

10 CFR50.12

RS-05-090

September 23, 2005

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001Byron Station, Units 1 and 2
Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. 50-454 and 50-455**Subject:** Request for Exemption from Cladding Material Specified in 10 CFR50.44,
10 CFR50.46 and 10 CFR 50 Appendix K

In accordance with 10 CFR 50.12, "Specific exemptions," Exelon Generation Company, LLC (EGC) is requesting a temporary exemption from the requirements of 10 CFR 50.44, "Standards for combustible gas control system in light-water-cooled power reactors," 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," and 10 CFR 50 Appendix K, "ECCS Evaluation Models," for Byron Station, Unit 1, Cycle 15.

The regulations, as written, specify Zircaloy or ZIRLO™ is used as fuel rod cladding material. In order to use a different cladding material, an exemption to these regulations is needed.

EGC intends to use four lead test assemblies (LTAs) containing fuel rods clad with AXIOM™ cladding material in Byron Station, Unit 1, Cycle 15. The attachment to this letter provides the justification for the acceptability of the AXIOM™ cladding material.

EGC plans to initially insert the lead test assemblies in non-limiting core locations during the Byron Station, Unit 1, refueling outage scheduled to begin in fall 2006. Consequently, EGC requests that review and approval of the exemption request be completed by June 2006 to support fuel procurement and delivery for the Byron Station, Unit 1, fall 2006 refueling outage.

The current licensed fuel performance code predictions for the developmental cladding will be compared to post-irradiation examination data at Byron Station. If significantly adverse observations are found relative to predictions, the affected rod(s) will either be removed and the fuel assembly will be reconstituted with suitable replacement rods, or

the entire fuel assembly will be removed from the following cycle(s) until the deviations are understood and addressed.

Based on the fact that the developmental cladding alloys are similar to alloys already evaluated, the actual performance of the developmental cladding will likely be bounded by the predictions obtained from the licensed fuel performance codes. No new design limits were established for these developmental claddings (i.e., the current Byron Station design limits will be used).

Where appropriate, concurrent data obtained from other LTA programs for the same developmental claddings will be factored into the assessment of the LTAs at Byron Station. Specifically, before the assemblies are reinserted, all available information will be reviewed to ensure existing design assumptions remain valid.

The proposed exemption request for Byron Station is similar to that previously approved by the NRC for the V. C. Summer Nuclear Station in an safety evaluation provided in a letter from K. R. Cotton (U. S. NRC) to J. B. Archie (South Carolina Electric & Gas Company) dated January 14, 2005 (ADAMS accession number ML050040249).

As demonstrated in the attachment to this letter, the requested exemption:

- is authorized by law;
- presents no undue risk to public health and safety;
- is consistent with common defense and security; and
- is supported by special circumstances.

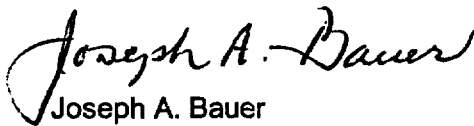
Information contained in the exemption request technical justification is "proprietary" to Westinghouse Electric Company, LLC (Westinghouse) and is supported by the affidavit signed by Westinghouse, the owner of the information. The affidavit sets forth the basis on which the information may be withheld 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, EGC requests that information proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the Commission's regulations.

Enclosed are a Westinghouse authorization letter, CAW-05-2022, with accompanying affidavit, proprietary information notice, copyright notice, and the technical justification for the exemption request. There are two versions of the technical justification for the exemption request: the first is proprietary and the second is non-proprietary.

Correspondence with respect to the copyright or proprietary aspects of the items listed above or the supporting Westinghouse affidavit should reference CAW-05-2022 and be addressed to J. A. Gresham, Manager of Regulatory Compliance and Plant Licensing, Westinghouse Electric Company, LLC, P. O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

If there are any questions regarding this submittal, please contact David Chrzanowski at (630) 657-2816.

Respectfully,

A handwritten signature in black ink that reads "Joseph A. Bauer". The signature is fluid and cursive, with the first name "Joseph" and last name "Bauer" clearly legible.

Joseph A. Bauer
Manager, Licensing

Attachments:

1. Application for Withholding Proprietary Information from Public Disclosure, with Affidavit, Proprietary Information Notice, and Copyright Notice (CAW-05-2022)
2. Request for Exemption from the Provisions of 10 CFR 50.44, 10 CFR 50.46, and 10 CFR 50 Appendix K for Four Lead Test Assemblies (LTAs) with AXIOM™ Clad Material and Supporting Justification (Proprietary)
3. Request for Exemption from the Provisions of 10 CFR 50.44, 10 CFR 50.46, and 10 CFR 50 Appendix K for Four Lead Test Assemblies (LTAs) with AXIOM™ Clad Material and Supporting Justification (Non-Proprietary)

ATTACHMENT 1

**Application for Withholding Proprietary Information from
Public Disclosure, with Affidavit, Proprietary Information Notice, and
Copyright Notice (CAW-05-2022)**



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) 374-4643
Direct fax: (412) 374-4011
e-mail: greshaja@westinghouse.com

Our ref: CAW-05-2022

July 12, 2005

**APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE**

Subject: "Request for Exemption from the Provisions of 10 CFR 50.44, 10 CFR 50.46, and 10 CFR 50 Appendix K for Select Rods in Lead Test Assemblies (LTAs) with AXIOM™ Clad Material and Supporting Justification", (Proprietary), July 2005

The proprietary information for which withholding is being requested in the above-referenced exemption request is further identified in Affidavit CAW-05-2022 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 Exelon Generation Company, LLC.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference this letter, CAW-05-2022 and should be addressed to J. A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

Very truly yours,

A handwritten signature in black ink, appearing to read 'J. A. Gresham', written over a horizontal line.

J. A. Gresham, Manager
Regulatory Compliance and Plant Licensing

Enclosures

cc: J. Hopkins/NRR
F. M. Akstulewicz/NRR
B. J. Benney/NRR

A BNFL Group company

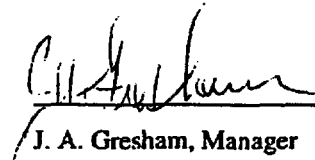
AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

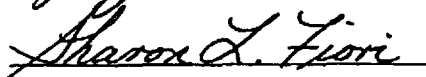
COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared J. A. Gresham, 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:



J. A. Gresham, Manager
Regulatory Compliance and Plant Licensing

Sworn to and subscribed
before me this 12th day
of July, 2005



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 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 "Request for Exemption from the Provisions of 10 CFR 50.44, 10 CFR 50.46, and 10 CFR 50 Appendix K for Select Rods in Lead Test Assemblies (LTAs) with AXIOM™ Clad Material and Supporting Justification", (Proprietary), for review and approval, being transmitted by the Exelon Generation Company, LLC letter RS-05-090 and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse for Byron Unit 1 and 2 Nuclear Generating Stations is an exemption for review and approval for advanced cladding material use in Lead Test Assemblies.

This information is part of that which will enable Westinghouse to:

- (a) Provide technical information in support of high burnup licensing.
- (b) Assist customer to obtain license change.

Further this information has substantial commercial value as follows:

- (a) Westinghouse can use this information to further enhance their licensing position with their competitors.
- (b) 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 analyses 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

The reports transmitted herewith each bear a Westinghouse copyright notice. The NRC is permitted to make the number of copies of the information contained in these reports which are necessary for its internal use in connection with generic and plant-specific reviews and approvals as well as the issuance, denial, amendment, transfer, renewal, modification, suspension, revocation, or violation of a license, permit, order, or regulation subject to the requirements of 10 CFR 2.390 regarding restrictions on public disclosure to the extent such information has been identified as proprietary by Westinghouse, copyright protection notwithstanding. With respect to the non-proprietary versions of these reports, the NRC is permitted to make the number of copies beyond those necessary for its internal use which are necessary in order to have one copy available for public viewing in the appropriate docket files in the public document room in Washington, DC and in local public document rooms as may be required by NRC regulations if the number of copies submitted is insufficient for this purpose. Copies made by the NRC must include the copyright notice in all instances and the proprietary notice if the original was identified as proprietary.

ATTACHMENT 3

**Request for Exemption from the Provisions of 10 CFR 50.44, 10 CFR 50.46, and
10 CFR 50 Appendix K for Four Lead Test Assemblies (LTAs)
with AXIOM™ Clad Material and Supporting Justification
(Non-Proprietary)**

Byron Station Units 1 and 2

Request for Exemption from the Provisions of 10 CFR 50.44, 10 CFR 50.46, and 10 CFR 50 Appendix K for Select Rods in Lead Test Assemblies (LTAs) with AXIOM™ Clad Material and Supporting Justification (Non-Proprietary)

[Proprietary information is enclosed in brackets. Superscripts a, b, and c refer to Affidavit paragraphs 4(ii)(a), 4(ii)(b), and 4(ii)(c), respectively.]

PURPOSE

This attachment provides supporting justification pursuant to 10 CFR 50.12 for an exemption request to allow use of a select number of rods clad in AXIOM™ in four Lead Test Assemblies (LTAs) at Byron Station, Units 1 and 2.

10 CFR 50.44, "Standards for combustible gas control system in light-water-cooled power reactors," references analysis for water-metal reactions. This relates back to the use of the Baker-Just equation which assumes use of a zirconium alloy different than the AXIOM™ used in a select number of rods in the four LTAs. 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," specifically refers to fuel with Zircaloy or ZIRLO™ cladding. 10 CFR 50 Appendix K, "ECCS Evaluation Models," paragraph I.A.5, references an analysis that utilizes the Baker-Just equation which assumes use of a zirconium alloy different than the AXIOM™ used in a select number of rods in the four LTAs. While AXIOM™ is a variant of ZIRLO™, it does not fall within the definition of ZIRLO™ as documented in WCAP-12610-P-A, "Vantage+ Fuel Assembly Reference Core Report," or Optimized ZIRLO™ as documented in WCAP-12610-P-A/ CENPD-404-P-A, Addendum 1, "Implementation of ZIRLO™ Cladding Material in CE Nuclear Power Fuel Assembly Designs," since it has a different composition and microstructure.

BACKGROUND

As the nuclear industry pursues longer operating cycles with increased fuel discharge burnups and more aggressive fuel management (inclusive of uprates), corrosion performance requirements for nuclear fuel cladding have become more demanding. Optimized ZIRLO™ was developed to meet these more demanding conditions; however, in the future there will be advanced fuel designs and still higher fuel duties and discharge burnups along with potential regulatory changes that will require further advances in the cladding performance. Thus, it is important for the industry to develop even more advanced alloys for the future. With the extensive testing and lead times needed to generate data for licensing new cladding alloys, it is critical that in-reactor testing of the advanced alloys begin now.

Available industry data from the American Nuclear Society, the International Atomic Energy Agency, the Electric Power Research Institute, and Westinghouse Electric Company (Westinghouse) indicate that corrosion resistance improves for cladding with a lower tin content. In addition, developmental testing has shown that small additions of some alloying elements will further improve the corrosion resistance, microstructure and mechanical properties of the cladding. As such, Westinghouse is continuing to focus on improved cladding materials and is [

] ^{a, c}.

This improvement will provide additional margin for fuel rod internal pressures (resulting from the increased fuel duty, use of integral fuel burnable absorbers (IFBAs) and corrosion/temperature feedback effects) and reduced corrosion/improved microstructure to enhance margins for long term storage and transient analyses.

To meet these needs, Westinghouse has developed an LTA program in cooperation with Byron Station. One element is the use of [

] ^{a, c} in the

four LTAs. The four [

] ^{a, c} are

shown in Table 1.

Table 1

a, b, c

It is planned that the four LTAs, to be placed into the Byron Station Unit 1 core during the fall of 2006 reload, will include [

] ^{a, c}. All four LTAs will be placed in non-limiting core locations. For subsequent cycles, two of the LTAs will be placed into Byron Station Unit 2 for a second cycle and the other two LTAs will be re-inserted into Byron Station Unit 1 for a second cycle. The two LTAs that will reside in Byron Station Unit 1 for both cycles will see high fuel duty. The two

LTAs that will be in Byron Station Unit 2 for their second cycle will see medium fuel duty. Again, none of the LTAs will be placed in limiting core locations.

The rationale for setting the number of [

] ^{a, c}.

[

] ^{a, c} well within the Technical Specification limits for doses and in all cases, core coolable geometry would be maintained.

The Byron Station Units 1 and 2 Technical Specifications have sufficient flexibility to allow the use of a limited number of LTAs that have not completed representative testing to be placed in nonlimiting core regions; therefore, no changes to the Technical Specifications are necessary to allow use of the LTAs. However, since the AXIOM™ cladding material is different than either Zircaloy-4 or ZIRLO™, an exemption from 10 CFR 50.44, 10 CFR 50.46, and 10 CFR 50 Appendix K is required.

TECHNICAL JUSTIFICATION

The Byron Station Units 1 and 2 and Westinghouse will jointly perform evaluations of the LTAs during the program development phase. These evaluations will include both testing and analysis and will address all aspects of safety including mechanical, nuclear, and thermal-hydraulic design, and transient and loss-of-coolant accident (LOCA) analyses.

- Mechanical evaluations (including fuel rod design) will be completed to demonstrate that the pertinent design criteria are satisfied. No new or altered design limits for purposes of 10 CFR 50, Appendix A, General Design Criterion 10, "Reactor Design" are required for

this program. With respect to the mechanical evaluations, the three primary areas that will be impacted by the use of advanced alloy cladding are (A) material properties, (B) corrosion, and (C) thermal creep.

(A) Material Properties:

[

a, b, c

]

(B) Corrosion:

[

a, b, c

]

(C) Thermal Creep:

a, b, c

[

]

- Nuclear design evaluations addressing the LTAs will be completed as part of the final LTA evaluation. The standard reload methodologies are considered to be applicable to the advanced cladding alloys and will be used to evaluate the LTA design and complete the reload safety evaluation. The nuclear design evaluations will also confirm that the LTAs are placed in non-limiting core locations.
- Thermal-hydraulic, LOCA, and non-LOCA evaluations addressing the LTAs will be completed as part of the final LTA evaluation. These evaluations will confirm that the LTAs are bounded by the analyses of record.

JUSTIFICATION OF EXEMPTION

10 CFR 50.12, "Specific exemptions," states that the Nuclear Regulatory Commission may grant exemptions from the requirements of the regulations of this part provided three conditions are met:

- the exemption is authorized by law;
- the exemption will not present an undue risk to the health and safety of the public;
- the exemption is consistent with the common defense and security.

In addition, the Commission will not consider granting an exemption unless special circumstances are present.

The requested exemption to allow use of AXIOM™ cladding material rather than Zircaloy or ZIRLO™ in the LTAs satisfies these criteria as described below.

1. This exemption is authorized by law.

Selection of a specific cladding material in 10 CFR 50.46, and implied in 10 CFR 50.44 and 10 CFR 50 Appendix K was at the discretion of the Commission consistent with its statutory authority. No statute required the NRC to adopt this specification. Additionally, the NRC has the authority under 10 CFR 50.12 to grant exemptions from the requirements of Part 50 with the provision of proper justification. Furthermore, this request does not

seek an exemption from the acceptance and analytical criteria of 10 CFR 50.44, 10 CFR 50.46, and 10 CFR 50 Appendix K. The request is intended only to allow application of these regulations to AXIOM™ cladding material.

2. This exemption will not present an undue risk to public health and safety.

The LTA safety evaluation will ensure that the acceptance criteria of 10 CFR 50.46, 10 CFR 50.44, and 10 CFR 50 Appendix K are met following insertion of the assemblies containing AXIOM™ material. Fuel assemblies using AXIOM™ cladding will be evaluated using NRC-approved analytical methods and will address the changes in the cladding material properties. The safety analysis for Byron Station Units 1 and 2 is supported by the applicable Technical Specifications. The Byron Station Units 1 and 2 reload cores containing AXIOM™ cladding will continue to be operated in accordance with the operating limits specified in the Technical Specifications. LTAs using AXIOM™ cladding will be placed in non-limiting core locations. Therefore, this exemption will not pose an undue risk to public health and safety.

3. This exemption is consistent with common defense and security.

The exemption request is only to allow application of regulatory requirements to a variant cladding material. Requirements and acceptance criteria of 10 CFR 50.46, 10 CFR 50.44, and 10 CFR 50 Appendix K will be maintained. Special nuclear material in these assemblies will continue to be handled and controlled in accordance with approved procedures. Use of the LTAs in Byron Station Units 1 and 2 will not affect plant operations and is consistent with maintaining the common defense and security.

SPECIAL CIRCUMSTANCES

10 CFR 50.12(a)(2) states that the NRC will not consider granting an exemption to the regulations unless special circumstances are present. The requested exemption meets the special circumstances of 10 CFR 50.12(a)(2)(ii) which states that, "Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule." In this particular circumstance, application of the subject regulations is not necessary to achieve the underlying purpose of the regulations.

The underlying purpose of 10 CFR 50.44 is to ensure that there is an adequate means of controlling generated hydrogen during a LOCA. The hydrogen produced in a post-LOCA scenario comes from a reaction between water and zirconium. [

] ^{a, c} will not

adversely affect current assessments of hydrogen gas production.

10 CFR 50.46 identifies acceptance criteria for ECCS performance at nuclear power plants. Westinghouse will perform a LOCA evaluation of the Byron Station Units 1 and 2 LTAs prior to use to ensure the assemblies are bounded by the analysis of record. Therefore, the conclusion is that the ECCS performance of Byron Station Units 1 and 2 will not be affected by insertion of []^{a, c} in four LTAs.

10 CFR 50, Appendix K, paragraph I.A.5 applies an equation for rates of energy release, hydrogen generation, and cladding oxidation from a metal-water reaction that conservatively bounds all post-LOCA scenarios. Application of the Baker-Just equation is expected to be conservative for AXIOM™.

CONCLUSION

10 CFR 50.44 references analysis for water-metal reactions. This relates back to the use of the Baker-Just equation which assumes use of a zirconium alloy different than the AXIOM™ used in four LTAs. 10 CFR 50.46 only applies to use of fuel rods clad with Zircaloy or ZIRLO™. 10 CFR 50.46 does not apply to use of the proposed []^{a, c} used in four LTAs because the composition is different than that of Zircaloy-4 or ZIRLO™. In addition, paragraph I.A.5 of 10 CFR 50 Appendix K, "ECCS Evaluation Models," references an analysis utilizing the Baker-Just equation which assumes use of a zirconium alloy different from the AXIOM™ used in the LTAs.

In order to support evaluation of AXIOM™ cladding material with regard to improved corrosion resistance, an exemption from the requirements of 10 CFR 50.44, 10 CFR 50.46, and 10 CFR 50, Appendix K is requested. As required by 10 CFR 50.12, the requested exemption is authorized by law, does not present undue risk to public health and safety, and is consistent with common defense and security. Approval of this exemption request does not violate the underlying purpose of the rule. Special circumstances do exist to justify the approval of an exemption from the subject requirements.