Dave Holm
Plant General Manager

R.E. Ginna Nuclear Power Plant, LLC
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Constellation Energy
Generation Group

May 19, 2006

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

ATTENTION: Document Control Desk

SUBJECT: **R.E. Ginna Nuclear Power Plant**
Docket No. 50-244

Final Response to Requests for Additional Information Regarding Topics Discussed on Conference Calls for Extended Power Uprate (EPU)

By letter dated July 7, 2005, R.E. Ginna Nuclear Power Plant, LLC (Ginna LLC) submitted an application associated with a request for authorization to increase the maximum steady-state thermal power level at the R.E. Ginna Nuclear Power Plant from 1520 megawatts thermal (MWt) to 1775 MWt. On February 23, 2006, the NRC staff engaged the Ginna Extended Power Uprate Project Team in discussions involving the Extended Power Uprate (EPU) Licensing Submittal. By letter dated May 9, 2006, Ginna LLC provided the non-proprietary responses to the NRC staff questions. The purpose of this letter is to provide formal documentation of the completion of the responses to the verbal requests for additional information (RAI).

Please note that some information contained within this submittal is considered Proprietary to our design vendor Westinghouse. Accordingly, two versions of our response to the RAI have been prepared.

Attachment I contains the "Application for Withholding Proprietary Information from Public Disclosure". As Attachment 2 contains information proprietary to Westinghouse Electric Company LLC, it is supported by an affidavit signed by Westinghouse, the owner of the information. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b) (4)of Section 2.390 of the Commission's regulations. Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with10 CFR Section 2.390 of the Commission's regulations. Correspondence with respect to the copyright or proprietary aspects of the items listed above or the supporting Westinghouse affidavit should reference CAW-05-2077 and should be addressed to B.F. Maurer, Acting Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

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Attachment 2 contains a proprietary version of the NRC's questions and Ginna LLC's response. Attachment 3 contains a non-proprietary version of the NRC's questions and Ginna LLC's response.

In addition to the information requested, Attachment 4 contains errata pages. This page describes typographical errors in our original submittal identified during the preparation of these responses.

The responses do not include any new regulatory commitments.

If you have any questions, please contact Robert Randall at (585) 771-3734 or robert.randall@constellation.com.

Very truly yours,

Dave A. Holm

STATE OF NEW YORK :
: **TO WIT:**
COUNTY OF WAYNE :

I, Dave A. Holm, being duly sworn, state that I am Plant General Manager – R.E. Ginna Nuclear Power Plant, LLC (Ginna LLC), and that I am duly authorized to execute and file this response on behalf of Ginna LLC. To the best of my knowledge and belief, the statements contained in this document are true and correct. To the extent that these statements are not based on my personal knowledge, they are based upon information provided by other Ginna LLC employees and/or consultants. Such information has been reviewed in accordance with company practice and I believe it to be reliable.

____

Subscribed and sworn before me, a Notary Public in and for the State of New York and County of Monroe, this 19 day of May, 2006.

WITNESS my Hand and Notarial Seal: Sharon L Miller

Notary Public

My Commission Expires:
12-21-06

SHARON L. MILLER
Notary Public, State of New York
Registration No. 01MI6017755
Monroe County
Commission Expires December 21, 2006

Attachments:

(1) Application for Withholding Proprietary Information from Public Disclosure
(2) Proprietary Response to NRC Request for Additional Information on the R.E.Ginna Extended Power Uprating
(3) Non-Proprietary Response to NRC Request for Additional Information on the R.E.Ginna Extended Power Uprating
(4) Errata

cc: S. J. Collins, NRC
P.D. Milano, NRC
Resident Inspector, NRC (Ginna)
J. P. Spath, NYSERDA
P.D. Eddy, NYSDPS

Attachment 1
Application for Withholding Proprietary Information from Public Disclosure

Westinghouse Electric Company
Nuclear Services
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

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

Direct tel: (412) 374-4419
Direct fax: (412) 374-4011
e-mail: maurerbf@westinghouse.com

Our ref: CAW-06-2138

May 10, 2006

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

Subject: RGE-06-17 P-Attachment, "Response to NRC Request for Additional Information on the R. E. Ginna Extended Power Uprating," dated May 10, 2006 (Proprietary)

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-06-2138 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying affidavit by Constellation Energy.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference this letter, CAW-06-2138 and should be addressed to B. F. Maurer, Acting Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

Very truly yours,

B. F. Maurer, Acting Manager
Regulatory Compliance and Plant Licensing

Enclosures

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared B. F. Maurer, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

B. F. Maurer, Acting Manager
Regulatory Compliance and Plant Licensing

Sworn to and subscribed
before me this 11th day
of May, 2006

Sharon L. Fiori
Notary Public

Notarial Seal
Sharon L. Fiori, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires January 29, 2007
Member, Pennsylvania Association Of Notaries

(1) I am Acting Manager, Regulatory Compliance and Plant Licensing, in Nuclear Services, Westinghouse Electric Company LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse "Application for Withholding" accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitutes Westinghouse policy and provides the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(c) Its use 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 a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, it is to be received in confidence by the Commission.

(iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in the attachment to letter RGE-06-17 (P-Attachment) "Response to NRC Request for Additional Information on the R. E. Ginna Extended Power Uprating," dated May 10, 2006 (Proprietary) for submittal to the Commission, being transmitted by Constellation Energy letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse is that associated with Constellation Energy's request for NRC approval of the R. E. Ginna Extended Power Uprating.

This information is part of that which will enable Constellation Energy to:

(a) Obtain NRC approval of the Extended Power Uprating (EPU).

(b) Respond to an NRC Request for Additional Information in support of the EPU.

Further this information has substantial commercial value as follows:

(a) Westinghouse plans to sell the use of this information to its customers for purposes of licensing upratings.

(b) Westinghouse can sell support and defense of the use of this model for licensing purposes.

(c) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar calculations and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

Proprietary Information Notice

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

Copyright Notice

Attachment 3

Non-Proprietary Response NRC Request for Additional Information on the R.E.Ginna Extended Power Uprating

RGE-06-17 NP-Attachment

R.E. GINNA NUCLEAR POWER PLANT
EXTENDED POWER UPRATE PROGRAM

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION ON THE R. E. GINNA EXTENDED POWER UPRATING

May 10, 2006

Westinghouse Electric Company LLC
P.O. Box 355
Pittsburgh, PA 15230-0355

3) Following an SBLOCA, the switch to recirculation needs to be performed. For those breaks where RCS pressure remains above the shutoff head of the LPI pump, a switch to recirculation results in a termination of HPSI for 10 -15 minutes, when the alignment is performed. At the request of the staff, analyses submitted by the licensee showed that for a range of small breaks, this interruption in ECC injection demonstrated that no core uncovery occurred for a range of small breaks where RCS pressure remained above 140 psia. The staff notes that the analysis considered only breaks on the bottom of the discharge leg. Because of the unique ECC design for Ginna, the staff requests that licensee consider breaks on the side and top of the discharge leg. With the break on the side or top of the discharge leg, the loop seal region (suction leg piping) will contain large amounts of liquid, which will increase the loop pressure drop following an SBLOCA. This condition is expected to occur late following an SBLOCA when the recirculation alignment would be expected to be performed. With the break on the bottom of the discharge leg, recovery of the core during the long term shows that large amounts of liquid are contained in the upper plenum and hot leg regions late following an SBLOCA. As such, an interruption in the injection would not boil-off the large amounts of liquid present in the system for this break location to cause the core to uncover again. If the break is on the side or top of the discharge leg, water trapped in the loop seals create a larger steam pressure in the upper plenum (to drive the core decay steaming rate through the loop) depressing the two-phase level to near the top of the core. The core is expected to remain covered in this condition; however, less liquid is present above the core. The concern is that an interruption in ECC flow could cause the core to re-uncover and heat-up, since the lesser liquid inventory above the break may not be sufficient during the ECC interruption to preclude heat-up and excessive clad temperatures during the re-alignment. The licensee needs to perform an analysis of breaks on the top and side of the discharge leg to show that core uncovery and excessive temperatures do not occur for these particular break locations. This issue surfaces during the EPU review because the Ginna NSSS has loop seas (suction leg piping) with a bottom elevation that is well below the top elevation of the core.

Response;

Ginna LLC is confident that the time to align high head recirculation in a small break LOCA scenario is less than 10 minutes. The alignment evolution would likely occur more than one hour into the event. This would provide operators time to prepare for and brief the evolution. Training has and will continue to emphasize the need to minimize the time when injection is secured. The alignment evolution involves three sets of valves (RWST outlet valves, SI pump recirculation valves and RHR to SI pump suction valves), all operated remotely from the control room. Each set of valves takes less than one minute to operate. After the valves are repositioned, an SI pump is started. A realistic estimate for the time to accomplish the alignment evolution is less than five minutes. The ten minute time frame assumed in the analysis is bounding for the expected duration, with margin.

In general, all Westinghouse plant designs are of the same loop seal configuration. As such, the only significant differences in the designs which would affect loop seal plugging are Safety injection (SI) configurations and whether or not the Reactor Coolant Pumps (RCPs) have either a weir on the discharge side or contain a diffuser cone (inherent weir design). The Low Head Safety Injection (LHSI) configuration for R. E. Ginna, as well as all 2-loop Westinghouse designs, is such that it injects into the Upper Plenum (otherwise known as UPI). As such, once the Reactor Coolant System (RCS) pressure drops below the LHSI cut-in pressure for this class of plant, concerns with loop seal re-plugging are essentially eliminated. The Reactor Coolant Pump (RCP) in the R. E. Ginna plant contains a diffuser cone which acts as an inherent cold leg weir. The effective weir height modeled in

NOTRUMP is [ ]^{a,c} when compared to the cold leg piping diameter of 2.29167 ft (27.5 inch I.D.). Note that the actual top of the diffuser is above the top of the cold leg elevation. This feature can not be modeled in this fashion in the NOTRUMP code without re-nodalization. Therefore, in order to have backflow into the RCP Pump Suction Piping (PSP), the break must be oriented at or above the effective weir height. Thus, the Reactor Coolant System (RCS) has to have significantly refilled following the Loss of Coolant Accident (LOCA) event in order for this to occur. Because of this, downcomer level and the associated driving head, is increased which reduces the core uncovery potential.

In order to illustrate the effects of break orientation with the NOTRUMP Evaluation Model (EM), several demonstration cases were performed. The limiting PCT transient for R. E. Ginna EPU analysis, 2-Inch Cold Leg Break, was re-performed with [ ]^{a,c} of the RCS cold leg. [ ]^{a,c} were performed to encompass the SI interruption effect. These being assuming Containment Spray (CS) actuation at T=0.0 seconds and CS actuation at T=650.0 seconds. The CS on at T=650.0 second case represents the same time at which the limiting [ ]^{a,c} break [ ]^{a,c} CS system was actuated. The CS on at T=0.0 second case represents the earliest time at which the SI interruption can occur for this break configuration/size due to RWST drainage. Comparison plots between the results obtained with the traditional [ ]^{a,c} and that of the [ ]^{a,c} with CS on at T=650 seconds can be observed in Figure 3-1 through Figure 3-3. Subsequent comparison plots between the results obtained with the traditional [ ]^{a,c} with CS on at T=650 seconds and that of the [ ]^{a,c} with CS on at T=0.0 seconds can be observed in Figure 3-4 through Figure 3-6. As can be seen, the response observed is as previously described in the NOTRUMP documentation, most notably Reference 3-1 which states that the [ ]^{a,c}.

The general phenomena associated with the initial loop seal clearing is unaffected by the break location in the NOTRUMP EM. Since the NOTRUMP EM is comprised of a series of stratified fluid nodes with inter-connecting flow links, the initial loop seal clearing process is controlled by the formation of a stratified level in the broken RCS cold leg. The NOTRUMP code does not allow the formation of a stratified level until the region reaches saturation conditions. As such, even if vapor is flowing through the RCP suction cross-over loop seal piping, it can not readily vent out the break and allow for pressure equalization between the vessel downcomer and core/upper plenum region until stratification occurs in the broken loop cold leg. In other words, the liquid trapped in the RCP suction cross-over leg uphill side must saturate and void before vapor flow can be established through this piping. Physical mechanisms such as entrainment and evaporation can also play a role in this. Obviously the larger the break size, the more significant these mechanisms become. Another possible method of core/upper plenum pressure equalization with the downcomer is via the stratification of the RCS downcomer region through the upper head spray nozzle flow path. The upper head cooling spray nozzles are a design bypass flow path between the vessel downcomer and upper head fluid region. Vapor venting through this flow path typically occurs following the drainage of the upper head region. While this flow path may not be sufficient by itself to relieve core steam generation, it does provide a means of relieving some of the core steam back-pressure once the head has drained. Depending on the break location, orientation and transient time, this may result in a fraction of the core steam being bypassed to the break.

Small breaks may indeed undergo brief periods of uncovery as a result of loop seal re-plugging due to RCS system refill; however, this is highly dependent on the break orientation assumed as well as

ECCS performance characteristics utilized in the analysis. For a typical NOTRUMP EM Appendix-K analysis with the [ ]^{a,c} *of the RCS cold leg, ECCS backflow into the loop* seal piping can not occur until a significant refill of the RCS occurs due to the nature of the critical flow models utilized to simulate the break and the SI flow capacities modeled. Therefore, essentially all ECCS flow introduced to the broken loop RCS piping is discharged out the break. As such, backflow due to broken loop ECCS injection can only be expected to occur for breaks oriented at locations other than the [ ]^{a,c}. As stated previously, the ability to backflow liquid into the PSP is also affected by the existence of an RCP weir or diffuser cone. Depending on the effective height of the weir, the conditions under which SI water backflow into the PSP can occur are limited further. As seen in the figures associated with the [ ]^{a,c}, loop seal re-plugging was indeed observed (Figure 3-3 and Figure 3-6) although the predicted uncovery associated with this type of phenomena was tenuous (Figure 3-2 and Figure 3-5) and the core exit vapor temperatures observed were much less severe than predicted with a [ ]^{a,c} (Figure 3-1 and Figure 3-4). In fact, the predicted core exit vapor temperatures remained at saturation conditions for *the duration of the transient simulated for both* [ ]^{a,c} *regardless of the assumed SI* interruption. The time at which this loop seal plugging/clearing behavior occurs is after 1 hour, although not modeled, operator action to cooldown and depressurize the plant will be occurring in this time frame. This action will minimize this observed behavior.

As a result of a teleconference between Ginna LLC, Westinghouse and the NRC, additional [ ]^{a,c} studies were performed for the 4-inch Cold Leg Break. Recall that for the base [ ]^{a,c}, no significant cladding heat-up was observed (non-limiting break size); however, this break size was that at which the NRC was indicating potential concern.

Note that the break modeling technique utilized has an effect on the potential for loop seal re-plugging. The application of liquid pull-through models and break contact diameter affect the ability of the RCS cold leg mixture level to increase to a point which can allow ECCS backflow into the RCP PSP region. Modeling the break at the [ ]^{a,c}, without the application of liquid pull-through models, results in the most severe prediction of ECCS backflow into the RCP PSP region with the NOTRUMP nodalization utilized. Recall that the RGE RCP has a diffuser cone which acts as a large inherent cold leg weir making ECCS backflow into the RCP PSP region difficult to achieve.

As seen in the comparison figures provided between the [ ]^{a,c} for the 4-inch Cold Leg Break, periods of loop seal re-plugging were observed (Figure 3-11) for the [ ]^{a,c}. No sustained core uncovery or cladding heat-up was observed for the simulation period modeled (2.2 hours) (Figure 3-7 and Figure 3-8). This is consistent with tests performed at the ROSA facility under similar conditions. It should be noted that the NOTRUMP model predicts that the RCS would depressurize to below the LHSI cut-in pressure prior to RWST switchover for the [ ]^{a,c} (Figure 3-10). As such, no interruption of safety injection would be predicted for this case; however, for matter of proof, the LHSI system was not modeled in these transient simulations. As a result, the injection gap can be clearly seen in the downcomer mixture level response (Figure 3-9).

The conclusion which can be reached, as a result of the simulations performed with the NOTRUMP EM, is that the [ ]^{a,c} is not limiting in terms of predicted Peak Cladding Temperature (PCT). In addition, loop seal re-plugging as a result of ECCS backflow into the RCP PSP region does not result in sustained core uncovery periods, as a result of loop seal re-plugging, and does not constitute a significant safety concern.

References

3-1 WCAP-10054-P-A Addendum 2 Revision 1, “Addendum to the Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code: Safety Injection into the Broken Loop and COSI Condensation Model,” July 1997.

a,c

Figure 3-1 R.E. Ginna 2-Inch Break, Core Exit Vapor Temperature Comparison

a,c

Figure 3-2 2-Inch Break, Core Mixture Level Comparison

a,c

Figure 3-3 R.E. Ginna 2-Inch Break, Broken Loop Seal Vapor Flow Comparison

a,c

Figure 3-4 R.E. Ginna 2-Inch Break, Core Exit Vapor Temperature Comparison

a,c

Figure 3-5 R.E. Ginna 2-Inch Break, Core Mixture Level Comparison

a,c

Figure 3-6 R.E. Ginna 2-Inch Break, Broken Loop Seal Vapor Flow Comparison

a,c

Figure 3-7 R.E. Ginna 4-Inch Break, Core Exit Vapor Temperature Comparison

a,c

Figure 3-8 R.E. Ginna 4-Inch Break, Core Mixture Level Comparison

a,c

Figure 3-9 R.E. Ginna 4-Inch Break, Downcomer Mixture Level Comparison

a,c

Figure 3-10 R.E. Ginna 4-Inch Break, RCS Pressure Comparison

a,c

Figure 3-11 R.E. Ginna 4-Inch Break, RCP Liquid Discharge Flow Comparison

Attachment 4
Errata

Errata

The following typographical errors were discovered in Table 2.8.5.4.2-1: Time Sequence of Events-Uncontrolled RCCA Bank Withdrawal at Power, of the EPU Licensing Report.

- The Case column stating '100% Power, Maximum Feedback, Rapid RCCA Withdrawal (100 pcm/sec)' should instead state '100% Power, Minimum Feedback, Rapid RCCA Withdrawal (100 pcm/sec)'.
- The Case column stating '100% Power, Minimum Feedback, Slow RCCA Withdrawal (5 pcm/sec)' should instead state '100% Power, Maximum Feedback, Slow RCCA Withdrawal (5 pcm/sec)'.
- The Event column stating 'Power Range High Neutron Flux – High Setpoint Reached' should state 'OT ΔT Setpoint Reached'
- The Time (sec) column value of 3.6 should be 1.2
- The Time (sec) column value of 4.1 should be 1.7
- The Time (sec) column value of 4.3 should be 2.3
- The Time (sec) column value of 26.6 should be 213.9
- The Time (sec) column value of 27.1 should be 215.9
- The Time (sec) column value of 27.5 should be >215.9

In addition, please note typo corrections to the Licensing Report for Section 2.8.5.4.2 Uncontrolled Control Rod Assembly Withdrawal at Power.

- Section 2.8.5.4.2.3 Results. In the second paragraph, the word 'minimum' should be 'maximum' (...from 100% power with maximumfeedback is shown in Figures 2.8.5.4.2-4...)
- Label for Figure 2.8.5.4.2-4 the word Minimum should be changed to Maximum.
- Label for Figure 2.8.5.4.2-5 the word Minimum should be changed to Maximum.
- Label for Figure 2.8.5.4.2-6 the word Minimum should be changed to Maximum.

Deleted: minimum

pressurizer, pressurizer relief and safety valves, pressurizer spray, steam generators, and main steam safety valves (MSSVs). The program computed pertinent plant variables including temperatures, pressures, power level, and DNBR.

Evaluation of Impact on Renewed Plant Operating License Evaluations and License Renewal Programs

Components of the reactivity control and protection systems that are within the scope of License Renewal are electrical and instrumentation and control components that are treated as commodity groups in NUREG-1786. Aging effects, and the programs used to manage the aging effects of these components are discussed in NUREG-1786, section 3.6. There are no modifications or additions to system components as the result of EPU that would introduce any new functions or change the functions of existing components that would affect the license renewal system evaluation boundaries. Operation of the reactivity control and protection systems at EPU conditions does not add any new types of materials or previously unevaluated materials to the system. System component internal and external environments remain within the parameters previously evaluated. Thus, no new aging effects requiring management are identified.

2.8.5.4.2.3 Results

DNB Case

Figures 2.8.5.4.2-1 through 2.8.5.4.2-3 show the transient response for a rapid uncontrolled RCCA bank withdrawal incident (100 pcm/sec) starting from 100% power with minimum feedback. Reactor trip on high neutron flux occurred shortly after the start of the accident. Because of the rapid reactor trip, small changes in T_{avg} and pressure resulted in the margin to the DNBR limit being maintained.

The transient response for a slow uncontrolled RCCA bank withdrawal (5 pcm/sec) from 100% power with maximum feedback is shown in Figures 2.8.5.4.2-4 through 2.8.5.4.2-6. Reactor trip on overtemperature ΔT occurred after a longer period of time, and the rise in temperature was consequently larger than for a rapid RCCA bank withdrawal. Again, the minimum DNBR was greater than the safety analysis limit value.

Deleted: minimum

Figure 2.8.5.4.2-7 shows the minimum DNBR as a function of reactivity insertion rate from 100% power for both minimum and maximum reactivity feedback conditions. It can be seen that the high neutron flux and overtemperature ΔT reactor trip functions provided DNB protection over the range of reactivity insertion rates. The minimum DNBR was never less than the safety analysis limit value.

Table 2.8.5.4.2-1 Time Sequence of Events – Uncontrolled RCCA Bank Withdrawal at Power		
Case	**Event**	**Time (sec)**
100% Power, Minimum Feedback, Rapid RCCA Withdrawal (100 pcm/sec)	Initiation of Uncontrolled RCCA Withdrawal	0.0
	Power Range High Neutron Flux – High Setpoint Reached	1.2
	Rods Begin to Fall	1.7
	Minimum DNBR Occurs	2.3
100% Power, Maximum Feedback, Slow RCCA Withdrawal (5 pcm/sec)	Initiation of Uncontrolled RCCA Withdrawal	0.0
	OT ΔT Setpoint Reached	213.9
	Rods Begin to Fall	215.9
	Minimum DNBR Occurs	≥215.9
8% Power, RCS Pressure Case, Minimum Feedback, Limiting RCCA Withdrawal (55 pcm/sec)	Initiation of Uncontrolled RCCA Withdrawal	0.0
	High Pressurizer Pressure Setpoint Reached	13.3
	Rods Begin to Fall	15.3
	Maximum RCS Pressure Occurs	16.7

Deleted: Maximum

Deleted: 3.6

Deleted: 4.1

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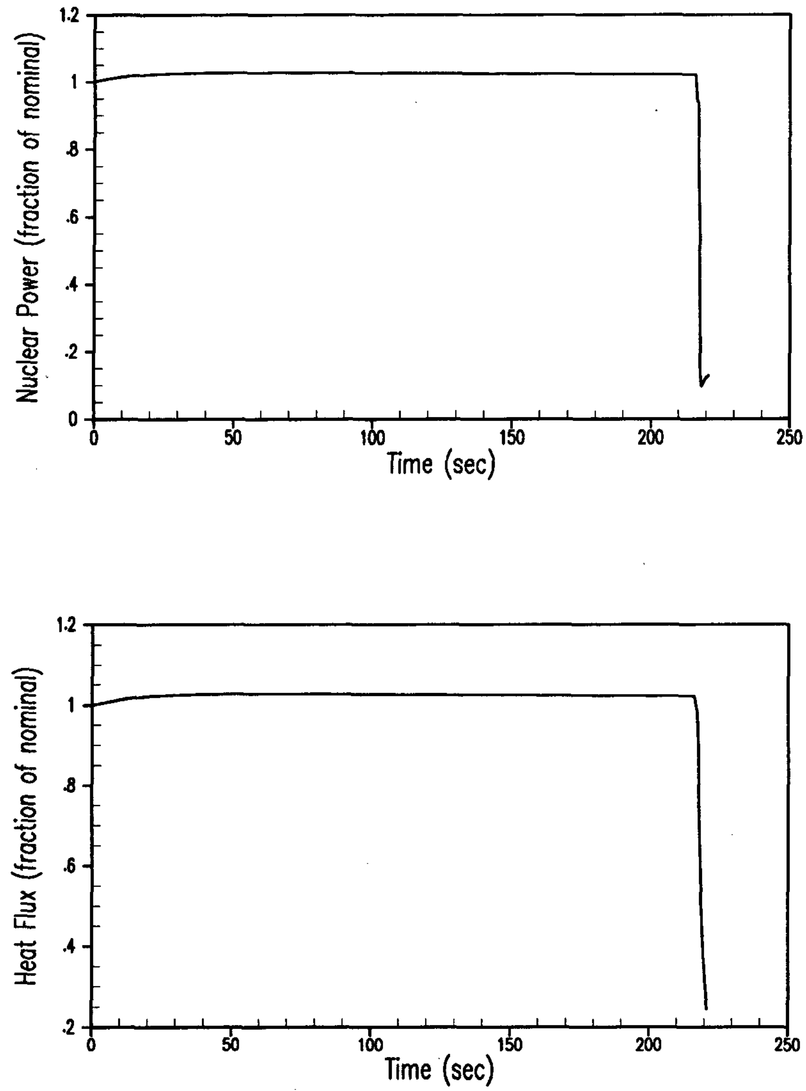

Figure 2.8.5.4.2-4
Rod Withdrawal at Power – DNB Case
Maximum Reactivity Feedback – 100% Power - 5 pcm/sec
Nuclear Power and Heat Flux vs. Time

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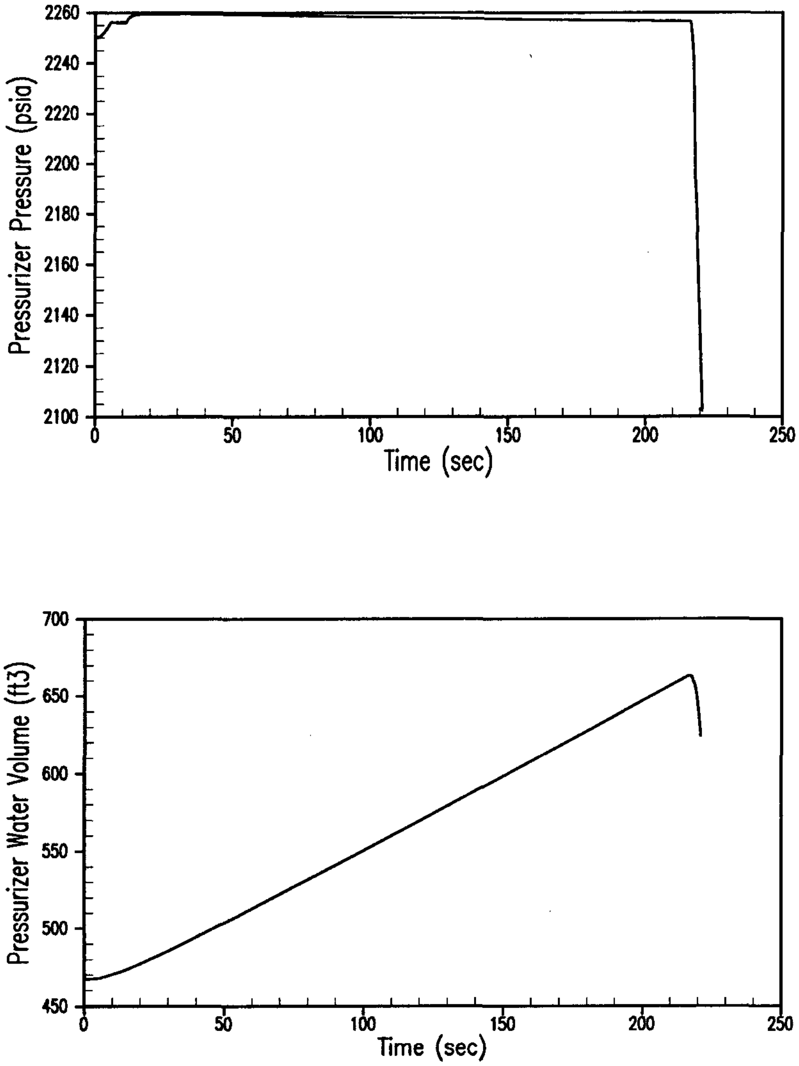

Figure 2.8.5.4.2-5
Rod Withdrawal at Power – DNB Case
Maximum Reactivity Feedback – 100% Power - 5 pcm/sec
Pressurizer Pressure and Water Volume vs. Time

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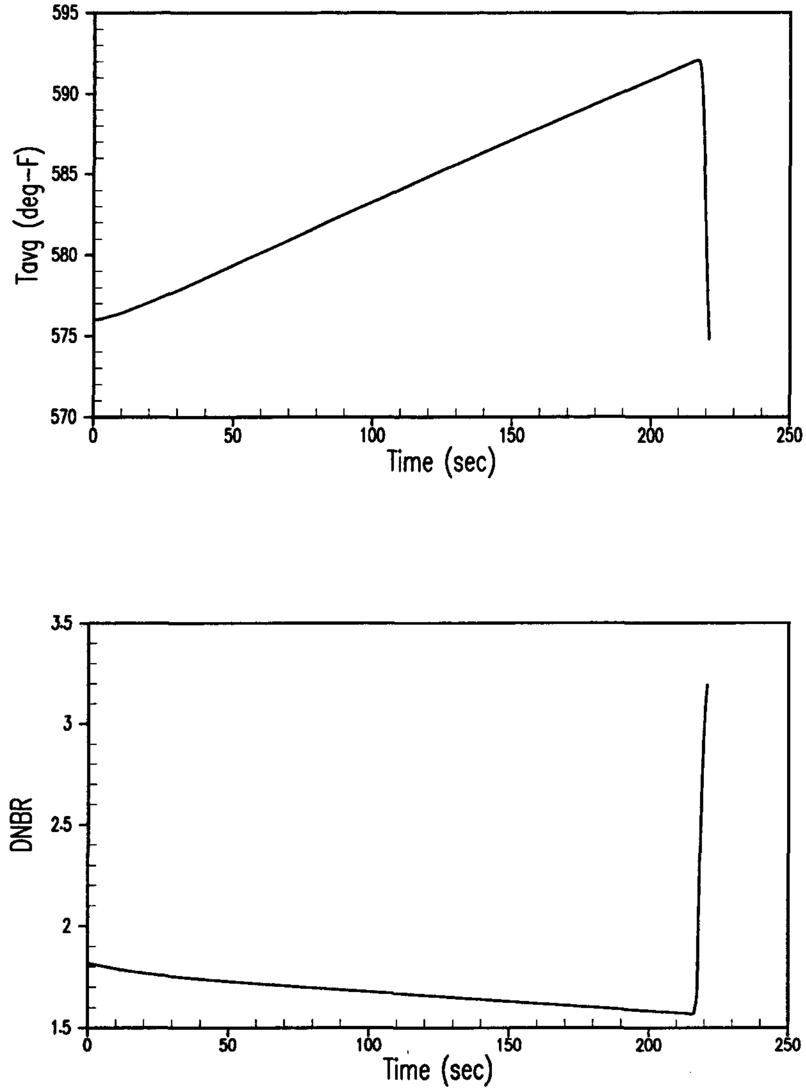

Figure 2.8.5.4.2-6
Rod Withdrawal at Power – DNB Case
Maximum Reactivity Feedback – 100% Power - 5 pcm/sec
Core Average Temperature and DNBR vs. Time

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