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Clinton Power Station
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An Exelon/British Energy Company

RS-01-278

December 6, 2001

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Additional Materials Engineering Information Supporting the License
Amendment Request to Permit Up-rated Power Operation at Clinton Power
Station

References: (1) Letter from J. M. Heffley (AmerGen Energy Company, LLC) to U.S. NRC,
"Request for License Amendment for Extended Power Uprate Operation,"
dated June 18, 2001

(2) Letter from J. B. Hopkins (U.S. NRC) to O. D. Kingsley (Exelon Generation
Company, LLC), "Clinton Power Station, Unit 1 - Request For Additional
Information (TAC No. MB2210)," dated November 14, 2001

In Reference 1, AmerGen Energy Company (AmerGen), LLC submitted a request for changes to the Facility Operating License No. NPF-62 and Appendix A to the Facility Operating License, Technical Specifications (TS), for Clinton Power Station (CPS) to allow operation at an uprated power level. The proposed changes in Reference 1 would allow CPS to operate at a power level of 3473 megawatts thermal (MWt). This represents an increase of approximately 20 percent rated core thermal power over the current 100 percent power level of 2894 MWt. The NRC in Reference 2 requested additional information regarding the proposed changes in Reference 1. Attachment A to this letter provides the information requested in NRC Questions 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8, and 9.9 of Reference 2. Responses to the remaining NRC questions in Reference 2 will be provided separately.

A portion of the information in Attachment A is proprietary to the General Electric Company, and AmerGen requests that it be withheld from public disclosure in accordance with 10 CFR 2.790, "Public inspections, exemptions, requests for withholding," paragraph (a)(4). The proprietary information is indicated with sidebars. Attachments B-1 and B-2 provide the affidavits supporting the request for withholding the proprietary information in Attachment A from public disclosure, as required by 10 CFR 2.790, paragraph (b)(1). Attachment C contains a non-proprietary version of Attachment A.

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Should you have any questions related to this information, please contact Mr. Timothy A. Byam at (630) 657-2804.

Respectfully,

A handwritten signature in cursive script that reads "K. R. Jury for".

K. R. Jury
Director – Licensing
Mid-West Regional Operating Group

Attachments:

Affidavit

- Attachment A: Additional Materials Engineering Information Supporting the License Amendment Request to Permit Up-rated Power Operation at Clinton Power Station (Proprietary Version)
- Attachment B-1: Affidavit for Withholding Portions of RAI Questions 9.2 and 9.4 of Attachment A from Public Disclosure
- Attachment B-2: Affidavit for Withholding Portions of RAI Questions 9.5 and 9.6 of Attachment A from Public Disclosure
- Attachment C: Additional Materials Engineering Information Supporting the License Amendment Request to Permit Up-rated Power Operation at Clinton Power Station (Non-Proprietary Version)

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Clinton Power Station
Office of Nuclear Facility Safety – Illinois Department of Nuclear Safety

STATE OF ILLINOIS)
COUNTY OF DUPAGE)
IN THE MATTER OF)
AMERGEN ENERGY COMPANY, LLC) Docket Number
CLINTON POWER STATION, UNIT 1) 50-461

**SUBJECT: Additional Materials Engineering Information Supporting the License
Amendment Request to Permit Up-rated Power Operation at Clinton
Power Station**

AFFIDAVIT

I affirm that the content of this transmittal is true and correct to the best of my
knowledge, information and belief.

K. A. Ainger

K. A. Ainger
Manager – Licensing

Subscribed and sworn to before me, a Notary Public in and
for the State above named, this 6 day of
December, 2001.

Anese L. Grigsby
Notary Public



ATTACHMENT B-1

**Affidavit for Withholding Portions of RAI Questions 9.2 and 9.4
of Attachment A from Public Disclosure**

General Electric Company

AFFIDAVIT

I, **George B. Stramback**, being duly sworn, depose and state as follows:

- (1) I am Project Manager, Regulatory Services, 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 Attachment 2 to letter GE-CPS-AEP-081, *Response to NRC RAI Regarding EPU – RAIs 9.1, 9.2, 9.4, and 10.7*, dated November 21, 2001. The proprietary information in Attachment 2 (*GE-CPS-AEP-081, GE Responses to NRC RAIs for EPU – RAIs 9.2, 9.4, and 10.7*, (GE Company Proprietary)), is identified 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 further details regarding the GE proprietary report NEDC-32989P, *Safety Analysis Report for Clinton Power Station Extended Power Uprate*, Class III (GE Proprietary Information), dated June 2001, which contains detailed results of analytical models, methods and processes, including computer codes,

which GE has developed, obtained NRC approval of, and applied to perform evaluations of transient and accident events in the GE Boiling Water Reactor ("BWR").

The development and approval of these system, component, and thermal hydraulic models and computer codes was achieved at a significant cost to GE, on the order of several million dollars.

The development of the evaluation process 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.

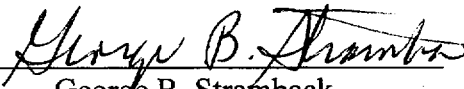
The value of this information to GE would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GE of 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)

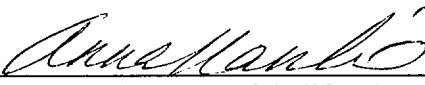
George B. Stramback, being duly sworn, deposes and says:

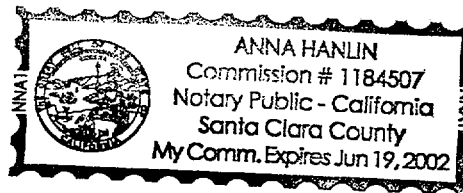
That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at San Jose, California, this 21st day of November 2001.


George B. Stramback
General Electric Company

Subscribed and sworn before me this 21st day of NOVEMBER 2001.


Notary Public, State of California



ATTACHMENT B-2

**Affidavit for Withholding Portions of RAI Questions 9.5 and 9.6
of Attachment A from Public Disclosure**

General Electric Company

AFFIDAVIT

I, **George B. Stramback**, being duly sworn, depose and state as follows:

- (1) I am Project Manager, Regulatory Services, 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 Attachment 1 to letter GE-CPS-AEP-079, *Response to NRC RAI Regarding EPU – RAIs 9.5, 9.6, and 10.8*, dated November 19, 2001. The proprietary information in Attachment 1 (*GE-CPS-AEP-079, GE Responses to NRC RAIs for EPU – RAIs 9.5, 9.6, and 10.8*, (GE Company Proprietary)), is identified 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).
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 - 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;
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which GE has developed, obtained NRC approval of, and applied to perform evaluations of transient and accident events in the GE Boiling Water Reactor ("BWR").

The development and approval of these system, component, and thermal hydraulic models and computer codes was achieved at a significant cost to GE, on the order of several million dollars.

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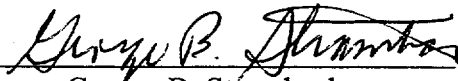
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STATE OF CALIFORNIA)
)
COUNTY OF SANTA CLARA) ss:

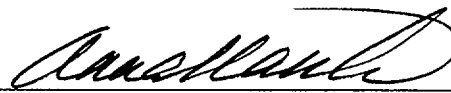
George B. Stramback, being duly sworn, deposes and says:

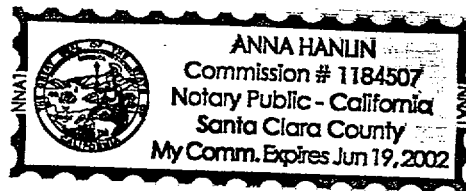
That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at San Jose, California, this 19th day of November 2001.


George B. Stramback
General Electric Company

Subscribed and sworn before me this 19th day of NOVEMBER 2001.


Notary Public, State of California



ATTACHMENT C

Additional Materials Engineering Information Supporting the License Amendment Request to Permit Uprated Power Operation at Clinton Power Station (Non-Proprietary)

Reference: GE NEDC-32989P (Attachment E to Reference 1)

Question 9.1

"The subject report states that the increase in core average power results in higher reactor internal pressure differences (RIPDs). Provide a technical assessment as to how the Nuclear Regulatory Commission (NRC) staff-approved Boiling Water Reactor Vessel and Internals Project (BWRVIP) inspection and flaw evaluation (I&E) guidelines will continue to bound Clinton given this increase in RIPD."

Response 9.1

The increase in reactor internal pressure differences (RIPDs) will have some impact on the shroud inspections. The impact of the higher RIPD on the inspection results of other reactor internals is negligible.

Clinton Power Station (CPS) has been performing all reactor internals inspections in accordance with Boiling Water Reactor Vessel and Internals Project (BWRVIP) inspection and flaw evaluation requirements. Currently, there have been no indications identified in the shroud. Additional core shroud ultrasonic test inspections are planned during the next refueling outage (C1RO8), currently scheduled in Spring 2002. Indications that may be identified are evaluated using loading that includes the higher RIPDs due to extended power uprate (EPU). Thus, the EPU effects are fully considered in the BWRVIP inspections and evaluations.

Flaw handbooks have been developed for several reactor internals components to evaluate potential flaws that may be discovered as part of the BWRVIP inspections at CPS. The flaw handbooks include and bound the EPU effects including RIPD changes. Thus the increased loads resulting from EPU are fully addressed in the BWRVIP inspection and evaluations. Table 9.1-1 summarizes the assessment for all reactor internals.

Table 9.1-1

Component	BWRVIP Document	Assessment
Shroud	BWRVIP-76	Higher RIPD due to EPU will be included in flaw evaluation
Core Spray	BWRVIP-18	Handbook includes EPU loads
Jet Pump Assembly	BWRVIP-41	Handbook includes EPU loads
Shroud Support	BWRVIP-38	Generic, EPU has negligible impact
Top Guide	BWRVIP-26	EPU has negligible impact
Core Plate	BWRVIP-25	EPU has negligible impact

ATTACHMENT C

Additional Materials Engineering Information Supporting the License Amendment Request to Permit Up-rated Power Operation at Clinton Power Station (Non-Proprietary)

Component	BWRVIP Document	Assessment
Other Components: e.g., Lower Plenum, Core delta- Pressure Line, Instrument Penetrations, Vessel Inside Diameter Attachments, Low Pressure Core Injection	Other BWRVIP documents	EPU has negligible impact

Question 9.2

"With regards to the shroud loads, discuss more fully how the change in pressure (P) and total stresses, including providing the calculated and design-basis numbers, will affect the Upset and Faulted conditions. Also discuss more fully, including providing the calculated and design-basis numbers, how the change in postulated recirculation system line break LOCA acoustic and flow-induced loads will affect the Upset and Faulted conditions."

Response 9.2

ATTACHMENT C

Additional Materials Engineering Information Supporting the License Amendment Request to Permit Uprated Power Operation at Clinton Power Station (Non-Proprietary)

Question 9.3

"The subject report states that there is no increase in P across the core support. Discuss more fully why this is since the report previously stated that there is an increase in RIPD. As clarified by the NRC: Question 9.3 was asked because of inconsistency between Table 1-2 (states no increase in dome pressure and temperature) and Tables 3-4 and 3-5 (those tables show increase in temperature and pressure). Section 3.3.2 of the submittal also states that there is no change in design conditions. We would like the inconsistencies explained."

Response 9.3

Table 1-2 of Attachment E to Reference 1 presents the "Current and EPU Plant Operating Conditions," which shows the system operating (i.e., dome) pressure is unchanged by the power uprate. Table 3-4 of Attachment E to Reference 1 presents the "RIPDs for Faulted Conditions," which shows the differential pressures across various internals components resulting from pipe breaks. Table 3-5 of Attachment E to Reference 1 presents the "Reactor Internal Components - Summary of Stresses," which shows the pre-EPU and post-EPU stresses in various components for Normal, Upset, and Faulted conditions. There are no inconsistencies between these tables because they address different issues.

The statement in Section 3.3.2 of Attachment E to Reference 1 reflects that none of the original component design allowable stresses have been exceeded by the changes resulting from EPU. Therefore, the stresses used for the original component design are unchanged.

Question 9.4

"For the shroud supports, provide the calculated and design-basis numbers for the beam buckling stresses and the fatigue usage factor, and discuss more fully why the proposed changes do not significantly reduce the design safety margins."

Response 9.4

ATTACHMENT C

Additional Materials Engineering Information Supporting the License Amendment Request to Permit Up-rated Power Operation at Clinton Power Station (Non-Proprietary)

Question 9.5

"For the core plate, provide the calculated and design-basis numbers for the beam buckling stresses and the fatigue usage factor, and discuss more fully why the proposed changes do not significantly reduce the design safety margins."

Response 9.5

ATTACHMENT C

Additional Materials Engineering Information Supporting the License Amendment Request to Permit Up-rated Power Operation at Clinton Power Station (Non-Proprietary)

Table 9.5-1

Question 9.6

"Provide the calculated and design-basis numbers for the P and total stresses generated for the reactor vessel and internal components due to the EPU. Include a discussion of how the Upset and Faulted conditions will be affected, including how the change in annulus temperature will affect the internal components."

Response 9.6

ATTACHMENT C

Additional Materials Engineering Information Supporting the License Amendment Request to Permit Up-rated Power Operation at Clinton Power Station (Non-Proprietary)

Question 9.7

"It is stated in the submittal that the evaluation of and inspection for flow accelerated corrosion (FAC) after EPU is in compliance with NRC Generic Letter 89-08, "Erosion/Corrosion in Piping." This letter requires that an effective program is implemented to maintain structural integrity of high-energy carbon steel systems. Describe how was this program modified to account for EPU. If the code used in predicating wall thinning by FAC in this program is a generic code, specify it. However, if the code is plant-specific provide its description."

Response 9.7

The requirements of Generic Letter (GL) 98-08, "Erosion/Corrosion in Piping," are implemented at CPS by utilization of the Electric Power Research Institute generic program, "CHECWORKS." CPS specific parameters are entered into this program to develop requirements for monitoring and maintenance of specific system components. These requirements are implemented through plant procedures. The CHECWORKS program inputs are currently being reviewed and modified by a program expert for operation at up-rated power conditions. The program revision and implementation of the results of the update will be completed prior to operation at up-rated conditions.

Question 9.8

"Why in the evaluation of the FAC effects in the main steam and attached piping system, monitoring of wall thinning in a single-phase is specified when this system contains two-phase fluids?"

Response 9.8

The main steam and associated piping systems are modeled in the CHECWORKS program for erosion and corrosion effects. The program uses specific steam quality inputs to evaluate the effects of flow in the system. This is not specifically either single-phase or two-phase fluid, but rather a specific evaluation of the fluid contained in the portion of the piping being evaluated.

Question 9.9

"What is the highest change in the predicted wall thinning caused by EPU?"

Response 9.9

The most significant change in the predicted wall thinning rate (i.e., in mils/year) caused by up-rated power conditions is in the steam lines carrying scavenging steam to the high-pressure feedwater heaters. The change is from 38 mils/year to an EPU value of 70 mils/year, or approximately an 84% increase. This amount of change is not unexpected due to the type of flow in these lines and is consistent with results obtained at other power stations. The affected system and components are contained within the scope of the plant-monitoring program. Monitoring and maintenance schedules will be modified as necessary based on the complete results of the CHECWORKS program update.

ATTACHMENT C

Additional Materials Engineering Information Supporting the License Amendment Request to Permit Upgraded Power Operation at Clinton Power Station (Non-Proprietary)

References

1. Letter from J. M. Heffley (AmerGen Energy Company, LLC) to U.S. NRC, "Request for License Amendment for Extended Power Uprate Operation," dated June 18, 2001