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Project 717

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U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20852-2738

Attention: Chief, Information Management Branch
Program Management
Policy Development and Analysis Staff

Subject: **TRACG Control System Diagrams**

In response to a request from the NRC, Enclosure 1 contains diagrams that may be helpful in understanding the ESBWR TRACG control systems. The ESBWR TRACG control systems are based on the ODYN computer code control systems. ODYN provides general control system models which can simulate various BWR types. The following control system diagrams are attached:

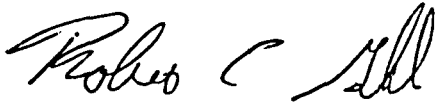
- Pressure Control System
- Turbine Control Valves
- Bypass Control Valves
- Turbine-Generator and Grid Model
- Feedwater and Level Control Systems
- Feedwater Enthalpy Models

Enclosure 1 contains GE proprietary information as defined by 10 CFR 2.390. Non proprietary information is also included in Enclosure 1 to form a complete package. A non-proprietary version is provided in Enclosure 2. GE customarily maintains this information in confidence and withholds it from public disclosure.

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The affidavit contained in Enclosure 3 identifies that the information contained in Enclosure 1 has been handled and classified as proprietary to GE. GE hereby requests that the information of Enclosure 1 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17. If you have any questions about the information provided here, please let me know.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert E. Gamble", with a stylized flourish at the end.

Robert E. Gamble
Manager, ESBWR

Enclosures:

1. MFN 04-096 – TRACG Control System Diagrams - GE Proprietary Information
2. MFN 04-096 – TRACG Control System Diagrams – Non Proprietary
3. Affidavit, Ronald E. Engel, dated September 1, 2004

cc: AE Cabbage USNRC (with enclosures)
WD Beckner USNRC (w/o enclosures)
GB Stramback - GE (with enclosures)
eDRF 0000-0019-3403

MFN 04-096
Enclosure 2

ENCLOSURE 2

MFN 04-096

TRACG Control System Diagrams

RAI TRACG Control System Diagrams

Provide diagrams of the ESBWR TRACG control systems.

Response to RAI

The ESBWR TRACG control systems are based on the ODYN computer code control systems. ODYN provides general control system models which can simulate various BWR types. The following control system diagrams are attached:

Fig 3-4 Pressure Control System

Fig 3-5 Turbine Control Valves

Fig 3-6 Bypass Control Valves

Figure 3-7 Turbine-Generator and Grid Model

Fig 3-9 Feedwater and Level Control Systems

Fig 3-10 Feedwater Enthalpy Models

Two copies of each of the above figures are provided, the original ODYN users manual copy (ODYNV08_manual_control_systems.pdf), and a copy marked up by the programmer who implemented the ODYN control system in a TRACG control system as part of a TRACG pre-processor (atrac_control_systems.pdf).

The marked up diagrams include control block numbers, which are related to the "CBNAM" in the TRACG input as follows:

"CBNAME" of each control block contains a 12 character code such as "FCONTL07WSUM".

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The code is broken down as follows:

Characters 1-1 denote the system name

Characters 2-6 denote the subsystem name

Characters 7-8 denote the block number per subsystem

Characters 9-12 denote the block type

The systems include:

F = FEEDWATER AND LEVEL CONTROL SYSTEM
P = PRESSURE CONTROL SYSTEM

Subsystems under FEEDWATER AND LEVEL CONTROL SYSTEM are:

SENSR = SENSOR
LVLSP = LEVEL SETPOINT
LVLCN = LEVEL CONTROLLER
COMPN = COMPENSATOR
CONTL = CONTROLLER
SYSDY = SYSTEM DYNAMICS
BACKP = PUMP BACKPRESSURE HEAD/FLOW
MINFR = MINIMUM FLOW RECIRCULATION
ENTHL = ENTHALPY

Subsystems under PRESSURE CONTROL SYSTEM are:

GVRNR = SPEED LOAD GOVERNOR
ACLRY = ACCELERATION RELAY
SPADJ = SETPOINT ADJUSTOR
SENSR = SENSOR
SPCHG = SETPOINT CHANGE
NOREG = NORMAL REGULATOR
FBREG = FEEDBACK REGULATOR
BYRLY = BYPASS RELAY
PRRLY = PRIMARY RELAY
SERV(a-d) = TURBINE SERVOS (LOOPS a THRU d)
SERVO = TURBINE SERVO BLOCKS (OUT OF LOOPS)
MFILL = VALVE POSITION TO FILL MASS FLOW CONVERSION
VCLSE = TURBINE VALVE CLOSURE (OUT OF LOOPS)
VCLS(a-d) = TURBINE VALVE CLOSURE (LOOPS a THRU d)
BYPSS = BYPASS VALVES (OUT OF LOOPS)

BYP(a-g) = BYPASS VALVES (LOOPS a THRU g)
EBYPS = ELECTROMATIC BYPASS VALVES
TGRID = TURBINE-GENERATOR AND GRID FREQUENCY
SMOTH = SMOOTHING FOR STEADY STATE INITIALIZATION

The example CBNAM, "FCONTL07WSUM" is decoded as follows:

F= FEEDWATER AND LEVEL CONTROL SYSTEM

CONTL = CONTROLLER, the block falls within the dotted line boundaries on the in
Feedwater Controller, the upper right area of marked up Fig 3-9

07=Block is indicated with a 7 on the marked up diagram (summer block on diagram)

WSUM=The TRAC control block type (ICBTYP) is WSUM.

This naming convention applies to many, but not all of the blocks in the Feedwater and Pressure regulator systems. Where it applies it is helpful in understanding the function of the block.

Not all of the TRACG control blocks derived from ODYN control diagrams use the above CBNAM naming convention. The following diagrams from the ODYN manual are provide examples of typical BWR control systems, for which there is no corresponding diagram marked up with the CBNAM block number. The CBNAM are simply SCRAM ##, SRV ##:

Fig 2-2 Block Diagram Symbols

Fig 2-11 Scram Switch Logic Network

Fig 2-13 Relative Functions of SRV variables

Fig 2-14 MSIV Initiation Logic

Some of the control blocks have been customized for the ESBWR, and no corresponding ODYN diagram is available.

MFN 04-096
Enclosure 3

ENCLOSURE 3

MFN 04-096

Affidavit

General Electric Company

AFFIDAVIT

I, Ronald E. Engel, state as follows:

- (1) I am Technical Leader, Systems Engineering, 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 Enclosure 1 of GE letter MFN 04-096, Robert E. Gamble to NRC, *TRACG Control System Diagrams*, dated September 1, 2004. The proprietary information is in Enclosure 1, *TRACG Control System Diagrams*. GE proprietary information is identified with double square brackets before and after the object. In each case, the notation {3} refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.
- (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), and 2.390(a)(4) for "trade secrets" (Exemption 4). The material for which exemption from disclosure is here sought 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 aspects of past, present, or future General Electric customer-funded development plans and programs, resulting in potential products to General Electric;

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

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a., and (4)b, above.

- (5) To address 10 CFR 2.390 (b) (4), 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. 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. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.
- (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), above, is classified as proprietary because it details specific information regarding application of TRACG to the ESBWR design. This TRACG code has been developed by GE for over fifteen years, at a total cost in excess of three million dollars. The reporting, evaluation and interpretations of the results, as they relate to the ESBWR, was achieved at a significant cost to GE.

The development of the evaluation process along with the interpretation and application of the analytical results is derived from the extensive experience database that constitutes a major GE asset.

- (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 safety and 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. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

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

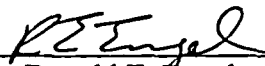
The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

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.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed on this 1st day of September 2004



Ronald E. Engel
General Electric Company