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February 24, 1982



Director, Office of Nuclear Reactor Regulation
Attention: D. M. Crutchfield, Chief
Operating Reactors Branch No. 5
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Subject: Docket 50-206
NUREG-0737, Item II.F.1
Attachment 1, Noble Gas Effluent Monitor
Attachment 2, Sampling and Analysis of Plant Effluents
San Onofre Nuclear Generating Station
Unit 1

References:

1. Letter, K. P. Baskin, SCE, to D. M. Crutchfield, NRC, Response to Order Confirming Commitments for TMI Related Requirements, August 6, 1981

2. Letter, K. P. Baskin, SCE, to D. M. Crutchfield, NRC, NUREG-0737, Item II.F.1, Attachment 2, Sampling and Analysis of Plant Effluents, November 25, 1981

3. Letter, D. M. Crutchfield, NRC, to R. Dietch, SCE, Status of NUREG-0737, Items II.F.1.1 and II.F.1.2, January 29, 1982

Reference 1 provided you with a system description and a statement of our design criteria for the San Onofre Unit 1 plant stack monitoring system, in response to the subject requirement. Reference 2 informed you of our deviation from the design criteria and a justification for the deviation. Reference 3 is a summary of your understanding of the current status of the subject requirement at San Onofre Unit 1 and a request that we provide additional information, if necessary, to clarify the status of the requirement.

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3/1 Drawings
To: BC

This correspondence is intended to inform you of additional clarification needed to define the status and anticipated completion date of modifications in response to the subject requirements. We are also informing you of our effort to examine potential design alternatives which could alleviate the sample-line plate-out problem described below.

The stack monitoring system as described in Reference 1, further classified on the attached system description and associated equipment and layout drawings, has been designed in accordance with the guidance presented in NUREG-0737. The supplemental guidance given in ANSI N13.1-1969 was also used to minimize the plate-out of particulates and iodines by locating the sampler as close as practical to the plant stack, attempting to minimize the horizontal component of the sample line, using long radius bends where bends were necessary, and heat tracing the sample lines. The sample skid was installed in June, 1981 and is presently located as indicated in the attached drawing 5161348-0, with the sample lines routed as indicated in the same drawing. These sample lines are planned to be relocated to a new location as indicated on the drawing titled "Proposed Sample Line to Vent Stack Wide Range Gas Monitor." The rerouting of the lines is an attempt to reduce sample line particulates and iodine plate-out by reducing the horizontal component and reducing the number of bends in the sample line. This modification is currently scheduled to be completed during the steam generator inspection outage to commence approximately March 1, 1982.

The noble gas effluent monitor and the radioiodine grab sampler at San Onofre Unit 1 are an integrated system on two skids located as discussed above. The noble gas effluent monitor was made operable on December 24, 1981 with the exception of the ability to sample when effluent conditions are 100% relative humidity at 100-110$^{o}$F. This problem should be resolved and the noble gas effluent monitor made fully operational during the March 1, 1982 steam generator inspection outage. Sample line plate-out calculations for particulates were performed using the guidance presented in ANSI N13.1-1969, Appendix B. Based on our system configuration, the results of the calculations showed an anticipated 80% plate-out of particulates in the high flow--low radiation sample and 100% plate-out of particulates in the low flow--high radiation sample line. When the previously discussed sample line reroute is completed, the plate-out calculations will be recalculated using the new configuration, but current estimates do not anticipate an appreciable change in the percentage of sample-line plate-out.

Based on informal inquiries of ten (10) nuclear power stations, the plate-out problem is one of generic concern. Our inquiry indicated that although plate-out has been identified as a problem at other stations, an acceptable value for sample line plate-out has not been quantified or even calculated in a manner according to ANSI N13.1-1969, Appendix B. The current guidance presented in NUREG-0737 and ANSI N13.1-1969 suggests that the plate-out be evaluated, but does not establish any criteria for an acceptable level of plate-out.

Based on the above discussion, the San Onofre Unit 1 post-accident effluent monitoring system has been designed and installed to comply with the existing criteria and no further modifications, other than those previously discussed, are planned. We are initiating an effort to examine design alternatives which would reduce the plate-out in the system and enable a grab sample to be taken. It is not currently known if redesign will reduce the sample line plate-out to an acceptable level but we will inform you of the results of our effort on June 1, 1982.

If you have any questions, please let me know.

Very truly yours,

K P Baskin

Enclosures

cc: R. H. Engelken, Director, OIE, Region V

SYSTEM DESCRIPTION
STACK EFFLUENT RADIATION MONITORING SYSTEM

## INTRODUCTION

The Stack Effluent Radiation Monitoring System, also described as Wide Range Gas Monitoring System (WRGMS), is designed to meet the recommendations of NUREG-0578, Item 2.1.8b-1. The system provides the control room operator a continuous measurement of the noble gas radioactivity being released to the environment via plant effluent pathway, namely the stack. Another effluent release path under certain postulated accident conditions is the atmospheric steam dump valve and/or the steam generator safety valves. The effluent monitoring system for this release path is described elsewhere.

## SYSTEM COMPONENTS

Since the plant personnel are to have access to certain components of the WRGMS (such as the particulate and iodine sample filters) during high range release conditions, the system is separated into distinct component assemblies which are located in such a way as to minimize personnel exposure to the postulated high levels of radiation. There are six (6) component assemblies of the system which are:

1. Isokinetic Nozzles
2. Sampling Rack
3. Sample Conditioner
4. Wide Range Gas Detector
5. Electronics
6. Readouts

## ISOKINETIC NOZZLES

There are two (2) sets of isokinetic nozzles, one for normal and one for high range conditions. Both sets of nozzles are mounted on a common sample gantry in the stack. Supplied with the isokinetic nozzles are pressure and temperature transducers to measure the effluent flow in the duct to provide computation of activity release rates in microcuries per second. The nozzle assembly is located in the effluent stack at elevation 75'-7". (See SCE Drawing No. 5161349.)

## SAMPLE CONDITIONING SKID ASSEMBLY

The sample conditioning skid assembly consists of sample rack and sample conditioner equipment.

Sampling rack is connected to the isokinetic nozzles and provides for collection of particulate and iodine samples. There are two (2) sets of sampling hardware, one for normal operation and the other for high range conditions. Filter holders and valves are provided to allow grab sample collection of particulates and iodines for isotopic analysis in the laboratory. The sampling rack is shielded to minimize personnel exposure.

The sample conditioner functions only during high range conditions. The purpose of the conditioner is to prevent contamination of the gas monitor by filtering out large concentrations of radioiodines and particulates. To provide enough filtering material to contain radioiodines and particulates for the duration of the measurement period, multiple filters are employed. While one is being used to filter the sample, the other is purging automatically. The sample conditioning skid assembly is located to the west of the ventilation equipment room and outside of the concrete shield wall. (See Drawing Nos. 5161348 and 5161350.)

WIDE RANGE GAS DETECTOR ASSEMBLY

This assembly contains three radioactive gas detectors to monitor noble gas concentrations from $10^{-7}$ to $10^{5}$ microcuries per cubic centimeter, after the iodine and particulates have been removed. This assembly also contains the necessary pumps, flow control valves, flow meters, etc. Each detector has a solenoid actuated check source to verify proper operation. The twelve (12) decades of noble gas concentrations are monitored by the three (3) detectors with at least one decade overlap between ranges of individual detectors.

There are two (2) flow paths to the detectors. During normal operation, only the low-range detector is used and the mid-range and high-range detectors are bypassed. As the low-range detectors begins to saturate, the flow path is automatically changed to mid- and high-range detectors while the low-range is purged.

The assembly is located adjacent to the Sample Conditioning Skid (see SCE Drawing No. 5161350).

ELECTRONICS ASSEMBLY

This assembly consists of a G. A. Co. Model RM-80 Microprocessor and a junction box for field terminations. The microprocessor performs flow control, valve actuations, engineering conversions, and other calculations and control functions. The microprocessor is located in a low radiation area in the Control Building (see SCE Drawing No. 5161363). The processor communicates with the digital readout assembly in the main control room.

READOUTS

The readout is mounted in the control room on panel C05 and consists of the digital module (G. A. Co. Model RM-23 Readout) and a chart recorder. The readout provides display of all monitor parameters, including channel activity in desired units, flow rates, alarm status, and check source actuation. The multipoint recorder is provided to maintain a hard copy record of radioactive gas concentrations per unit volume (micro curies per cubic centimeter for each of the three detectors) as well as a record of rate of release of activity from the effluent point (micro curies per second). The RM-80 Microprocessor maintains history files of twenty-four-10 minutes, twenty-four-1 hour and twenty-eight-1 day averages of channel activity that are available for recall via controls on the readout assembly. (See SCE Drawing No. 568736 and 5161353 for C05 panel mounted readout arrangement.)

DRAWING REFERENCES:

| SCE Drawing No. | Description |
|---|---|
| 451942 | Loop Diagram |
| 568736 | Vertical Board Arrangement |
| 5161348 | Installation Details - Sample Lines |
| 516349 | Installation Details - Isokinetic Nozzle Assembly |
| 5161350 | Installation Details - Skid Instruments |
| 5161353 | Installation Details - Radiation Monitoring System |

GENERAL ATOMIC DRAWING DOCUMENTS

Model RM-23 Readout User's Guide,No. E-115-809
Model RM-80 Equipment Manual, No. E-115-860
Wide Range Gas Monitors:
General Atomic Drawing Nos.
0366-0010
0366-0030
0366-0040

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