**TENNESSEE VALLEY AUTHORITY**

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FEB 23 1989

U.S. Nuclear Regulatory Commission
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Gentlemen:

| | | |
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| In the Matter of | ) | Docket Nos. 50-259 |
| Tennessee Valley Authority | ) | 50-260 |
| | ) | 50-296 |
| | ) | 50-327 |
| | ) | 50-328 |
| | ) | 50-390 |
| | ) | 50-391 |

BROWNS FERRY NUCLEAR PLANT (BFN), SEQUOYAH NUCLEAR PLANT (SQN), AND WATTS BAR NUCLEAR PLANT (WBN) - RESPONSE TO GENERIC LETTER 88-14 - INSTRUMENT AIR SUPPLY SYSTEM PROBLEMS AFFECTING SAFETY-RELATED EQUIPMENT

The subject generic letter requested licensees/applicants to ". . . perform a design and operations verification of the instrument air system." and provide information on programs for maintaining proper instrument air quality. This letter provides TVA's response to Generic Letter 88-14. Enclosures 1, 2, and 3 provide the responses for SQN, BFN, and WBN, respectively. Enclosure 4 provides a summary list of commitments made by TVA in the submittal.

If you have any questions, please telephone D. L. Williams at (615) 632-7170.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

R. Gridley, Manager
Nuclear Licensing and
Regulatory Affairs

Enclosures
cc: See page 2

A048

U.S. Nuclear Regulatory Commission

FEB 23 1989

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ENCLOSURE 1

TVA RESPONSE TO GENERIC LETTER (GL) 88-14
FOR
SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2

ACTION 1: Verify by test that actual instrument air quality is consistent with manufacturer's recommendations for individual components served.

TVA RESPONSE:

The SQN compressed air system is divided into a station control and service air (SCSA) system and a safety-related auxiliary control air (ACA) system. The SCSA system supplies air to safety-related and non-safety-related users on the SCSA system and is the normal air supply source for safety-related, air-operated devices located on the dual-trained ACA supply headers. During normal operation, air supplied from the SCSA system compressors is processed through regenerative desiccant-type dryers and filters. Air supplied to the ACA system is further processed through similar ACA system dryers and filters while the ACA air compressors are maintained in standby condition.

Preoperational Test TVA-27 sampled air at remote locations in the SCSA and ACA systems and verified a dewpoint of -40 degrees F, or lower, at line pressure and a maximum particle size of 5 micrometres or less, which meets system design requirements. Reviews of safety-related users as documented in NUREG-1275 found no requirement for filtration below 5 micrometres in size. Because the four SCSA compressors and the two ACA compressors are the nonlubricated type, oil content was not analyzed in Preoperational Test TVA-27. Test filters were visually inspected for signs of oil contamination, and none was detected. Subsequent to preoperational testing, a fifth, lubricated, rotary screw compressor has been added to the SCSA system. The lubricant for the fifth compressor is silicon based and, therefore, will not contaminate the air system with hydrocarbons. The rotary screw compressor is provided with a sump separator and 2-stage coalescing and puralescing filters designed to reduce lubricant content at the discharge to 1 parts per million (ppm) or less. The SCSA and ACA prefilter filtration ratings are 3 and 0.9 micrometres, respectively, and the afterfilters are 5 and 0.9 micrometres, respectively.

The SQN service air header is used for plant breathing air purposes, and TVA's Occupational Hygiene Group (OHG) routinely samples service air to meet OSHA standards and Compressed Air and Gas Specification G7.1. The acceptance criteria OHG uses for condensed hydrocarbons is 5 milligrams per cubic meter ($mg/m^3$) (approximately 4 ppm by weight) and for particulates, 2 $mg/m^3$. These samples are taken upstream of the air dryer prefilters and afterfilters. As such, air samples taken at these sample points that meet the above acceptance criteria should be indicative of high quality instrument air (downstream of the filter and dryers). In addition, dewpoint alarms are provided in each SCSA and ACA supply header and are set to provide alarm indication at 6 percent relative humidity (i.e., equivalent to + 22 degrees F dewpoint maximum under design conditions).

TVA's Nuclear Maintenance organization has reviewed maintenance history items for SQN units 1 and 2 and found no indication of a generic problem with instrument air quality. In addition, instrumentation and control drawings and details were also reviewed by Nuclear Engineering (NE) for air-operated valves and controls having a safety classification. Design drawings showed 591 of 619 users have local filters or filter regulators installed.

Based on the above reviews, TVA has identified the following additional actions for addressing the recommendations of GL 88-14 in this area:

1. Postmodification test (PMT) 84, which is still open, will be revised to require air quality verification for lubricant content at the rotary screw compressor's discharge downstream of the 2-stage pipeline filter. The acceptance criteria for lubricant content will be 1 ppm maximum condensed lubricant. The scoping document for PMT 84 will be revised by May 4, 1989, and PMT 84 will be performed by July 31, 1989.

2. Plant procedures will be revised to require routine setpoint verification of moisture elements in the ACA and SCSA systems by July 31, 1989.

3. Routine air quality testing will be implemented by August 28, 1989.

4. The need for local filters for the remaining 28 users will be evaluated by June 1, 1989.

ACTION 2: Verify that maintenance practices, emergency procedures, and training are adequate to ensure that safety-related equipment will function on loss of instrument air.

TVA RESPONSE:

Maintenance Practices

SQN's preventive maintenance program for the SCSA and ACA systems provides for replacing filters and dryer desiccant and performing air dryer maintenance on a regularly scheduled basis. Current control air quality preventative maintenance procedures (referred to as PMs) include dryer inspection, desiccant replacement, and replacement of system filters. PM is performed for the SCSA system on a periodic basis. PMs for the SCSA system include the following: Intercooler water traps are inspected and maintained; intercooler filters are replaced; aftercooler drain traps are cleaned; compressor components (pistons, rings, gaskets, seals, and cylinders) are checked and cleaned; aftercooler tubes are cleaned; and receiver tank drains and traps are inspected and maintained. The ACA is periodically maintained by another set of PMs with the following elements: Low-level oil switches for the compressor sump are calibrated; the compressors are completely rebuilt and inspected on a periodic basis; dryer pilot valves and check valves are inspected; and aftercoolers are inspected, cleaned, and checked for leaks in accordance with the manufacturer's recommendations. These PMs enhance the assurance that the ACA system will function as intended on a loss of the SCSA system.

SQN Standard Practice SQN 63, "Preventive Maintenance Program Upgrade Project," is being implemented to further improve the overall SQN PM program through a systematic evaluation of PM requirements. Also, as a result of the reviews performed for GL 88-14, it has been discovered that some drain traps in the ACA and SCSA systems may require additional emphasis on proper maintenance. Even though drain trap failures have not been a problem to date, including these devices within the scope of the PM program will enhance their long-term reliability. New procedures will be created or existing procedures will be revised by May 15, 1989, to ensure adequate PM for system drain traps.

## Operating Procedures

Abnormal Operating Instruction (AOI) 10, "Loss of Control Air," is the principal instruction covering a loss of SCSA and ACA for SQN. AOI-10 specifically addresses the indications, possible alarms, and automatic action associated with a loss of control air.

The expected automatic plant responses to a loss of control air are addressed by AOI-10 and depend upon the modes of plant operation. These responses include automatic actions of compressed air system components, valve failure positions, turbine and/or reactor trip, etc. The plant response also depends on whether failure is system or train dependent. A slow decrease in system air pressure allows time for operator response in accordance with AOI-10. If a reactor trip occurs, Emergency Operating Instruction (EOI) E-0, "Reactor Trip or Safety Injection," and EOI ES 0.1, "Reactor Trip Response," will be followed. Manual actions to be taken by the operator to respond to a loss of control air event are covered by AOI-10. Each section of AOI-10 details immediate, as well as subsequent, operator actions.

Restoration actions to be taken after control air is regained are dependent on the plant mode and whether or not one train of ACA was lost. AOI-10, section A, specifically addresses actions to be taken for recovering from a loss of SCSA while the plant is either in operation or at hot standby (modes 1, 2, or 3). If isolating a header or line break is possible, pressure to portions of the control air system can be restored immediately. As the air pressure is restored to normal, the air-operated equipment will automatically align for power operation or will be aligned by the operator. The necessary actions will depend upon the conditions at the time of the loss, what portions of the system were lost, and actions taken during the loss.

AOI-10, section B, addresses recovery from a loss of control air while the residual heat removal (RHR) system is in service by directing the operator to the proper system operating instruction (SOI) for normal letdown and charging after corrective maintenance is performed to restore the air system. Normal RHR heat removal is to be reestablished in accordance with general operating instruction (GOI) 3B.

AOI-10, section C, does not address recovery from a loss of a single train of the dual-trained ACA. However, Technical Specification Interpretation Log No. 3, revision 3, lists the limiting condition for operation (LCOs) the unit will enter for a failure of an A or B train compressor and associated trained equipment. Also, loss of ACA will cause the unit to enter LCOs because of the loss of a single train of ACA-supplied components (listed along with their failure position in AOI-10, Table 1).

A total loss of alternating current (ac) power is covered by Emergency Contingency Instruction (ECA) 0.0, "Loss of All AC Power." Operator action is determined by estimates of the planned availability of offsite or emergency ac power. Following a safety injection (SI) and recovery from loss of all ac power, EOI-ES 0.2, "S.I. Termination Unit 1 and 2," directs that control air be restored to containment.

In summary, operator action for loss of SCSA or ACA is dependent on plant conditions at the time the failure occurs. For this reason, SQN emergency instructions are symptom-based procedures. Operators are trained to act based on specific plant parameters; and, if components do not fail to their intended position, operator action is based on those parameters. For the above reasons, AOI-10 is considered to provide the operator with sufficient instruction for loss of air events. In addition, to support this conclusion, NE will perform a review of AOI-10 to ensure that air systems events are adequately covered and responded to by Operations from an engineering standpoint. Any identified deficiencies will be transmitted to Operations to eliminate possible interface problem between NE and Operations. This review will be complete by September 29, 1989.

Training

Classroom training is provided to licensed and non-licensed Operations personnel at SQN. Simulator training on loss of air is provided during Certification, Pre-License, and Requalification Training for SQN. Operator training on the importance of instrument air systems and the potential for common mode failures caused by particulates, hydrocarbons, water, or other contaminants is stressed in the Requalification Lesson Plan for Institute of Nuclear Power Operations (INPO) Significant Operating Event Report (SOER) 88-01. This lesson plan covers common problems in air systems, operation problems on a loss of air event, and air quality enhancement methods. The present coverage of the instrument air system is adequate to ensure system knowledge and use of the existing procedure.

SQN SCSA and ACA maintenance training programs have been reviewed and were determined to be adequate. The purpose and use of air systems and purpose and control of air moisture traps and dryer types are covered as well as the importance of air being clean and dry. SQN maintenance training programs are INPO accredited. This program, which includes the plant air systems, provides detailed task analysis to determine training needs for plant equipment. This INPO accreditation satisfies the current training requirements for maintenance of the air systems. Any new industry experiences in this area are integrated into the program as required.

The SQN technical staff and managers recently received orientation training (EGT 227) to maintain INPO accreditation. This training alerted the plant technical staff and managers to SOER 88-01.

ACTION 3: Verify that the design of the entire instrument air system, including air or other pneumatic accumulators, is in accordance with its intended function, including verification by test that air-operated, safety related components will perform as expected in accordance with all design basis events, including a loss of the normal instrument air system. This design verification should include an analysis of current air-operated component failure positions to verify that they are correct for ensuring required safety functions.

TVA RESPONSE:

In order to verify that the as-designed instrument air system will perform as intended, a list of air-operated, safety-related equipment was generated. The required fail-safe position was identified and compared to that specified on the logic and control diagrams. Safety-related valves supplied by the ACA system were tested for rapid and slow loss of air to verify that they failed in the correct position and performed their required function under Preoperational Test TVA-27.

As part of TVA's review of SOER 88-01, a review is being conducted to identify improvements required to the SCSA and ACA pneumatic accumulators and check valves and their maintenance testing procedures. This review is being done to ensure that (1) accumulator check valves will properly reseat upon both a gradual and rapid loss of upstream pressure, (2) check valves are properly designed for air service, (3) low accumulator tank pressure is properly annunciated, and (4) accumulator tank design is properly documented by calculations. This review will be complete by April 3, 1989.

A review of the ACA system was included in the Design Baseline and Verification Program conducted during the SQN restart effort. This program, in part, verified by walkdown that configuration of the ACA system was consistent with the system "as constructed" drawings. The Restart Test Program (RTP) reviewed the testing of the compressed air system's design safety functions required for restart. The review included the ACA and SCSA systems. Failure modes of control air containment isolation valves were verified by test. The system preoperational tests included the non-safety-related SCSA compressor, the non-safety-related SCSA dryers, the ACA compressors and ACA dryers, and response to loss of air for units 1 and 2 valves. The SCSA safety-related users were not tested for loss of air under Preoperational (PreOP) Test TVA-27. Vendor test data verified the compressors delivered their rated output capacity. Testing indicated that capacity was not a problem with the SCSA compressors, and air demands could be met without utilization of the ACA compressors. Testing verified that the low-lubricating oil and high-temperature compressor trips, the unit 1 and 2 containment isolation valves, and their associated main control room annunciation functioned properly.

Control diagrams for 18 users did not indicate failure positions. An evaluation will be performed by September 15, 1989, to determine if the failure position of the 18 unmarked users should be shown and drawings will be revised accordingly. In addition, questions have been raised concerning the proper failure positions for 10 air-operated ventilation dampers. An evaluation of this matter will be complete by May 4, 1989.

ACTION 4: Each licensee/applicant should provide a discussion of their program for maintaining proper instrument air quality.

TVA RESPONSE:

The SQN maintenance program includes maintenance of the control air system. ACA system filters are replaced semiannually under PMs 1488, 1489, 1516, and 1477. The filters are inspected at this time, and any abnormal conditions are reported to the cognizant engineer for evaluation. PMs 1450 and 1451 are performed on ACA dryers A-A and B-B to replace the desiccant. The dryers are inspected at this time, and any abnormal conditions are reported to the cognizant engineer for evaluation. Dryer maintenance is performed with the system still serviced by operable dryers.

The systems are checked to the PM requirements monthly to ensure proper operation of the drain traps for the SCSA intercoolers, aftercoolers, and compressors. Various drain traps are also checked once each shift during an operations walkdown. Additional air requirements for special purposes are handled by dedicated compressors, hoses, and manifolds, e.g., air needed for steam generator tube plugging. These dedicated compressors are not tied into the SCSA or ACA air system.

A comprehensive PM program is employed on the ACA and SCSA compressors. PMs 1117 and 1118 are used to rebuild the ACA compressors. PMs 310, 319, 364, and 365 are used to check pistons, valves, rings, gaskets, and seals on the SCSA compressors (A, B, C, and D). PMs 2317 and 2371 are used for general inspections for the fifth SCSA compressor.

SQN addresses unexpected maintenance problems such as moisture, oil, or particulate contamination through the initiation of a Special Maintenance Instruction to correct the problem. In addition, connections to control air lines are not permitted without a review by NE.

Further enhancements of SQN's PM program are being addressed by TVA as discussed in the response to items 1 and 2 above.

ENCLOSURE 2

TVA RESPONSE TO GENERIC LETTER (GL) 88-14
FOR
BROWNS FERRY NUCLEAR PLANT (BFN) UNITS 1, 2, AND 3

ACTION 1: Verify by test that actual instrument air quality is consistent with manufacturer's recommendations for individual components served.

TVA RESPONSE:

The compressed air systems which can provide a pneumatic supply to safety-related components are the Control Air System, Service Air System, the Control Building Emergency Control Air Compressor, and the Drywell Control Air System.

The control and service air system compressors and receivers are shared by the three Browns Ferry units. The control air is supplied by four oil-free, continuous service compressors supplying three control air receivers which supply four air dryers, one for each unit and a standby dryer which may be aligned to any unit.

The service air system provides backup to the control air receiver and dryers through a check valve and a backpressure control valve which automatically opens if control air pressure drops below 90 psig. The control and service air are normally separate with the service air acting as a backup to control air.

A Drywell Control Air (DCA) System is provided for each reactor unit and provides control air for the equipment inside the drywell. The system takes its suction from the drywell inerted atmosphere. The control air is supplied by two oil free, continuous-service compressors supplying one receiver. The compressed air passes through an aftercooler and refrigeration-type dryer prior to entering the receiver. Normally, the DCA system furnishes control air for the equipment located inside the drywell.

The emergency control air compressor is an additional feature located in the control building and supplies instrument air exclusively to the units 1, 2, and 3 control room air-conditioning systems upon loss of normal air supply. This compressor is normally in standby and is designed to start automatically on low control air pressure. Since this compressor is to be used only during a loss of control air, and then only until the normal control air system is restored, quality of the air supplied by the emergency compressor is therefore not considered to have an impact on the operation of the control room air-conditioning system. Additionally, the air-conditioning system can be manually operated upon complete loss of air by disconnecting air operators and using bypass valves. Therefore, the air quality supplied by this unit is not being evaluated and will not be included in routine monitoring for entrained oil, particulate, or moisture.

The control air system is designed to supply compressed air with the following quality:

| Capability | Standby | Unit 1 | Unit 2 | Unit 3 |
|---|---|---|---|---|
| Condensed Hydrocarbon | Oil Free | Oil Free | Oil Free | Oil Free |
| Particle Size (micron) | < 4 | < 5 | < 4 | < 4 |
| (1) Moisture (Dew Point at Line Pressure)°F | -35 | -35 | -5 | -5 |

(1) Based on 90°F saturated air entering the dryer.

The DCA system is designed to supply compressed air with the following quality:

| Capability | Unit 1 | Unit 2 | Unit 3 |
|---|---|---|---|
| Condensed Hydrocarbon | Oil Free | Oil Free | Oil Free |
| Particle Size (micron) | < 40 | < 40 | < 40 |
| Moisture (Dew Point at Line Pressure)°F | 30 | 30 | 30 |

The design requirements for air quality supplied to the individual air operated components was reviewed. The review indicates that the majority of components have qualitative requirements (i.e., clean, dry and oil free). The following components were found to have quantitative requirements:

| | Oil | Moisture | Particulate |
|---|---|---|---|
| Main Steam Isolation Valves | Oil Free | -40°F at 0 psig | < 50 micron |
| Main Steam Relief Valves | Oil Free | -4C°F at 0 psig | < 50 micron |

Air Quality Testing

Testing was performed to confirm control air system air quality using Occupational Health and Safety Act (OSHA) methods and standards for solid particulate and condensed hydrocarbon in conjunction with existing plant procedure Technical Instruction (TI)-34, "Control Air Dryer Dew Point Test and Purge Control". The test results for the Control Air System taken at the discharge of the filter/dryers yielded the following data:

| As Tested | Standby | Unit 1 | Unit 2 | Unit 3 |
|---|---|---|---|---|
| Condensed Hydrocarbon ppm w/w | < .03 | < .03 | < .03 | < .03 |
| (2) Particle Size (% < 3 micron) | 98 | 98 | 98 | 98 |
| Moisture (Dew Point at Line Pressure)°F | -18.8 | -1.6 | -26.1 | -26 |

(2) The weight density of all samples was <.01 mg/m³ air.

Based on the above installed capability and one set of test results, clean (entrained particulate 98% < 3 micron), oil-free (condensed hydrocarbon < 1 ppm w/w) air is being supplied to the control air unit headers.

Sampling at remote locations was performed to confirm the quality of control air being supplied to the safety-related components. The three remote sample locations for each unit were chosen based on the following:

1. Safety-related components being served by control air were downstream of the remote sample locations.

2. The remote sample locations are downstream of the 4-inch carbon steel control air unit headers, and piping downstream of these sample points is essentially all copper.

3. The air quality at these sample locations is considered to be representative of the air being supplied to individual components.

4. There are three 1-1/2-inch copper lines from the 4-inch carbon steel control air unit headers entering each unit reactor building.

The remote sample analyses results are as follows:

| As Tested | Sample | Unit 1 | Unit 2 | Unit 3 |
|---|---|---|---|---|
| Condensed Hydrocarbon ppm w/w | 1 | < .03 | < .03 | < .03 |
| | 2 | < .03 | < .03 | < .03 |
| | 3 | < .03 | < .03 | < .03 |
| (3) Particle Size (% < 3 micron) | 1 | 98 | 98 | 98 |
| | 2 | 98 | 98 | 98 |
| | 3 | 98 | 98 | 98 |

(3) The weight density of all samples was <.01 mg/m$^3$ air.

Based on the remote sampling test results, clean (entrained particulate 98% < 3 micron), oil-free (condensed hydrocarbon < 1 ppm w/w) air is being supplied to the control air users in the Reactor Buildings.

The minimum ambient air design temperature used for consideration in design calculations is five (5) degrees Fahrenheit per Environmental Design Criteria BFN-50-715. The as-tested dryer output dew points were considerably less than the ambient air temperature (at the time of the test) which indicates that the dryer output was acceptable. A review of historical dew point data obtained indicates that the dryers maintain an acceptable dew point margin relative to the ambient temperature throughout the year. TI-34 will be revised prior to unit 2 restart to verify that adequate margin is maintained.

The DCA system has been out of service on all BFN units for a long period of time due to extended plant shutdown. Therefore, air quality testing has not been performed. Air quality testing will be performed on the DCA system prior to restart of the respective unit.

ACTION 2: Verify that maintenance practices, emergency procedures, and training are adequate to ensure that safety-related equipment will function as intended on loss of instrument air.

TVA RESPONSE:

Maintenance Practices

BFN's preventative maintenance (PM) program provides for the inspection/replacement of dryer afterfilters and checkout of the dryer electrical controls on a regularly scheduled basis. PMs are also periodically performed on the control air system as follows: compressor intake filters are changed; moisture traps are drained and inspected; intercooler and aftercooler tube bundles are cleaned; compressor components (pistons, rings, gaskets, seals, and cylinders) are checked and cleaned. Also, air compressor capacity is checked regularly. Dryer dew point is tested on a monthly basis.

These PMs ensure air quality is being maintained and provides a means for early warning of potential equipment or system problems that can be corrected prior to system contamination or malfunction. Additional PMs will be established to change the dryer desiccant on a regular basis by March 28, 1989.

PMI-6.22, Preventative Maintenance Program Upgrade Project, provides the guidelines to improve the PM program through the evaluation of requirements (vendor, licensing commitments, equipment reliability, etc.). Maintenance instructions for the control air system components have been reviewed for adequacy. The following procedural changes will be made to ensure that the quality of control air is maintained:

A. Site Director Standard Practice (SDSP)-6.9, "Cleanliness of Fluid Systems," will be changed to add a cleanliness criteria for hydrocarbons, particulate, and moisture for control air.

B. Specific procedures detailing maintenance work on the control air supply to pneumatic operators will be changed to incorporate a check that the control air system is maintained per the guidelines of SDSP-6.9.

C. Maintenance procedures detailing work on the control air compressors will be changed to specify approved cleaning solvents and to incorporate the cleanliness criteria of SDSP-6.9.

D. Mechanical Maintenance Instruction (MMI)-42, "MSIV/ADS Accumulator Leakage," will be changed to test for both slow and rapid depressurization.

These revisions will be completed by April 28, 1989.

Operating Procedures

Operating Instructions (OIs), Abnormal Operating Instructions (AOIs), and alarm response procedures for the control air system were reviewed. This review included verification that actions with respect to plant response to loss of air events including symptoms, automatic actions, failure position of critical valves, expected system response, operator actions, and system restoration were adequate. As a result of this review, it was determined that the AOIs for loss of control air should be upgraded and expanded. The AOIs for loss of control air will be revised to address symptoms, automatic actions, failure position of critical valves, expected system response, operator actions, and system restorations for unit 2 and common units prior to unit 2 restart. Procedures specific to units 1 and 3 will be revised prior to the unit's respective restart.

## Training

Training's present coverage of the control (Instrument) air systems, associated safety-related systems, and procedures is adequate to ensure proper operations and maintenance in relation to present plant design and normal, abnormal, and emergency procedures (including loss of instrument air). Operations and maintenance training programs presently contain instruction at various levels of detail on Control Air System operation to accommodate the needs of each respective work group.

The determination that present coverage is adequate is based on the following:

1. Nuclear Operator Training programs are established on Nuclear Position Task Analysis and are INPO accredited.
2. Personnel who attend these training programs are examined on the material.
3. Adequacy of coverage is also supported by training on Conduct of Operations (PMI-12.12) and Clearance Procedures (SDSP-14.9). Systems are aligned, operated, tagged, tested, and have maintenance performed according to procedures.
4. Emergency procedures (EOIs) are symptom-oriented. Emergency procedures training is an integral part of the training programs for licensed operators, shift technical advisors (STAs), and technical staff and managers Based upon plant symptoms, EOIs provide guidance to the operator to bring the plant to a safe condition without depending on control air.
5. Abnormal procedures are failure-oriented. Abnormal procedures training is an integral part of the training programs for licensed operators, STAs, and technical staff and managers. Therefore, present training provides instruction on the intended operation of safety-related equipment on loss of compressed air.
6. Administrative procedures (SDSP-8.10) provide for updating training programs when plant changes are implemented.
7. The TVA Nuclear Experience Review Program provides Browns Ferry training information on related industry events. This is incorporated into initial, requalification, and continuing training programs, as appropriate.

In summary, the Browns Ferry Training Program is considered to be adequate with respect to the concerns of GL 88-14. In accordance with the existing procedures (SDSP-8.10), plant design changes and procedure changes which result from implementation of GL 88-14 will be factored into the training program and personnel will be trained in the course of normal training schedules.

ACTION 3: Verify that the design of the entire instrument air system including air or other pneumatic accumulators is in accordance with its intended function, including verification by test that air-operated, safety related components will perform as expected in accordance with all design-basis events, including a loss of the normal instrument air system. This design verification should include an analysis of current air-operated component failure positions to verify that they are correct for ensuring required safety functions.

TVA RESPONSE:

Design Verification

TVA is in the process of implementing a Design Baseline and Verification Program (DBVP) and a Restart Test Program (RTP). These programs have been previously described in the Browns Ferry Nuclear Performance Plan, Revision 2, which was submitted to the NRC on October 24, 1988. The DBVP essentially constitutes a verification that the design of unit 2 systems, common systems, and portions of unit 1 and unit 3 systems required to support safe shutdown of unit 2 are in accordance with their intended function.

Drawing upon these design evaluations of safety-related systems in the DBVP, 544 air users were identified along with their designed function on loss of control air.

Testing Failure Positions

The control air end users identified have been or will be tested to ensure that they fail to their as-designed position upon loss of air except in cases where not testing is justified. Presently, 96 of the 129 components have been tested; the remainder will be tested for loss of air prior to restart of unit 2. Also, 415 components (370 of these are the Control Rod Drive (CRD) scram inlet and outlet valves) do not require individual testing as justified below.

Seven of the 129 air operated components were not included in the RTP. These seven components will be tested for loss of air prior to the restart of unit 2.

| Components: | Bases for Not Testing |
|---|---|
| 2-FCV-85-39A (185)<br>2-FCV-85-39B (185) | These are the CRD scram inlet and outlet valves (1 pair for each of the 185 CRDs). The CRD system at BFN is equipped with a scram feature which initiates full control rod insertion upon sensing of low control air pressure. This feature ensures specific designed behavior of the system on loss of air and is tested to ensure its input to the Reactor Protection System. Therefore, individual component testing on loss of air is not necessary. |
| 2-FCV-64-028A thru H<br>2-FCV-64-028J thru M | These devices are test actuators for the suppression chamber to drywell vacuum breakers to allow functional verification of the valves. They are for testing only and serve no function in an accident or safe shutdown. Therefore, loss of air testing is not necessary. |

| | |
|---|---|
| 2-FCV-70-016<br>2-FCV-70-018<br>2-FCV-70-020<br>2-FCV-70-022<br>2-FCV-70-024<br>2-FCV-70-026<br>2-FCV-70-028<br>2-FCV-70-030<br>2-FCV-70-032<br>2-FCV-70-034 | These valves, which control waterflow to the drywell coolers are not required to function on loss of air. Therefore, loss of air testing is not necessary. |
| 2-PCV-1- 19<br>2-PCV-1- 22<br>2-PCV-1- 30<br>2-PCV-1- 31<br>2-PCV-1- 34<br>2-PCV-1- 5<br>2-PCV-1- 18<br>2-PCV-1- 23<br>2-PCV-1- 4<br>2-PCV-1- 41<br>2-PCV-1- 42<br>2-PCV-1-179<br>2-PCV-1-180 | These are the main steam relief valves (MSRVs). Six of these have accumulators to assure that they can be opened following loss of control air. Verification that the accumulators are adequately sized and function as intended is based on calculations and leakage testing as is discussed separately. Operational testing of these valves on loss of air pressure is not practical during shutdown conditions because operation of the pilot valve without steam pressure is detrimental to pilot valve internals. Such testing during power operation is not considered practical since a) the MSRVs are "air to open" type valves, b) isolation and depressurization of the air supply to these valves would require that they be declared inoperable, and c) plant technical specification limits on supression pool water temperature would preclude gradual loss of air testing for these valves (i.e., slow closure) during power operation. Also, these valves are functionally tested during power operation per existing surveillance instructions. |
| 2-FCV-74-102<br>2-FCV-74-103<br>2-FCV-74-119<br>2-FCV-74-120 | These are RHR drain and vent valves to the suppression pool. The piping associated with these valves is being cut and capped and the valves abandoned in place by Engineering Change Notice (ECN) P0962. |
| 2-LCV-71-005<br>2-LCV-73-005 | These are HPCI and RCIC steam supply lines drain pot level control valves. During an accident or safe shutdown, the piping downstream of these valves is automatically isolated and this valve is not relied upon to function. Therefore, loss of air testing is not necessary. |
| 2-LCV-2-003 | This is the automatic condensate reject valve which controls the main condenser hot-well level. This valve serves no function during an accident or safe shutdown, therefore, loss of air testing is not necessary. |
| 2-FCV-3-188A | This valve is used to monitor reactor vessel head flange leakage. This valve serves no function during an accident or safe shutdown, therefore, loss of air testing is not necessary. |

| | |
|---|---|
| 2-FCV-64-36 | This valve is used to vent the containment during inerting and de-inerting of the atmosphere. It serves no postaccident or safe shutdown function and loss of air testing is not necessary. |
| 0-TCV-31-0016 | This valve, which controls chilled waterflow to the Switchyard Relay Room cooler, is not required to function on loss of air. Therefore, loss of air testing is not necessary. |

Test Results

The following air-operated components have been found to fail to a position other than the design position:

| Components | Failure | Action Taken |
|---|---|---|
| 2-FCV-[illegible]-62 and 63 | Failed As-Is instead of Closed | Modified system to fail closed. [Refer to Licensee Event Report (LER) 260/87007]. |
| 0-FCO-31-125B | Failed Closed instead of Open | Damper linkage was reoriented, retest performed, and proper fail position obtained [Reference (Condition Adverse to Quality Report (CAQR) BFP 881085]. |
| 0-TCV-31-628, 644, 660 and 676 | Failed to Flow-Bypassed instead of full flow condition. | Changed failure position of the valves (Reference CAQR BFP 880440). |

Accumulators

There are three different sets of accumulators required to support the safe shutdown of unit 2. They are the accumulators associated with the automatic depressurization system (ADS), the main steam isolation valves (MSIVs) and the large equipment air lock doors.

The six ADS valves are equipped with a solenoid pilot valve and an accumulator sized for five valve actuation cycles. The check valve between the air supply and the accumulator is spring loaded with a soft seat. The accumulators receive pneumatic supply from the DCA system via check valves.

The MSIVs are spring-loaded, pneumatic-piston-operated globe valves designed to fail closed on a loss of pneumatic pressure or electrical power to the solenoid pilot valves. Each MSIV has an accumulator sized for one closure cycle should pneumatic supply be unavailable. The check valve between the air supply and the accumulator is spring loaded with a soft seat. The inboard MSIVs are normally served by the DCA system and the outboard MSIVs are normally served by the control air system.

The DBVP includes verification of the MSRV and MSIV accumulators for performing their intended function. The RTP includes MSRV and MSIV accumulator leakage testing; however, gradual loss of air supply to the accumulator is not included. The plant procedure (MMI-42) will be revised to include testing the accumulators and check valves for both rapid and gradual loss of air. This testing is scheduled as part of the RTP to be complete prior to unit 2 restart.

The equipment air lock doors are provided with inflatable seals which are equipped with accumulators. The inside and outside set of doors each has a separate accumulator. Air to the accumulators is normally supplied from the control air system via check valves. The system has been successfully tested to ensure it will perform its intended function on loss of air to the accumulators.

The suppression pool vacuum relief system consists of two valves in series in each of two lines to secondary containment atmosphere. The outboard valve is self-actuating and the inboard valve is air operated. These inboard valves are not equipped with accumulators and are designed to fail open upon loss of control air. This configuration is recognized as being a concern and has been documented under TVA's corrective action program (reference CAQR BFP 890085).

Conclusion

The DBVP and RTP for unit 2 includes a verification of the design of the control air system and verification by test that safety-related air-operated components and accumulators perform in accordance with their intended functions for the safe shutdown of unit 2.

This information is primarily associated with unit 2 since units 1 and 3 are being maintained in an extended shutdown condition. However, the program for restart of units 1 and 3 will include a similar verification of design and verification by test that safety-related, air-operated components and accumulators perform in accordance with their intended function prior to restart of the affected unit.

ACTION 4: Each licensee/applicant should provide a discussion of their program for maintaining proper instrument air quality.

TVA RESPONSE:

To ensure that proper control air quality is being maintained, the following activities are/will be performed:

A. Electrical controls and annunciators for the control air dryers are inspected yearly for proper operation per Electrical Preventive Instruction (EPI)-32-DRY001. The frequency for this procedure will be evaluated and revised if necessary prior to unit 2 restart.
B. PMs will be developed to periodically change dryer desiccant and dryer inlet and outlet filters. These PMs will be established and implemented by March 28, 1989.
C. Maintenance of air-operated valves is performed per MMI-51. This procedure provides guidelines for the disconnection of air lines, cleanliness, leak checks, reassembly, and postmaintenance testing for proper operation.

D. Air compressor and receiver condensate drain lines are blown down each shift per OI-32.
E. Control air dryer dew point is monitored and recorded on a routine basis per Technical Instruction (TI)-34, as a preventative maintenance item.
F. A program will be developed to monitor control air on a six-month frequency for hydrocarbons and particulate. This program will be implemented by July 1, 1989.

ENCLOSURE 3

TVA RESPONSE TO GENERIC LETTER (GL) 88-14
FOR
WATTS BAR NUCLEAR PLANT (WBN) UNITS 1 AND 2

ACTION 1: Verify by test that actual instrument air quality is consistent with the manufacturer's recommendations for individual components served.

TVA RESPONSE:

The Watts Bar Nuclear (WBN) Plant compressed air system is divided into a Station Control and Service Air System (SCSAS) and a safety-related Auxiliary Control Air System (ACAS). The SCSAS is the normal air supply source for non-safety-related devices as well as safety-related, air-operated devices located on the SCSAS headers and on the dual-trained ACA supply headers. During normal operation, air supplied from the SCSAS is reprocessed through the ACAS regenerative desiccant-type dryers and filters while the ACAS air compressors are maintained in standby condition.

The Design Basis Documents (DBD) and component contracts (specifications) for the instrument air components have been reviewed to establish and substantiate the original design basis. The SCSAS and ACAS air quality was verified under Preoperational Tests TVA-27A and 27B, respectively. The instrument air dewpoint was verified to be -40°F or lower, test filters were installed and the air was verified to contain no particles 5 micrometres or larger in size, and test filters were visually inspected to ensure that oil was not present. These results were consistent with design requirements. Reviews of safety-related valves as documented in NUREG 1275 found no requirement for filtration below 5 micrometres in size. The actual SCSAS and ACAS filtration ratings are 3 micrometres and 0.9 micrometres for prefilters and 5 micrometres and 0.9 micrometres for afterfilters, respectively. Oil content (condensed hydrocarbon ppm) in the air being discharged from these nonlubricated piston type compressors was not measured.

Subsequent to preoperational testing, a rotary screw compressor was added to support condensate demineralizer operation. This compressor has cross connect capability to the SCSA system. Air quality checks downstream of the air dryers and filters have not been performed since installation of this compressor. However, a compressor sump separator and 2-stage air purifier is provided for the rotary screw compressor to reduce the lubricant content to 1 ppm maximum upstream of the SCSAS air dryer and filter trains. Since service air is used for breathing air purposes, TVA's Occupational Hygiene Group (OHG) samples service air every six months for compliance to OSHA standards and Compressed Air and Gas Specification G7.1. An acceptance criteria of 5 mg/m$^3$ is specified for condensed hydrocarbon and 2 mg/m$^3$ for particulates. Since these samples are taken upstream of the air dryer and filter trains it should be indicative of good instrument air quality downstream. High humidity alarms set at 6 percent relative humidity are also provided for both systems.

Plant procedures will be written to require air quality sampling at remote locations in each of the three ACA and SCSA air headers at each unit on a six month basis. Acceptance criteria will be 5 micrometre maximum particle size, 1 ppm maximum condensed hydrocarbons, and 0°F dewpoint at line pressure. The 0°F dewpoint will provide operating margin between the -40°F design value and the 6 percent relative humidity alarm setpont.

A review of design drawings and details has been performed to verify that air-operated valves and instrumentation are provided with local filters or filter regulators. The design drawings reviewed indicates that 5 HVAC dampers per unit and a common unit moisture modifier were installed without local filters. These eleven components will be field inspected. If it is confirmed that there are no local filters installed, maintenance data and manufacturers' recommendations will be reviewed to determine if a need exists for the installation of local filters for these devices.

WBN System Description N3-32-4002 currently states that the air quality of the compressed air system meets ISA Standard S7.3. However, TVA's review in accordance with GL 88-14 has identified that the statement in the system description is inconsistent with the standard's particle size limitation (3 micrometres) because the SCSAS afterfilter rating is 5 micrometres. It would therefore be possible for particles of desiccant dust larger than 3 micrometres to exist in the system. The maintenance history of SCSAS supplied valves and instruments will be reviewed to ensure that existing filtration is adequate. Upon completion of the review, the system description will be revised.

ACTION 2: Verify that maintenance practices, emergency procedures, and training are adequate to ensure that safety-related equipment will function on loss of instrument air.

TVA RESPONSE:

Maintenance Practices

The existing preventive maintenance (PM) program for the ACAS (PM 32-70, 32-71, 32-72, 32-73, and 32-74) makes provisions for inspecting/replacing filters (afterfilters, prefilters, and inlet filters), changing desiccant as necessary in dryers, replacing soft seats in valves and replacing diaphragms in pneumatic valve actuators. For the Control Air System (CAS) similar PM procedures exist (PM 32-1, 32-2, 32-3, 32-4, 32-5, 32-6, and 32-7), and like the ACAS, PM practices and schedule are based on manufacturers' recommendations and maintenance history.

The WBN maintenance program includes a preventive maintenance program which incorporates vendor recommendations (reference AI 3.1 "Administration of Site Instructions - to Include NP-STD-4.4.7," AI 9.1, "Watts Bar Nuclear Plant Maintenance Program," AI 9.2, "Maintenance Request and Preventative Maintenance"). The preventive maintenance program implements the guidelines for the performance of basic maintenance activities, such as visual and minor routine inspections, lubrications, adjustments, replacement of parts, or other activities accomplished on a periodic or routine basis.

Periodic preventive maintenance is performed on air dryers (PM 32-5 for the CAS dryers and PM 32-73 for the ACAS dryers) to ensure proper operation. This is in accordance with manufacturers' recommendations. Desiccant in air dryers is replaced on a scheduled basis in accordance with vendor recommendations (see PM 32-5 for the CAS and PM 32-73 for the ACAS).

System filters associated with the compressor packages are installed and replaced, in accordance with vendor recommendations, per PMs 32-1, 32-2, 32-3, 32-4, 32-5, 32-70, 32-71, and 32-73.

Mechanical maintenance PMs and component information are being further reviewed for prefilters, afterfilters, desiccant, valves, and diaphragms to ensure these components are addressed and in compliance with vendor maintenance recommendations. Any deviations discovered during this investigation will be incorporated in the existing PM program. Cleanliness verification levels for the CAS following preventive maintenance or repairs have been reviewed and found to be consistent with the ACAS. However, procedures will be written or revised as appropriate to require internal inspection of components suspected of contamination following indication of SCSAS or ACAS contamination due to the presence of water, particulates, or oil in system headers.

## Operating Procedures

System Operating Instructions (SOIs) 32.1, 32.2, and 33.1 are operating instructions for Control Air, Auxiliary Control Air, and Service Air Systems while Abnormal Operating Instruction (AOI) No. 10 (loss of control air) contains the current operating procedures, symptoms, and actions for a loss of control air incident. A list of the WBN air-operated, safety-related components has been prepared and will be reviewed against existing procedures to verify that these components have been addressed. The procedures, instructions, and physical plant will then be reviewed to ensure that actions are covered with respect to loss of air indication, incident recovery, plant response, manual actions, and unexpected component positioning. Any deficiencies identified from this review will be evaluated, documented and appropriately corrected.

## Training

Operators receive training on AOI-10, Loss of Control Air, on a yearly basis. The training includes operator actions to be taken upon a loss of air.

Maintenance procedures include preventive maintenance for Service/Control Air Dryers (PM 32-5) and Auxiliary Control Air Dryers (PM 32-73). Cleanliness criteria is addressed in Technical Instruction (TI)-27.

Air system operation maintenance is currently included in continuing training lesson plans for Mechanical maintenance craftsmen.

ACTION 3: Verify that the design of the entire instrument air system, including air or other pneumatic accumulators, is in accordance with its intended function, including verification by test that air-operated, safety-related components will perform as expected in accordance with all design-basis events, including a loss of the normal instrument air system. This design verification should include an analysis of current air-operated component failure positions to verify that they are correct for ensuring required safety functions.

TVA RESPONSE:

Upon completion of the review of SOER 88-01, TVA will implement improvements as required to its pneumatic accumulators and check valves and their maintenance testing procedures. This program will ensure that 1) accumulator check valves will properly reseat upon both a gradual and rapid loss of upstream pressure, 2) check valves are properly designed for air service, 3) low accumulator tank pressure is properly annunciated, and 4) accumulator tank design is properly documented by calculations.

Air-operated valves supplied by the safety-related ACAS were tested under both a gradual and rapid loss of system air pressure in accordance with Regulatory Guide 1.80 (Preoperational Test TVA-27B).

Safety-related valves supplied by the SCSAS were not similarly tested under Preoperational Test TVA-27A. The testing history of safety-related valves supplied by the SCSAS will be reviewed and the valves will be similarly tested as required.

Engineering will evaluate the use of the lubricated condensate demineralizer air compressor for its ability to supply air within acceptable standards. Following the results of the engineering evaluation, Operations will revise procedures as required to govern the use of this compressor.

A review of the fail position of safety-related valves will be performed by Nuclear Engineering. This review will confirm/establish the proper fail position for each valve. Identified discrepancies will be reconciled with the system description, FSAR, and applicable drawings. New Preoperational Test Scoping Documents will be developed or existing ones revised to include any additional test requirements.

ACTION 4. Each licensee/applicant should provide a discussion of their program for maintaining proper instrument air quality.

TVA RESPONSE:

The SCSAS and ACAS will be upgraded as required by the time of unit 1 fuel load through the following actions (detailed throughout the response and summarized here) as part of the WBN program for maintaining proper instrument air quality and system operation:

1. An air sampling program will be established and procedurally implemented.

2. Filtration will be provided to components that are determined to require local filters as per manufacturers' recommendations.

3. Maintenance history of SCSAS-supplied components will be reviewed to further ensure the adequacy of 5 micrometre afterfilters. Vendor maintenance recommendations will be reviewed to ensure consistency with the PM program for the respective air components.

4. Engineering will evaluate the use of the lubricated condensate demineralizer air compressor for its ability to supply air within acceptable standards.

5. Following the results of the engineering evaluation, Operations will revise procedures as required to govern the use of this compressor.

6. The safety-related component listing will be used to evaluate total plant procedural coverage with regard to actions, indications, and fail positions.

7. The design adequacy of pneumatic accumulators and check valves used in safety-related application will be documented, or upgraded as required, as part of TVA's nuclear experience review of SOER 88-01.

8. The specified fail position of air-operated valves used in nuclear safety-related application will be verified to be the correct or preferred fail position.

9. The testing history will also be reviewed for safety-related valves supplied by the SCSAS to ensure that these components have demonstrated proper response to a loss of air event.

ENCLOSURE 4

TVA RESPONSE TO GENERIC LETTER 88-14
SUMMARY LIST OF COMMITMENTS

SQN

1. PMT-84, which is still open, will be revised to require air quality verification for lubricant content at the rotary screw compressor's discharge downstream of the 2-stage pipeline filter. The scoping document for PMT 84 will be revised by May 4, 1989, and PMT 84 will be performed by July 31, 1989.

2. Plant procedures will be revised to require routine set point verification of moisture elements in the ACA and SCSA systems by July 31, 1989.

3. Routine air quality testing will be implemented by August 28, 1989.

4. The need for local filters for 28 users will be evaluated by June 1, 1989.

5. New procedures will be created or existing procedures will be revised by May 15, 1989, to ensure adequate PM for system drain traps.

6. NE will perform a review of AOI-10 to ensure the air systems events are adequately covered and responded to by Operations from an engineering standpoint. Any identified deficiencies will be transmitted to Operations to eliminate possible interface problem between NE and Operations. This review will be complete by September 29, 1989.

7. As part of TVA's review of SOER 88-01, a review is being conducted to identify improvements required to the SCSA and ACA pneumatic accumulators and check valves and their maintenance testing procedures. This review is being done to ensure that (1) accumulator check valves will properly reseat upon both a gradual and rapid loss of upstream pressure, (2) check valves are properly designed for air service, (3) low accumulator tank pressure is properly annunciated, and (4) accumulator tank design is properly documented by calculations. This review will be complete by April 3, 1989.

8. An evaluation will be performed by September 15, 1989, to determine if the failure position of 18 unmarked users should be shown, and drawings will be revised accordingly.

9. An evaluation of the proper failure position of 10 air-operated ventilation dampers will be completed by May 4, 1989.

BFN

1. TI-34 will be revised prior to unit 2 restart to verify that adequate margin (between the ambient air temperature and dew point range at air dryer outlets) is maintained.

2. Air quality testing will be performed on the DCA system prior to restart of the respective units.

3. Additional PMs will be established to change the dryer desiccant in the control air system on a regular basis by March 28, 1989.

4. Site Director Standard Practice (SDSP)-6.9 "Cleanliness of Fluid Systems," will be changed by April 28, 1989, to add a cleanliness criteria for hydrocarbons particulate and moisture for control air.

5. Specific procedures detailing maintenance work on the control air supply to pneumatic operators will be changed by April 28, 1989, to incorporate a check that the control air system is maintained per the guidelines of SDSP-6.9.

6. Maintenance procedures detailing work on the control air compressors will be changed by April 28, 1989, to specify approved cleaning solvents and to incorporate the cleanliness criteria of SDSP-6.9.

7. Mechanical Maintenance Instruction (MMI)-42, "MSIV/ADS Accumulator Leakage," will be changed by March 28, 1989, to test for both slow and rapid depressurization.

8. The AOIs for loss of control air will be reviewed to address symptoms, automatic actions, failure position of critical valves, expected system response, operator actions, and system restorations for unit 2 and common prior to unit 2 restart. Procedures specific to units 1 and 3 will be revised prior to the unit's respective restart.

9. The control air end users identified have been or will be tested to ensure that they fail to their as-designed position upon loss of air except in cases where not testing is justified. Presently, 96 of the 129 components have been tested; the remainder will be tested for loss of air prior to restart of unit 2.

10. Seven additional air operated components that were not included in the RTP will be tested for loss of air prior to the restart of unit 2.

11. MMI-42 will be revised to include testing the MSRV and MSIV accumulators for both rapid and gradual loss of air. This testing is scheduled as part of the RTP to be completed prior to unit 2 restart.

12. The program for restart of units 1 and 3 will include a similar verification of design and verification by test that safety-related, air-operated components and accumulators perform in accordance with their intended function prior to restart of the affected unit.

13. Electrical controls and annuciators for the control air dryers are inspected yearly for proper operation per Electrical Preventive Instruction (EPI)-32-DRY001. The frequency for this procedure will be evaluated and revised if necessary prior to unit 2 restart.

14. PMs will be developed to periodically change dryer desiccant and dryer inlet and outlet filters. These PMs will be established and implemented by March 28, 1989.

15. A program will be developed to monitor control air on a six-month frequency for hydrocarbons and particulate. This program will be implemented by July 1, 1989.

WBN (General Note: The commitments listed below will be completed before unit 1 fuel loading)

1. Plant procedures will be written to require air quality sampling at remote locations in each of the three ACA and SCSA air headers at each unit on a six-month basis.

2. Design drawings reviewed indicated that 5 HVAC dampers per unit and a common unit moisture modifier were installed without local filters. These eleven components will be field inspected. If it is confirmed that there are no local filters installed, maintenance data and manufacturers recommendations will be reviewed to determine if a need exists for the installation of local filters for these devices.

3. The maintenance history of SCSAS-supplied valves and instruments will be reviewed to ensure that existing filtration is adequate. Upon completion of the review, the system description will be revised to clarify the level of compliance with ISA Standard S7.3

4. Mechanical maintenance PMs and component information are being further reviewed for prefilters, afterfilters, desiccant, valves, and diaphragms to ensure these components are addressed and in compliance with vendor maintenance recommendations. Any deviations discovered during this investigation will be incorporated in the existing PM program.

5. Cleanliness verification levels for the CAS following preventive maintenance or repair have been reviewed and found to be consistent with the ACAS. However, procedures will be written or revised as appropriate to require internal inspection of components suspected of contamination following indication of SCSAS or ACAS contamination due to the presence of water, particulates, or oil in system headers.

6. A list of the WBN air-operated, safety-related components has been prepared and will be reviewed against existing procedures to verify that these components have been addressed. The procedures, instructions and physical plant will then be reviewed to ensure that actions are covered with respect to loss of air indication, incident recovery, plant response, manual actions, and unexpected component positioning. Any deficiencies identified from this review will be evaluated, documented, and appropriately corrected.

7. Upon completion of the review of SOER 88-01, TVA will implement improvements as required to its pneumatic accumulators and check valves and their maintenance testing procedures. This program will ensure that 1) accumulator check valves will properly reseat upon both a gradual and rapid loss of upstream pressure, 2) check valves are properly designed for air service, 3) low accumulator tank pressure is properly annunciated, and 4) accumulator tank design is properly documented by calculations.

8. The testing history of safety-related valves supplied by the SCSAS will be reviewed and the valves will be similarly tested as required.

9. A review of the fail position of safety-related valves will be performed by Nuclear Engineering. This review will confirm/establish the proper fail position for each valve. Identified discrepancies will be reconciled with the system description, FSAR, and applicable drawings. New Preoperational Test Scoping Documents will be developed or existing ones revised to include any additional test requirements.

10. Engineering will evaluate the use of the lubricated condensate demineralizer air compressor for its ability to supply air within acceptable standards.

11. Following the results of the engineering evaluation, Operations will revise procedures as required to govern the use of this compressor.