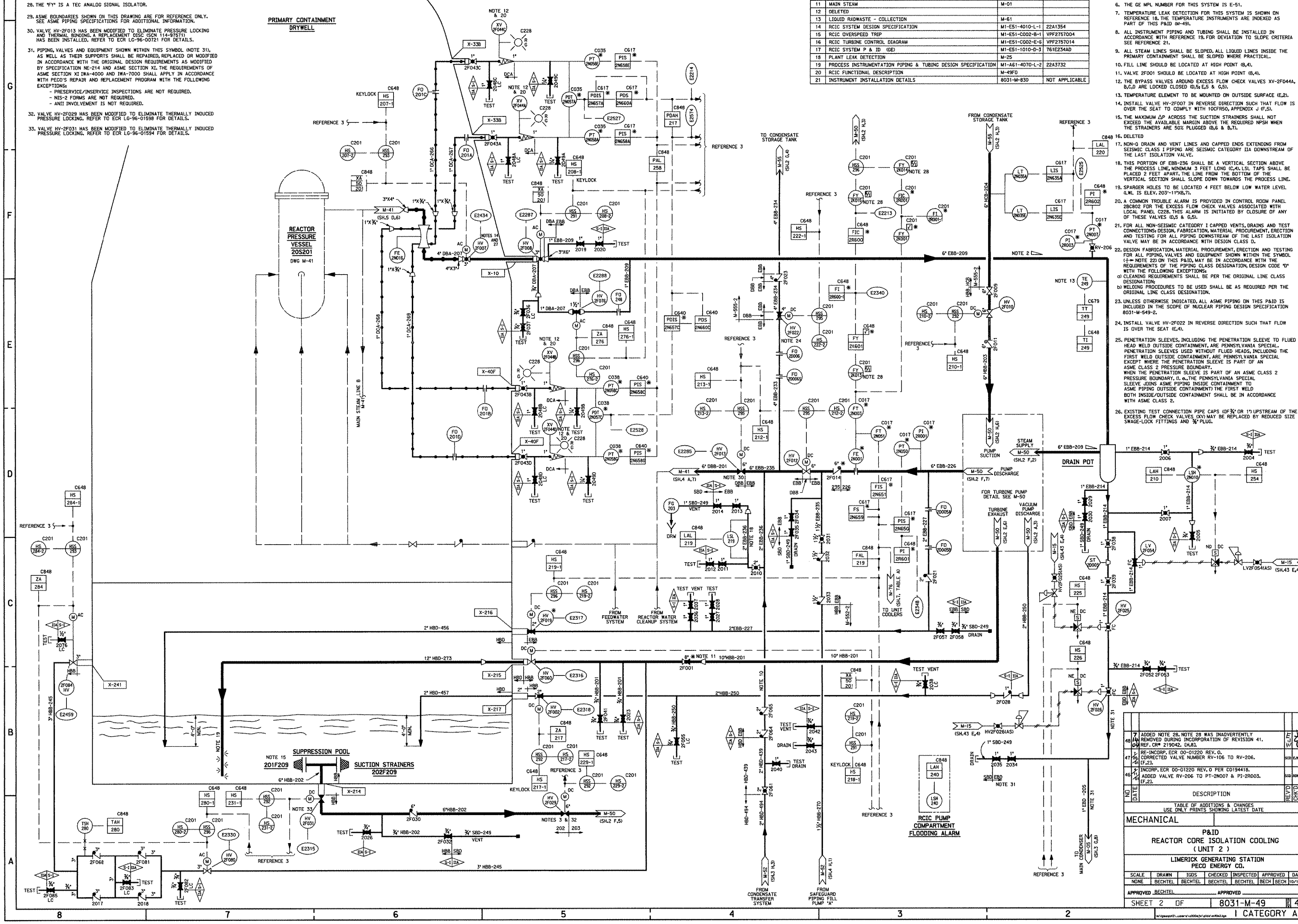
NOTES: (CONT'D.)

27. VALVE HV-2F007 IS NORMALLY POWERED FROM DIVISION 3 MCC 20B223. IF THIS POWER SUPPLY BECOMES UNAVAILABLE, A DIVISION 1 POWER SUPPLY TO THE VALVE CAN BE ESTABLISHED BY MANUALLY CLOSING THE CIRCUIT BREAKER IN CIRCUIT 31 OF MCC 20B213 AND BY ACTUATING MANUAL TRANSFER SWITCH 43-CB22313/TI (LOCATED IN TERMINAL BOX 20TB49-2F007) TO THE EMERGENCY POSITION. THE CIRCUIT BREAKER IS NORMALLY LOCKED OPEN AND THE DOOR TO THE TERMINAL BOX IS NORMALLY LOCKED CLOSED. ACTUATION OF THE MANUAL TRANSFER SWITCH ILLUMINATES AN INDICATING LIGHT ON PANEL 20C648 AND ALSO IS ANNUNCIATED IN THE CONTROL ROOM.
28. THE "FY" IS A TEC ANALOG SIGNAL ISOLATOR.
29. ASME BOUNDARIES SHOWN ON THIS DRAWING ARE FOR REFERENCE ONLY. SEE ASME PIPING SPECIFICATIONS FOR ADDITIONAL INFORMATION.
30. VALVE HV-2F013 HAS BEEN MODIFIED TO ELIMINATE PRESSURE LOCKING AND THERMAL BINDING. A REPLACEMENT DISC (SCN 114-97571) HAS BEEN INSTALLED. REFER TO ECR LG-96-00721 FOR DETAILS.
31. PIPING, VALVES AND EQUIPMENT SHOWN WITHIN THIS SYMBOL (NOTE 31), AS WELL AS THEIR SUPPORTS SHALL BE REPAIRED, REPLACED OR MODIFIED IN ACCORDANCE WITH THE ORIGINAL DESIGN REQUIREMENTS AS MODIFIED BY SPECIFICATION NE-214 AND ASME SECTION XI. THE REQUIREMENTS OF ASME SECTION XI IWA-4000 AND IWA-7000 SHALL APPLY IN ACCORDANCE WITH PECO'S REPAIR AND REPLACEMENT PROGRAM WITH THE FOLLOWING EXCEPTIONS:
    - PRESERVICE/INSERVICE INSPECTIONS ARE NOT REQUIRED.
    - NIS-2 FORMS ARE NOT REQUIRED.
    - ANII INVOLVEMENT IS NOT REQUIRED.
32. VALVE HV-2F029 HAS BEEN MODIFIED TO ELIMINATE THERMALLY INDUCED PRESSURE LOCKING. REFER TO ECR LG-96-01598 FOR DETAILS.
33. VALVE HV-2F031 HAS BEEN MODIFIED TO ELIMINATE THERMALLY INDUCED PRESSURE LOCKING. REFER TO ECR LG-96-01594 FOR DETAILS.



REF NO.	REFERENCE DRAWINGS	BECHTEL NO.	G E NO.
1	RCIC PUMP TURBINE	M-50	
2	P & ID LEGEND	M-00	
3	RCIC FUNCTIONAL CONTROL DIAGRAM	M1-E51-1030-F	729E622AD
4	NUCLEAR BOILER	M-41	
5	NUCLEAR BOILER FUNCTIONAL CONTROL DIAGRAM	M1-B21-1030-F	761E557AD
6	RESIDUAL HEAT REMOVAL	M-51	
7	HIGH PRESSURE COOLANT INJECTION	M-55	
8	RCIC TURBINE OUTLINE	M1-E51-C002-C-2	VPF2757067
9	CONDENSATE	M-05	
10	CONDENSATE & REFUELING WATER STORAGE & TRANSFER	M-08	
11	MAIN STEAM	M-01	
12	DELETED		
13	LIQUID RADWASTE - COLLECTION	M-61	
14	RCIC SYSTEM DESIGN SPECIFICATION	M1-E51-4010-L-1	22A1354
15	RCIC OVERSPEED TRIP	M1-E51-C002-B-1	VPF2757004
16	RCIC TURBINE CONTROL DIAGRAM	M1-E51-C002-E-6	VPF2757014
17	RCIC SYSTEM P & ID (GE)	M1-E51-1010-D-3	761E234AD
18	PLANT LEAK DETECTION	M-25	
19	PROCESS INSTRUMENTATION PIPING & TUBING DESIGN SPECIFICATION	M1-A61-4070-L-2	22A3732
20	RCIC FUNCTIONAL DESCRIPTION	M-49FD	
21	INSTRUMENT INSTALLATION DETAILS	8031-M-830	NOT APPLICABLE

NOTES:

1. RCIC IS A SEISMIC CATEGORY I SYSTEM EXCEPT AS NOTED.
2. SLOPE STEAM LINE DOWN ALL THE WAY FROM MAIN STEAM LINE TO DRAIN POT JUST AHEAD OF TURBINE (F,2).
3. LOCATE VALVE HV-2F029 (A,5) AS CLOSE AS POSSIBLE TO PUMP SUCTION LINE FROM CONDENSATE STORAGE TANK.
4. AC POWER FOR RCIC INSTRUMENTS SHALL BE DERIVED FROM A DC SOURCE SEPARATE FROM THAT WHICH SUPPLIES THE HPCI SYSTEM, VIA THE UNINTERRUPTIBLE AC OR COMPARABLE DC TO AC CONVERSION SYSTEM.
5. PIPING HIGH POINT VENTS AND LOW POINT DRAINS TO BE ADDED AS NECESSARY.
6. THE GE MPL NUMBER FOR THIS SYSTEM IS E-51.
7. TEMPERATURE LEAK DETECTION FOR THIS SYSTEM IS SHOWN ON REFERENCE 18. THE TEMPERATURE INSTRUMENTS ARE INDEXED AS PART OF THIS P&ID (M-49).
8. ALL INSTRUMENT PIPING AND TUBING SHALL BE INSTALLED IN ACCORDANCE WITH REFERENCE 19. FOR DEVIATION TO SLOPE CRITERIA SEE REFERENCE 21.
9. ALL STEAM LINES SHALL BE SLOPED. ALL LIQUID LINES INSIDE THE PRIMARY CONTAINMENT SHALL BE SLOPED WHERE PRACTICAL.
10. FILL LINE SHOULD BE LOCATED AT HIGH POINT (B,4).
11. VALVE 2F001 SHOULD BE LOCATED AT HIGH POINT (B,4).
12. THE BYPASS VALVES AROUND EXCESS FLOW CHECK VALVES XV-2F044A, B,C,D ARE LOCKED CLOSED (D,5; E,5 & G,5).
13. TEMPERATURE ELEMENT TO BE MOUNTED ON OUTSIDE SURFACE (E,2).
14. INSTALL VALVE HV-2F007 IN REVERSE DIRECTION SUCH THAT FLOW IS OVER THE SEAT TO COMPLY WITH 10CFR50, APPENDIX J (F,5).
15. THE MAXIMUM ΔP ACROSS THE SUCTION STRAINERS SHALL NOT EXCEED THE AVAILABLE MARGIN ABOVE THE REQUIRED NPSH WHEN THE STRAINERS ARE 50% PLUGGED (B,6 & B,7).
16. DELETED
17. NON-Q DRAIN AND VENT LINES AND CAPPED ENDS EXTENDING FROM SEISMIC CLASS I PIPING ARE SEISMIC CATEGORY IIA DOWNSTREAM OF THE LAST ISOLATION VALVE.
18. THIS PORTION OF EBB-236 SHALL BE A VERTICAL SECTION ABOVE THE PROCESS LINE, MINIMUM 3 FEET LONG (C,4). LSL TAPS SHALL BE PLACED 2 FEET APART. THE LINE FROM THE BOTTOM OF THE VERTICAL SECTION SHALL SLOPE DOWN TOWARDS THE PROCESS LINE.
19. SPARGER HOLES TO BE LOCATED 4 FEET BELOW LOW WATER LEVEL (LWL IS ELEV. 203'-11")(B,7).
20. A COMMON TROUBLE ALARM IS PROVIDED IN CONTROL ROOM PANEL 2BC802 FOR THE EXCESS FLOW CHECK VALVES ASSOCIATED WITH LOCAL PANEL C228. THIS ALARM IS INITIATED BY CLOSURE OF ANY OF THESE VALVES (D,5 & G,5).
21. FOR ALL NON-SEISMIC CATEGORY I CAPPED VENTS, DRAINS AND TEST CONNECTIONS: DESIGN, FABRICATION, MATERIAL PROCUREMENT, ERECTION AND TESTING FOR ALL PIPING DOWNSTREAM OF THE LAST ISOLATION VALVE MAY BE IN ACCORDANCE WITH DESIGN CLASS D.
22. DESIGN FABRICATION, MATERIAL PROCUREMENT, ERECTION AND TESTING FOR ALL PIPING, VALVES AND EQUIPMENT SHOWN WITHIN THE SYMBOL (NOTE 22) ON THIS P&ID, MAY BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE PIPING CLASS DESIGNATION, DESIGN CODE "D" WITH THE FOLLOWING EXCEPTIONS:
    a) CLEANING REQUIREMENTS SHALL BE PER THE ORIGINAL LINE CLASS DESIGNATION;
    b) WELDING PROCEDURES TO BE USED SHALL BE AS REQUIRED PER THE ORIGINAL LINE CLASS DESIGNATION.
23. UNLESS OTHERWISE INDICATED, ALL ASME PIPING ON THIS P&ID IS INCLUDED IN THE SCOPE OF NUCLEAR PIPING DESIGN SPECIFICATION 8031-M-549-2.
24. INSTALL VALVE HV-2F022 IN REVERSE DIRECTION SUCH THAT FLOW IS OVER THE SEAT (E,4).
25. PENETRATION SLEEVES, INCLUDING THE PENETRATION SLEEVE TO FLUED HEAD WELD OUTSIDE CONTAINMENT, ARE PENNSYLVANIA SPECIAL. PENETRATION SLEEVES USED WITHOUT FLUED HEADS, INCLUDING THE FIRST WELD OUTSIDE CONTAINMENT, ARE PENNSYLVANIA SPECIAL EXCEPT WHERE THE PENETRATION SLEEVE IS PART OF AN ASME CLASS 2 PRESSURE BOUNDARY. WHEN THE PENETRATION SLEEVE IS PART OF AN ASME CLASS 2 PRESSURE BOUNDARY, (I. e., THE PENNSYLVANIA SPECIAL SLEEVE JOINS ASME PIPING INSIDE CONTAINMENT TO ASME PIPING OUTSIDE CONTAINMENT) THE FIRST WELD BOTH INSIDE/OUTSIDE CONTAINMENT SHALL BE IN ACCORDANCE WITH ASME CLASS 2.
26. EXISTING TEST CONNECTION PIPE CAPS (OF ¾" OR 1") UPSTREAM OF THE EXCESS FLOW CHECK VALVES (XV) MAY BE REPLACED BY REDUCED SIZE SWAGE-LOCK FITTINGS AND ⅜" PLUG.

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
48	7/14/04	ADDED NOTE 28. NOTE 28 WAS INADVERTENTLY REMOVED DURING INCORPORATION OF REVISION 41. REF. CR# 219042. [H,8].	[illegible]	[illegible]	[illegible]
47	7/20/01	RE-INCORP. ECR 00-01220 REV. 0. CORRECTED VALVE NUMBER RV-106 TO RV-206. [F,2].	SCD	EJW	MSD
46	4/11/01	INCORP. ECR 00-01220 REV. 0 PER C0194418. ADDED VALVE RV-206 TO PT-2N007 & PI-2R003. [F,2].	SCD	RDR	MSD

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
REACTOR CORE ISOLATION COOLING
(UNIT 2)

LIMERICK GENERATING STATION
PECO ENERGY CO.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	10/14/90

APPROVED BECHTEL APPROVED

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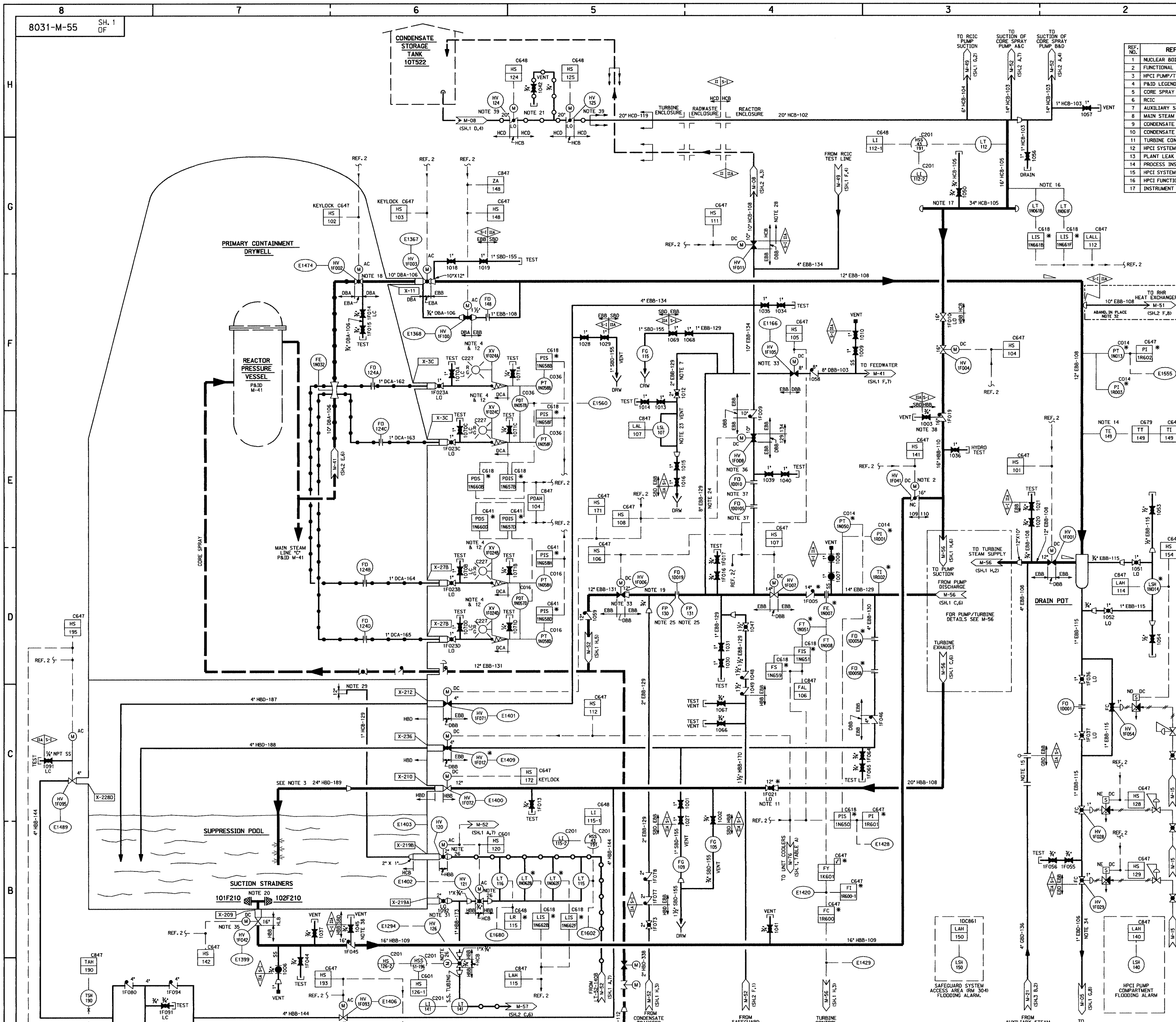

REF. NO.	REFERENCE DRAWINGS	BECHTEL NO.	GE NO.
1	NUCLEAR BOILER	M-41	
2	FUNCTIONAL CONTROL DIAGRAM HPCI	8031-M-E41-1030-F	729E627AD
3	HPCI PUMP/TURBINE	M-56	
4	P&ID LEGEND	M-00	
5	CORE SPRAY	M-52	
6	RCIC	M-49	
7	AUXILIARY STEAM	M-21	
8	MAIN STEAM	M-01	
9	CONDENSATE	M-05	
10	CONDENSATE & REFUELING WATER STORAGE	M-08	
11	TURBINE CONTROLS DIAGRAM	8031-M1-E41-C002-K	JPF2763-92-1
12	HPCI SYSTEM P&ID	8031-M1-E41-1010-D	761E230AD
13	PLANT LEAK DETECTION	M-25	
14	PROCESS INST PIPING & TUBING DESIGN SPEC	8031-M1-A61-4070-L	22A3732
15	HPCI SYSTEM DESIGN SPECIFICATION	8031-M1-EV1-4010-L	22A3021
16	HPCI FUNCTIONAL DESCRIPTION	M-55FD	
17	INSTRUMENT INSTALLATION DETAILS	8031-M-830	NA

NOTES:

1. THE HPCI SYSTEM IS A SEISMIC CATEGORY I SYSTEM EXCEPT AS NOTED. SEISMIC CATEGORY I CLASSIFICATION SHALL EXTEND UP TO THE FIRST WALL PENETRATION BEYOND POINT INDICATED AND SHALL INCLUDE THE FIRST ANCHOR POINT IN OR BEYOND THIS WALL.
2. LOCATE VALVE 1F041 (ZONE E-3) AS CLOSE AS POSSIBLE TO PUMP SUCTION LINE FROM CONDENSATE STORAGE TANK.
3. PENETRATION LOCATION TO BE ABOVE MAXIMUM EXPECTED WATER LEVEL, WITH SPARGER LOCATED 4 FEET BELOW LOW WATER LEVEL (ZONE C-7).
4. A COMMON TROUBLE ALARM IS PROVIDED IN CONTROL ROOM PANEL 1BC802 FOR THE EXCESS FLOW CHECK VALVES ASSOCIATED WITH LOCAL PANEL C227. THIS ALARM IS INITIATED BY CLOSURE OF ANY OF THESE VALVES (ZONE D,5).
5. AC POWER FOR HPCI INSTRUMENTS SHALL BE DERIVED FROM THE PLANT DC POWER SYSTEM, VIA AN INVERTER. THE DC SOURCE IS TO BE SEPARATE FROM THAT WHICH SUPPLIES THE RCIC SYSTEM.
6. THE GE MPL NUMBER FOR THIS SYSTEM IS E-41.
7. VENT CONNECTION SHOULD BE LOCATED AT A HIGH POINT (ZONE F,5).
8. TEMPERATURE LEAK DETECTION FOR THIS SYSTEM IS SHOWN ON REF 13. THE TEMPERATURE INSTRUMENTS ARE INDEXED AS PART OF P&ID M-55.
9. ALL INSTRUMENT PIPING & TUBING SHALL BE INSTALLED IN ACCORDANCE WITH REFERENCE 14. FOR DEVIATIONS TO SLOPE CRITERIA SEE REFERENCE 17.
10. ALL STEAM LINES SHALL BE SLOPED. ALL LIQUID LINES INSIDE THE PRIMARY CONTAINMENT SHALL BE SLOPED WHERE PRACTICAL.
11. VALVE 1F021 SHOULD BE LOCATED AT A HIGH POINT (ZONE C,4).
12. THE BYPASS VALVES AROUND EXCESS FLOW CHECK VALVES XV-1F024A,B,C,D ARE LOCKED CLOSED.
13. DELETED.
14. TEMPERATURE ELEMENT TO BE MOUNTED ON OUTSIDE SURFACE (ZONE E,2).
15. AFTER TESTING, BLIND PORTION OF THE SPECTACLE FLANGE SHALL BE INSTALLED (ZONE C,3).
16. LT-1N061 B,F SHOULD BE LOCATED ABOVE EL.201'-0" ON 16" HCB-105 (ZONE G,2).
17. 34" SECTION OF PIPING SHALL CONTAIN AT LEAST 1100 GALLONS (ZONE G,3).
18. INSTALL VALVE IN REVERSE DIRECTION SUCH THAT FLOW IS OVER THE SEAT (ZONE F,6).
19. VALVE HV-1F006 TO BE LOCATED AS CLOSE AS POSSIBLE TO JUNCTURE WITH CORE SPRAY LINE (ZONE D,5).
20. THE MAXIMUM ΔP ACROSS THE SUCTION STRAINERS SHALL NOT EXCEED THE AVAILABLE MARGIN ABOVE THE REQUIRED NPSH WHEN THE STRAINERS ARE 50% PLUGGED (ZONE B,7).
21. TO BE DRAINED WITHIN DIKED AREA (ZONE H,5).
22. NON-Q DRAIN AND VENT LINES AND CAPPED ENDS EXTENDING FROM SEISMIC CATEGORY I PIPING ARE SEISMIC CATEGORY IIA DOWNSTREAM OF THE LAST ISOLATION VALVE.
23. THIS PORTION OF EBB-129 SHALL BE A VERTICAL SECTION ABOVE THE PROCESS LINE, MINIMUM 3 FEET LONG. LSL TAPS SHALL BE PLACED 2 FEET APART. THE LINE FROM THE BOTTOM OF THE VERTICAL SECTION SHALL SLOPE DOWN TOWARDS THE PROCESS LINE (E,5 & F,5).
24. PENETRATION INTO STEAM TUNNEL AT COLUMN LINE J (ZONE E,4).
25. FLOW TAPS ARE PROVIDED ONLY FOR STARTUP FLOW VERIFICATION. THE INSTRUMENTATION WILL BE PROVIDED BY PECO (ZONE D,5).
26. VALVES HV-55-120, 121 & 126 SHALL BE INSTALLED SUCH THAT FLOW IS FROM THE CONTAINMENT (ZONE B,6).
27. FOR ALL NON-SEISMIC CATEGORY I CAPPED VENTS, DRAIN & TEST CONNECTIONS: DESIGN, FABRICATION, MATERIAL PROCUREMENT, ERECTION & TESTING FOR ALL PIPING DOWNSTREAM OF THE LAST ISOLATION VALVE, MAY BE IN ACCORDANCE WITH DESIGN CODE D.
28. DESIGN, FABRICATION, MATERIAL, PROCUREMENT, ERECTION AND TESTING FOR ALL PIPING, VALVES & EQUIPMENT SHOWN WITHIN THE SYMBOL (NOTE 28) ON THIS P&ID, MAY BE IN ACCORDANCE WITH THE REQUIREMENTS OF PIPING CLASS DESIGNATION, DESIGN CODE D, WITH THE FOLLOWING EXCEPTIONS:
   a) CLEANING REQUIREMENTS SHALL BE PER ORIGINAL LINE CLASS DESIGNATION.
   b) WELDING PROCEDURES TO BE USED SHALL BE AS REQUIRED PER THE ORIGINAL LINE CLASS DESIGNATION. (ZONE F-5)
29. 1" HCB-129 GOOSENECK SHALL BE LOCATED AS HIGH AS PRACTICAL INSIDE THE SUPPRESSION CHAMBER BUT THE ELEVATION OF THE OPEN END SHALL NOT BE LESS THAN EL.230'-6" (ZONE C,6).
30. DELETED.
31. VALVE NO. 1092 IS TO BE LOCKED OPEN W/MANUAL OPERATOR PER LOCKED VALVE LISTING; PECO ADMIN. PROCEDURE A-8.
32. 10" EBB-108 FLOW PATH HAS BEEN PLUGGED. BOTH THE PIPE AND THE SUPPORTS ARE FOR STRUCTURAL COUPLING OF SEISMIC I PIPING AND ARE DESIGNED AS HANGER CRITICAL SEISMIC I. SEE ISO EBB-108-01 FOR DETAILS.
33. VALVES HV-055-1F105 & 1F006 HAVE BEEN MODIFIED TO ELIMINATE PRESSURE LOCKING BY DRILLING A HOLE IN THE RPV SIDE OF THE WEDGE. REFER TO ECRS NO. 95-02335 & 95-02336 FOR DETAILS.
34. PIPING VALVES AND EQUIPMENT SHOWN WITHIN THIS SYMBOL (NOTE 34) AS WELL AS THEIR SUPPORTS SHALL BE REPAIRED, REPLACED OR MODIFIED IN ACCORDANCE WITH THE ORIGINAL DESIGN REQUIREMENTS AS MODIFIED BY SPECIFICATION NE-214 AND ASME SECTION XI. THE REQUIREMENTS OF ASME SECTION XI IWA-4000 AND IWA-7000 SHALL APPLY IN ACCORDANCE WITH PECO'S REPAIR AND REPLACEMENT PROGRAM WITH THE FOLLOWING EXCEPTIONS:
   - PRESERVICE/INSERVICE INSPECTIONS ARE NOT REQUIRED.
   - NIS-2 FORMS ARE NOT REQUIRED.
   - ANII INVOLVEMENT IS NOT REQUIRED.
35. VALVE HV-055-1F042 HAS BEEN MODIFIED TO ELIMINATE PRESSURE LOCKING BY DRILLING A HOLE IN THE SUPPRESSION POOL SIDE OF THE WEDGE. SEE ECR LG 96-03080 FOR DETAILS.
36. INSTALL VALVE HV-1F008 IN REVERSE DIRECTION SUCH THAT FLOW IS OVER THE SEAT.
37. DIRECTION OF FLOW THROUGH FO-1D010 AND FO-1D010S WILL NOT AFFECT ITS PERFORMANCE, RELIABILITY, OR METHOD OF OPERATION.
38. BONNET VENT VALVE ADDED TO 1F019 & 1F045 PER ECR 04-00428.
39. PER MSD ECR 11-00105, MCC D114-D-G-16 COMPARTMENT 1D IS LOCKED OPEN AND MCC D124-D-G-16 COMPARTMENT 1D IS LOCKED OPEN WITH RESPECT TO VALVES HV-055-124 AND HV-055-125.

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
58	6/18/12	INCORP. ECR 11-00105 REV.1 PER WO C0241062 & C0241071. CHANGED VALVES HV-055-124 AND HV-055-125 FROM "NO" TO "LO". ADDED NOTE 39. [H,5-6]	EJW	JW	RAS
57	3/30/10	INCORP. ECR 09-00430 REV.1 PER WO C0230986 & C0230987. ADDED SS VENTS AND SS BALL VALVES 1006, 1007, AND 1008. [A,7] & [D,4]	EJW	JCW	RAS
56	3/27/10	PARTIAL INCORP. OF ECR 09-00430 REV.0 PER WO C0230984. ADDED SS VENT AND SS VALVES 1009 AND 1010. [F,4].	EJW	JCW	RAS
55	3/13/06	INCORP. ECR 04-00428 REV.2 PER WO C0211324. ADDED VENT AND VALVE 1003 TO BONNET OF 1F019. REVISED NOTE 38. [F,3].	EJW	SAC	JB

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
HIGH PRESSURE COOLANT INJECTION
(UNIT 1)

LIMERICK GENERATING STATION
EXELON NUCLEAR CORP.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	01-31-91

APPROVED BECHTEL APPROVED

SHEET 1 OF | 8031-M-55 | REV 58

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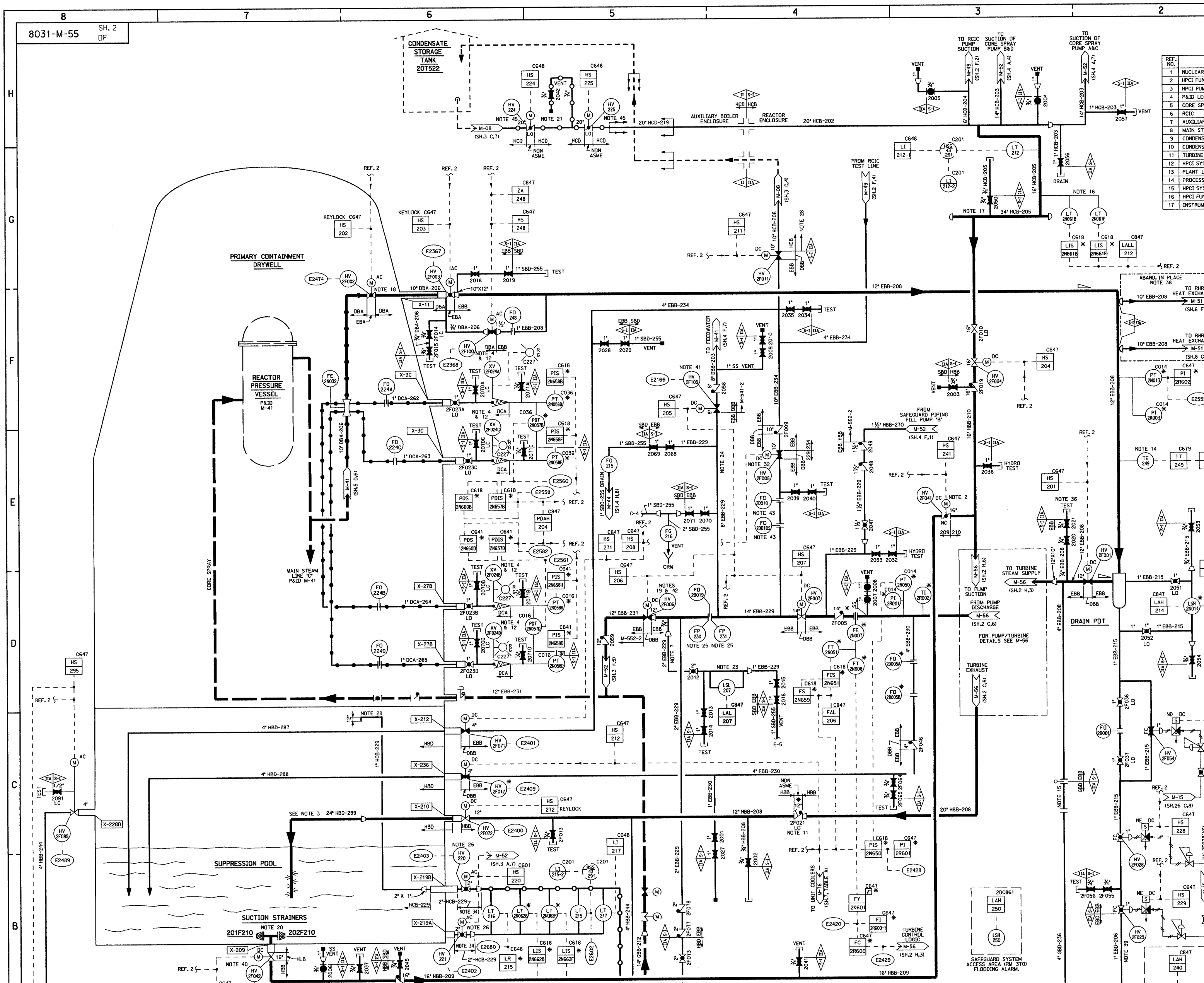
M-55 (SHT. 1)



REF. NO.	REFERENCE DRAWINGS	BECHTEL NO.	GE NO.
1	NUCLEAR BOILER	M-41	
2	HPCI FUNCTIONAL CONTROL DIAGRAM	8031-M-E41-1030-F	729E627AD
3	HPCI PUMP/TURBINE	M-56	
4	P&ID LEGEND	M-00	
5	CORE SPRAY	M-52	
6	RCIC	M-49	
7	AUXILIARY STEAM	M-21	
8	MAIN STEAM	M-01	
9	CONDENSATE	M-05	
10	CONDENSATE & REFUELING WATER STORAGE	M-08	
11	TURBINE CONTROLS DIAGRAM	8031-M1-E41-C002-K	VPF2763-92-1
12	HPCI SYSTEM P&ID	8031-M1-E41-1010-D	761E230AD
13	PLANT LEAK DETECTION	M-25	
14	PROCESS INST PIPING & TUBING DESIGN SPEC	8031-M1-A61-4070-L2	22A3732
15	HPCI SYSTEM DESIGN SPECIFICATION	8031-M1-E41-4010-L3	22A3021
16	HPCI FUNCTIONAL DESCRIPTION	M-55 FD	
17	INSTRUMENT INSTALLATION DETAILS	M-830	NA

NOTES:

1. THE HPCI SYSTEM IS A SEISMIC CATEGORY I SYSTEM EXCEPT AS NOTED. SEISMIC CATEGORY I CLASSIFICATION SHALL EXTEND UP TO THE FIRST WALL PENETRATION BEYOND POINT INDICATED AND SHALL INCLUDE THE FIRST ANCHOR POINT IN OR BEYOND THIS WALL.
2. LOCATE VALVE HV-2F041 (ZONE E,3) AS CLOSE AS POSSIBLE TO PUMP SUCTION LINE FROM CONDENSATE STORAGE TANK.
3. PENETRATION LOCATION TO BE ABOVE MAXIMUM EXPECTED WATER LEVEL, WITH SPARGER LOCATED 4 FEET BELOW LOW WATER LEVEL (ZONE C,7).
4. A COMMON TROUBLE ALARM IS PROVIDED IN CONTROL ROOM PANEL 2BC802 FOR THE EXCESS FLOW CHECK VALVES ASSOCIATED WITH LOCAL PANEL C227. THIS ALARM IS INITIATED BY CLOSURE OF ANY OF THESE VALVES (ZONES D,5 & E,6).
5. AC POWER FOR HPCI INSTRUMENTS SHALL BE DERIVED FROM THE PLANT DC POWER SYSTEM, VIA AN INVERTER. THE DC SOURCE IS TO BE SEPARATE FROM THAT WHICH SUPPLIES THE RCIC SYSTEM.
6. THE GE MPL NUMBER FOR THIS SYSTEM IS E-41.
7. VENT CONNECTION SHOULD BE LOCATED AT A HIGH POINT (ZONE D,5).
8. TEMPERATURE LEAK DETECTION FOR THIS SYSTEM IS SHOWN ON REF 13. THE TEMPERATURE INSTRUMENTS ARE INDEXED AS PART OF P&ID M-55.
9. ALL INSTRUMENT PIPING & TUBING SHALL BE INSTALLED IN ACCORDANCE WITH REFERENCE 14. FOR DEVIATIONS TO SLOPE CRITERIA SEE REFERENCE 17.
10. ALL STEAM LINES SHALL BE SLOPED. ALL LIQUID LINES INSIDE THE PRIMARY CONTAINMENT SHALL BE SLOPED WHERE PRACTICAL.
11. VALVE 2F021 SHOULD BE LOCATED AT A HIGH POINT (ZONE C,4).
12. THE BYPASS VALVES AROUND EXCESS FLOW CHECK VALVES XV-2F024A, B, C, D ARE LOCKED CLOSED (ZONES D,6 & E,6).
13. DELETED.
14. TEMPERATURE ELEMENT TO BE MOUNTED ON OUTSIDE SURFACE (ZONE E,2).
15. AFTER TESTING, BLIND PORTION OF THE SPECTACLE FLANGE SHALL BE INSTALLED (ZONE C,3).
16. LT-2N061 B,F SHOULD BE LOCATED ABOVE EL. 201'-0" ON 16" HCB-205 (ZONE G,2).
17. 34" SECTION OF HCB-205 PIPING SHALL CONTAIN AT LEAST 800 GALLONS (ZONE G,3).
18. INSTALL VALVE HV-2F002 IN REVERSE DIRECTION SUCH THAT FLOW IS OVER THE SEAT (ZONE F,6).
19. VALVE HV-2F006 TO BE LOCATED AS CLOSE AS POSSIBLE TO JUNCTURE WITH CORE SPRAY LINE (ZONE D,5).
20. THE MAXIMUM ΔP ACROSS THE SUCTION STRAINERS SHALL NOT EXCEED THE AVAILABLE MARGIN ABOVE THE REQUIRED NPSH WHEN THE STRAINERS ARE 50% PLUGGED (ZONE B,7).
21. TO BE DRAINED WITHIN DIKED AREA (ZONE H,5).
22. DELETED
23. THIS PORTION OF THE EBB-229 SHALL BE A VERTICAL SECTION ABOVE THE PROCESS LINE, MINIMUM 3 FEET LONG. LSL TAPS SHALL BE PLACED 2 FEET APART. THE LINE FROM THE BOTTOM OF THE VERTICAL SECTION SHALL SLOPE DOWN TOWARDS THE PROCESS LINE (ZONE D,4).
24. PENETRATION INTO STEAM TUNNEL AT COLUMN LINE J (ZONE E,4).
25. FLOW TAPS ARE PROVIDED ONLY FOR STARTUP FLOW VERIFICATION. THE INSTRUMENTATION WILL BE PROVIDED BY PECO (ZONE D,5).
26. VALVES HV-220 & 221 SHALL BE INSTALLED SUCH THAT FLOW IS FROM THE CONTAINMENT (ZONE B,6).
27. FOR ALL NON-SEISMIC CATEGORY I CAPPED VENTS, DRAIN & TEST CONNECTIONS: DESIGN, FABRICATION, MATERIAL PROCUREMENT, ERECTION & TESTING FOR ALL PIPING DOWNSTREAM OF THE LAST ISOLATION VALVE, MAY BE IN ACCORDANCE WITH DESIGN CODE D.
28. DESIGN, FABRICATION, MATERIAL, PROCUREMENT, ERECTION AND TESTING FOR ALL PIPING, VALVES & EQUIPMENT SHOWN WITHIN THE SYMBOL (NOTE 28) ON THIS P&ID, MAY BE IN ACCORDANCE WITH THE REQUIREMENT OF PIPING CLASS DESIGNATION, DESIGN CODE D, WITH THE FOLLOWING EXCEPTIONS:
   a) CLEANING REQUIREMENT SHALL BE PER ORIGINAL LINE CLASS DESIGNATION.
   b) WELDING PROCEDURES TO BE USED SHALL BE AS REQUIRED PER THE ORIGINAL LINE CLASS DESIGNATION.
29. 1" HCB-229 GOOSENECK SHALL BE LOCATED AS HIGH AS PRACTICAL INSIDE THE SUPPRESSION CHAMBER BUT THE ELEVATION OF THE OPEN END SHALL NOT BE LESS THAN EL.230'-6" (ZONE C,6).
30. DELETED
31. UNLESS OTHERWISE INDICATED, ALL ASME PIPING ON THIS P&ID IS INCLUDED IN THE SCOPE OF NUCLEAR PIPING DESIGN SPECIFICATION 8031-M-555-2.
32. INSTALL VALVE HV-55-2F008 IN REVERSE DIRECTION SUCH THAT FLOW IS OVER THE SEAT (ZONE E,4).
33. PENETRATION SLEEVES, INCLUDING THE PENETRATION SLEEVE TO FLUED HEAD WELD OUTSIDE CONTAINMENT ARE PENNSYLVANIA SPECIAL. PENETRATION SLEEVES USED WITHOUT FLUED HEADS, INCLUDING THE FIRST WELD OUTSIDE CONTAINMENT ARE PENNSYLVANIA SPECIAL, EXCEPT WHERE THE PENETRATION SLEEVE IS PART OF AN ASME CLASS 2 PRESSURE BOUNDARY.
    WHEN THE PENETRATION SLEEVE IS PART OF AN ASME CLASS 2 PRESSURE BOUNDARY, (I.E., THE PENNSYLVANIA SPECIAL SLEEVE JOINS ASME PIPING INSIDE CONTAINMENT TO ASME PIPING OUTSIDE CONTAINMENT) THE FIRST WELD BOTH INSIDE/OUTSIDE CONTAINMENT SHALL BE IN ACCORDANCE WITH ASME CLASS 2.
34. THE PORTION OF HCB-229 LOCATED OUTSIDE THE CONTAINMENT, INCLUDING VALVES HV220 AND HV221, IS AS-BUILT HBB CARBON STEEL.
35. EXISTING TEST CONNECTION PIPE CAPS (OF ¾" OR 1") UP-STREAM OF THE EXCESS FLOW CHECK VALVES (XV), MAY BE REPLACED BY REDUCED SIZE SWAGE-LOCK FITTINGS AND ⅜" PLUG.
36. SPECIFICATION 8031-P-364 REQUIRES A PRESSURE TRANSMITTER TO BE INSTALLED AT THIS POINT DURING THE STARTUP TEST PROGRAM. THE INSTRUMENT SHALL BE REMOVED PRIOR TO THE COMPLETION OF THE FIRST REFUELING OUTAGE. VALVES 2020 AND 2021 WILL REMAIN CLOSED UPON COMPLETION OF THE TEST (E,3).
37. ASME BOUNDARIES SHOWN ON THIS DRAWING ARE FOR REFERENCE ONLY. SEE ASME PIPING SPECIFICATIONS FOR ADDITIONAL INFORMATION.
38. 10" EBB-208 FLOW PATHS HAVE BEEN PLUGGED. BOTH THE PIPE AND THE SUPPORTS ARE FOR STRUCTURAL COUPLING OF SEISMIC I PIPING AND ARE DESIGNED AS HANGER CRITICAL SEISMIC I. SEE ISO EBB-208-01 FOR DETAILS.
39. PIPING, VALVES AND EQUIPMENT SHOWN WITHIN THIS SYMBOL (NOTE 39), AS WELL AS THEIR SUPPORTS SHALL BE REPAIRED, REPLACED OR MODIFIED IN ACCORDANCE WITH THE ORIGINAL DESIGN REQUIREMENTS AS MODIFIED BY SPECIFICATION NE-214 AND ASME SECTION XI. THE REQUIREMENTS OF ASME SECTION XI IWA-4000 AND IWA-7000 SHALL APPLY IN ACCORDANCE WITH PECO'S REPAIR AND REPLACEMENT PROGRAM WITH THE FOLLOWING EXCEPTIONS:
    - PRESERVICE/INSERVICE INSPECTIONS ARE NOT REQUIRED.
    - NIS-2 FORMS ARE NOT REQUIRED.
    - ANII INVOLVEMENT IS NOT REQUIRED.
40. VALVE HV-2F042 HAS BEEN MODIFIED TO ELIMINATE PRESSURE LOCKING BY DRILLING A HOLE IN THE SUPPRESSION POOL SIDE OF THE WEDGE. SEE ECR LG-96-01192 FOR DETAILS.
41. VALVE HV-2F105 HAS BEEN MODIFIED TO ELIMINATE PRESSURE LOCKING BY DRILLING A HOLE IN THE RPV SIDE OF THE WEDGE. SEE ECR LG-96-00720 FOR DETAILS.
42. VALVE HV-2F006 HAS BEEN MODIFIED TO ELIMINATE PRESSURE LOCKING BY DRILLING A HOLE IN THE RPV SIDE OF THE WEDGE. SEE ECR LG-96-00719 FOR DETAILS.
43. DIRECTION OF FLOW THROUGH 2D010 AND 2D010S WILL NOT AFFECT THEIR PERFORMANCE, RELIABILITY, OR METHOD OF TEST.
44. BONNET VENT VALVES ADDED TO 2F019 & 2F045 PER ECR 04-00428.
45. PER MSO ECR 11-00105, MCC D214-D-G-16 COMPARTMENT 1D IS LOCKED OPEN AND MCC D224-D-G-16 COMPARTMENT 1D IS LOCKED OPEN WITH RESPECT TO VALVES HV-055-224 AND 225.

NO	DATE	DESCRIPTION	REV'D	CHK'D	APP'D
57	6/18/12	INCORP ECR 11-00105 R/1 PER WO C0241077 AND C0241080. CHANGED VALVES HV-224 AND HV-225 FROM "NO" TO "LO". ADDED NOTE 45. [H,5-6].	[illegible]	[illegible]	[illegible]
56	4/05/09	RE-INCORP ECR 08-00459 R/0. CHANGED VALVES 2009 & 2010 FROM BALL TO GLOBE. [F,4].	EJW	JCW	DCN
55	4/02/09	FINAL INCORP ECR 08-00459 R/0 PER WO C0227873. ADDED VENT AND BALL VALVES 2009 & 2010 DOWNSTREAM OF CHECK VALVE 2058. [F,4].	EJW	JCW	TJ
54	3/31/09	PARTIAL INCORP ECR 08-00459 R/0 PER WO C0227964. ADDED VENT AND BALL VALVES 2007 & 2008 UPSTREAM OF FE-2N007. [D,4].	EJW	RAS	JN

TABLE OF ADDITIONS & CHANGES
USE ONLY PRINTS SHOWING LATEST DATE

MECHANICAL

P&ID
HIGH PRESSURE COOLANT INJECTION
(UNIT 2)

LIMERICK GENERATING STATION
EXELON NUCLEAR CORP.

SCALE	DRAWN	IGDS	CHECKED	INSPECTED	APPROVED		DATE
NONE	BECHTEL	BECHTEL	BECHTEL	BECHTEL	BECH	BECH	10-13-89

APPROVED BECHTEL APPROVED

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