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September 2, 1988

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

Gentlemen: ULNRC-1825

DOCKET NO. 50-483
CALLAWAY PLANT
REQUEST FOR INFORMATION REGARDING NOBLE GAS
RADIATION MONITORS LOCATION AND TECHNICAL SPECIFICATIONS
Reference: T. W. Alexion ltr to D. F. Schnell, dated August 2, 1988

The referenced letter requested information concerning the Callaway Noble Gas Radiation Monitors. The attachment to this letter provides the requested information.

If you have any questions concerning this information, please contact us.

Very truly yours,

Donald F. Schnell

Donald F. Schnell

DS/keb

Attachment

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STATE OF MISSOURI)
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CITY OF ST. LOUIS)

Donald F. Schnell, of lawful age, being first duly sworn upon oath says that he is Senior Vice President-Nuclear and an officer of Union Electric Company; that he has read the foregoing document and knows the content thereof; that he has executed the same for and on behalf of said company with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By Donald F. Schnell
Donald F. Schnell
Senior Vice President
Nuclear

SUBSCRIBED and sworn to before me this 2nd day of September, 1988

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MY COMMISSION EXPIRES 6/4/90
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RESPONSE TO NRC QUESTIONS CONCERNING THE CALLAWAY POST-ACCIDENT NOBLE GAS MONITORING SYSTEM

ITEM 470.1: The acceptable location for externally mounted monitors specified by NUREG-0737, Item II.F.1, Attachment 1, Clarification (3), "Noble Gas Effluent Monitor," is on the main steam line upstream of the safety valves/power-operated relief valve (PORV) pathway. Callaway's post-accident noble gas effluent monitoring system, however, deviates from the NUREG document. The monitors are located on the auxiliary building roof and oriented, shielded and collimated to detect the plume from the PORV's. If the PORV's are blocked, the radiation monitors appear incapable of responding to post-accident main steam releases via the safety relief valves.

Provide the following information to justify the location of the noble gas effluent monitoring system at Callaway.

1) Demonstrate that the locations of the radiation monitors are capable of responding to post-accident main steam releases via the safety relief valves. Also, in an accident scenario, demonstrate how you plan to detect the release of radioactive effluents and/or the loss of secondary system coolant due to blocked leaky PORV's. The following information, requested for clarification on page II.F.1-3 of NUREG-0737, should be included in your description of your instrumentation capabilities in the accident scenario.

   (a) System description, including:

      (i) instrumentation to be used, including range or sensitivity, energy dependence or response, calibration frequency and technique, and vendor's model number, if applicable;

      (ii) monitoring locations (or points of sampling), including description of methods used to assure representative measurements and background correction;

      (iii) location of instrument readout(s) and method of recording, including description of the method or procedure for transmitting or disseminating the information or data;

(iv) assurance of the capability to obtain readings at least every 15 minutes during and following an accident; and,

(v) the source of power to be used.

(b) Description of procedures or calculational methods to be used for converting instrument readings to release rates per unit time, based on exhaust air flow and considering radionuclide spectrum distribution as a function of time after shutdown.

RESPONSE: The Secondary Side Release Point Monitors (SSRM) continuously monitor for gamma radiation level in the steam release from the steam generator power operated relief valves (PORV's). The monitors are positioned to view the plume directly rather than through the pipe wall because of the significant attenuation of low energy gammas by the relief valve tailpipe wall. This eliminates the error due to estimating release of low energy noble gases by calculation methods.

Union Electric monitors only the PORV plumes and not the safety relief valve plumes because the PORV is set to open at a lower pressure than the safety relief valves and are Class IE components (See Callaway FSAR Table 7A-3). It is assumed that the PORV will be open and releasing the same concentration and distribution of radionuclides any time the safety relief valves on the same steam line are open. If the release should occur from a steam line safety valve with its corresponding PORV blocked, a contingency method has been developed and is included in Emergency Plan Implementing Procedure EIP-ZZ-01211, Back-up Method for Initial Dose Assessment.

The SSRMs utilize a Geiger - Mueller (G-M) tube (G. A. Technologies Model RD-12) with a range of 1 to 1E+05 mR/hr. The G-M tube is housed in a heavily lead shielded collimator with an unshielded window that is covered by a thin metal weather shield. Each monitor is mounted on the auxiliary building roof in a position to view its associated steam plume discharge.

The detector receives high voltage from a high-voltage power supply in the G. A. Technologies Model RM-80 microprocessor. The G-M tube, in turn, provides a positive pulse output for each gamma photon that strikes the tube. These pulses are transmitted to the remotely located RM-80 microprocessor assembly, where a pulse count occurs. The RM-80 processes the signal in digital form, computes averages for 1 minute, 10 minutes, 1 hour and 1 day up to 28 days and stores this data.

Data prepared by the RM-80 can be displayed in the control room at the G. A. Technologies Model RM-11 control/display mini-computer and G. A. Technologies RM-23 control/display module. The RM-11 and RM-23 receive the display data by separate data links from the RM-80. In addition, an analog signal is provided from the RM-80 to a strip chart recorder located in the control room.

The RM-11 continuously transmits the 1 minute average dose rate (mR/hr) to the Radioactive Release Information System (RRIS). The RRIS converts the dose rate reading to a plume concentration (microcuries/cc) by multiplying by a dose rate-to-concentration conversion factor which accounts for the detector-source geometry and an energy response correction factor of 0.37 for XE-133. This results in a measurement range of 5.22 E-02 microcuries/cc to 5.22 E+03 microcuries/cc. The RRIS computes a release rate by multiplying the plume activity concentration (microcuries/cc) by the steam discharge rate and appropriate unit conversion factors which are dependent on steam pressure. RRIS display terminals are located at the emergency facilities and are updated every 15 minutes.

The SSRMs are powered from AC distribution panel SP02, which is fed from inverter SP01. The inverter is fed from motor control center PG19GFF3 and also from DC distribution panel PK0304. The latter is fed by batteries or battery charger PK23, which is powered from Class I load center NG01.

In addition to the contingency method for a blocked PORV, we have developed dose assessment methods should the SSRM's or RRIS be inoperable. These methods are described below and included in procedure EIP-ZZ-01211.

Should a release occur with its corresponding PORV blocked or SSRM inoperable, a portable instrument reading would be taken of the affected steam line in the main steam isolation valve room. The dose rate (mR/hr) obtained is converted to a plume release rate (microcuries/sec) by multiplying by the steam flow rate (CFM) and the $\frac{\text{microcurie - hr}^2}{\text{mR - sec - CFM}}$ conversion factor which accounts for the attenuation of low energy gammas by the pipe wall.

If the RRIS should become inoperable, the dose rate for the SSRM would be obtained from the RM-11 or RM-23 in the control room. The plume release rate (microcuries/sec) would be determined by multiplying the dose rate by the

steam flow rate (lb/hr) and the $\frac{\text{microcurie - hr}^2}{\text{mR - sec - lb}}$ conversion factor which accounts for the detector-source geometry, energy response and appropriate steam flow unit conversion factor.

ITEM 470.2: Generic Letter 83-37, "PWR NUREG-0737 Technical Specifications," dated November 1, 1983, specifies that all of the licensee-identified post-accident noble gas effluent radiation monitors should be included in the accident monitoring technical specifications; however, Callaway's Technical Specifications 3.3.3.6, "Accident Monitoring Instrumentation Limiting Condition for Operation," and 4.3.3.6, "Accident Monitoring Instrumentation Surveillance Requirements," include only the plant unit-vent high-range noble-gas monitor. Please discuss this discrepancy.

RESPONSE: The Callaway Technical Specifications were developed in the last half of 1983 and the first half of 1984 subsequent to the issuance of Generic Letter 83-37. The guidance contained in this Generic Letter was utilized in the development of the Callaway Technical Specifications.

In meetings between Union Electric personnel and the NRC Staff (R. Fell and F. Anderson) on January 4 through January 6, 1984 it was agreed that the Unit Vent-High Range Noble Gas Monitors would be included but the Steam Relief-High Range Noble Gas Monitors would not be added to the accident monitoring instrumentation table.

As part of the current industry and NRC efforts to improve technical specifications, the determination as to which post accident (R.G. 1.97) monitors will be included in technical specifications will be addressed. Although there is not full agreement between the industry and the Staff at this time, the most conservative interpretation would require instruments which measure Type A, Category 1 variables (as defined in R.G. 1.97) and those considered to contain constraints of prime importance in limiting the likelihood or severity of the accident sequence to be in technical specifications. For Callaway these monitors are considered Type E, Category 2 and are not required to limit the likelihood or severity of any accident sequence.

Based on the preceeding discussion, Union Electric believes that the post accident noble gas effluent radiation monitors were adequately reviewed prior to issuance of the Callaway operating license. Future improvements to the technical specifications will likely include relocation of these requirements from technical specifications to other plant administrative programs.