TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

September 1, 1981

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Chief
Licensing Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Ms. Adensam:

In the Matter of) Docket No. 50-328
Tennessee Valley Authority)

As a result of our meeting with the NRC staff on August 28, 1981, TVA was requested to provide additional information on TVA's proposed implementation changes for the following NRC requirements related to Sequoyah Nuclear Plant unit 2.

(1) Permanent Hydrogen Mitigation System
(2) Reactor Coolant System Vent System
(3) Incore Thermocouples
(4) Technical Support Center
(5) Post Accident Sampling
(6) Accident Monitoring Instrumentation

Enclosed is the requested information.

We have provided detailed design and procurement schedular information, justifications for interim operation, and reasons for schedule revisions. In all cases, we believe alternate measures are provided to ensure safe plant operation until these modifications can be implemented.

If you have any questions, please get in touch with D. L. Lambert at FTS 857-2581.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Regulation and Safety

Sworn to and subscribed before me
this 1st day of Sept 1981
Brenda M. Lowery
Notary Public
My Commission Expires 4/4/82

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ENCLOSURE

SEQUOYAH NUCLEAR PLANT

SCHEDULE REVISIONS FOR

(1) PERMANENT HYDROGEN MITIGATION SYSTEM

(2) REACTOR COOLANT SYSTEM VENT SYSTEM

(3) INCORE THERMOCOUPLES

(4) TECHNICAL SUPPORT CENTER

(5) POST ACCIDENT SAMPLING

(6) ACCIDENT MONITORING INSTRUMENTATION

PERMANENT HYDROGEN MITIGATION SYSTEM (PHMS)

Description of Change Requested

TVA is proceeding to implement a Permanent Hydrogen Mitigation System (PHMS) at Sequoyah Nuclear Plant units 1 and 2 to satisfy license condition 22.D(2) for unit 1 and 22.g(1) for unit 2. These conditions require that "for operation of the facility beyond January 31, 1982, the Commission must confirm that an adequate hydrogen control system for the plant is installed and will perform its intended function in a manner that provides adequate safety margins." The PHMS is designed to ensure controlled combustion of lean mixtures of hydrogen using thermal igniters distributed throughout containment and is intended to completely replace the installed Interim Distributed Ignition System (IDIS), which was designed to operate on the same principle. While replacing the IDIS with the PHMS, TVA intends to upgrade the system by improving the quality of components, adding redundancy, and enhancing the control capability. However, because of the lead time required to procure the system components and the adequacy of the similar IDIS that is already operational, TVA requests that implementation of the PHMS be deferred until the first refueling outage for each unit. The current schedules for those outages are September 1982 for unit 1 and January 1983 for unit 2. This request has been made previously to the NRC staff (reference letters from L. M. Mills to A. Schwencer dated March 10, 1981, and L. M. Mills to E. Adensam dated July 1, 1981). It should be noted that TVA's request for extension is for hardware implementation only and is not related to the research program which should be concluded and substantially documented by January 31, 1982.

Design and Procurement Information

The design of the PHMS is essentally complete, and procurement of the new equipment has begun. This includes environmentally and seismically qualified electrical transformers, distribution panels, cables, and control switches. The lead times, even under emergency purchase, are such that delivery of all the components cannot be promised before June 1, 1982. Specifically, the igniters are scheduled for delivery by January 1, 1982, the transformers by March 1, 1982, and the distribution panels and switches by June 1, 1982. TVA has decided to specify the highest practical system and component standards for the PHMS rather than to relax the standards in order to expedite delivery.

Justification for Length of Outage

The installation of the PHMS inside containment will require extended periods of occupancy in both upper and lower compartments during a shutdown. New cable and conduit must be routed for each of the 60 new igniter locations and new igniter assemblies must be mounted. Current material estimates for this system include 20,000 feet of cable, 3500 feet of conduit, 350 supports, 60 junction boxes, and 120 cable terminations. By the nature of the igniter locations being distributed throughout the containment area and generally at the top of each volume, physical access for installation of the system is difficult. As a result, temporary scaffolding will be required for most of the work. In addition, the

containment access restrictions applicable during shutdown of a unit that has been in operation complicate the work schedule. TVA estimates that 37,000 man-hours will be required to install the entire system. Much of this work will be inside containment. Even assuming that the work is done during the first refueling outage and progresses 24 hours a day for 10-12 weeks, it is still the critical path item for a plant outage of 110 days. Therefore, the shutdown necessary to install the containment portion of the PHMS must be deferred until the first refueling outage for each unit to avoid a separate and lengthy forced outage.

Interim Measures

TVA believes that the extension to the first refueling outage is acceptable and reasonable for a number of reasons, of which two are summarized here. First, there would be no real improvement over the IDIS if system installation was rushed before qualified replacement components could be obtained. Second, the impact of the extension on overall risk to the public is negligible because the event to be mitigated is unlikely, the duration of the extension is only a small fraction of the plant operating life, and the IDIS should be almost as reliable a mitigation system as the PHMS. The IDIS operates on the same concept as the PHMS, has the same functional capability, has equivalent coverage by location, has similar manual initiation logic, and has diesel backup power. TVA believes that the IDIS will continue to serve as an "adequate hydrogen control system" until the PHMS can be installed.

Summary

TVA is proceeding to replace the present Interim Distributed Ignition System with the Permanent Hydrogen Mitigation System in both Sequoyah units. However, since all of the qualified equipment cannot be procured and delivered until mid-1982 and a separate forced plant outage for system installation would be quite lengthy, TVA requests that the license condition be modified to allow installation to be completed during the first refueling outage for each unit. In the meantime, TVA believes that the Interim Distributed Ignition System that is installed and operational in both units provides fully adequate safety margins to mitigate the effects of hydrogen released during a degraded core event.

REACTOR COOLANT SYSTEM VENTING
NUREG-0737, ITEM II.B.1

Background

In response to NUREG-0578 and a recommendation from a TVA internal study group on the TMI accident, TVA signed a contract with Westinghouse in December 1979 for the addition of a reactor pressure vessel (RPV) head vent. The system for Sequoyah unit 2 was to be delivered by September 1, 1981.

TVA furnished NRC details of the conceptual designs for the RPV and pressurizer vents on July 1, 1981 (as required by NUREG-0737).

TVA's January 1980 response to the NRC on NUREG-0578 committed to the addition of the RPV vent and stated that pressurizer venting is already included in the Sequoyah design. Since the Sequoyah design contained two power-operated relief valves (PORV), either of which could accomplish venting, the pressurizer vent design was considered to be adequate.

In October 1980, NUREG-0737 gave additional details on the vent system. Although The RPV vent system was determined to meet the NUREG-0737 requirements, the PORV's for the pressurizer vent appeared to be deficient in the areas of environmental qualification and operability following an earthquake. Subsequently, TVA contacted Westinghouse in November 1980 regarding a pressurizer vent system which meets the requirements of NUREG-0737. Westinghouse has furnished TVA in May 1981 with a conceptual design, but a contract has not been signed for delivery of the system. TVA is pursuing this issue with the intent of having all design and procurement functions completed by July 1, 1982. However, due to the preliminary status of this design, the work inside containment required to install this system cannot be completed before full power operation of unit 2.

Equipment Procurement

With the exception of two valves, all the Westinghouse equipment for the RPV vent has been delivered. In approximately two more months equipment delivery, piping supports, and other drawings should be complete. There is a hand indicator controller for the main control room which is to be procured by TVA. Attempts by TVA to obtain this switch has resulted in no response from the vendors. This lack of response is due to the requirements that the switch has to be qualified in accordance With IEEE Standard 323, 1974 version. However, based on recent NRC staff information on the NUREG-0588 requirements for equipment in "mild" environments, TVA intends to obtain a seismically qualified switch and to determine that it has proper environmental qualification. TVA's plan has been to have the RPV vent system ready for installation before July 1982. We still believe that this schedule can be met.

Interim Measures

The schedule for the pressurizer vent installation is also July 1982. However, as discussed above, this schedule is not as firm as for the RPV vent because of the lack of a contract at this time. As noted in our response to NUREG-0578, there already exists a capability for venting of

the pressurizer via the PORV's. Therefore, until an upgraded system can be installed to meet the NUREG-0737 requirements, we believe that the present design provides sufficient interim capability for venting the pressurizer.

Summary

Basically, TVA's need for an extension on the scheduled implementation date of reactor coolant system venting is for the purpose of better scheduling the plant outage required to implement this modification. Three to four weeks in cold shutdown, not including time for shutdown and startup, will be required to complete the installation of the vent system. The RCS will have to be depressurized and cooled down to allow for installation.

TVA recommends that the Sequoyah unit 2 full power operating license be conditioned to require installation of the RCS Vent System before startup following the first refueling.

INCORE THERMOCOUPLES

The following is TVA's response to NUREG-0737, item II.F.2, attachment 1, "Design and Qualification Criteria for Pressurized - Water Reactor Incore Thermocouples," and NUREG-0578, item 2.1.3(b), same subject. Points are addressed in the same order as given in attachment 1 to item II.F.2.

First, TVA's incore thermocouple system as upgraded since the TMI-2 event will be described.

1. The Sequoyah incore thermocouples are located at the core exit for each quadrant, and in conjunction with core inlet RTD data, are sufficient to provide indication of radial distribution of the coolant enthalpy rise across representative sections of the core. Sixteen (four per quadrant) of the core-exit thermocouples will be designated as PAM sensors.

2. The primary operator display is a computer-driven printer. This system has the following capabilities:

   a. A spatially oriented core map is available on demand which indicates the temperature at each core exit thermocouple location.

   b. An example of the Sequoyah selective readings is an on-demand tabular listing of all instantaneous incore thermocouple values.

   c. A printout of average, instantaneous and maximum values is provided for all T/C temperatures. The range will meet the suggested range in the RG (200°F to 2300°F).

   d. Trend capability showing temperature time histories is designed into the system. Strip chart recorder points are available to assign to any incore thermocouple on demand. In addition, a point value trend printout is available on the control room printer.

   e. Alarm capability is provided in conjunction with the subcooling monitor which uses the average of all the T/C readings in the calculations.

   f. The control room displays are designed for rapid operator access and ease of viewing data. Also, the incore program has a validity-check comparison which reduces the probability of accessing false readings.

3. A backup analog readout is provided with the capability of selective reading of any T/C in the system. The range of the system is 0-700°F.

   Another means of obtaining this data is by reading the raw signals (T/C and reference junction output) with portable test equipment. This data is available in the control building and would be accessible under all conditions should the primary and backup display devices fail.

4. Present isolation between the primary and backup channels is implemented in the form of electrical switches. The primary and backup display channels are powered by a reliable battery-backed power source.

5. The existing incore T/C system is a very simple set of hardware which should, by virtue of its simplicity, be a highly reliable and accessible system.

Although TVA has been required through the licensing process to commit to the environmental qualification and the physical separation of these 16 incore thermocouples, we believe further enhancement of the incore thermocouple system will not add to overall plant safety.

In addition to the incore thermocouples, TVA utilizes a saturation meter to detect/follow the approach to inadequate core cooling and expects to utilize the reactor vessel level instrument to determine the degree of inadequate core cooling.

The Reactor Vessel Level instrument is designed to provide direct readings of vessel level which can be used by the operator. This Reactor Vessel Level Instrumentation System does not replace existing systems and is not coupled to safety systems, but acts only to provide additional information to the operator.

The Upper Range Reactor Vessel Level Instrumentation has differential pressure measurement across the upper region of the reactor vessel. The system utilizes two differential pressure cells measuring the pressure drop from the reactor coolant hotleg piping to the reactor vessel head. The system provides an indication of reactor vessel water level above the hotleg pipe when the pump in the loop with the hotleg connection is not operating. The number of pumps operating in the other loops has an effect of less than 10 percent of this indication. When the pump is operating in the loop with the hotleg connection, the instrument reading will be offscale.

The narrow range reactor vessel level instrumentation measures vessel level from the top to the bottom of the reactor vessel when only one or no reactor coolant pumps are running. The instrument will also measure the reactor core and internals pressure drop, and therefore an indication of the relative void content or density of the circulating fluid when only one pump is operating. When more than one pump is running, the instrument will be offscale.

The wide range reactor vessel level instrument measures the reactor core internals and outlet pressure drop for any combination of pumps running. Comparison of any measures pressure drop with the measured pressure drop during normal operation will provide an approximate indication of the relative void content or density of the circulating fluid.

To provide the required accuracy for water level measurement, temperature measurements of the reference legs are provided.

These measurements together with the reactor coolant temperature measurements are used to compensate the differential pressure particularly during the environment inside the containment structure following an accident.

The Reactor Vessel Level Instrumentation System utilizes differential pressure cell instrumentation in two of the hotleg pipes. The instrumented hotleg piping will not be adjacent, but with respect to the plant layout, will be on opposite sides of the reactor vessel. The differential pressure cells are to be located outside of containment so that calibration cell replacement, reference leg checks and filling, and operation are made more easily and the overall system accuracy is improved.

Instrumentation for the operator for the Reactor Vessel Level Instrumentation System is intended to be unambiguous and reliable so that operator error or misinterpretation is avoided.

Upper range, narrow range, and wide range level signals are available from each train for display on standard VX-252 type vertical scale voltage meters. Thus, the indication is compatible with existing control board layouts. The indication signals are electrically isolated from the protection set and are suitable to serve as either a standard control grade or postaccident monitoring output.

The control board displays provide the following information:

1. An indication of reactor vessel level (narrow range) for each instrumented set displaying vessel level in percent from 0 to 60 percent after compensation for the effects of the reactor coolant and capillary line temperature and density, when reactor coolant pumps are not operating.

2. An indication of reactor differential pressure (d/p) (wide range) from each instrumented set displaying d/p in percent from 0 to 100 percent, after compensation for the effects of the reactor coolant and capillary line temperature and density effects, when reactor coolant pumps are operating.

3. An indication of upper range vessel level on each of the two instrumented sets displaying vessel level in percent from 60 to 100 percent after compensation for any reactor coolant and capillary line density effects, when the reactor coolant pump in the loop with the hotleg connection is not operating. A status light will indicate the operation of the reactor coolant pump with the hotleg connection.

   Redundant displays are provided for the two sets. Level information based on all three d/p measurements is presented. Correction for reference leg densities is automatic. Any error conditions such as out-of-range sensors or hydraulic isolators are automatically displayed on the affected measurements.

   The Reactor Vessel Level Instrumentation is to be used in conjunction with a coolant subcooling readout to determine the state and transient behavior of the reactor coolant system. The reactor vessel wide range level indication will read onscale with all four reactor coolant pumps running during normal operation from 0 to 100 percent full power. With all pumps shut down, the indicator will provide a direct indication of water level in the reactor vessel.

TVA believes that the combination of saturation meter, reactor vessel water level indication (Reactor Vessel Level Instrumentation is scheduled to be installed during the first refueling outage), and standard incore thermocouples with extended range provides more than adequate information to detect and determine the degree of inadequate core cooling. We believe that imposed requirements such as incore thermocouple qualification are not necessary based on the other information that will be available to the operator.

Summary

TVA believes that further upgrade of incore thermocouples at Sequoyah unit 2 should not be required. If NRC continues to require further upgrading of incore thermocouples at Sequoyah unit 2, the full power operating license be conditioned to require upgrading of the incore thermocouples before startup following the first refueling outage. Allowing TVA to implement the thermocouple upgrade at the first refueling outage should provide adequate time to prevent significant impact on more important work.

TECHNICAL SUPPORT CENTER

Background

TVA's letter to NRC dated July 2, 1981 (L. M. Mills to H. R. Denton) provided the conceptual design for the Sequoyah Technical Support Center (TSC) and other Emergency Response Facilities (ERF). The letter identified the TSC as the only ERF that could not be completed before the October 1, 1982 deadline.

Design and Procurement

The design work for the TSC began with the issuance of NRC Generic Letter 81-10 in February of 1981. At this time, the completion of the design drawings and the delivery of all components to the site is scheduled for April 1982.

Outage Time

To implement the TSC, TVA estimates that 60 days of nonoutage time and 4 weeks of outage time (not including time for shutdown and startup) will be required. However, to accommodate plant operating requirements, most of the nonoutage work will extend over a period of about one year. The outage time is required to allow installation of equipment in the main control room. TVA considers it unsafe to perform work of this nature in the main control room while a unit is in power operation.

Interim Measures

TVA has implemented an interim TSC as reviewed and approved by NRC in Sequoyah SER Supplement 2. The Local Recovery Center and access to meterological and radiological data will be provided to appropriate response centers by June 1, 1982. TVA's centralized emergency centers have been implemented as described in the June 2, 1981 letter.

Summary

TVA recommends that the Sequoyah unit 2 full power operating license be conditioned to require completion of the TSC by July 1, 1983. This will allow TVA to schedule the necessary outage work during a refueling outage.

POSTACCIDENT SAMPLING
NUREG-0737, ITEM II.B.3

Introduction

The overall design and implementation of postaccident sampling (PAS) at TVA has gone through many unforeseen and/or unplanned changes, many of which are due to plant-unique features. TVA as a whole has made an all-out effort to meet our January 1, 1982, implementation date for PAS at Sequoyah Nuclear Plant unit 2.

NUREG-0737 was issued approximately 1.7 years after the accident at TMI and 1.3 years after the issuance of NUREG-0578. To meet the very early date of January 1981 for an operational PAS capability set by NUREG-0578, several normal design activities including a detailed radiation dose analysis (both airborne radioactivity and gamma radiation from process equipment) were bypassed. Conservative assumptions were made and then were used as a basis for the first issues of the PAS design criteria for both Browns Ferry and Sequoyah Nuclear Plants. After the schedule relaxation given in NUREG-0737 occurred, the radiation calculations bypassed earlier were initiated.

Since the radiochemical laboratory and much of the auxiliary building at Sequoyah were not originally designed for postaccident access, the radiation doses that the sampling technicians would encounter enroute to the PAS station, to the radiochemical laboratory, and back to the operational support center were unknown. Further specifics on how to get an aliquot of each sample fluid into the radiochemical laboratory instrumentation/laboratory equipment to get the needed analytical results were unknown. These are now believed to be settled. Once this is done, the radiation doses can be calculated and the needed scope of radiation protection clothing and face masks, etc., are determined, the scope of the HVAC needs can be established. This work is now in process. No HVAC needs can be finalized until mission doses are established. Table I depicts many other important milestones for PAS and important dates to TVA.

The following discussions provide specific details on the current status of design and construction, design problems encountered, and interim measures available until the PAS is fully operational.

Status of Design and Construction

Although problems were encountered with the heating, ventilation, air-conditioning, and air cleanup (HVAC) in the radiochemical laboratory and sample station, work continued in areas that had a minimal chance of being affected by possible design changes. These areas include the essential interface services listed below which are required for the operation of the sample station:

1. Component cooling
2. Control air
3. Demineralized water
4. Nitrogen
5. Waste disposal drains
6. Shielding

The design of the above services and their corresponding piping and valves is essentially complete. The basic sampling system has been purchased from Sentry Equipment Corporation and is onsite available for installation. Construction has proceeded on the sample station with its present status listed below:

1. Completion is estimated between 45 and 50 percent.
2. All the required shielding (steel and concrete) is in place.
3. The necessary penetrations for PAS have not been made through the shield walls for the samples.
4. Additional penetrations for component cooling water through the auxiliary building walls are not complete.
5. The work (mostly installation of piping) inside containment has not commenced.

It is possible that the sample station could be in the range of 90 percent complete by January 1982. The items that would not be complete are the HVAC modifications and the work needed to be performed inside containment. The problems encountered with the HVAC are discussed in the next section.

The design for the modification of the radiochemical laboratory had been placed on hold for a period; therefore, no construction work has been initiated. The problems faced with this phase of work are outlined in the next section.

Design Problems Encountered

In an effort to expedite PAS implementation and meet NUREG-0737 requirements for an onsite radiological and chemical laboratory, TVA decided to use the existing radiochemical laboratory as opposed to locating and constructing a new facility. Although this facility was not originally designed to serve this function and might require some redesign to ensure its habitability after a loss-of-coolant accident (LOCA), this appeared to be the best possible alternative for meeting NRC requirements. However, more detailed evaluations regarding the use of this facility have identified the following problems:

1. The initial dose and shielding calculations determined that additional shielding is required in the ceiling or roof of the radiochemical laboratory for personnel protection. If shielding is added, the radiochemical laboratory would likely be shut down during the necessary construction work. This in turn would require a two-unit plant shutdown.

2. Difficulties were encountered in the location and sizing of the HVAC and associated ducting for the radiochemical laboratory.

The problems with the sample station HVAC were as follows:

1. The existing plant auxiliary building gas treatment system which was planned for use in the treatment of the sample station exhaust air could not treat the additional flow and, concurrently, accomplish its other required system safety functions during a postulated accident.

2. As a result of item 1, a reevaluation of the plant design basis for this system was required to determine an alternate means of treating the exhaust air.

These problems did not surface all at once. They occurred in a "rippling effect" from May through July 1981. The problems encountered caused further reevaluation and changes in the system design basis. Readjustments in the design basis were completed during August 1981. TVA is confident that these readjustments will essentially resolve the open issues and at the same time meet and fulfill all NRC requirements for PAS. However, the appropriate dose and shielding calculations remain to be completed in order to confirm the proposed readjustments to this system.

Due to design modifications discussed above, changes were required to the HVAC specifications which added a minimum of three months to our procurement schedule. Currently our schedules for procurement identify contract award in December 1981 and equipment delivery in September 1982. This schedule is based on maximum use of emergency purchase procedures.

Interim Solutions for PAS

Until the PAS system becomes fully operational TVA has written interim procedures for obtaining a sample(s). These procedures are described in the plant's technical instructions (TI-66). These procedures would allow TVA to collect samples from existing sample points which are not entirely qualified for severe accident scenarios.

Summary

For the reasons outlined above, TVA recommends that the Sequoyah unit 2 full power license be conditioned to require implementation of the postaccident sampling requirements before startup following the first refueling outage.

TABLE I
POSTACCIDENT SAMPLING

Date	Background
March 28, 1979	TMI Accident
July 1979	NUREG-0578 issued
January 24, 1980	Justification for emergency purchase approved
January 25, 1980	Postaccident equipment procurement specification for Browns Ferry, Sequoyah, and Watts Bar issued
February 1, 1980	Common design criteria issued for all plants
April 10, 1980	Revised common design criteria for all plants
April 30, 1980	Sentry Equipment contract signed
July 3, 1980	TVA entered into Subagreement No. with the Department of Energy (DOE) specifically Oak Ridge National Laboratory (ORNL) to gain technical expertise related to PAS
September 1980	Advance notice of NUREG-0737 received from NRC
November 1980	NUREG-0737 issued by NRC
December 1980	Regulatory Guide 1.97, revision 2, was issued by NRC (see note below)
February 24, 1981	Detailed design criteria issued for Sequoyah
May 1981	Problems with the use of the existing radiochemical laboratory at Sequoyah were identified
July 22, 1981	TVA determined that the HVAC for the Sequoyah sample station will have to be revised
August 27, 1981	Readjustments in the design basis for the radiochemical laboratory and sample station at Sequoyah were completed

NOTE:

Regulatory Guide 1.97 deals with the "type" and "category" requirements of instruments that are to function during and following an accident. Postaccident sampling instrumentation falls into type "D" measuring "variables that provide information to indicate the operation of individual safety systems and other systems important to safety."

The system whose variables are being measured then determine what the "category" of the instruments should be. Regulatory Guide 1.97 goes into detail concerning "types" and "categories."

Regulatory Guide 1.97 impacted the design schedule, but it aided TVA in making a decision to lower the classification of some of the piping and valves which resulted in some cost savings.

ADDITIONAL ACCIDENT MONITORING INSTRUMENTATION
NUREG-0737 ITEM II.F.1

Item II.F.1 of NUREG-0737 requires utilities with operating plants or plants under construction to add and/or upgrade instrumentation associated with accident monitoring by January 1, 1982 (or initial fuel loading, whichever is later). TVA is proceeding to purchase and install this equipment on an expedited basis. However, in some areas, problems have developed in our design and procurement work for Sequoyah which will make the January 1, 1982, implementation date for this instrumentation difficult to meet. The following is a technical summary on the current status of these efforts:

Wide Range Noble Gas, Iodine and Particulate Effluent Monitors

I. General Comments

1. Wide range noble gas monitors which meet regulatory requirements are available from a number of vendors (such as General Atomic, Eberline, etc.).

2. RG 1.97 and NUREG-0737 call for particulate and iodine sampling as well as noble gas. A monitor which accomplishes particulate, iodine and noble gas monitoring and meets regulatory requirements is not presently available.

3. Noble gas monitors presently available (as mentioned in 1 above) require a sampling assembly for the vents. The monitor assembly often is as large as 6' x 3' x 4' and weighs as much as 5000 lbs. Some presently available models make provisions for taking particulate and iodine grab samples.

4. Installation of a noble gas assembly now and adding a particulate and iodine capability as it becomes available will require an additional space and likely an additional isokinetic sampling assembly for each vent sampled.

II. TVA's Intent

1. Provide a noble gas monitoring capability which covers the ranges required by RG 1.97 and NUREG-0737 and which are IEEE Class 1E, seismic Category I, and qualified to the environment in which they are located.

2. Procure an integrated monitoring assembly which will accomplish particulate, iodine and noble gas monitoring per regulatory requirements. The isokinetic sampling task can be accomplished with one probe assembly and one control panel assembly.