



Westinghouse
Electric Corporation

Energy Systems

Nuclear Technology Division

Box 355
Pittsburgh Pennsylvania 15230-0355

October 26, 1995

CAW-95-893

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

Attention: Mr. William T. Russell, Director

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

Subject: Cold Rod Drop Time Analysis Report - Revision 1

Dear Mr. Russell:

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-95-893 signed by the owner of the proprietary information, Westinghouse Electric Corporation. 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 2.790 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying Affidavit by Wolf Creek Nuclear Operating Corporation.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference this letter, CAW-95-893, and should be addressed to the undersigned.

Very truly yours,

N. J. Liparulo, Manager
Nuclear Safety Regulatory & Licensing Activities

TJK/bbp

Attachment
cc: Kevin Bohrer/NRC(12H5)

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AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

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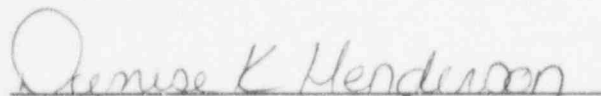
COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared Henry A. Sepp, 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 Corporation ("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:



Henry A. Sepp, Manager
Regulatory and Licensing Initiatives

Sworn to and subscribed
before me this 26th day
of October, 1995



Notary Public

Notarial Seal
Denise K. Henderson, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires Oct. 23, 1996
Member, Pennsylvania Association of Notaries

- (1) I am Manager, Regulatory and Licensing Initiatives, in the Nuclear Technology Division, of the Westinghouse Electric Corporation 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 rulemaking proceedings, and am authorized to apply for its withholding on behalf of the Westinghouse Energy Systems Business Unit.
- (2) I am making this Affidavit in conformance with the provisions of 10CFR Section 2.790 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 the Westinghouse Energy Systems Business Unit 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 2.790 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 which 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 10CFR Section 2.790, 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 "Cold Rod Drop Time Analysis Report, Revision 1", (Proprietary), for the Wolf Creek Nuclear Station, being transmitted by the Wolf Creek Nuclear Operating Corporation (WCNOC) letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk, Attention Mr. William T. Russell. The proprietary information as submitted for use by the Wolf Creek Nuclear Operating Corporation for the Wolf Creek Nuclear Station is expected to be applicable in other licensee submittals in

response to certain NRC requirements for justification of the implementation of cold rod drop testing.

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

- (a) Provide documentation of the methods for evaluating the implementation of cold rod drop testing.
- (b) Establish applicable analytical technologies for drop time determination.
- (c) Establish the system operating conditions for rod drop time measurements.
- (d) Establish the applicable codes and standards which are to be applied.
- (e) Assist the customer to obtain NRC approval.

Further this information has substantial commercial value as follows:

- (a) Westinghouse plans to sell the use of similar information to its customers for purposes of meeting NRC requirements for licensing documentation.
- (b) Westinghouse can sell support and defense of the technology to its customers in the licensing process.

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 cold rod drop time evaluation services 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 for developing testing and analytical methods and performing tests.

Further the deponent sayeth not.

ATTACHMENT I-NP (Non-Proprietary)

SAFETY EVALUATION

Safety Evaluation

Proposed Change

This license amendment request proposes revising Surveillance Requirement 4.1.3.1.3 to delete the requirement for performing the control rod drop surveillance test with T_{avg} greater than or equal to 551°F. This would allow performing this test with T_{avg} below 551°F. This change will also add justification for performing the rod drop test with T_{avg} below 551°F to Bases Section 3/4.1.3, Movable Control Assemblies.

Background

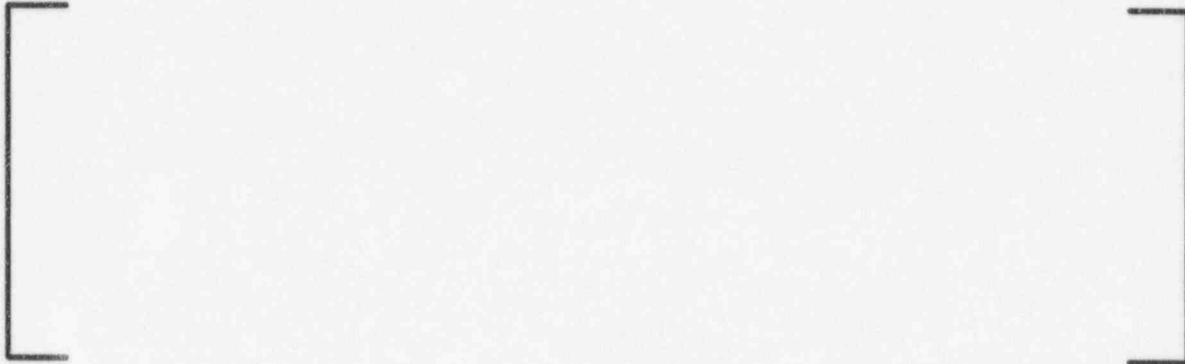
Prior to the issuance of Amendment 89 to the Wolf Creek Technical Specifications, Technical Specification 3.1.3.4, Rod Drop Time, required the control rod drop time to be less than or equal to 2.7 seconds with T_{avg} greater than or equal to 551°F and with all reactor coolant pumps running. In Amendment 89 these criteria were put into a new surveillance requirement, SR 4.1.3.1.3. These acceptance criteria and testing requirements ensure that rod drop times would be representative of insertion times experienced during a reactor trip at operating conditions and meet the assumptions used in the Safety Analyses.

Rod drop testing is performed during startup from each refueling outage. Due to the temperature conditions required for the test, this test can delay plant startup following a refueling outage. WCNOG Reactor Engineering personnel determined that if the rod drop test could be performed at lower temperatures, this would provide additional flexibility in that the test could be performed prior to startup but while still shutdown, and could be scheduled such that it would not cause a delay in plant startup. Therefore, Westinghouse performed an evaluation of the feasibility for performing the rod drop test at temperatures below 551°F.

Safety Evaluation

A cold rod drop time analysis was performed by developing a WCGS-specific analytical model of the plant's driveline configuration and system operating conditions for that configuration. A driveline consists of the subset of components affecting a rod cluster control assembly (RCCA) scram, specifically the fuel, upper core plate, upper and lower guide tubes, upper support plate, reactor closure head penetration, thermal sleeve, control rod drive mechanism (CRDM), rod travel housing, and the RCCA/drive rod assembly. The system operating conditions were defined as temperature, pressure and flow. The analytical model consists of values for parameters describing geometries of driveline components, component mechanical interaction relationships (including drag coefficients and pressure loss coefficients), hydraulic resistances of flow paths (including hydraulic force coefficients, fluid viscosity and fluid density), RCCA/drive rod assembly weight, and system operating conditions.

A coded Westinghouse algorithm named DROP was used with the analytical model to correlate the model to the actual WCGS-measured RCCA drop time-to-dashpot entry data at no-flow and full-flow conditions for each RCCA location. The algorithm, DROP, solves Newton's second law of motion using plant-specific information. This law can therefore be stated as:



The algorithm, DROP, is used by Westinghouse to determine the effect of design changes on rod drop times. Its development process included scale model testing and correlation with various plant test results.

A drop analysis was performed using the nominal plant conditions under which RCCA drop times are measured. These conditions include best estimated flow, nominal fuel thermal/hydraulic loss coefficients and no flow imbalance. The model (DROP input parameter values) was adjusted to account for the system operating conditions being considered, and also to account for component design tolerances and hydraulic performance uncertainties. Rod drop times were then calculated at various (RCS) temperatures ranging from 110°F to 551°F. This provides RCCA drop time data that should be experienced at the worst rod location (using the maximum measured drop times at a single rod location), which should envelope the other rod locations. This data is shown in Table 1.

The analysis concluded that the rod drop time limit at a given temperature is bounding for measurements performed at reduced temperatures, and that the cumulative effects of a temperature reduction result in an increase in the rod drop time. Therefore, provided the rod drop times measured at a reduced temperature are less than or equal to the specified time limit (2.7 seconds), the rod drop times would only improve when compared with times obtained at increased RCS temperatures.

A comparison of the analysis results to several USAR accident analyses was performed. It was determined that the proposed change will not affect the large and small-break LOCA analyses or other LOCA-related evaluations, or the assumptions used in the non-LOCA transient analyses, and would not affect RCS component integrity or the ability of the RCS to perform its intended safety function. The proposed change was determined to not affect normal plant operating parameters, any safeguards system actuation setpoints or accident mitigation capabilities, or create conditions more limiting than those assumed in the LOCA and the non-LOCA analyses. The proposed change will not change or alter the design, configuration, qualification, or performance of safety related electrical systems or

components. It was also determined that the proposed change will not affect the main steamline break mass and energy releases, will not affect the calculations for the steam mass release used as an input to a radiological dose evaluation, and will not affect post accident radiological consequences or post-LOCA hydrogen production.

The Non-LOCA analyses discussed in the USAR are also not affected by the proposed Technical Specification change because the LCO criteria set forth in Technical Specification 3/4.1.3 remains unchanged, the change does not affect normal plant operating parameters, and the Technical Specification RCCA drop time requirement remains unchanged. Performing rod drop testing at a temperature below 551°F does not change any assumptions used in the Non-LOCA safety analyses, would not affect the capabilities of any accident mitigation systems to perform their safety functions, or create a more limiting condition than is presented in the current Non-LOCA licensing basis analyses. Therefore, the conclusions of the safety analyses presented in the USAR remain valid.

The proposed change to Surveillance Requirement 4.1.3.1.3 and Technical Specification Bases Section 3/4.1.3 does not involve an unreviewed safety question because operation of the WCGS with this change would not:

1. Increase the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report. The proposed change will not result in a condition where the material or construction standards applicable prior to the change are altered. The rod control system integrity is not affected by this change, and this change will not affect the ability of the system to fulfill its design function. This change will allow the control rod drop test to be performed at lower temperatures than currently allowed, but will not affect the method of operation of the system and will not alter the drop time criterion of the test. This change will not affect any fission product barrier, and will not affect the integrity of any fuel assembly or the reactor internals. Thus this change will not affect the ability of the rod control system to mitigate the consequences of any previously evaluated accident. The proposed change will not alter, degrade or prevent the response of the rod control system to any accident scenarios evaluated in the USAR. Therefore, neither the probability of occurrence nor the consequences of any accident previously evaluated in the USAR will be increased by this change.
2. Create a possibility for an accident or malfunction of a different type than previously evaluated in the safety analysis report. The proposed change will alter the existing rod drop test to allow the test to be performed over a range of temperatures but will not alter the rod drop time criterion of the test. This change will not create a new type of accident or malfunction, and the method and manner of plant operation remains unchanged. This change will not alter the safety functions of the rod control system.

3. Reduce the margin of safety as defined in the bases for any Technical Specification. This proposed change will have no affect on the availability, operability or performance of any safety-related system or component. The change will not prevent inspections or surveillances required by the technical specifications, and does not alter the rod drop time criterion specified in the technical specifications. Performance of the rod drop tests at other temperatures allows an alternative method to verify that the rod drop time currently specified in the technical specifications and used in the safety analyses continues to be valid. Therefore, the proposed change will not reduce the margin of safety as described in the Bases to any technical specification.

Based on the above discussions and the no significant hazards consideration determination presented in Attachment II, the proposed change does not increase the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report; or create the possibility for an accident or a malfunction of a different type than any previously evaluated in the safety analysis report; or reduce the margin of safety as defined in the basis for any technical specification. Therefore, the proposed change does not adversely affect or endanger the health or safety of the general public or involve a significant safety hazard.

ATTACHMENT II

NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

No Significant Hazards Consideration Determination

This license amendment request proposes revising Surveillance Requirement 4.1.3.1.3 to delete the requirement for performing the control rod drop surveillance test with T_{avg} greater than or equal to 551°F. This would allow performing this test with T_{avg} below 551°F. This change will also add justification for performing the rod drop test with T_{avg} below 551°F to Bases Section 3/4.1.3, Movable Control Assemblies.

Standard I - Involve a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated

The proposed change will not result in a condition where the material or construction standards applicable prior to the change are altered. The rod control system integrity is not affected by this change, and this change will not affect the ability of the system to fulfill its design function. This change will allow the control rod drop test to be performed at lower temperatures than currently allowed, but will not affect the method of operation of the system and will not alter the drop time criterion of the test. This change will not affect any fission product barrier, and will not affect the integrity of any fuel assembly or the reactor internals. Thus this change will not affect the ability of the rod control system to mitigate the consequences of any previously evaluated accident. The proposed change will not alter, degrade or prevent the response of the rod control system to any accident scenarios evaluated in the USAR. Therefore, neither the probability of occurrence nor the consequences of any accident previously evaluated in the USAR will be increased by this change.

Standard II - Create the Possibility of a New or Different Kind of Accident from any Previously Evaluated

The proposed change will alter the existing rod drop test to allow the test to be performed over a range of temperatures, but will not alter the rod drop time criterion of the test. This change will not create a new type of accident or malfunction, and the method and manner of plant operation remains unchanged. This change will not alter the safety functions of the rod control system. The safety design bases in the USAR have not been altered, and no new or different accident scenarios, transient precursors, failure mechanisms, or limiting single failures will be introduced as a result of this change. Therefore, the possibility of a new or different kind of accident other than those already evaluated will not be created by this change.

Standard III - Involve a Significant Reduction in the Margin of Safety

There are no changes being made to any safety limits or safety system settings that would adversely impact plant safety. This proposed change will have no effect on the availability, operability or performance of any safety-related system or component. The change will not prevent inspections or surveillances required by the technical specifications, and does not alter the rod drop time criterion specified in the technical specifications. Performance of the rod drop tests at other temperatures allows an alternative method to verify that the rod drop time currently specified in the technical specifications and used in the safety analyses continues to be valid. Therefore, the proposed change would not result in a reduction in a margin of safety.

Based on the above discussions, it has been determined that the requested technical specification change does not involve a significant increase in the probability or consequences of an accident or other adverse condition over previous evaluations; or create the possibility of a new or different kind of accident or condition over previous evaluations; or involve a significant reduction in a margin of safety. Therefore, the requested license amendment does not involve a significant hazards consideration.

ATTACHMENT III

ENVIRONMENTAL IMPACT DETERMINATION

Environmental Impact Determination

This amendment request meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) as specified below:

- (i) **the amendment involves no significant hazards consideration**

As demonstrated in Attachment II, the proposed change does not involve any significant hazards consideration.

- (ii) **there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite**

The proposed change does not involve a change to the facility or operating procedures which would create new types of effluents. The proposed change in the surveillance procedure will not affect system performance or operation. Therefore, all offsite and control room doses will remain within the limits of 10 CFR 100 and 10 CFR 50 Appendix A, General Design Criteria 19.

- (iii) **there is no significant increase in individual or cumulative occupational radiation exposure**

The proposed change affects only the temperatures at which the rod drop test can be performed. This test can be performed only after the reactor vessel head has been replaced and the plant is ready for startup. This test affects only the rod control system; no other radioactive systems are affected. Thus, this change will not result in a significant increase in individual or cumulative occupational radiation exposure.

Based on the above, it is concluded that there will be no impact on the environment resulting from the proposed change and that the proposed change meets the criteria specified in 10 CFR 51.22 for a categorical exclusion from the requirements of 10 CFR 51.21 relative to requiring a specific environmental assessment by the Commission.