PECO NUCLEAR
A Unit of PECO Energy

PECO Energy Company
965 Chesterbrook Boulevard
Wayne, PA 19087-5691

June 24, 1999

Docket No. 50-353
License No. NPF-85

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

Subject: Limerick Generating Station, Unit 2
Supplemental Response to Generic Letter 94-03
Summary of Core Shroud Inspection Results

Dear Sir/Madam:

On July 25, 1994, the NRC issued Generic Letter (GL) 94-03, "Intergranular Stress Corrosion Cracking of Core Shrouds in Boiling Water Reactors," requesting that addressees take the following actions with respect to their core shrouds: 1) inspect their core shrouds no later than the next refueling outage, and perform an appropriate evaluation and/or repair based on the results of the inspection; and 2) perform a safety analysis supporting continued operation of the facility until inspections are conducted. The GL also required that all addressees submit written reports discussing the specific actions that will be taken, and when the actions have been completed.

By letter dated August 24, 1994, and as supplemented by letters dated October 24, 1994, and October 28, 1996, PECO Energy responded to GL 94-03 for Limerick Generating Station (LGS), Unit 2. In our responses, we discussed the schedule for completing the inspections/examinations of the LGS Unit 2 core shroud. Specifically, in our October 28, 1996 letter, we indicated that the core shroud inspections would be performed during the 1999 Refueling Outage (2R05).

GL 94-03 also required that within 30 days of completion of inspections, a written report must be submitted detailing the results of the inspections. Accordingly, this letter serves to notify the NRC that PECO Energy has completed the core shroud inspections for LGS Unit 2. The Exhibit to this letter contains a summary report (including attachments) discussing the inspection results and evaluations. This letter is being submitted under affirmation, and the required affidavit is provided in Enclosure 1.

Attachment 5 of the Exhibit contains information that General Electric Company (GE) considers to be of a confidential and proprietary nature. The proprietary/confidential information is identified by a vertical bar in the right margin of the document. GE is requesting that this information in Attachment 5 be withheld from public disclosure in accordance with the requirements of 10CFR2.790(a)(4). An affidavit supporting this request is provided in Enclosure 2. A *non-proprietary* version of Attachment 5 is in preparation and will be submitted upon completion.

A001

If you have any questions or require additional information, please do not hesitate to contact us.

Very truly yours,

D. G. Helker /FOR

Garrett D. Edwards
Director - Licensing

Exhibit/Enclosures

cc: H. J. Miller, Administrator, USNRC, Region I (w/ exhibit/enclosures)
A. L. Burritt, USNRC Senior Resident Inspector, LGS (w/ exhibit/enclosures)

ENCLOSURE 1

(PECO Energy Company Affidavit)

COMMONWEALTH OF PENNSYLVANIA :

: ss.

COUNTY OF CHESTER :

J. J. Hagan, being first duly sworn, deposes and says:

That he is Senior Vice President of PECO Energy Company; that he has read the foregoing supplemental response to NRC Generic Letter 94-03, "Intergranular Stress Corrosion Cracking of Core Shrouds in Boiling Water Reactors," for Limerick Generating Station, Unit 2, and knows the contents thereof; and that the statements and matters set forth therein are true and correct to the best of his knowledge, information, and belief.

Senior Vice President

Subscribed and sworn to
before me this 24th day
of June 1999.

Notary Public

Notarial Seal
Carol A. Walton, Notary Public
Tredyffrin Twp., Chester County
My Commission Expires May 28, 2002
Member, Pennsylvania Association of Notaries

ENCLOSURE 2
(GE Company Affidavit)

General Electric Company

AFFIDAVIT

I, David J. Robare, being duly sworn, depose and state as follows:

(1) I am Technical Account Manager, General Electric Company ("GE") and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in the GE proprietary report GE-NE B13-02010-33, *The Evaluation of Limerick Unit 2 Shroud Cracking for at Least One Fuel Cycle of Operation*, Class II (GE Nuclear Energy Proprietary Information), dated May 1999. The proprietary information is delineated by bars marked in the margin adjacent to the specific material.

(3) In making this application for withholding of proprietary information of which it is the owner, GE relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), 2.790(a)(4), and 2.790(d)(1) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information", and some portions also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by General Electric's competitors without license from General Electric constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information which reveals cost or price information, production capacities, budget levels, or commercial strategies of General Electric, its customers, or its suppliers;

d. Information which reveals aspects of past, present, or future General Electric customer-funded development plans and programs, of potential commercial value to General Electric;

e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in both paragraphs (4)a. and (4)b., above.

(5) The information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GE, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GE, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within GE is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GE are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2), above, is classified as proprietary because it contains detailed results of analytical models, methods and processes, including computer codes, which GE has developed and applied to perform evaluations of indications in the core shroud for the BWR.

The development of the crack growth methodologies that are used to evaluate BWR Core Internal components was achieved at a significant cost, on the order of one million dollars, to GE.

The development of the evaluation process contained in the paragraph (2) document along with the interpretation and application of the analytical results is derived from the extensive experience database that constitutes a major GE asset.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GE's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GE's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GE.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GE's competitive advantage will be lost if its competitors are able to use the results of the GE experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GE would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GE of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

STATE OF CALIFORNIA)
) ss:
COUNTY OF SANTA CLARA)

David J. Robare, being duly sworn, deposes and says:

That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at San Jose, California, this 23RD day of JUNE 1999.

David J. Robare
General Electric Company

Subscribed and sworn before me this 23RD day of JUNE 1999.

Notary Public, State of California

ANNA HANLIN
Commission # 1184507
Notary Public - California
Santa Clara County
My Comm. Expires Jun 19, 2002

EXHIBIT

(Including Attachments)

PECO ENERGY COMPANY
LIMERICK GENERATING STATION
UNIT 2
REACTOR PRESSURE VESSEL CORE SHROUD
2R05 INSPECTIONS FINAL REPORT
May 1999

In May 1999, during the fifth refueling outage (2R05) of Limerick Generating Station (LGS), Unit 2, portions of the core shroud structure were inspected. These inspections were conducted to determine the condition of specific core shroud welds considered, based on industry experience, to be most susceptible to Intergranular Stress Corrosion Cracking (IGSCC). This effort is discussed in the PECO Energy response to NRC Generic Letter 94-03, dated August 24, 1994, the Safety Evaluation contained in NRC letter dated March 13, 1995, and the LGS, Unit 2, core shroud Inspection Plan, forwarded to the NRC in our letter dated January 12, 1999. The inspections were conducted in accordance with the guidance provided by the Boiling Water Reactor Vessel and Internals Project (BWRVIP), as specified in BWRVIP-01, "BWR Core Shroud Inspection and Flaw Evaluation Guidelines", Revision 2, dated October 1996 (Reference 1). Additional guidance was utilized from BWRVIP-03, "Reactor Pressure Vessel and Internals Examination Guidelines", Revision 1, dated March 1999 (Reference 2), BWRVIP-07, "Guidelines for Reinspection of BWR Core Shrouds", dated February 1996 (Reference 3), and GENE-B13-01980-14, "Shroud Vertical Weld Inspection and Evaluation Guidelines" (Draft), dated March 1999 (Reference 4).

The following describes the 2R05 core shroud inspections and summarizes the results of this effort.

BACKGROUND:

The LGS, Unit 2, core shroud was fabricated by Sun Shipbuilding and Drydock Co., Chester PA. The product forms used for this fabrication included 2" thick SA-240, Type 304L stainless steel plate (for shroud cylinders), and varying thickness of SA-240, Type 304L stainless steel plate for the rings. Figure 1 provides an elevation view depicting the LGS, Unit 2, core shroud configuration, weld locations, and materials of fabrication. The plate materials have a low carbon content (.018% to .026%). The product forms were joined using the submerged arc welding process. The weld filler metal was ASME SFA-5.9, Class ER308L. Welds H-1 through H-6 were welded from both surfaces, using a double bevel weld prep. Weld H-7 was welded from the inside surface of the core shroud using a single bevel weld prep and a backing ring. The H-7 weld was made at the LGS site, and it connected the prefabricated core shroud structure to the Reactor Pressure Vessel. This weld is a dissimilar metal weld (304 stainless to Alloy 600). The filler metal for this weld was ASME SFA-5.14, Class ERNiCr-3 (Alloy 82) for the root, and

ASME SFA-5.11, Class ENiCrFe-3 (Alloy 182) for the remainder of the weld. The processes used for this joint were the Gas Tungsten Arc Welding and Shielded Metal Arc Welding. The LGS, Unit 2, H-7 weld has an additional Alloy 82 fillet weld on the OD between the lower core shroud cylinder and the backing ring for crevice mitigation.

The LGS, Unit 2, core shroud has been in service since January 8, 1990. During this first decade of operation, LGS Unit 2, operated with relatively low, primary-water conductivity. Unit 2's mean conductivity has been maintained well below the EPRI recommended value of .20 μS/cm for a majority of this time period. The effects of early water chemistry history on the susceptibility of the core shroud welds to IGSCC are addressed in Reference 1.

The above-described factors place the LGS, Unit 2, core shroud into Inspection Category B, as defined by Reference 1. This category has a lower potential for IGSCC in core shrouds. Therefore, limited inspections of welds H-3, H-4, H-5 and H-7 are recommended.

INSPECTIONS:

The scope of the LGS, Unit 2, core shroud inspections included all Category B circumferential welds (i.e., H-3, H-4, H-5 and H-7). Provisions to expand the scope to Category C (i.e., the addition of welds H-1, H-2 and H-6) were included in the 2R05 Inspection Plan should significant indications (i.e., greater than 10% of the examined length) be detected in any Category B weld. During the inspection, circumferential indications exceeding 10% of the examined length were first detected in the weld heat affected zone of the H-4 weld. As a result, all of the circumferential welds in the core shroud structure (welds H-1, H-2, H-3, H-4, H-5, H-6, and H-7) were examined during the current outage (2R05). No vertical welds, shroud attachment welds, ring segment welds, or shroud support structure welds were examined.

The method used for inspection of these circumferential welds was Ultrasonic Testing (UT), performed from the outside surface of the core shroud, using the General Electric Nuclear Energy (GENE) SMART 2000 data acquisition system and the GENE OD Tracker. This core shroud inspection equipment was satisfactorily demonstrated at the EPRI NDE Center per Reference 2. The extent of the planned inspections included 100% of the circumferential weld lengths, accessible for the GENE OD Tracker. This scope and extent of planned inspections was identified in our January 12, 1999 response to Generic Letter 94-03.

The UT scanning was accomplished using three transducers. These transducers included 45° shear wave, 60° longitudinal wave, and creeping wave search units. The transducers scanned each weld and heat affected zone (HAZ) of the accessible lengths of each weld. The creeping wave transducer was used to enable better near-surface detection capabilities.

The purpose of the core shroud inspections was to assess the condition of the shroud circumferential welds so that the integrity of the shroud structure could be quantitatively demonstrated. Additionally, the inspection results will be used to establish a baseline of this condition for comparison to future inspection results. This baseline data will also be used to develop schedules for future core shroud inspections, evaluations, or repairs.

Severe access restrictions to UT delivery equipment are inherent in the LGS, Unit 2, type vessel. These access restrictions are caused primarily by the four (4) Low Pressure Coolant Injection (LPCI) couplings which pass radially through the vessel annulus, between the vessel wall and the core shroud, just above the H-2 shroud weld. These couplings not only interfere with circumferential scanning of all core shroud welds below the H-1 weld, but also impact the access space needed for insertion of the Tracker tool into the vessel annulus. The LPCI couplings are located at azimuth 45°, 135°, 225°, and 315°. Figure 2 provides a plan view of the LGS, Unit 2, vessel and core shroud, and provides a breakdown of the core shroud circumference into scanning zones for the implementation of the inspections; six zones identified are paired into 3 groups of corresponding access conditions. Zones 1 and 4 have essentially the same access restrictions. Likewise, zones 2 and 5 have the same access restrictions, as do zones 3 and 6. Zones 2 and 5 have the least restriction to insertion and scanning with the OD Tracker. These zones are representative of accessibility found during past industry core shroud inspection experiences. Zones 3 and 6 do not provide access for insertion of the OD Tracker, due to interferences with the core shroud lifting lugs, jet pumps and core spray downcomer piping. Zones 1 and 4 also have restricted clearances for insertion of the OD Tracker due to the Core Spray downcomer piping and the jet pumps. Although General Electric did not recommend use of the OD Tracker delivery device in these zones (i.e., 1, 3, 4, and 6), due to the potential for damage to the inspection tool during the insertion and set-up process, zones 1 and 4 were successfully inspected using the OD Tracker. Additionally, the Suction Cup (Area) Scanner was used to inspect portions of the H-4 weld in zones 3 and 6.

The extent of core shroud weld inspections performed during 2R05 include:

57.41% of the length of weld H-1,	396.78"
57.44% of the length of weld H-2,	397.05"
61.53% of the length of weld H-3,	400.36"
63.79% of the length of weld H-4,	415.08"
61.41% of the length of weld H-5,	399.61"
59.50% of the length of weld H-6,	346.69"
59.09% of the length of weld H-7,	372.69"
Total	2,728.26"

The extent of these weld inspections is graphically depicted on the attached weld maps for welds H-1, H-2, H-3, H-4, H-5, H-6 and H-7 (Attachment 2).

RESULTS:

The extent of examination of these welds varied depending on accessibility. All accessible weld lengths were examined. The examination coverage achieved was sufficient to quantify the core shroud structural integrity.

Circumferential indications were found in the weld heat affected zone (HAZ) at welds H-1, H-2, H-3, H-4, H-5, and H-6. No indications were observed at the H-7 weld. Attachment 1 contains the General Electric (GE) Nuclear Energy, UT Report summarizing the extent of each weld examination, their results and weld maps depicting the general location of the as-found indications.

EVALUATIONS:

Due to the large number of UT indications detected during 2R05 it was not practical during the outage to determine the true nature (i.e., geometric, metallurgical or flaw) of each reflector. Accordingly, all as-found surface connected indications were conservatively assumed to be through-wall cracks. Therefore, depth sizing of the indications was not utilized in the evaluations. Additionally, the weld lengths, which were not inspected, due to inaccessibility, were assumed to have through-wall cracks.

The engineering evaluations of examination results were performed by Structural Integrity Associates (SIA), to determine the remaining Code safety factor in each weld, at the end of a specific period of time (see Tables 9 and 10 in Attachment 3). The evaluation considered the most limiting condition relative to individual core shroud weld stresses and required safety factor. The evaluation also considered the loads associated with Power Rerate conditions, increased reactor internal pressure differences (RIPD) associated with the change to GE 13 fuel with debris filters (current bounding fuel type), and a 24 month operating cycle.

The evaluation for continued service of the core shroud structure considered one (1) two year cycle of operation for calculating the extent of crack growth for any as-found or assumed indication. Per BWRVIP guidance, NDE uncertainty factors were added, as applicable, to the identified indication lengths and depths. Also, NDE uncertainty factors were added to the unexamined regions' lengths. Since core shroud vertical welds were not examined, the structural capabilities of these welds was evaluated based on conservative assumptions regarding their condition, as described in the BWRVIP draft guidance for vertical welds. Additionally, this draft guidance indicates that no examination of ring segment welds is required for unrepaired core shrouds. The basis is that no significant safety consequences result from cracking of these welds, given that the structural margins of the circumferential welds are maintained. The results of the structural evaluations of circumferential and vertical welds indicate that the Code required safety factors will be maintained for the next operating cycle. Therefore, no specific structural evaluation was performed for the ring segment welds. No operational limitations are imposed by the current or projected condition of the core shroud through the next operating cycle.

The following lists the specific conservatism utilized in the current engineering evaluation performed by SIA:

1. All areas not examined due to inaccessibility, were considered to contain through-wall flaws for all evaluations.

2. A bounding crack growth rate (5×10^{-5} inches/hour) for length and depth was applied to all "identified" flaws, as well as to the assumed flaws comprised of the uninspected regions.

3. UT inspection uncertainty factors were applied to all identified indications, as well as to uninspected regions.

4. ASME Code, Section XI proximity criteria for adjacent flaws were applied, after accounting for crack growth and inspection uncertainties. Any two adjacent flaws within 4 inches were combined into one longer flaw.

5. ASME Code, Section XI pressure boundary safety margins were applied to these evaluations even though the core shroud is not a primary pressure boundary.

6. All eight (8) core shroud vertical welds were assumed to be flawed for their entire length, to a depth exceeding the maximum depth of any indication identified at any circumferential weld.

7. Deadweight of the core shroud and supported components was ignored, because the weight of the core shroud would oppose the applied loads, and reduce their net effect.

The results of the evaluations of the core shroud circumferential welds are contained in Attachment 3, SIA Report: SIR-99-061, "Evaluation of the Limerick, Unit-2 Shroud Examination Results", dated May 14, 1999. Appendices A and B to SIR-99-061, which provide a reprint of the Attachment 2 Inspection Results, and a computer print out of the Flaw Evaluation Results using the ANSC 2.0 (04/26/94) software, respectively, have not been reproduced here but are available onsite for more detailed review. The results of the evaluations of the core shroud axial welds are contained in Attachment 4, SIA Report: SIR-99-063, "Evaluation of Shroud Vertical Welds at Limerick, Unit 2", dated May 14, 1999.

General Electric Company also performed supplemental engineering evaluations, for welds H-3 and H-4. These evaluations were performed using more realistic input assumptions, as recommended by the BWRVIP. However, the NRC has not accepted these analytical input assumptions for generic application. Therefore, the evaluation for continued service of the core shroud structure is based on the conclusions of the SIA reports for all welds, since the NRC has generically approved for use all assumptions used in those reports. The GE Report is included for historical purposes only, as Attachment 5.

The impact of potential leakage through the identified core shroud weld indications was investigated. Although, the BWRVIP flaw and evaluation guidelines require that the engineering evaluation of shroud structural integrity assume through-wall cracking in any unexamined region, the evaluation need not address shroud bypass leakage unless through-wall cracking is actually detected. There was no through-wall cracking detected in any weld during the 2R05 Inspection. Regardless, should through wall cracking actually exist, significant bypass leakage will be detected as a result of an unexplained insertion of negative reactivity and a corresponding reduction of reactor power. LGS Procedure OT-104, Unexpected/Unexplained Reactivity Insertion, will be entered and the event effectively controlled.

In addition, the maximum credible failure of a flawed shroud is expected to occur as a result of a Main Steam Line Break (MSLB) or a Recirculation Line Break (RLB). Some ECCS injection degradation is expected during the MSLB due to interference with Core Spray (CS) Injection that may result from the lifting shroud. However, the amount of ECCS flow required under the MSLB event is minimal and as such there is no impact in overall ECCS performance. The impact of a postulated shroud failure on a RLB is limited to some additional ECCS flow needed to maintain 2/3rds core coverage. This is the result of leakage through lower weld cracks. This leakage is minimal compared to a single-pump ECCS capacity for the RHR pump or the CS pump and the normal overflow through the jet pumps. Accordingly, there is also no impact in overall ECCS performance for the RLB event.

CONCLUSIONS:

A 10CFR50.59 determination and safety evaluation has been developed and reviewed by the Plant Operations Review Committee (PORC). The conclusion of this evaluation indicates that no unreviewed safety questions exist as a result of the core shroud inspection findings.

The results of the inspections and evaluations conclude that the condition of the LGS, Unit 2, core shroud, projected through at least the next operating cycle, will support the required safety margins, specified in the ASME Code and reinforced by the BWRVIP recommendations. Additionally, the results of these UT inspections substantiate the Safety Analysis developed in response to Generic Letter 94-03.

The extent of the core shroud inspections provides a comprehensive baseline for comparison to future inspections. Significant conservative assumptions have been made in both the UT data analysis and engineering evaluation of the core shroud structural integrity. PECO Energy will continue its analysis of the UT data in an effort to determine the true nature of the reflectors and will refine its engineering evaluation, as appropriate, using more realistic input assumptions. Reinspection requirements for the LGS, Unit 2, core shroud welds will be determined based on these reviews and applicable BWRVIP guidance documents.

REFERENCES:

1. BWRVIP-01, BWR Vessel and Internals Project, "BWR Core Shroud Inspection And Flaw Evaluation Guideline, Revision 2", EPRI Report No. TR-107079, October 1996.

2. BWRVIP-03, BWR Vessel and Internals Project, "Reactor Pressure Vessel and Internals Examination Guidelines, Revision 1", EPRI Report No. TR-105696-R1, March 1999.

3. BWRVIP-07, BWR Vessel and Internals Project, "Guidelines for Reinspection of BWR Core Shrouds", EPRI Report No. TR-105747, February 1996.

4. BWRVIP-14, BWR Vessel and Internals Project, "Evaluation of Crack Growth in BWR Stainless Steel RPV Internals", EPRI Report No. TR-105873, March 1996.

5. BWR Vessel and Internals Project, Shroud Vertical Weld Inspection and Evaluation Guidelines, DRAFT Report # GENE-B13-01980-14, March 1999.

ATTACHMENT

1. Summary of Core Shroud UT Examination and Evaluation.

2. GE Nuclear Energy Report, Limerick Generating Station - Unit 2, Core Shroud Ultrasonic Examination, Report No. 1H61R, Rev. 0 (Interim Report), May 1999.

3. Structural Integrity Associates, "Evaluation of the Limerick, Unit 2 Shroud Examination Results, Report No. SIR-99-061, Revision 0, May 14, 1999.

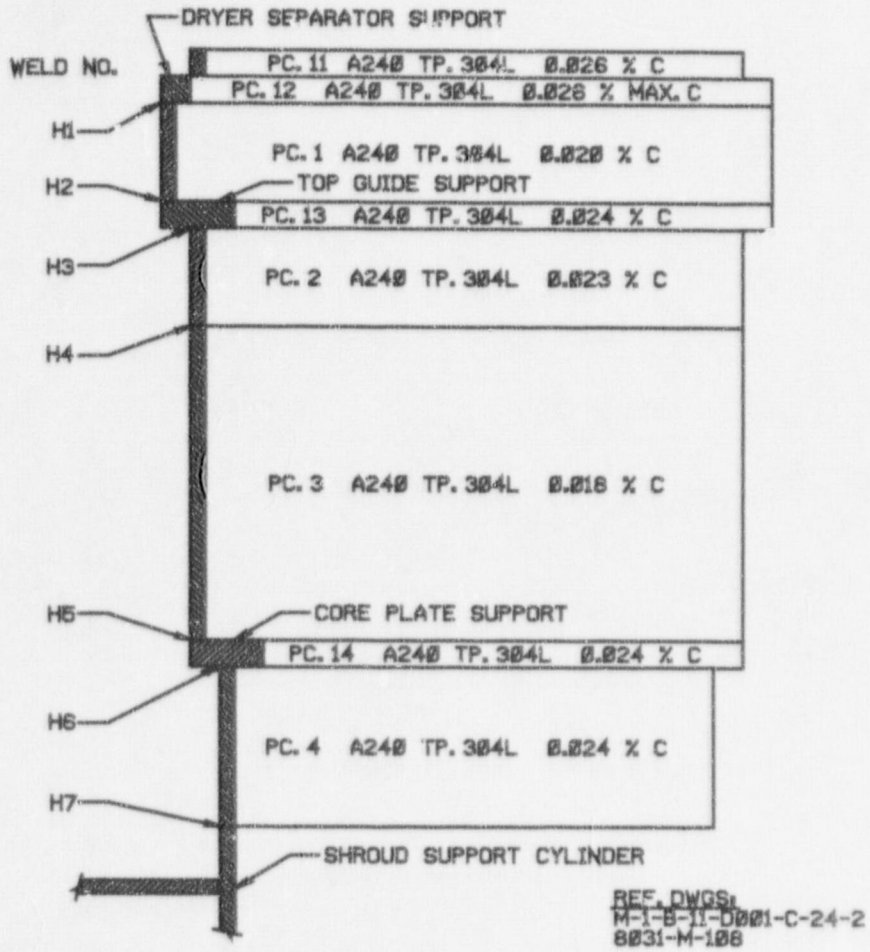
4. Structural Integrity Associates, "Evaluation of Shroud Vertical Welds at Limerick, Unit 2", Report No. SIR-99-063, dated May 14, 1999.

5. General Electric Technical Services, The Evaluation of Limerick Unit 2 Shroud Cracking For At Least One Cycle of Operation, GE-NE-B13-02010-33, dated May 1999.

PECO ENERGY COMPANY
LIMERICK GENERATING STATION
UNIT 2
REACTOR PRESSURE VESSEL CORE SHROUD
2R05 INSPECTIONS FINAL REPORT
May 1999

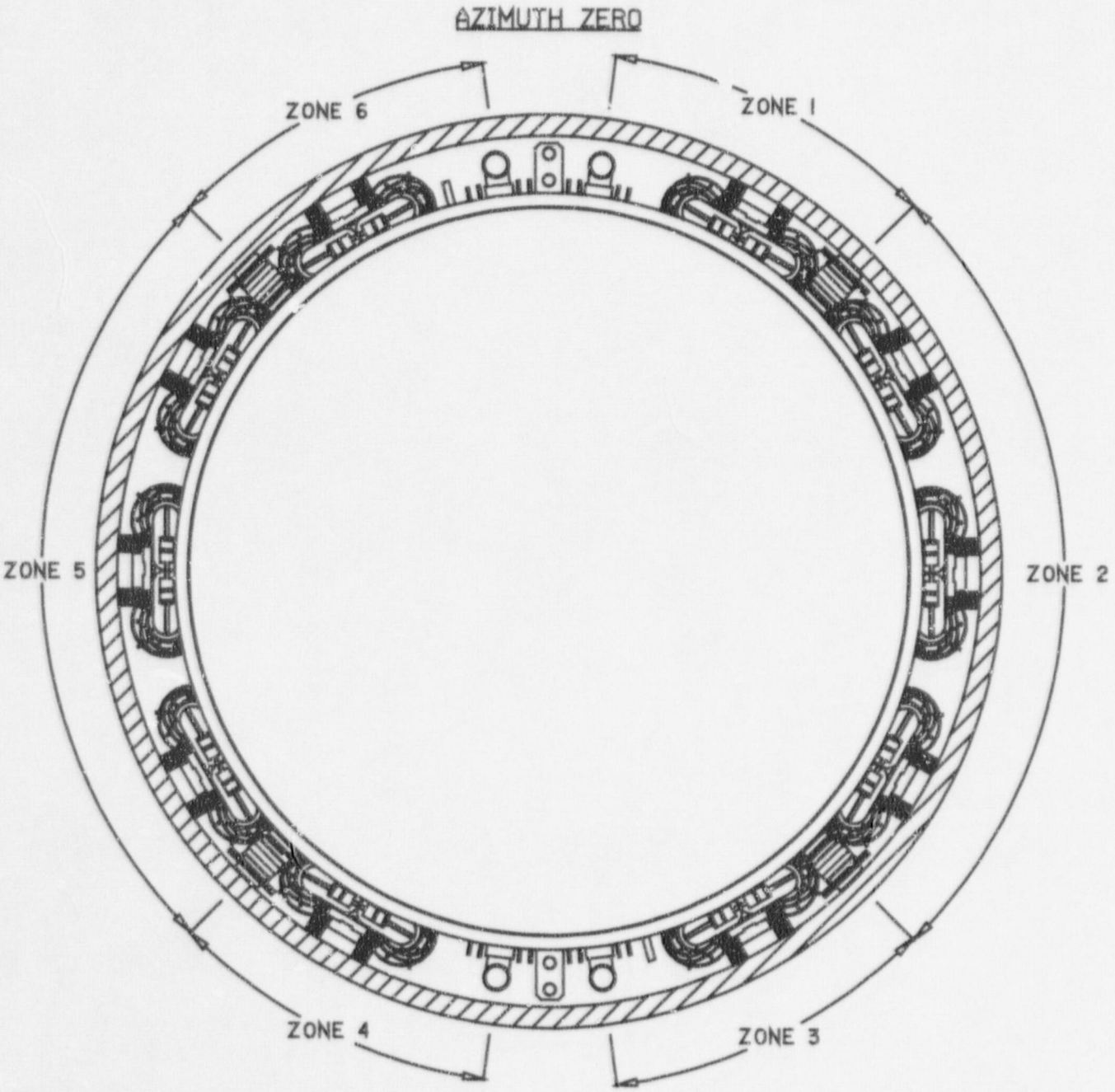
FIGURE 1

REACTOR PRESSURE VESSEL - SHROUD
LIMERICK GENERATING STATION
UNIT 2



PECO ENERGY COMPANY
LIMERICK GENERATING STATION
UNIT 2
REACTOR PRESSURE VESSEL CORE SHROUD
2R05 INSPECTIONS FINAL REPORT
May 1999

FIGURE 2



PECO ENERGY COMPANY
LIMERICK GENERATING STATION
UNIT 2
REACTOR PRESSURE VESSEL CORE SHROUD
2R05 INSPECTION FINAL REPORT
May 1999

ATTACHMENT 1

Summary of Core Shroud UT Examination and Evaluation

(1 Page)

ATTACHMENT 1
LIMERICK GENERATING STATION, UNIT 2 (2R05)
SUMMARY OF CORE SHROUD UT EXAMINATION AND EVALUATION RESULTS

Weld #	Indications	Side of Weld	Surface	% of Weld Length Scanned	% of Length Flawed*	Max. Depth inches	Comments
H-1	yes	plate	ID OD	57.41%	31.95%** 34.30%**	0.43" 0.19"	Limit Load method
H-2	yes	plate	ID	57.44%	39.54%	0.31"	Limit Load method
H-3	yes	plate	ID OD	61.53%	61.40%** 56.40%**	0.39" 0.33"	Limit Load method
H-4	yes	plate (upper)	OD	63.79%	40.85%	0.11"	Limit Load/LEFM method Scanned w/ Tracker & Suction Cup
H-5	yes	plate	ID OD	61.41%	8.17%** 1.73%**	<0.05" <0.05"	Limit Load method
H-6	yes	plate	ID	59.50%	64.80%	0.35"	Limit Load method
H-7	no	N/A	N/A	59.09%	0%	N/A	Limit Load method

* Cumulative as found indication length divided by total scanned area. ** ID and OD lengths are not additive.

PECO ENERGY COMPANY
LIMERICK GENERATING STATION
UNIT 2
REACTOR PRESSURE VESSEL CORE SHROUD INSPECTIONS
2R05 INSPECTION FINAL REPORT
May 1999

ATTACHMENT 2

GE Nuclear Energy Report
Limerick Generating Station - Unit 2
Core Shroud Ultrasonic Examination
Report No. 1H61R, Revision 0
(Interim Report)
May 1999

(37 Pages)

PECO NUCLEAR
A Unit of PECO Energy

PECO Energy Company
965 Chesterbrook Boulevard
Wayne, PA 19087-5691

July 9, 1999

Docket No. 50-353
License No. NPF-85

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

Subject: Limerick Generating Station, Unit 2
Revision to Supplemental Response to Generic Letter 94-03
Summary of Core Shroud Inspection Results

Dear Sir/Madam:

By letter dated June 24, 1999, PECO Energy submitted a supplemental response to Generic Letter (GL) 94-03, *"Intergranular Stress Corrosion Cracking of Core Shrouds in Boiling Water Reactors,"* for Limerick Generating Station (LGS), Unit 2. The information provided in our June 24, 1999 letter, contained a Summary Report discussing the inspection results and evaluations associated with the LGS, Unit 2, reactor vessel core shroud examinations that were performed during the last refueling outage (i.e., 2R05).

Included as an attachment in the Summary Report (i.e., Attachment 5) was General Electric (GE) Report GE-NE-B13-02010-33P, *"The Evaluation of Limerick Unit 2 Shroud Cracking for at Least One Fuel Cycle of Operation,"* dated June 1999. In our June 24, 1999 letter, we indicated that GE requested that this report be withheld from public disclosure since it included information of a proprietary/confidential nature. GE's request was submitted in accordance with the requirements of 10CFR2.790(a)(4) and a supporting affidavit was provided. At the time of the submittal, we also indicated that a non-proprietary version of the GE report was in preparation and would be submitted at a later date upon completion. Accordingly, this letter forwards the non-proprietary version of Attachment 5 (i.e., GE Report GE-NE-B13-02010-33NP).

In addition, this letter also provides several revised pages to the Summary Report previously submitted by our letter dated June 24, 1999. These revised pages are necessary in order to provide clarification regarding the proprietary nature of Attachment 2, and to clarify the evaluation assumptions for considering through-wall cracking. Specifically, the title page for Attachment 2 (i.e., Report No. 1H61R, dated May 1999) inadvertently contained a proprietary disclaimer statement. This document is a non-proprietary report and a replacement title page (with the disclaimer statement deleted) is attached. The Summary Report also discussed evaluations and through-wall cracking assumptions. The information provided was based on preliminary data provided by Structural Integrity Associates (SIA). The affected pages from the Summary Report have been revised to reflect the most current data concerning the through-wall cracking assumptions, and are attached.

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If you have any questions or require additional information, please do not hesitate to contact us.

Very truly yours,

G. D. Edwards /FOR

Garrett D. Edwards
Director - Licensing

Attachments/Enclosure

cc: H. J. Miller, Administrator, USNRC, Region I (w/ attachments/enclosure)
A. L. Burritt, USNRC Senior Resident Inspector, LGS (w/ attachment/enclosure)