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Subject: **Response to Portion of NRC Request for Additional
Information Letter No. 119 Related to ESBWR Design
Certification Application - Auxiliary Systems - RAI Number
9.3-40 S01**

Enclosure 1 contains GEH's response to the subject RAI transmitted via Reference 1. The original response was transmitted via Reference 2 in response to Reference 3.

Should you have any questions about the information provided here, please contact me.

Sincerely,

R. E. Brown for

James C. Kinsey
Vice President, ESBWR Licensing

*DAGS
NRO*

References:

1. MFN 07-657, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 119 Related to the ESBWR Design Certification Application*, December 5, 2007.
2. MFN 07-527, *Response to Portion of NRC Request for Additional Information Letter No. 100 Related to ESBWR Design Certification Application –Auxiliary Systems– RAI Number 9.3-40*, October 17, 2007.
3. MFN 07-327, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 100 Related to the ESBWR Design Certification Application*, May 30, 2007.

Enclosure:

1. Response to Portion of NRC Request for Additional Information Letter No. 119 Related to ESBWR Design Certification Application - Auxiliary Systems - RAI Number 9.3-40 S01.

cc: AE Cabbage USNRC (with enclosure)
RE Brown GEH/Wilmington (with enclosure)
DH Hinds GEH/Wilmington (with enclosure)
GB Stramback GEH/San Jose (with enclosure)
eDRF 0000-0073-8312, Revision 3

Enclosure 1

MFN 08-176

**Response to Portion of NRC Request for
Additional Information Letter No. 119
Related to ESBWR Design Certification Application
Auxiliary Systems
RAI Number 9.3-40 S01**

For historical purposes, the original text of RAI 9.3-40 with the GEH response is included.

NRC RAI 9.3-40

Provide discussion regarding:

- a. Whether or not the Auxiliary Boiler System (ABS) would interface directly with any nuclear process systems,*
- b. Where the Auxiliary Boiler is located, and*
- c. Whether the ABS lines would pass through areas where safety-related equipment is located.*

Address that failure of the ABS system as a result of a pipe break or malfunction of the system would not adversely affect safety-related systems or associated components and instrumentations.

GEH Response

Response to Item a.

No, the ABS does not interface directly with nuclear process systems.

Response to Item b.

The auxiliary boiler is located outside the Turbine Building, adjacent to the Radwaste Building, as shown on DCD Tier 2, R3, Standard Plant General Site Plan Figure 1.1-1.

Response to Item c.

ABS piping is routed in the Turbine Building. Safety related RPS sensors are located in the Turbine Building. The response to RAI 14.3-99 S01 addresses the failure of nonsafety-related piping and systems in the Turbine Building that have the potential to impact safety-related function(s) of safety related sensors.

DCD Impact

No DCD changes will be made in response to this RAI.

NRC RAI 9.3-40 S01

The response to the RAI is incomplete. Please address in the RAI response and in the DCD whether the failure of the Auxiliary Boiler System (ABS) as a result of a pipe break or malfunction of the system would adversely affect safety-related systems or associated components and instrumentations.

Please clarify the apparent difference between the RAI response and DCD Tier 2, Revision 4, Section 9.3.12.3. The response to item (c) in the RAI indicates that failure of the ABS piping may impact safety-related sensors. DCD Tier 2, Revision 4, Section 9.3.12.3 states, "High-energy pipe rupture analysis is not required for the ABS because none of the lines pass through areas where safety-related equipment is located."

GEH Response

Safety-related sensors are mounted on or near nonsafety-related piping and structures in the Turbine Building. The Turbine Building included in the ESBWR standard plant design is nonsafety-related. The Turbine Building structure is designed to prevent a failure of the structure that would impair the ability of nearby safety-related SSCs, including safety-related sensors, from performing their function. This supplemental response addresses the failure of nonsafety-related piping and systems in the Turbine Building that have the potential to adversely impact the safety-related function(s) of safety-related sensors. This includes an Auxiliary Boiler System (ABS) pipe break or malfunction that has the potential to adversely affect safety-related systems or associated components and instrumentation. This potential adverse effect is mitigated by the fail-safe design of the sensors and their respective control systems to provide safety system protection.

The following is a list of safety-related sensors located in, or potentially located in, the Turbine Building:

- Condenser Pressure transmitters (RPS),
- Turbine Bypass Valve limit switches (RPS),
- Main Stop Valve limit switches (RPS),
- Undervoltage Sensor on the power generation bus (RPS),
- Turbine Control Valve (fast closure) hydraulic pressure transmitters (RPS),
- Main Steam Line turbine inlet pressure transmitters (LD&IS), and
- Main Steam Line leak detection in the Turbine Building (LD&IS),

The sensors in the above list that are included in the safety-related Reactor Protection System (RPS) are identified with the acronym "RPS" in parentheses at the end of the respective sensor description. The sensors in the above list that are included in the safety-related Leak Detection and Isolation System (LD&IS) are identified with the acronym "LD&IS" at the end of the respective sensor description.

For further discussion on sensors, see response to RAI 14.3-99 S01 (MFN 07-003 S01, August 13, 2007).

The fail-safe nature of the RPS and LD&IS systems, as described above and in RAI 14.3-99 S01, allows sensors to be mounted on or near nonsafety-related systems in the turbine building without the need for physical protection or barriers.

DCD Impact

DCD Tier # 2, Section 9.3.12.3 will be revised in Revision 5, as noted in the attached markup.

unavailable. Auxiliary Boilers Fuel Oil Pumps are provided in the Auxiliary Boiler System to transfer fuel oil from the fuel oil tank to the Auxiliary Boiler. The fuel oil piping is connected to the fuel oil tank by means of a fuel tank nozzle situated above the minimum level required for the Diesel Generator System.

The Makeup Water System provides makeup feedwater to the ABS. A pressure control valve maintains the steam supply pressure while a level control valve regulates Auxiliary Boiler feedwater flow to the boiler. The steam generated by the Auxiliary Boiler passes through Steam Separators and is then distributed via two supply lines to the auxiliary steam header and to the gland steam supply line in the Turbine Gland Seal System. Each supply line contains an air-operated block valve and check valve for isolation.

The condensate from the Continuous Blowdown Flash Tanks is directed to the Auxiliary Boiler Drain Tank. The non-radioactive area of the Equipment and Floor Drain System collects drains from the ABS.

The ABS has sample connections to monitor pH, dissolved oxygen and conductivity.

9.3.12.3 Safety Evaluation

The ABS does not perform or ensure any safety-related function and therefore requires no safety evaluation. Failure of the ABS as a result of a pipe break or malfunction of the system will not adversely affect the function or operation of affected safety-related systems due to the fail safe design of the safety-related systems. The safety-related sensors are designed with diversity and defense-in-depth, allowing them to be mounted on or near nonsafety-related systems in the turbine building without the need for physical protection or barriers.

~~High energy pipe rupture analysis is not required for the ABS because none of the lines pass through areas where safety-related equipment is located.~~

9.3.12.4 Testing and Inspection Requirements

Testing of the ABS is performed prior to initial plant operation. Components of the system are monitored during operation to verify satisfactory performance.

9.3.12.5 Instrumentation

A boiler control system is provided with the Auxiliary Boiler package for automatic control of the Auxiliary Boiler. Features of the control system include automatic shutdown of the Auxiliary Boiler and the Auxiliary Boiler feedwater pumps on an abnormal condition.

The ABS is provided with the necessary controls and indicators for local or remote monitoring and control of the operation of the system.

9.3.12.6 COL Information

None

9.3.12.7 References

None