



Westinghouse
Electric Corporation

Energy Systems

Box 355
Pittsburgh Pennsylvania 15230-0355

AW-96-937

March 1, 1996

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

ATTENTION: T. R. QUAY

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

SUBJECT: WESTINGHOUSE RESPONSES TO NRC REQUESTS FOR ADDITIONAL
INFORMATION ON THE AP600

Dear Mr. Quay:

The application for withholding is submitted by Westinghouse Electric Corporation ("Westinghouse") pursuant to the provisions of paragraph (b)(1) of Section 2.790 of the Commission's regulations. It contains commercial strategic information proprietary to Westinghouse and customarily held in confidence.

The proprietary material for which withholding is being requested is identified in the proprietary version of the subject report. In conformance with 10CFR Section 2.790, Affidavit AW-96-937 accompanies this application for withholding setting forth the basis on which the identified proprietary information may be withheld from public disclosure.

Accordingly, it is respectfully requested that the subject information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10CFR Section 2.790 of the Commission's regulations.

Correspondence with respect to this application for withholding or the accompanying affidavit should reference AW-96-937 and should be addressed to the undersigned.

Very truly yours,

Brian A. McIntyre, Manager
Advanced Plant Safety and Licensing

/nja

cc: Kevin Bohrer NRC 12H5

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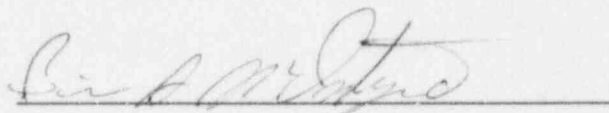
AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

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COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared Brian A. McIntyre, 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:



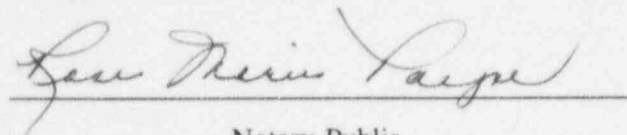
Brian A. McIntyre, Manager

Advanced Plant Safety and Licensing

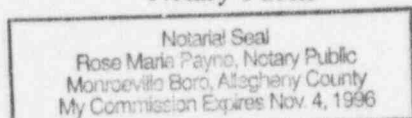
Sworn to and subscribed

before me this 4 day

of March, 1996



Notary Public



- (1) I am Manager, Advanced Plant Safety And Licensing, in the Advanced Technology Business Area, 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) Enclosed is Letter NSD-NRC-96-4656, March 1, 1996 being transmitted by Westinghouse Electric Corporation (W) letter and Application for Withholding Proprietary Information from Public Disclosure, Brian A. McIntyre (W), to Mr. T. R. Quay, Office of NRR. The proprietary information as submitted for use by Westinghouse Electric Corporation is in response to questions concerning the AP600 plant and the associated design certification application and is expected to be applicable in other licensee submittals in response to certain NRC requirements for justification of licensing advanced nuclear power plant designs.

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

- (a) Demonstrate the design and safety of the AP600 Passive Safety Systems.
- (b) Establish applicable verification testing methods.
- (c) Design Advanced Nuclear Power Plants that meet NRC requirements.
- (d) Establish technical and licensing approaches for the AP600 that will ultimately result in a certified design.
- (e) Assist customers in obtaining NRC approval for future plants.

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 advanced plant licenses.
- (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 advanced nuclear power designs 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 analytical methods and receiving NRC approval for those methods.

Further the deponent sayeth not.

ATTACHMENT A

RAI's included in the March 1, 1996 transmittal:

LOFTRAN

440.263

440.266

440.268

ENCLOSURE 2

NSD-NRC-96-4656

CONTAINS NON-PROPRIETARY MATERIAL

NRC REQUEST FOR ADDITIONAL INFORMATION



Question 440.263

Re: WCAP-14234 (LOFTRAN CAD)

Page 1-3, It is stated that reverse flow is not allowed in the loop with the pressurizer? Are there any AP600 transients that will be simulated with LOFTRAN that will experience reverse flow in this loop? When the pressurizer drains into the loop during a transient, it would appear reasonable to assume that reverse flow might result. Please explain.

Response:

None of the AP600 transients that are simulated with LOFTRAN experience reverse flow in the loop with the pressurizer. For the AP600 transients that are simulated with LOFTRAN, there is a positive ΔP driving head providing forward coolant flow through the loop with the pressurizer.

It is reasonable to assume reverse flow for a transient resulting in a rapid loss of RCS coolant inventory (i.e. LOCA). Such a transient is simulated with WCOBRA/TRAC.

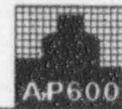
SSAR Revision: NONE



Westinghouse

440.263-1

NRC REQUEST FOR ADDITIONAL INFORMATION



Question 440.266

Re: WCAP-14234 (LOFTRAN CAD)

Page 1-4, It is stated that "the code calculates pressure drops around the loop based on flow rates and input loss coefficients". What correlations are used for wall friction in single and two-phase flow? Please explain.

Response:

The LOFTRAN code has a single-phase loop flow model around the loop. Two-phase flow wall friction is not used. Moody¹ wall friction data is used for the LOFTRAN single-phase loop flow model.

Steady-state loop pressure drops are calculated for a consistent full design flow rate around the loop and are input to the LOFTRAN code. The pressure drop calculations are based on form and frictional loss coefficients ($k + f l/D$), where f is the Moody¹ friction factor. Where there is a significant variation in friction factor for the core and steam generator tubes for large changes in flow, a variable friction factor correlation is modeled in LOFTRAN. The change in friction factor for the reactor vessel piping is negligible, and other losses are "form losses" independent of Reynold's number.

The correlation programmed computes: $[]^{a,c}$, where F = fraction of nominal mass flow and the constant is calculated for steady-state conditions at $t=0$. For small changes in mass flow, F , around its nominal value, f is $[]^{a,c}$. The correlation fits the Crane² Manual (for drawn tubing) down to nearly laminar flow.

SSAR Revision: NONE

¹ L. F. Moody, "Friction Factors for Pipe Flow", Transactions of the American Society of Mechanical Engineers, Volume 66, November, 1944, pages 671-678

² Crane Co. Technical Paper No. 410, "Flow of Fluids Through Valves, Fittings and Pipe," 1978



Question 440.268

Re: WCAP-14234 (LOFTRAN CAD)

Page 1-4, What are the effects of ignoring local compressibility on code error? Does this result in propagating an increasing error in the code for long term simulations? Please explain.

Response:

Local compressibility is not ignored in the LOFTRAN code. The compressibility of every node in the reactor coolant system is individually accounted for at each time step as a function of local enthalpy and transient reactor coolant system pressure. ("Compressibility" is not determined as an explicit parameter, but is implicit in the determination of local fluid specific volume as a function of enthalpy and pressure.) For the purposes of determining fluid specific volume, the reactor coolant system is assumed to be at a uniform, but not constant, pressure. That is, reactor coolant system pressure changes in time, but not in space.

For the non-LOCA transients for which LOFTRAN is used, the spatial variation in pressure within the reactor coolant system has very little effect on the specific volume as it relates to the overall mass/volume balances that determine pressurizer surge rates and system pressure. Changes in local specific volume and resultant acceleration terms, whether due to changes in local enthalpy or transient changes in pressure, are considered in the momentum equations used to determine reactor coolant system flow.

There is no long-term propagation and error increase in LOFTRAN results due to the assumption that spatial variations in the reactor coolant system are negligible.

SSAR Revision: NONE



Westinghouse

440.268-1