Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

MAR 16 1993

O. J. "Ike" Zeringue
Vice President, Browns Ferry Nuclear Plant

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

Gentlemen:

In the Matter of	)	Docket Nos. 50-259
Tennessee Valley Authority	)	50-260
		50-296

BROWNS FERRY NUCLEAR PLANT (BFN) - RESPONSE TO THE NRC REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING TECHNICAL SPECIFICATION (TS) NO. 316 - TVA'S PROPOSED UPGRADE OF THE REACTOR BUILDING RADIATION MONITORING SYSTEM FOR BROWNS FERRY UNITS 1, 2, AND 3 (TAC NOS. M84161, M84162, AND M84163)

Reference: Letter from NRC to TVA, dated February 25, 1993, "Request For Additional Information Regarding TVA's Proposed Upgrade Of The Reactor Building Radiation Monitoring System For Browns Ferry, Units 1, 2, and 3 (TAC NOS. M84161, M84162, and M84163)"

As part of the staff's review of proposed amendment (TS 316) to licenses DPR-33, DPR-52 and DPR-68 to upgrade the Browns Ferry reactor building and refuel floor radiation monitoring system from analog to digital for Units 1, 2, and 3, additional information was requested by NRC.

The RAI contained an enclosure with eight areas for TVA/BFN to provide information. The TVA response to the eight areas of concern, along with two additional items requested by NRC during a March 11, 1993, telephone conversation, is contained in Enclosure 1.

General Electric (GE) has informed TVA that the documents requested by NRC in the RAI contain proprietary information. GE requests that these documents be withheld from public disclosure under 10 CFR 2.790. As required by 10 CFR 2.790(b), GE has prepared an application and affidavit requesting that the documents be treated as proprietary information. That application and affidavit are contained in Enclosure 2.

The documents requested in the RAI are attached as Enclosure 3.

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A001

If you have any questions, contact G.D. Pierce, Interim Manager of Site Licensing, at (205) 729-7566.

Sincerely,

O.J. Zeringue

Enclosures
cc (Enclosures):
NRC Resident Inspector
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ENCLOSURE ONE

1 **Provide NEDC-31974P "NUMAC Qualification Report for RBVRM System for TVA BFN Units 1, 2, and 3", November 1991.**

See General Electric proprietary information attached.

2 **Is GE performing additional EMI/RFI environmental tests to include the broader frequency ranges of the environment? If so, describe the tests in detail.**

a) Radiated Electric Field Susceptibility

The NUMAC RBVRM, including the Digital Sensor & Converter, was tested at a level of at least 65 V/M at a frequency range of 20 MHz to 990 MHz. The test field strength is higher than would be experienced from a portable transceiver (walkie-talkie) at a range of approximately one foot.

GE plans to test the NUMAC RBVRM in accordance with several standards. These will be MIL-STD-461C test RS03 from a frequency of 10 KHz to 18 GHz at a field strength of 50 V/M, ANSI/IEEE Std C37.90.2 (Trial Use) from a frequency of 25 MHz to 1000 MHz at a field strength of 20 V/M. Additionally MIL-STD-461 (Draft) test CS114 will be conducted to simulate currents induced into cables at frequencies of 10 KHz to 400 MHz, at a level ranging from 43 dB A to 98 dB A. These multiple tests may be combined into one bounding test or may be run separately.

b) Radiated Magnetic Field Susceptibility

The NUMAC RBVRM I/O and power cables were subjected to magnetic and electric field susceptibility testing by bundling the I/O and power cables with test wires from a test generator. Bursts of damped oscillations are injected at a repetition rate of 1/2 to 1 Hz into the test wires, with each burst consisting of 6 to 7 cycles of oscillation having an initial amplitude of 300 V_{p-p}, with oscillation frequencies of 100, 200, 300, 400, and 500 MHz. Also, 5 V_{p-p} oscillations ranging from 500 KHz to 100 MHz at a sweep rate of 1 to 5 MHz per second were applied to the test wires.

Per MIL STD 461, magnetic field susceptibility is required only for equipment installed in aircraft having Anti-Submarine Warfare capability and to Navy equipment and subsystems intended for use on having Very Low Frequency equipment and subsystems. Additionally, magnetic fields have been detected at other nuclear power stations only in close (2 to 3 feet) proximity to such devices as motors and cables carrying large currents. The NUMAC RBVRM equipment is not mounted in close proximity to any components such as motor or large current carrying conductors that would produce a significant magnetic field.

The NUMAC RBVRM chassis was not tested for magnetic field susceptibility. However, to alleviate any potential concerns as to the lack of magnetic field testing, GE will test the NUMAC RBVRM in accordance with MIL-STD-461C, from a frequency of 30 Hz to 50 KHz at a magnetic flux density ranging from 180 to 120 dBpT.

For comparison, for an infinitely long conductor carrying 100 amps of current (60 Hz AC, I = 141 cos 377t A), the magnetic flux density at 6 inches (0.15 meters) is 1.37×10^{-4} T (163 dBpT) or 1.77×10^{-4} cos 377t.

c) Electrostatic Discharge Susceptibility

The NUMAC Wide Range Neutron Monitor (WRNM) was tested to IEC Standard 801-2 at a level of 8KV. Based on the similarity of components used in the NUMAC RBVRM and the WRNM, the normally humid climate of North Alabama, the lack of carpet on the refuel floor, and the use of anti-static carpet in the Main Control Room, the testing and discharge levels used are adequate to ensure that the function of the NUMAC RBVRM will not be adversely affected. Additionally, GE plans to test a NUMAC RBVRM to the IEC 801-2.

d) Line Conducted Noise

The NUMAC line has had a variety of line conducted noise testing performed. Two tests were performed on the NUMAC RBVRM in accordance with GE specification 249A1238 in which signals are applied to the AC input power leads. One test used bursts of damped oscillations which was injected at a repetition rate of 1/2 to 1 Hz into the test wires, with each burst consisting of 6 to 7 cycles of oscillation having an initial amplitude of 300 V_{p-p}, with oscillation frequencies of 100, 200, 300, 400, and 500 MHz. The second test applied 5 V_{p-p} oscillations ranging from 1 MHz to 100 MHz at a sweep rate of 1 to 5 MHz per second. Four tests were performed on the NUMAC WRNM in accordance with Svensk Standard SS 436 15 03. Test one applied $\pm$ 3KV pulses to the power and signal inputs (GE to confirm) with the equipment disconnected. Test two, with power on and I/O simulated by external impedances, 120VAC 60 Hz power is applied at I/O points between output leads, and chassis ground, and between chassis grounds of connected equipment. Test three applied bursts of up to 50 ns sawtooth transients of $\pm$ 2 to 4 KV were simultaneously applied to power, I/O, and chassis ground points. The final test applied a damped 1 KV, 1 MHz sinusoid at a repetition rate of 300 to 500 Hz, which was simultaneously applied to power, I/O, and chassis ground points.

GE plans to test the NUMAC RBVRM in accordance with MIL-STD-461(Draft) test CS114, which will inject current signals into all I/O and power cables to simulate the effects of radiated electric fields. This testing will be conducted using an injected signal with a frequency range of 10 KHz to 400 MHz at a field strength ranging from 43 to 98 dBμA.

e) Surge Withstand Capability

The NUMAC RBVRM has been tested for Surge Withstand Capability (SWC) by a test that applied six 1.25 MHz one-shot transients with an amplitude of 2500 volts to the AC power leads. In addition, Svensk Standard SS 436 15 03 testing was performed on the WRNM. This consisted of four tests. Test one applied ± 3KV pulses to the power and signal inputs (GE to confirm) with the equipment disconnected. Test two, with power on and I/O simulated by external impedances, 120VAC 60 Hz power is applied at I/O points between output leads, between output leads and chassis ground, and between chassis grounds of connected equipment. Test three applied bursts of up to 50 ns sawtooth transients of ± 2 to 4 KV which were simultaneously applied to power, I/O, and chassis ground points. The final test applied a damped 1 KV, 1 MHz sinusoid of at a repetition rate of 300 to 500 Hz which was simultaneously applied to power, I/O, and chassis ground points.

GE will test the NUMAC RBVRM in accordance with ANSI/IEEE C37.90.1, which will provide for command mode and transverse mode tests.

f) Radiated Emissions Contribution from the BFN Microwave Antenna

Browns Ferry has two Microwave (MW) antennas located on the Turbine Building roof. These are ten foot diameter parabolic antennae. One antenna is aimed at the Trinity substation at an angle of 150 degrees in relation to true north. The nearest RBVRM Sensor & Detector is approximately 9 degrees from the Trinity MW beam. The other antenna is aimed at the Thorntontown substation at an angle of 303 degrees from true north, and the nearest RBVRM Sensor & Detector is approximately 12 degrees from the Thorntontown MW beam. The Trinity MW link transmits at a frequency of 7.170 GHz and receives at a frequency of 7.840 GHz. The Thorntontown link transmits at a frequency of 8.405/8.040 GHz and receives at a frequency of 7.355/7.735 GHz. Both the Trinity and the Thorntontown MW links transmit at a power level of 2 watts. Based on the 2 watt transmitted power, an antenna gain of 45 dB (as compared to an isotropic antenna), a distance of 150 feet (45 meters) to the nearest portion of the Refuel floor wall directly opposite a Sensor & Converter, and an attenuation of 30 dB at 10 degrees from the main lobe, the worst case field strength on the outside wall is approximately 1 V/M. The concrete and rebar in the Refuel floor wall will attenuate the microwave signal greatly. Also, GE plans

to test the RBVRM in accordance with MIL-STD-461C test RS03 at the MW frequencies in question (See Above).

g) Radiated Emissions Contribution of Plant Radio Repeater via Radiax Antenna

Based on a review of non-safeguards drawings, the Repeater signals passes through at least two 50% power dividers prior to routing to the refuel floor. Ignoring any Radiax cable losses (which are approximately 2 dB/100 feet), connector losses, and antenna losses, this will result in 25 Watts of power being radiated on the refuel floor. Using the field strength equation for an isotropic antenna (taken from Reference Data for Radio Engineers, Sixth Edition, Chapter 27, equation 13), a worst-case field strength of 2.7 V/M is calculated at 10 meters. The NUMAC RBVRM Sensor & Converters are mounted at least 20 meters away. The testing performed for the NUMAC RBVRM bounds this.

h) Schedule for Additional EMI/RFI Testing to be Performed by GE

Presently, General Electric has a tentative schedule that will provided for an issued NEDE report to document the testing performed and the results. The targeted issue date for the NEDE document is in September 1993.

3 **Provide the onsite EMI/RFI survey plan and additional information necessary to demonstrate that the Nuclear Measurement Analysis and Control (NUMAC) Reactor Building Ventilation Radiation Monitor (RBVRM) is qualified to operate at the Browns Ferry Nuclear Plant. The onsite EMI/RFI survey should include the survey of the NUMAC RBVRM installed environment during plant start-up and normal power output level to show that the NUMAC RBVRM operating environment is well within the tested envelope.**

The request for the site survey to demonstrate that the NUMAC RBVRMs are qualified for operation is similar to the EMI/RFI qualification performed at other nuclear plants, such as Zion and Turkey Point, where acceptance of digital based installations was based on a comparison of the manufacturer's EMI/RFI equipment qualification testing and an EMI/RFI survey of the installed equipment location. This methodology is based on demonstrating that the on-site emissions levels surveyed are sufficiently less than the manufacturer's equipment qualification tested susceptibility levels to demonstrate equipment electromagnetic compatibility.

The surveys performed at Zion and Turkey Point did not reveal any obvious threat to digital system operations, with the observed radiated emissions much less than 1 V/M over the entire surveyed frequency range. The radiated field emissions and conducted emissions measured at these sites were relatively low. Also, NUREG/CR-3270, "Investigation of Electromagnetic (EMI) Levels in Nuclear Power Plants" (Lawrence Livermore Laboratories) performed EMI measurements and documented results from

one typical PWR, referred to as plant A, and one typical BWR, referred to as plant B. The plant A data in the NUREG was collected while the unit was operating at a relatively high power levels. The plant B data was collected during cold shutdown conditions following a refueling outage. Once again, the NUREG data did not reveal any obvious threats to digital system operations. However, the NUREG does state that the data from these two plants does provide an initial data base for one plant in the normal operation level state and one plant in the shutdown state. It emphasizes that those measurements form an initial database and are not necessarily "worst case" or design limits. This caution is consistent with the philosophy that a survey method for assessment of the EMI/RFI environment is of limited value and cannot be used as the sole basis for definition of acceptable minimum susceptibility test specifications.

Plant surveys of any reasonable duration can only provide a brief steady state emissions model for a limited range of plant operating modes. Industry experience shows that most EMI/RFI problems in commercial nuclear plants are due to infrequent transient interference and not steady-state noise. It is unlikely that an in-plant survey would capture a profile that would encompass all credible transient considerations. Steady state noise problems, when they occur, are primarily due to installation deficiencies or failures of equipment or cabling. This type of occurrence can be expected to be identified and corrected expeditiously within normal maintenance activities. In general, transient noise problems are more difficult to diagnose and correct.

There are no accepted industry standards that require in-plant surveys to identify and quantify transient threat levels. In the summary discussion included in the preface to IEEE C62.41-1991 "Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits" it pointed out that, although short-term monitoring of an individual site often gives some useful information, the environment is so dynamic that the analysis of a brief period may not give a good prediction of the future environment.

In-plant surveys cannot be considered as the sole basis for determination of acceptable minimum susceptibility test specifications. Additional margin, beyond the levels surveyed, needs to be established to bound all credible events. A correlation to this would be of temperature profiles for a plant location with a similar survey approach which could not establish adequate test and design criteria/qualification for equipment qualification parameters.

Presently, there are no specific standards/guidance in the nuclear industry for equipment EMI/RFI qualification. In the absence of this type guidance, manufacturers and utilities have applied a variety of MIL,IEC,IEEE,and SAMA standards to define a comprehensive set of test requirements and acceptance criteria for equipment to provide an assurance that the equipment will perform in expected EMI environmental conditions. In lieu of accepted standards, the Electric Power Research Institute (EPRI), as part of the Integrated Instrumentation & Control Upgrade Initiative (for which BFN is the lead BWR Demonstration plant) and several interested utilities have

developed a working group to take the initiative in the establishment of criteria for EMI/RFI testing to qualify safety-related equipment for use in nuclear plant installations. This working group is comprised of EPRI personnel, utility personnel, and recognized electromagnetic compatibility industry experts. TVA is an active participant in this EPRI working group. The working group's tentative plans are to collect test data at a representative number of nuclear plants and then utilize the data for establishment of a basis for recommendation of specific criteria for equipment qualification requirement purposes. It is expected that the typical plant characteristics developed from this effort will reinforce the current judgment that the plant steady state EMI/RFI conditions do not generally pose a threat to properly designed and installed equipment. The working group is presently developing a short term position statement which is expected to conclude that in-plant surveys are not an essential element of an overall equipment qualification program.

The process of developing requirements for any type of qualification test or standard involves the analysis of available empirical data and the application of engineering deduction by personnel with the appropriate technical qualifications and experience. TVA used this approach in development of Standard Specification SS E18.14.01 "Electromagnetic Testing Requirements for Electronic Devices". This specification has been in place for approximately 10 years. While not formally documented, experience has shown that equipment in compliance with this specification has operated with no known EMI/RFI susceptibility problems.

A review of the results from the surveys performed at Turkey Point, Zion, and the plants documented in the NUREG for comparison with TVA SS E18.14.01 concluded that the test field strengths requirements imposed by SS E18.14.01 are bounding and provide considerable margin for the frequencies defined in the Specification. The NUMAC RBVRM has been tested successfully to field strengths well above the levels defined in SS E18.14.01,adding more margin to the equipments' qualification considerations.

The existing GEMAC analog RBVRM Sensor and Converter produces an analog current output that is transmitted to the Indicator and Trip units located in the Main Control Room. This current signal is approximately 100 μA at less than 24 VDC for the Refuel floor monitors and approximately 20 μA at less than 24 VDC for the Reactor Zone Vent Monitors. These signals are transmitted over more than 100 feet of wiring to the MCR. The replacement NUMAC RBVRM Sensor and Converters transmit an RS-485 digital communications signal. The RS-485 protocol is a balanced line 5V differential signal, which has been proven to be highly immune to noise in industrial applications.

In addition the NUMAC line of instrumentation has been installed at 46 plants with over 1300 years of total operating experience. NUMAC installation was installed at BFN during the preceding Unit 2 Cycle 5 outage for monitoring Main Steam Line radiation. No problems directly related to EMI/RFI susceptibility have been identified. There

have been a small number of Low Voltage Power Supply (LVPS) failures in the NUMAC line that may have been caused by AC power line transients. GE Service Information Letter (SIL) number 499 recommended the addition of transient suppressers on the AC power lines as a conservative action for plants that suspected a problem. No problems of this nature have been associated with the MSLRMs at BFN. Also additional transient suppression circuitry has been added to all currently manufactured NUMAC equipment, including the RBVRM. The RBVRM successfully passed AC power line transient testing.

On the basis of the above discussion, it is TVA's position that in-plant surveys do not provide a sufficient basis for definition of potential transient threat levels nor is it likely to identify steady state interference levels higher than those to which the NUMAC testing was performed. Also, it is believed that the NUMAC equipment,based on operating experience and successful compliance to TVA Standard Specification E18.14.01, will not be susceptible to in-plant steady state EMI/RFI problems and can be expected to survive credible transients.

4 **Provide the drift analysis report, GE-NE-533-020-0492"Reactor Building Vents Radiation Monitoring System Drift Rate Calculation for Tennessee Valley Authority Browns Ferry Nuclear Plant."**

See General Electric proprietary information attached.

5 **Provide the TVA's maintenance document on the high voltage adjustment, which assures that the GM voltage drift is well within the permissible values between calibrations.**

See preliminary plant Surveillance Instruction attached.

6 **Provide the following GE NUMAC RBVRM software development requirement documents:**

a) 23A5161 "NUMAC Software Configuration Management Plan" R1
b) 23A5162 "NUMAC Software Management Plan" R2
c) 23A5163 "NUMAC Software Verification and Validation Plan" R3

See General Electric proprietary information attached.

7 **Describe the hardware configuration management for the NUMAC RBVRM.**

Hardware configuration control will be maintained in accordance with Browns Ferry Project Instruction PI 89-06. This procedure governs plant configuration changes and dictates design output documentation issue and/or revision to reflect design changes. Also, vendor manuals will be issued and controlled to document the RBVRM configuration. Hardware configuration control will be accomplished by the use of issued design drawings.

8 **Describe the training program for the NUMAC RBVRM.**

Operations Training

There is no RBVRM specific formal training scheduled for Operations personnel. Operations has experience with NUMAC equipment in the form of the Main Steam Line Radiation Monitors (MSLRM) installed in BFN Unit 2 for the past cycle. Based on the generic experience with the NUMAC line via the MSLRMs, and the user-friendly nature of the NUMAC RBVRM, formal training for operations personnel is not necessary. However, GE will conduct two four hour on-site seminars to familiarize Operations personnel to the NUMAC RBVRMs.

Maintenance Training

There is no RBVRM specific formal training scheduled for Maintenance personnel. Maintenance also has experience with NUMAC equipment in the form of the NUMAC MSLRM installed in BFN Unit 2 for the past cycle, and formal training was given on the NUMAC MSLRMs. Based on the generic experience with the NUMAC line via the MSLRM, the detailed maintenance manuals supplied by GE for the RBVRM, and the similarity of the NUMAC RBVRM hardware to the NUMAC MSLRM hardware, formal training for maintenance personnel is not deemed necessary.

9 **Are the NUMAC RBVRMs within the scope of RG 1.97?**

The NUMAC RBVRMs are not RG 1.97 instruments.

10 **Please provide a summary of the seismic qualification process for the RBVRM.**

GE has seismically tested various NUMAC instruments, Sensor and Converters, and Interface panels to specific seismic levels. These tests have been documented and are available for review at the GE offices in San Jose.

To qualify the specific TVA NUMAC RBVRM chassis, Interface Panels and Sensor and Converters, GE performed a similarity analysis and determined that the specific TVA devices are mechanically the same or equivalent to the devices tested and are therefore capable of withstanding the tested seismic forces. GE then performed seismic calculations of the panels and ducts where the devices will be mounted and determined that the loads at the mounting locations are enveloped by the tested limits. All of the precess was performed in compliance with IEEE 344-1975 and is certified as such by GE on the Product Quality Certifications provided with the equipment.

ENCLOSURE TWO

GENERAL ELECTRIC COMPANY

AFFIDAVIT

I, DAVID J. ROBARE, being duly sworn, depose and state as follows:

(1) I am Project Manager, Plant Licensing, General Electric Company ("GE") and have been delegated the function of reviewing the information described in paragraph 2 which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in the following GE proprietary reports:

a. NEDC-31974P, Class 111, "NUMAC Qualification Report for Reactor Building Vents Radiation Monitor (RBVRM) System for Tennessee Valley Authority (TVA) Browns Ferry Nuclear Plant Units 1, 2, and 3", dated November 1991.

b. 23A5161, Rev. 1, "NUMAC Software Configuration Management Plan", dated March 1991.

c. 23A5162, Rev. 1, "NUMAC Software Management Plan", dated March 1991.

d. 23A5163, Rev. 1, "NUMAC Software Verification and Validation Plan", dated March 1991.

These documents are provided for information only and are not provided as topical reports for NRC approval.

(3) In making this application for withholding of proprietary information of which it is the owner, GE relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), 2.790(a)(4), and 2.790(d)(1) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information", and some portions also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by General Electric's competitors without license from General Electric constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information which reveals cost or price information, production capacities, budget levels, or commercial strategies of General Electric, its customers, or its suppliers;

d. Information which reveals aspects of past, present, or future General Electric customer-funded development plans and programs, of potential commercial value to General Electric;

e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

(5) The information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GE, and is in fact so held. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in (6) and (7) following. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GE, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within GE is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GE are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2) is classified as proprietary because it contains details of analytical models, methods and processes, including computer codes and equipment, which GE has developed, relative to the application of the NUMAC system.

The development of the NUMAC system was achieved at a significant cost, on the order of several million dollars, to GE.

The development of the NUMAC process along with the interpretation and application to the BWR is derived from the extensive BWR experience database that constitutes a major GE asset.

This information is considered to be proprietary for the reasons set forth in both paragraphs 4.a and 4.b, above.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GE's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GE's comprehensive BWR technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process.

The research, development, engineering, and analytical costs comprise a substantial investment of time and money by GE.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GE's competitive advantage will be lost if its competitors are able to use the results of the GE experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GE would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GE of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

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

David J. Robare, being duly sworn, deposes and says:

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

Executed at San Jose, California, this 12TH day of MARCH, 1993.

David J. Robare
General Electric Company

Subscribed and sworn before me this 12th day of March, 1993.

Paula F. Hussey
Notary Public, State of California

OFFICIAL SEAL
PAULA F. HUSSEY
NOTARY PUBLIC - CALIFORNIA
SANTA CLARA COUNTY
My comm. expires APR 5, 1994

ENCLOSURE THREE

ENCLOSURE THREE

TVA-BROWNS FERRY NUCLEAR PLANT

GENERAL ELECTRIC
NUCLEAR MEASUREMENT ANALYSIS AND CONTROL (NUMAC)

REACTOR BUILDING VENTILATION RADIATION MONITORING (RBVRM)

TVA/BFN REPLY TO NRC
REQUEST FOR ADDITIONAL INFORMATION (RAI)

TVA/BFN ATTACHMENTS
AND
GENERAL ELECTRIC PROPRIETARY INFORMATION

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1. NEDC-31974P NUMAC Qualification Report for RBVRM System for TVA BFN Units 1, 2, and 3, November 1991 (GE PROPRIETARY INFORMATION)

2. GE-NE-533-020-0492 Reactor Building Vents Radiation Monitoring System Drift Rate Calculation for Tennessee Valley Authority Browns Ferry Nuclear Plant (NOTE: THIS DOCUMENT IS NOT GE PROPRIETARY INFORMATION)

3. BFN Plant PRELIMINARY SURVEILLANCE INSTRUCTION (SI), 1-SI-4.2.A-10 FT (TVA/BFN Attachment)

4. GE-23A5161 NUMAC Software Configuration Management Plan R1
GE-23A5162 NUMAC Software Management Plan R2
GE-23A5163 NUMAC Software Verification and Validation Plan R3 (ALL OF ABOVE ARE GE PROPRIETARY INFORMATION)