Entergy

Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72802
Tel 501 858 5000

July 17, 2000

0CAN070003

U. S. Nuclear Regulatory Commission
Document Control Desk
Mail Station OP1-17
Washington, DC 20555

Subject: Arkansas Nuclear One - Unit 1 and Unit 2
Docket No. 50-313 and 50-368
License No. DPR-51 and NPF-6
Supplemental Information on Relief From Post Accident Sampling System Requirements of NUREG-0737

Gentlemen:

By request of the Nuclear Regulatory Commission (NRC) Staff, the following information is provided as a supplement to the ANO submittals dated July 7, 1999 (0CAN079901) and February 24, 2000 (0CAN020006) proposing relief from NUREG-0737 requirements associated with the Post Accident Sampling System (PASS). The NRC Staff requested a specific statement regarding ANO's concurrence with the recently approved changes to Combustion Engineering's (CE) topical report NPSD-1157, "Technical Justification For The Elimination Of The Post-Accident Sampling System From The Plant Design And Licensing Bases For CEOG Utilities." The NRC Staff issued their safety evaluation of NPSD-1157 on May 16, 2000. The Staff has also requested information on several additional areas associated with the elimination of PASS in order to complete the safety evaluation for the ANO-2 submittal. The requested information, however, is not such that would require extensive elaboration on each item. Therefore, the following responses are bulleted to show comparisons between applicable sections of the NRC safety evaluation of NPSD-1157 and the ANO-2 specific application of such.

CE NPSD-1157, Revision 1

- ANO worked jointly with CE on developing revisions to topical report CE NPSD-1157. CE submitted to the NRC proposed revisions to the topical report on March 30, 2000, and provided supplemental information on April 14, 2000. ANO has reviewed the changes as presented in CE NPSD-1157, Revision 1, and supports these revisions. The revisions are not considered to be in conflict with ANO's original position as documented in the aforementioned ANO submittals and both ANO-1 and ANO-2 meet the necessary criteria of the revised topical.

NRC May 16, 2000, SER Section 3.1: *"...for plants not equipped with automated gas sampling systems, the delay between sampling and the availability of the results is long and of no practical significance in accident management."*

- The ANO PASS is identical on both Units 1 and 2. Neither system has the capability to perform automated total dissolved gas sampling of the reactor coolant system (RCS). Therefore, sampling for dissolved gases within the RCS to support identification of RCS voiding never considered necessary or timely since it is not used during emergency response actions. Operation's and emergency personnel will have determined the existence of voids and taken appropriate action before such a sample could be acquired and analyzed as described in the aforementioned ANO letters.

NRC May 16, 2000, SER Section 3.1: *"...the creation of voids in the vessel dome (and at the top of the steam generator U tubes) when depressurizing..."*

- The detection of RCS voiding was described in the July 7, 1999 ANO letter. Within this discussion, areas where voiding was expected to occur included the U tubes within the Unit 2 steam generators and the reactor vessel head and pressurizer high point of either unit. The discussion could have included an additional area for Unit 1, being the top of the hot leg candy-canes. Nevertheless, the discussion of void detection and elimination remains valid, since it applies to all of the above areas where voiding is expected to occur, including the Unit 1 hot leg candy-canes. In addition, the high point vent systems of both units, which may be used to aid in void elimination, are safety-related, may be remotely positioned from the control room and, therefore, are reasonably assured to be available to support such efforts.

NRC May 16, 2000, SER Section 3.2: *"...refinements in core damage assessments which might be provided by knowledge of dissolved hydrogen is not necessary."*

- The July 7, 1999, ANO letter stated that the ANO Core Damage Assessment Methodology (CDAM) would be revised upon approval of the submittal, to eliminate one of the four tiers presently maintained within the program. The tier to be deleted is the core damage assessment that depended on sampling in order to assess the condition of the reactor core. Included in the proposed revision is the deletion of recommendations to obtain a hydrogen sample of the RCS. ANO intends to remove this fourth tier from the CDAM after NRC approval of PASS elimination for ANO-1 and ANO-2, but before the stated implementation date.

NRC May 16, 2000, SER Section 3.3: *"In addition, whenever needed, oxygen concentration can be estimated from the oxygen concentrations in the reactor water storage tank..."*

- ANO does not routinely sample RCS makeup sources (Refueling Water Tank, Borated Water Storage Tank, etc.) for oxygen content. The CE Topical referenced the ability to estimate RCS oxygen levels based on the known fluids that were being added to the RCS during a severe accident. The concern for oxygen content is based on the control of reactor coolant chlorides which, as stated in the original submittal, are adequately controlled by controlling the pH of the reactor coolant. Where knowledge of the RCS oxygen content may be desired, ANO has the capability of determining the amount and source of borated water added to the RCS and could estimate the resultant oxygen content of the reactor coolant based on partial pressures, surface areas, etc. However, it is more likely that ANO would conservatively assume that the borated water sources added to the reactor coolant are saturated with oxygen, since these sources are stored in tanks that are vented to atmosphere. Making a conservative assumption of the oxygen content of the borated water sources will not impact the assumed state of the reactor core provided proper pH has been maintained.

NRC May 16, 2000, SER Section 3.6: *"The topical report recognizes that boron measurement may be required, but states that corroborative evidence would suffice to prevent re-criticality."*

- During accident conditions, makeup sources to the RCS are of a highly borated concentration. The need to obtain boron samples to ensure the reactor remains sub-critical is redundant and unnecessary. As discussed in the July 7, 1999, ANO letter, several defense-in-depth components exist to further aid the operators in monitoring the reactor for indications of an approach-to-criticality (neutron flux indicators, control rod positions, procedural calculations based on boron additions, etc.).

NRC May 16, 2000, SER Section 3.8: *"...contingency plans should be developed to support taking RCS samples post accident."*

- The July 7, 1999 ANO letter referred to ongoing dose rate analysis of the primary sample areas in order to support non-PASS sampling activities during events of up to 5% clad failure. In addition, these dose rates would be incorporated into appropriate procedures as an added input to the emergency classification process. ANO has completed the dose rate assessments and found that the dose rates will support sampling activities up to 5% clad failure. ANO intends to incorporate this information into appropriate station procedures, including the Emergency Plan Implementing Procedures, after NRC approval of PASS elimination for ANO-1 and ANO-2, but before the stated implementation date.

NRC May 16, 2000, SER Section 3.9: *"...severe accident management decision-making would rely on default hydrogen production assumptions contained in the SAMG."*

- ANO hydrogen analyzers for both ANO-1 and 2 are calibrated to provide containment hydrogen levels in the range of 0 – 10% hydrogen content. The ANO-2 Severe Accident Management Guidelines (SAMG) contain calculational aids to estimate the amount of hydrogen concentration in the containment atmosphere whether or not the hydrogen analyzers are available. This calculational aid is not unique to ANO-2 and, therefore, could be used in a severe accident in developing a like estimate of hydrogen for ANO-1.

NRC May 16, 2000, SER Section 3.11: *"...initial protective action recommendations (PARs) should be based upon plant indications of actual or projected severe core damage. Following this initial PAR, the licensee should continue assessment..."*

- As discussed in the previous ANO letters, an overall iodine sample is obtained by field personnel during a severe accident event at various off-site locations. ANO intends to maintain this sample capability, or equivalent, within its programs.

NRC May 16, 2000, SER Section 3.14: *"...the sump level (and the corresponding amount of water) and sump water temperature are known which allow an estimate to be made for the boron concentration."*

- Once the RCS has depressurized sufficiently to prevent sampling via the normal sample system, boron concentrations may be derived based upon the known sources and amounts of borated water that have been or are in the process of being added to the RCS. As discussed previously, in addition to such estimates, other defense-in-depth components are maintained to ensure a positive reactivity insertion can be detected and terminated in a prompt manner. Therefore, a sample of the containment sump to determine boron concentration is not necessary.

NRC May 16, 2000, SER Section 4.1

ANO has additionally reviewed the Licensee Required Actions (Section 4.1) of the NRC SER approving the CE NPSD-1157, Revision 1, topical report dated May 16, 2000, and commits to the following:

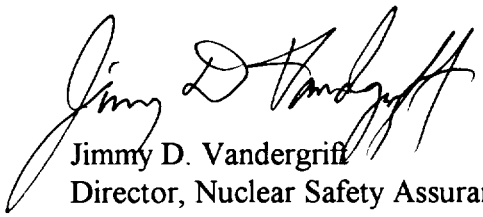
- ANO will establish and maintain the capability for classifying fuel damage events up to 5% clad failure (well above the Alert threshold) utilizing the normal sampling system, letdown line monitor, or a correlation of normal sampling system dose rates to reactor coolant concentrations.

- ANO will ensure contingency plans provide for obtaining and analyzing highly radioactive samples of the reactor coolant, containment sump, and containment atmosphere (including containment hydrogen), during post accident periods. Since information obtained via these contingency plans are not required for PAR development or core damage assessment, plans may include guidance for collecting samples while avoiding undue radiological exposure to personnel. Such guidance may consider use of temporary shielding and postponing the time at which the sample is to be taken. Consistent with the intended use of these contingency plans, need for operational staff flexibility, and the expectation that improved post accident resources may avail themselves in the future, no specific criteria with regard to minimum sampling time or accuracy is required. Since possible sample locations are broad and may change throughout the life of the plant, specific sample locations will not necessarily be addressed in station procedures. However, appropriate sample points will remain available to allow for a reactor coolant and containment atmosphere sample during an accident.

- ANO will maintain the capability to determine the overall iodine content of offsite releases from field samples obtained during severe accidents.

Entergy believes the above information is sufficient to support continued NRC review efforts in the matter of NUREG-0737 PASS relief approval for both ANO-1 and ANO-2. Should further information be required, please contact my office.

Very truly yours,



Jimmy D. Vandergriff
Director, Nuclear Safety Assurance

JDV/dbb

cc: Mr. Ellis W. Merschoff
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

NRC Senior Resident Inspector
Arkansas Nuclear One
P.O. Box 310
London, AR 72847

Mr. Chris Nolan, Project Manager
U. S. Nuclear Regulatory Commission
NRR Mail Stop 04-D-3
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Mr. David D. Snellings
Director, Division of Radiation
Control and Emergency Management
Arkansas Department of Health
4815 West Markham Street
Little Rock, AR 72205