RECORD #170

TITLE: Sampling Drywell Atmospher Before a Release

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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Docket No. 50-397

MEMORANDUM FOR: Robert B. Samworth, Project Manager
Project Directorate V
Division of Reactor Projects III/IV/V
and Special Projects
Office of Nuclear Reactor Regulation

FROM: LeMoine J. Cunningham, Chief
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Division of Radiation Protection
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Office of Nuclear Reactor Regulation

SUBJECT: TIA 88-19 REQUEST FOR ASSISTANCE FROM REGION V CONTAINED IN AUGUST 26, 1988 MEMORANDUM FROM R. A. SCARANO RELATIVE TO SAMPLING OF THE DRYWELL ATMOSPHERE AT WNP-2 PRIOR TO RELEASE

The subject memorandum with attached NRC Inspection Report of WNP-2 dated August 19, 1988 requested assistance in interpretation of two current WNP-2 Technical Specifications (TS): TS 3/4.11.2.1 (Enclosure 1) and TS 3/4.11.2.8 (Enclosure 2). Specifically, the memorandum asks: "In view of the licensee's interpretation as found and described in the enclosed report, does Technical Specification 4.11.2.1 and Table 4.11-2 require a sample of drywell atmosphere be taken and analyzed prior to each vent and/or purge operation through the Standby Gas Treatment (SGT) system?" It also asks: "If prior-to-release samples are required, should this be reflected in the ODCM, along with appropriate decontamination factor to account for SGT cleanup?"

We have reviewed the detailed information in the inspection report documenting the positions of the inspector and the licensee in regard to the subject question. We agree with the position expressed by the licensee's Corporate Nuclear Safety Review Board (CNSRB) member at the November 27, 1985 meeting of their Plant Operations Committee (POC) recorded on pages 10 and 11 of the Inspection Report. WNP-2 TS 4.11.2.1.2 with its Table 4.11-2 requires that a grab sample be taken prior to each PURGE and VENT from Primary Containment. TS 4.11.2.8.3 provides additional requirements for the case of PURGING or VENTING through other than the SGTS, but says nothing about when the SGTS is used. The APPLICABILITY of TS 3/4.11.2.1 is "At all times." Therefore the answer to the first question of Region V is "YES".

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In regard to the second question, TS 4.11.2.1.2 ties the sampling and analysis program of Table 4.11-2 to dose rate determinations "in accordance with the methodology and parameters in the ODCM." Thus statements regarding these determinations should be incorporated in the ODCM.

Original signed by LeMoine J. Cunningham

LeMoine J. Cunningham, Chief
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Enclosures:
1. TS 3/4.11.2.1
2. TS 3/4.11.2.8

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RADIOACTIVE EFFLUENTS

3/4.11.2 GASEOUS EFFLUENTS

DOSE RATE

LIMITING CONDITION FOR OPERATION

3.11.2.1 The dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the SITE BOUNDARY (see Figure 5.1-3) shall be limited to the following:

a. For noble gases: Less than or equal to 500 mrems/yr to the total body and less than or equal to 3000 mrems/yr to the skin, and

b. For iodine-131, for iodine-133, for tritium, and for all radionuclides in particulate form with half-lives greater than 8 days: Less than or equal to 1500 mrems/yr to any organ.

APPLICABILITY: At all times.

ACTION:

a. With the dose rate(s) exceeding the above limits, immediately restore the release rate to within the above limit(s).

b. The provisions of Specification 6.9.1.9.b are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.2.1.1 The dose rate due to noble gases in gaseous effluents shall be determined to be within the above limits in accordance with the methodology and parameters in the ODCM.

4.11.2.1.2 The dose rate due to iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents shall be determined to be within the above limits in accordance with the methodology and parameters in the ODCM by obtaining representative samples and performing analyses in accordance with the sampling and analysis program specified in Table 4.11-2.

TABLE 4.11-2

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

GASEOUS RELEASE TYPE	SAMPLING FREQUENCY	MINIMUM ANALYSIS FREQUENCY	TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION (LLD)[a] (μCi/mL)
A. Primary Containment PURGE and VENT	P Each PURGE[b] and VENT Grab Sample	P Each PURGE[b] and VENT	Principal Gamma Emitters[f]	$1x10^{-4}$
		M	H-3	$1x10^{-6}$
B. Main Plant Vent	M[b,d] Grab Sample	M[b]	Principal Gamma Emitters[f]	$1x10^{-4}$
			H-3	$1x10^{-6}$
C. Turbine Building Vents and Radwaste Building Vents	M Grab Sample	M	Principal Gamma Emitters[f]	$1x10^{-4}$
			H-3	$1x10^{-6}$
D. All Release Types as listed in A, B, and C above	Continuous[e]	W[c] Charcoal Sample	I-131 I-133	$1x10^{-12}$ $1x10^{-10}$
	Continuous[e]	W[c] Particulate Sample	Principal Gamma Emitters[f]	$1x10^{-11}$
	Continuous[e]	M Composite Particulate Sample	Gross Alpha	$1x10^{-11}$
	Continuous[e]	Q Composite Particulate Sample	Sr-89, Sr-90	$1x10^{-11}$
	Continuous[e]	Noble Gas Monitor	Noble Gases Gross Beta or Gamma	$1x10^{-6}$ (Xe-133 equivalent)

TABLE 4.11-2 (Continued)

TABLE NOTATIONS

[a]The LLD is defined, for purposes of these specifications, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66\ s_b}{E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot \exp(-\lambda \Delta\tau)}$$

Where:

LLD is the "a priori" lower limit of detection as defined above, as microcuries per unit mass or volume,

s_b is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate, as counts per minute,

E is the counting efficiency, as counts per disintegration,

V is the sample size in units of mass or volume,

2.22×10^6 is the number of disintegrations per minute per microcurie,

Y is the fractional radiochemical yield, when applicable,

λ is the radioactive decay constant for the particular radionuclide, and

$\Delta\tau$ for plant effluents is the elapsed time between the midpoint of sample collection and time of counting.

Typical values of E, V, Y, and $\Delta\tau$ should be used in the calculation.

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement.

TABLE 4.11-2 (Continued)

TABLE NOTATIONS

[b] Sampling and analysis shall also be performed following shutdown, startup, or a THERMAL POWER change exceeding 15% of RATED THERMAL POWER within a 1-hour period.

[c] Samples shall be changed at least once per 7 days and analyses shall be completed within 48 hours after changing, or after removal from sampler. Sampling shall also be performed at least once per 24 hours for at least 7 days following each shutdown, startup, or THERMAL POWER change exceeding 15% of RATED THERMAL POWER in 1 hour and analyses shall be completed within 48 hours of changing. When samples collected for 24 hours are analyzed, the corresponding LLDs may be increased by a factor of 10. This requirement does not apply if (1) analysis shows that the DOSE EQUIVALENT I-131 concentration in the primary coolant has not increased more than a factor of 3; and (2) the noble gas monitor shows that effluent activity has not increased more than a factor of 3.

[d] Tritium grab samples shall be taken at least once per 7 days from the main plant vent stack to determine tritium releases in the ventilation exhaust from the spent fuel pool area whenever spent fuel is in the spent fuel pool.

[e] The ratio of the sample flow rate to the sampled stream flow rate shall be known for the time period covered by each dose or dose rate calculation made in accordance with Specifications 3.11.2.1, 3.11.2.2, and 3.11.2.3.

[f] The principal gamma emitters for which the LLD specification applies include the following radionuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, and Xe-138 in noble gas releases and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, I-131, Cs-134, Cs-137, Ce-141 and Ce-144 in iodine and particulate releases. This list does not mean that only these nuclides are to be considered. Other gamma peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Semiannual Radioactive Effluent Release Report pursuant to Specification 6.9.1.11.

RADIOACTIVE EFFLUENTS

VENTING OR PURGING

LIMITING CONDITION FOR OPERATION

3.11.2.8 VENTING or PURGING of the Mark II containment drywell shall be through the standby gas treatment system or the primary containment vent and purge system. The first 24 hours of any vent or purge operation shall be through one standby gas treatment system.

APPLICABILITY: Whenever the drywell is vented or purged.

ACTION:

a. With the requirements of the above specification not satisfied, suspend all VENTING and PURGING of the drywell.

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.2.8.1 The containment drywell shall be determined to be aligned for VENTING or PURGING through the standby gas treatment system or the primary containment vent and purge system within 4 hours prior to start of and at least once per 12 hours during VENTING or PURGING of the drywell.

4.11.2.8.2 Prior to use of the purge system through the standby gas treatment system assure that:

a. Both standby gas treatment system trains are OPERABLE whenever the purge system is in use, and

b. Whenever the purge system is in use during OPERATIONAL CONDITION 1 or 2 or 3, only one of the standby gas treatment system trains may be used.

4.11.2.8.3 The containment drywell shall be sampled and analyzed per Table 4.11-2 of Specification 3.11.2.1 within 8 hours prior to the start of and at least once per 12 hours during VENTING and PURGING of the drywell through other than the standby gas treatment system.