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MFN 06-066, Supplement 5

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U.S. Nuclear Regulatory Commission
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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 07 Related to ESBWR Design Certification Application – Process Radiation Monitoring System – RAI Number 11.5-9 S01**

Enclosure 1 contains GE-Hitachi Nuclear Energy Americas (GEH) response to the subject NRC RAI transmitted via Reference 1. Enclosure 2 contains the DCD Markups associated with this response.

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

D068

NRO

Reference:

1. MFN 06-043 – Letter from US Nuclear Regulatory Commission (NRC) to David H. Hinds, *Request for Additional Information Letter No. 07 Related to ESBWR Design Certification Application,* dated January 26, 2006

Enclosures:

1. Response to NRC Request for Additional Information Letter No. 07 Related to ESBWR Design Certification Application – Process Radiation Monitoring System, RAI Number 11.5-9 S02
2. DCD Markups

cc: AE Cubbage USNRC (with enclosures)
GB Stramback GEH /San Jose (with enclosures)
RE Brown GEH /Wilmington (with enclosures)
eDRF 0073-7312

Enclosure 1

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Response to Portion of NRC Request for Additional Information Letter No. 07 Related to ESBWR Design Certification Application

Process Radiation Monitoring System

RAI Numbers 11.5-9 S01

NRC RAI 11.5-9 S01:

In RAI 11.5-9, as it relates to DCD Tier 2, Rev. 1, Sections 11.5.3 and 11.5.4, the staff requested the applicant to address inconsistencies in describing the display RMS channel ranges, dynamic response ranges, and expected activity levels. The specific information is presented in DCD Rev. 1, Tables 11.5-1, 11.5-2, 11.5-4, and 11.5-9. A review of these sections and tables of DCD Rev. 3 revealed the following inconsistencies. DCD Rev. 3, Table 11.5-1 describes the responses of PRMS subsystems using two radiological units, dose rates (mSv/h) and concentrations (MBq/m3). The subsystems with dynamic ranges described as radiation exposure rates include the Reactor Building HVAC Exhaust, Refuel Handling Area HVAC Exhaust, Control Building Air Intake HVAC, LCW Drywell Dump Discharge System, Fuel building General Area HVAC, Isolation Condenser Vent Exhaust, Containment Purge Exhaust, Fuel Building Fuel Pool HVAC, Turbine Building Normal Ventilation System, Turbine Building Compartment Area Air HVAC, Offgas Pre-treatment System, Charcoal Vault Ventilation, and Technical Support Center HVAC Air Intake. Since these subsystems are installed to measure radioactivity in process and effluent streams and air intakes, the units need to be expressed in radiological units that are consistent when measuring liquid and gaseous concentrations. In DCD Rev. 3, Table 11.5-9, the basis for the dynamic ranges of the same PRMS subsystems are expressed in units defined in terms of concentrations (MBq/m3) and not in units of dose rates (mSv/h). A review of the dynamic detection ranges listed in DCD Rev. 3, Tables 11.5-2 and 11.5-4 are also inconsistent with those listed in DCD Rev. 3, Table 11.5-9.

GEH Response:

GEH has added a footnote in Table 11.5-1 to clarify radiological units such that there is a clear understanding of units between DCD Tables 11.5-1 to 11.5-2 and 11.5-9.

DCD Impact:

DCD Tier 2, Subsection 11.5, Table 11.5-1 will be revised as noted on the attached markup and provided in Revision 5.

Enclosure 2

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DCD Markups

Table 11.5-1

Process and Effluent Radiation Monitoring Systems

Monitored Process	No. of Channels	Sample Line or Detector Location	Displayed Channel Range* and **
TB Compartment Area Air HVAC	2	Exhaust duct from Compartment area	1E-4 to 1E0 mSv/h
TB Combined Ventilation Exhaust	3	On TB combined exhaust line	1E-3 to 1E3 MBq/m^3 (gaseous) 1E-7 to 1E-1 MBq/m^3 (particulate and iodine)
Radwaste Building Ventilation Exhaust	3	On Radwaste Building exhaust line	1E-3 to 1E3 MBq/m^3 (gaseous) 1E-7 to 1E-1 MBq/m^3 (particulate) 1E-7 to 1E-1 MBq/m^3 (iodine)
Main Turbine Gland Seal Steam Condenser Exhaust	1	Sample line from exhaust from Gland Seal condenser	1E-3 to 1E3 MBq/m^3
Liquid Radwaste Discharge	1	Sample line from combined liquid Radwaste effluent path	1E-3 to 1E3 MBq/m^3
Offgas Pre-treatment	1	Sample line after Offgas cooler/condenser	1E-2 to 1E4 mSv/h
Offgas Post-treatment Skid A	3	Sample line after Charcoal treatment beds	1E0 to 1E7 MBq/m^3 (gaseous) 1E-7 to 1E1 MBq/m^3 (particulate) 1E-7 to 1E1 MBq/m^3 (iodine)
Offgas Post-treatment Skid B	1	Sample Line after Charcoal treatment beds	1E0 to 1E7 MBq/m^3 (gaseous)
Charcoal Vault Ventilation	1	On charcoal vault HVAC exhaust line	1E-2 to 1E4 mSv/h
Reactor Component Cooling Water Intersystem Leakage	2	Each RCCW heat exchanger line exit	1E-1 to 1E5 MBq/m^3

Table 11.5-1

Process and Effluent Radiation Monitoring Systems

Monitored Process	No. of Channels	Sample Line or Detector Location	Displayed Channel Range* and **
TSC HVAC Air Intake	1	Intake HVAC duct	1E4 to 1E0 mSv/h
Drywell Fission Product (Particulate)	1	Sample line from drywell atmosphere	1E-7 to 1E-1 MBq/m^3
Drywell Fission Product (Gaseous)	1	Sample line from drywell atmosphere	1E-1 to 1E4 MBq/m^3
FB Combined Ventilation Exhaust	3	Sample Line from HVAC exhaust leaving FB	1E-3 to 1E3 MBq/m^3 (gaseous) 1E-7 to 1E-1 MBq/m^3 (particulate) 1E-7 to 1E-1 MBq/m^3 (iodine)

* MBq/m^3 = mega-becquerel per cubic meter; mSv/h = milli-Sieverts per hour

** The "MBq/m^3" displayed channel range measurement unit are utilized to present to the operator the relationship between an acceptable regulatory offsite dose concentration and the actual concentration measured at the point of interest, in comparable scientific units. Display units for all other channels not indicating "MBq/m^3" use other scientific units, such as "mSv/hr", that are comparable with their intended use. The units are not directly used to present to the operator any information concerning offsite dose concentrations. Thus, units such as "mSv/hr" are used to indicate a dose rate associated with the radioactivity contained in the process at the point of measurement, and the subsequent actions taken by the operator are not predicted on directly viewing a relationship with an offsite concentration.