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SUBJECT: Forwards statement on how Unit 1 post-accident sampling sys (PASS) currently meets eleven criteria of NUREG-0737, Item II. B. 3. Concludes that PASS, w/limited mods, meets all criteria.

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

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 1
Docket Nos. STN 50-528 (License NPF-41)
Post Accident Sampling System (PASS)
File: 87-009-545; 87-056-026

Reference: Letter to the Document Control Desk (USNRC) from J. G. Haynes, (ANPP) dated April 24, 1987 (161-00170). Subject: Post Accident Sampling System (PASS).

Dear Sir:

The referenced letter transmitted an ANPP proposal that modifications to the PVNGS Unit 1 interim PASS be reduced. In subsequent telephone conversation on the referenced letter, Mr. E. A. Licitra of the NRC requested that ANPP forward a statement on how the Unit 1 PASS currently meets the eleven criteria of NUREG 0737, Item II.B.3. The requested statement is attached.

On the basis of this evaluation, ANPP concludes that the Unit 1 PASS, with the limited modifications of the referenced letter, meets all of the 11 Criteria of NUREG 0737, item II.B.3. Please contact Mr. W. F. Quinn of my staff if you have any questions on this matter.

Very truly yours,

J G Haynes

J. G. Haynes
Vice President
Nuclear Production

JGH/DAL/dlm
Attachment



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1/1

cc: O. M. De Michele
E. E. Van Brunt, Jr.
G. W. Knighton
E. A. Licitra
J. B. Martin
G. P. Yuhas
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ATTACHMENT

POST ACCIDENT SAMPLING SYSTEM (PASS)

Criterion (1)

The licensee shall have the capability to promptly obtain reactor coolant samples and containment atmosphere samples. The combined time allotted for sampling and analysis should be 3 hours or less from the time a decision is made to take a sample.

The Post-Accident Sampling System will use grab sample methodology as its primary means of sampling reactor coolant and containment atmosphere. The PASS can be operated from the hot lab to obtain reactor coolant and containment atmosphere samples and analyze any required sample within the required time span of 3 hours from the time a decision is made to take a sample.

Criterion (2)

The licensee shall establish an onsite radiological and chemical analysis capability to provide, within the 3-hour time frame established above, quantification of the following:

(a) certain radionuclides in the reactor coolant and containment atmosphere that may be indicators of the degree of core damage (e.g., noble gases, iodines and cesiums, and nonvolatile isotopes);

(b) hydrogen levels in the containment atmosphere;

(c) dissolved gases (e.g., $H_2$), chloride (time allotted for analysis subject to discussion below), and boron concentration of liquids;

(d) alternatively, have inline monitoring capabilities to perform all or part of the above analyses.

Liquid grab samples will be obtained from the reactor vessel hot leg, safety injection (train A), containment sump, auxiliary building radwaste sump, and gaseous grab samples will be obtained from containment atmosphere for analyses of radioisotopes, pH, boron, chloride, dissolved gases, hydrogen, and oxygen.

The procedure to be utilized to estimate the degree of core damage was developed from the "Development of Comprehensive Procedure Guidelines for Core Damage Assessment", Combustion Engineering Owners Group Task 467, dated July 1983. The procedure uses radioisotopic analysis data and takes into consideration other physical parameters, such as local core exit thermocouple temperatures, core coolant conditions, hydrogen concentrations, and area radiation levels.

Criterion (3)

> Reactor coolant and containment atmosphere sampling during post-accident conditions shall not require an isolated auxiliary system (e.g., the letdown system, reactor water cleanup system (RWCU) to be placed in operation in order to use the sampling system.

Operation of the PASS to obtain reactor coolant and containment atmosphere samples does not require an isolated auxiliary system to be placed into service. All equipment necessary to obtain reactor coolant and containment atmosphere samples has been verified to be operable in the environment it would experience under accident conditions.

Criterion (4)

> Pressurized reactor coolant samples are not required if the licensee can quantify the amount of dissolved gases with unpressurized reactor coolant samples. The measurement of either total dissolved gases or $H_2$ gas in reactor coolant samples is considered adequate. Measuring the $O_2$ concentration is recommended, but is not mandatory.

The PASS has the capability to quantify and analyze depressurized off gas from reactor coolant grab samples for total dissolved gases and dissolved hydrogen, in the concentration ranges of 11-2000 cc/kg and 10-2000 cc/kg, respectively.

Criterion (5)

> The time for a chloride analysis to be performed is dependent upon two factors: (a) if the plant's coolant water is seawater or brackish water and (b) if there is only a single barrier between primary containment systems and the cooling water. Under both of the above conditions, the licensee shall provide for a chloride analysis within 24 hours of the sample being taken. For all other cases, the licensee shall provide for the analysis to be completed within 4 days. The chloride analysis does not have to be done onsite.

Reactor coolant samples can be analyzed by ion chromatography for chloride ions within 96 hours (4 days), with an analytical range of 0.02-20 ppm and an accuracy of $\pm$25%.

Criterion (6)

> The design basis for plant equipment for reactor coolant and containment atmosphere sampling and analysis must assume that it is possible to obtain and analyze a sample without radiation exposures to any individual exceeding the criteria of GDC 19 (Appendix A, 10 CFR Part 50) (i.e., 5 rem whole body, 75 rem extremities). (Note that the design and operational review criterion was changed from the operational limits of 10 CFR Part 20 (NUREG-0578) to the GDC 19 criterion (October 30, 1979 letter from H. R. Denton to all licensees).)

Plant personnel can obtain and analyze post-accident grab samples without radiation exposures to any individual in excess of 5 rem whole body and 75 rem to the extremities (General Design Criterion 19).

Criterion (7)

> The analysis of primary coolant samples for boron is required for PWRs. (Note that Revision 2 of Regulatory Guide 1.97, when issued, will likely specify the need for primary coolant boron analysis capability at BWR plants).

Reactor coolant samples can be analyzed for boron. The analytical range is 100 to 6000 ppm, and the accuracy is ± 50 ppm below 1000 ppm and ±5% above 1000 ppm boron.

Criterion (8)

> If inline monitoring is used for any sampling and analytical capability specified herein, the licensee shall provide backup sampling through grab samples, and shall demonstrate the capability of analyzing the samples. Established planning for analysis at offsite facilities is acceptable. Equipment provided for backup sampling shall be capable of providing at least one sample per day for 7 days following onset of the accident and at least one sample per week until the accident condition no longer exists.

The primary means for sampling the reactor coolant and containment atmosphere is a grab sample type PASS. Grab samples are analyzed in an appropriate laboratory facility.

Criterion (9)

> The licensee's radiological and chemical sample analysis capability shall include provisions to:
>
> (a) Identify and quantify the isotopes of the nuclide categories discussed above to levels corresponding to the source terms given in Regulatory Guides 1.3 or 1.4 and 1.7. Where necessary and practicable, the ability to dilute samples to provide capability for measurement and reduction of personnel exposure should be provided. Sensitivity of onsite liquid sample analysis capability should be such as to permit measurement of nuclide concentration in the range from approximately 1 uCi/g to 10 Ci/g.
>
> (b) Restrict background levels of radiation in the radiological and chemical analysis facility from sources such that the sample analysis will provide results with an acceptably small error (approximately a factor of 2). This can be accomplished through the use of sufficient shielding around samples and outside sources, and by the use of ventilation system design which will control the presence of airborne radioactivity.

Isotopic analysis can be performed to identify and quantify the isotopes of the nuclide categories corresponding to the source terms given in Regulatory Guides 1.4 and 1.7. Provisions are included to measure a wide range of isotopes for both gases and liquids from 10 uCi/ml to 10 Ci/ml Sample dilution is available for grab sample analysis.

If background levels of radiation are too high in the sample analysis area to permit the analysis of the grab samples obtained, the sample can be transported to an unaffected PVNGS unit laboratory for analysis.

Background levels of radiation in the sample analysis area of the hot lab are kept ALARA, and the analytical results will have an error approximately a factor of 2.

Grab samples can be taken with a sample syringe and transported with a lead PIG.

The hot lab is provided with a ventilation system which will control the presence of airborne radioactivity.

Criterion (10)

> Accuracy, range, and sensitivity shall be adequate to provide pertinent data to the operator in order to describe radiological and chemical status of the reactor coolant systems.

The PASS has the analytical ranges and accuracies that are consistent with the recommendations of Regulatory Guide 1.97, Rev. 2, and the clarification of NUREG-0737, Item II.B.3, Post-Accident Sampling Capability. The analytical methods and instrumentation were selected for their ability to operate in the post-accident sampling environment. Equipment used in post-accident sampling and analyses will be calibrated or tested at least every six months. Retraining of operators for post-accident sampling is scheduled at a frequency of once every year.

Criterion (11)

> In the design of the post-accident sampling and analysis capability, consideration should be given to the following items:
>
> (a) Provisions for purging sample lines, for reducing plateout in sample lines, for minimizing sample loss or distortion, for preventing blockage of sample lines by loose material in the RCS or containment, for appropriate disposal of the samples, and for flow restrictions to limit reactor coolant loss from a rupture of the sample line. The post-accident reactor coolant and containment atmosphere samples should be representative of the reactor coolant in the core area and the containment atmosphere following a transient or accident. The sample lines should be as short as possible to minimize the volume of fluid to be taken from containment. The residues of sample collection should be returned to containment or to a closed system.

(b) The ventilation exhaust from the sampling station should be filtered with charcoal adsorbers and high-efficiency particulate air (HEPA) filters.

Provisions are made to purge sample lines, for reducing plate-out, to insure proper mixing, for minimizing leakage, preventing blockage, to back-flush, to blowdown, for appropriate sample disposal, minimizing crud traps, and for passive flow restrictions.

Containment gaseous sample lines for post-accident sampling are heat traced to reduce plate-out of iodines and are designed to reduce plateout of particulates. All post-accident liquid sample lines are filtered to prevent blockage by loose material in the reactor coolant system or containment sump samples.

The sample source acquisition points are located such that reactor coolant and containment atmosphere samples are representative of core area and containment conditions.

Samples can be returned to the containment or the reactor drain tank. The ventilation exhaust from the PASS sampling station is filtered through HEPA and charcoal filters located in the Auxiliary Building.