

**ENCLOSURE 2**

**U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV**

Docket Nos.: 50-528  
50-529  
50-530

License Nos.: NPF-41  
NPF-51  
NPF-74

Report No.: 50-528/97-13  
50-529/97-13  
50-530/97-13

Licensee: Arizona Public Service Company

Facility: Palo Verde Nuclear Generating Station, Units 1, 2, and 3

Location: 5951 S. Wintersburg Road  
Tonopah, Arizona

Dates: May 13-16, with inoffice inspection continuing until June 20, 1997

Inspector: John E. Whittemore, Reactor Inspector, Maintenance Branch

Approved By: Dr. Dale A. Powers, Chief, Maintenance Branch  
Division of Reactor Safety

**ATTACHMENT:** Supplemental Information



### EXECUTIVE SUMMARY

Palo Verde Nuclear Generating Station, Units 1, 2, and 3  
NRC Inspection Report 50-528/97-13; 50-529/97-13; 50-530/97-13

This inspection consisted of a review of the licensee's program for the use and control of measuring and test equipment, and licensee actions to address previous findings of a program audit conducted by the licensee's nuclear assurance division. The inspection report covers a 3-day period of direct inspection onsite with continuing inoffice inspection by one region-based inspector.

#### Maintenance

- The metrology lab was adequately staffed by qualified personnel and the environmental conditions were properly maintained (Section M1.1).
- The revised measuring and test equipment program procedures contained minor errors not identified in the review and approval process (Section M3.1).
- The specific measuring and test equipment deficiencies identified in sampled condition report/disposition requests were adequately addressed (Section M7.1).
- The generic implications that were obvious in a large number of condition report/disposition requests, were not initially identified by the licensee. However none of the issues were determined to be significant (Section M7.1).
- From reviewing a sample of condition report/disposition requests, the inspector concluded that the licensee audit identified all the obvious issues plus additional issues that were not evident (Section M7.1).
- The failure to meet procedural requirements related to out-of-tolerance notices on out-of-calibration or nonconforming measuring and test equipment was identified as a violation (Section M7.1).



Report Details

Summary of Plant Status

The three Palo Verde Units were at full power during the inspection week.

**M1 Conduct of Maintenance**

**M1.1 Measuring and Test Equipment Program Observations**

**a. Inspection Scope (35750)**

The inspector observed a testing activity demonstration and walked down the metrology laboratory to assess the control and use of measuring and test equipment.

**b. Observations**

During discussions with personnel and a tour of the metrology laboratory, the inspector noted that the laboratory was staffed by 12 licensee employees, who reported to a team leader. The personnel assigned to the laboratory performed calibration and repair of measuring and test equipment. The inspector made the following observations:

- Several items of measuring and test equipment were labelled as restricted in the allowable ranges for use;
- Several items of measuring and test equipment were labelled as limited and prohibited from use on quality or safety-related work;
- Measuring and test equipment were adequately separated and controlled as to current restrictions, limitations, and calibrations status;
- The shelves in the area for incoming items requiring periodic or initial calibration were near capacity, potentially indicating a large backlog;
- Environmental conditions were in the required range in all rooms of the laboratory. The humidity control system for the sensitive electronics room was out of service; however, the continuous graph of humidity indicated that humidity was adequately maintained by a group of independently-controlled portable humidifiers; and
- Discussions with laboratory personnel indicated that they were proficient in their area of responsibility and knowledgeable of programmatic requirements.



A condition report/disposition request had been initiated identifying that the measuring and test equipment used to measure the stroke of newly installed safety-related solenoid valves should be in the program and treated as qualified measuring and test equipment. The licensee had not placed the subject measuring and test equipment in the program. The inspector observed a test demonstration measuring the stroke of a solenoid valve. There were two different measuring devices for measuring the stroke of valves from two different vendors. One device had been provided by a vendor, and the other had been designed and fabricated by licensee personnel. The principle of measurement was identical for each device.

The inspector observed that the opening stroke of the valve was determined by measuring the travel of the indicator reed switch actuating magnet located at the top of the valve stem, inside a stainless steel tubular housing. This rough measurement was then compared to a calculated stroke distance. A successful test was performed when the measured valve stroke was within 10 percent of a calculated value, which was determined during valve assembly prior to valve installation. The licensee considered this assessment to be a functional test to assure proper operation of the valve after welding into the safety-related system.

The test assured adequate valve stroke in the open direction. The inspector determined that all valves, except one in each unit, had a closing safety function. The inspector verified that there was adequate periodic inservice and surveillance testing to assure that the opening or closing safety function of a valve would be operable. There was no identifiable need to place the stroke-measuring devices in the measuring and test equipment program. The licensee's decision not to place a measuring device for determining solenoid valve functionality in the measuring and test equipment program was justified.

c. Conclusions

The metrology lab was adequately staffed by qualified personnel and environmental conditions were being properly maintained.

M3 **Maintenance Procedures and Documentation**

M3.1 Adequacy of Revised Measuring and Test Equipment Procedures

a. Scope of Inspection (35750)

The inspector reviewed the procedures listed in the attachment to determine the effectiveness of procedure changes designed to improve the licensee's program.



b. Observations

The inspector noted that the majority of the extensive procedure changes to implement the corrective action for addressing the audit findings had been completed. During the review, the inspector made two observations related to measuring and test equipment procedure changes. There were minor grammatical and typographical errors throughout the procedures. The inspector identified one case of an incorrect reference in a procedure action step. The inspector informed licensee management of this observation and commented that the review process needed to better identify errors during such extensive procedures changes.

Secondly, the inspector noted that cases had been identified where maintenance personnel had used limited measuring and test equipment in the field instead of the qualified equipment that was required by the activity. It was also noted that management expectations and program procedures clearly assigned responsibility to the user for using the correct measuring and test equipment. However, the possibility of intermingling limited and qualified measuring and test equipment still existed. There was no apparent procedural guidance or management expectations on identifying misuse of measuring and test equipment in the field. Program procedures provided clear recovery instructions if improper use of measuring and test equipment in the field was identified. The licensee had conducted briefings of applicable personnel when the problem became known. The program procedures did not address identification of measuring and test equipment misuse beyond making the user, and sometimes planning personnel, responsible for determining the correct measuring and test equipment to use. There was apparently no required supervisory or nuclear assurance involvement following the identification of improper use of limited maintenance and test equipment.

c. Conclusions

The inspector concluded that the revised measuring and test equipment program procedures contained minor errors not identified by the review and approval process.

**M7 Quality Assurance in Maintenance Activities**

**M7.1 Identification of Measuring and Test Equipment Program Issues**

The licensee's program for control, use, and calibration of measuring and test equipment was required to meet the commitments specified in the Updated Final Safety Analysis Report, Chapter 17. The findings of a recent nuclear assurance division audit of licensee control of measuring and test equipment indicated that some commitments had not been implemented into the program. Additional generic



issues identified were a lack of specific environmental and software controls, accounting for inaccuracy of measuring and test equipment used in the field, and a lack of adequate justification for the acceptability of nonconforming measuring and test equipment.

a. Inspection Scope (35750)

The licensee provided a list of all corrective action documents related to issues with the control, use, and calibration of measuring and test equipment since January 1, 1995. The list consisted of over 150 condition report/disposition requests. This amount of corrective action documents, most of which had been closed out, appeared significantly high, and indicated that licensee personnel were identifying problems in the measuring and test equipment area. The inspector selected a ten percent sample of the condition report/disposition requests, mainly from 1995 and early 1996 to identify the specific and any generic issues related to measuring and test equipment. In addition, the inspector reviewed Nuclear Assurance Division Audit 96-019, dated December 24, 1996, of the measuring and test equipment program to determine what programmatic issues were identified.

b. Observations

The inspector noted that the selected condition report/disposition request sample addressed a wide cross section of specific issues related to the control, use, and calibration of measuring and test equipment. The problems included:

- Work performed using measuring and test equipment that was not calibrated or not in the periodic calibration program;
- Required accuracy of measuring and test equipment used in the field was not consistently assured by program procedures;
- The tools for measuring safety-related solenoid valve stroke were not in the qualified measuring and test equipment program;
- Nonquality (limited) measuring and test equipment was used for quality-related activities;
- Calibration standards kept in the field had deteriorated; and
- Torque wrenches were used to adjust torque values in the field to settings below the lowest calibration values.

A review of the closed condition report/disposition requests indicated that the individually identified issues had been adequately addressed. However, broader or generic issues were not always addressed by the corrective actions. For example, on more than one occasion, quality control inspectors identified that measuring and

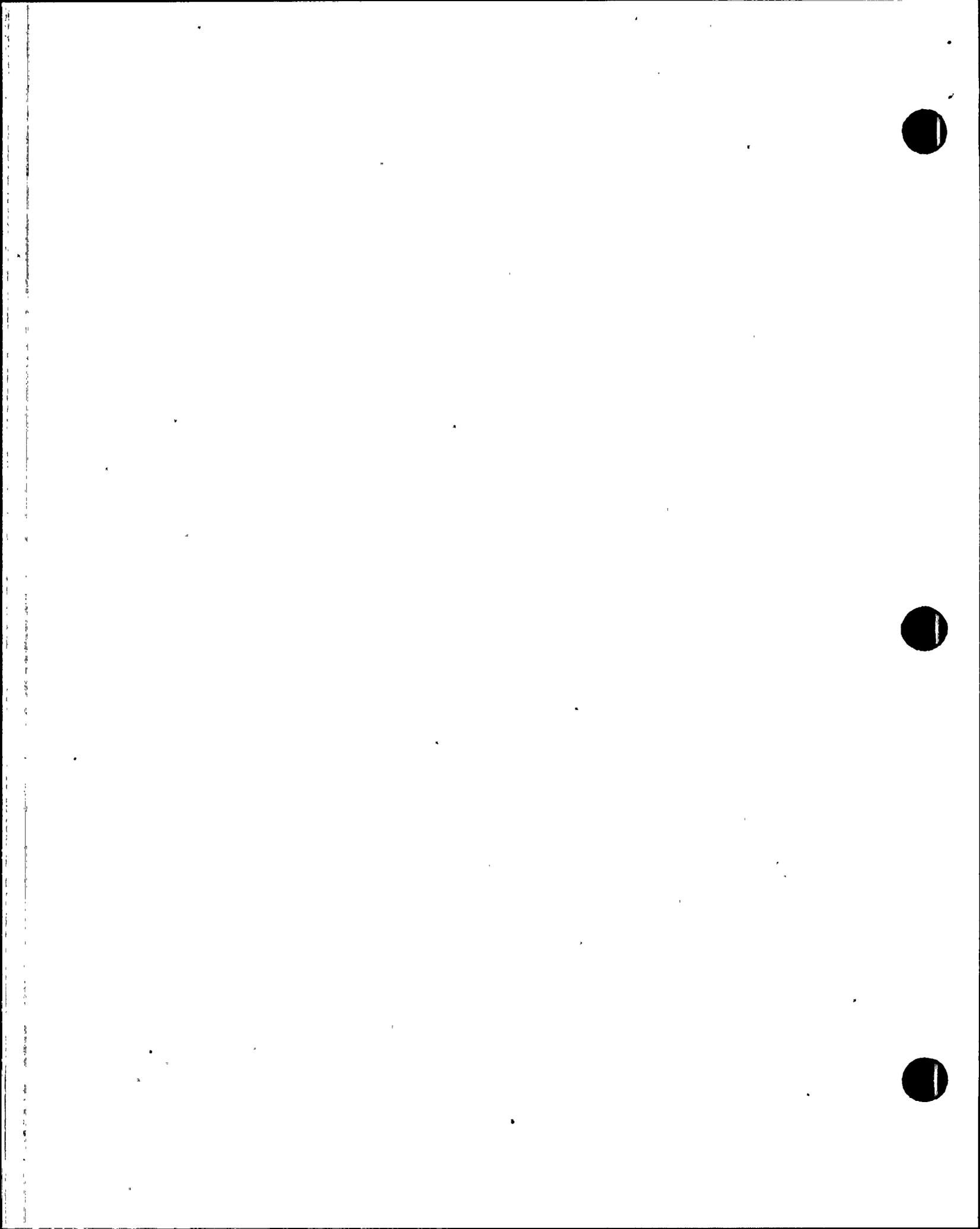


test equipment used for a quality-related task did not meet the accuracy requirements. The work was reformed using the correct measuring and test equipment, but the broader aspect of the programmatic deficiency was not addressed. The inspector believed that the majority of the programmatic issues should have been identified earlier because of the large number of corrective action documents that were initiated in a short time frame. However, based on the inspector's review of corrective action documents, those generic issues that the licensee initially failed to address were not considered to be safety significant by the inspector. The inspector noted there had been no corrective action documents issued or new measuring and test equipment issues since the December audit.

A comparison of the generic issues that were not adequately addressed in the sample of condition report/disposition requests reviewed by the inspector to those issues identified by the licensee's audit indicated that all programmatic issues evident in the condition report/disposition requests sample were identified in the audit. Additionally, generic issues related to weak environmental control, weak measuring and test equipment software control, poor implementation of commitments, and a weakness relating to the timeliness and adequacy of justification for nonconforming measuring and test equipment were identified.

To explain the justification issue, whenever out-of-calibration or nonconforming measuring and test equipment was found to be in use in the field, program procedures required an out-of-tolerance notice to be issued. The out-of-tolerance notice process was designed to initiate evaluation of the adequacy of all maintenance or testing performed using the measuring and test equipment back to the time it became nonconforming. The audit determined that the evaluation process was overly simplistic and identified a backlog of over 300 out-of-tolerance notices. At the time of the inspection, there were six out-of-tolerance notices to be resolved. The audit further identified several examples where out-of-tolerance notices were not initiated or dispositioned in accordance with procedural requirements.

The licensee issued Out-of-Tolerance Notice 960707 against Hygrometer/ Thermometer GU7034 on October 3, 1996. The instrument had been due for calibration on September 12, 1996. However, the notice remained open until November 20, 1996, without a documented extension for exceeding the 30-day limit. Procedure 34DP-OME01, "Out-of-Tolerance Evaluator's Instructions," Revision 3, Section 3.4, required that out-of-tolerance notices be resolved within 30 days of opening, or that justified extensions be documented. The inspector noted that there were 15 additional examples identified where out-of-tolerance notices were open for more than 30 days without obtaining the required extensions.



The licensee issued Out-of-Tolerance Notice 960192 against Calibrator MM0222 on March 12, 1996. The instrument had been due for calibration on January 18, 1996. The licensee audit determined that the initial disposition of the notice was inadequate and issued a corrective action document to address this problem. Procedure 34DP-OME01, Section 3.4, required that all out-of-tolerance evaluations contain documentation which clearly identifies the basis for acceptability. The inspector noted that the audit had identified an additional seven examples where out-of-tolerance notices contained inadequate documented basis or justification for the determination of continued acceptability.

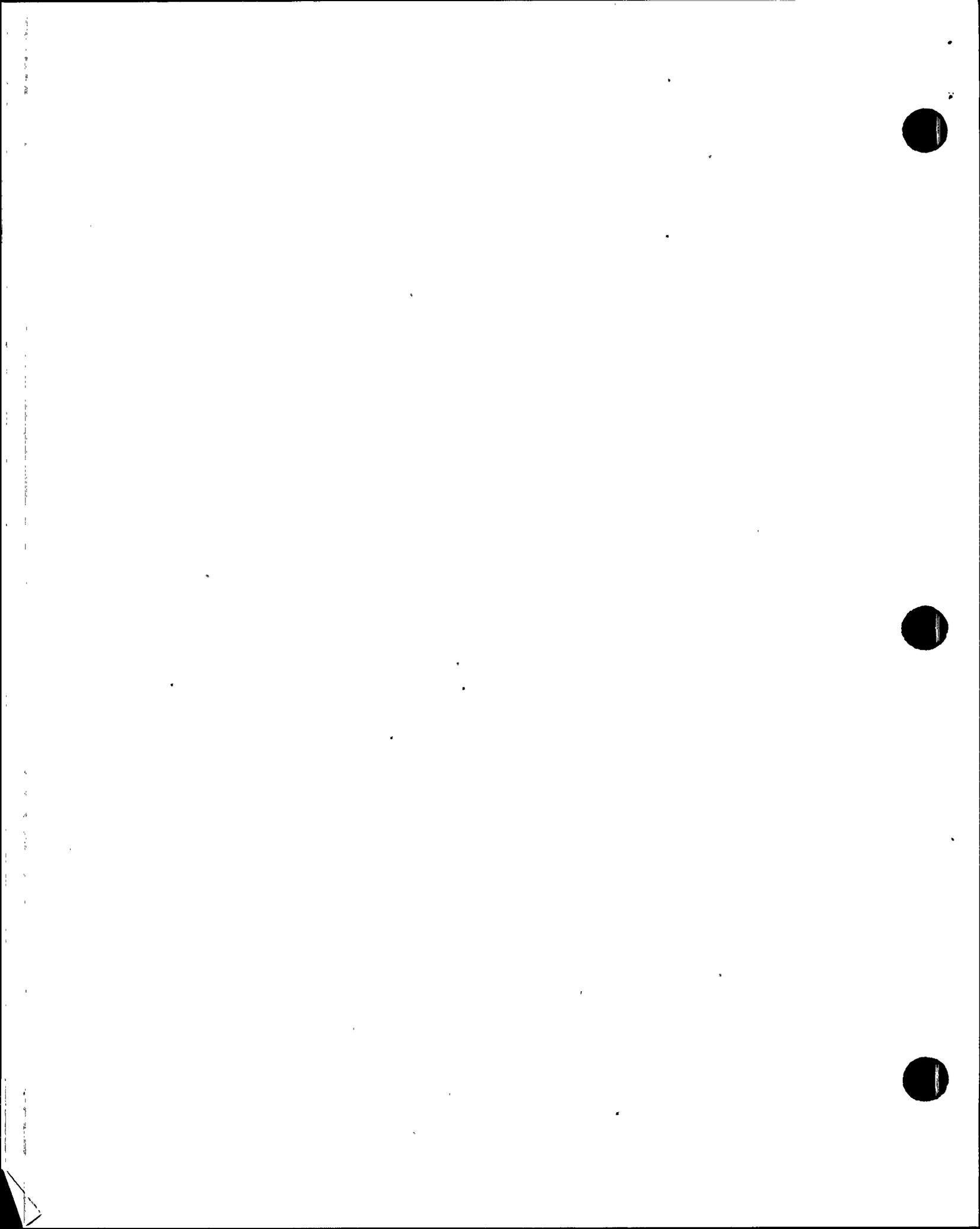
The licensee identified in late May 1996 that Hygrometer/Thermometer GU7037 had been due for calibration on February 4, 1996, and an out-of-tolerance notice had not been issued. Out-of-Tolerance Notice 96047 was issued on May 30, 1996. Procedure 34DP-OME02, "Measuring and Test Equipment," Revision 0, Section 1.3, required that equipment still in service past calibration due dates be documented by out-of-tolerance notices. The inspector noted that the audit had identified several examples where equipment was (more than 30 days) past the calibration due dates and had not been returned for calibration, and was not documented on out-of-tolerance notices.

The inspector reviewed the planned and implemented training and procedural changes to address the failures to meet requirements for processing out-of-tolerance notices. The changes were adequate to assure that, in the future, procedural requirements for adequacy, timeliness, and the documented justification bases would be met. The failure to meet procedural requirements in the performance of safety-significant activities was a violation of Criterion 5 of Appendix B to 10 CFR Part 50 (50-528;-529;-530/9713-01).

c. Conclusions

The inspector concluded that measuring and test equipment specific-deficiencies had been adequately addressed. The generic implications related to programmatic issues were not always identified in the condition report/disposition requests; however, none of the identified issues were determined to be safety significant because of their minor nature or because of the licensee having previously corrected the deficiency. The failure to meet procedural requirements was identified as a violation.

The licensee's audit identified all the obvious issues in the sample, as well as, additional issues that were not evident. The audit was thorough, identified violations of procedural requirements and areas needing programmatic improvement.



**M8 Miscellaneous Maintenance Issues**

**M8.1 (Closed), Inspection Followup Item 50-528/96018-01: A licensee audit of the measuring and test equipment program identified numerous issues for which the licensee had initiated corrective action.**

The line organization responded to a number of issues raised by the audit concerning their potential impact on the operability of plant equipment. In all cases, the operability of plant equipment was found to have been maintained. Licensee management expressed significant concerns regarding the program and stated an intention to focus the necessary management attention on program improvements.

The violation discussed in Section M7.1 is being issued to address the failures to meet procedural requirements for the treatment of nonconforming and out-of-tolerance measuring and test equipment. On the basis of the results of this inspection, which reviewed implemented or planned corrective actions to address the findings of Nuclear Assurance Division Audit 96-019, dated December 24, 1996, this item is closed.

**Management Meeting**

**X1 Exit Meeting Summary**

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on May 16, 1997, and in a supplemental telephone exit meeting on June 20, 1997. The licensee personnel acknowledged the findings presented. Licensee personnel did not identify as proprietary any information or materials examined during the inspection.



ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

S. Burns, Department Leader, Electrical/Instrumentation and Control Design Engineering  
R. Fullmer, Director, Nuclear Assurance Division  
D. Gouge, Department Leader, Maintenance Services  
R. Hazelwood, Engineer, Nuclear Regulatory Affairs  
D. Henry, Team Leader, Maintenance Services  
W. Ide, Vice President, Engineering  
A. Krainik, Department Leader, Nuclear Regulatory Affairs  
R. Lucero, Department Leader, Maintenance  
D. Marks, Section Leader, Nuclear Regulatory Affairs  
D. Mauldin, Director, Maintenance  
S. Ryan, Section Leader, Maintenance  
M. Salazar, Section Leader, Valve Services  
G. Shanker, Department Leader, Nuclear Assurance Maintenance

NRC

D. Orsini, Resident Inspector

INSPECTION PROCEDURES USED

IP 35750      Measuring and Test Equipment

ITEMS OPENED, CLOSED, AND DISCUSSED

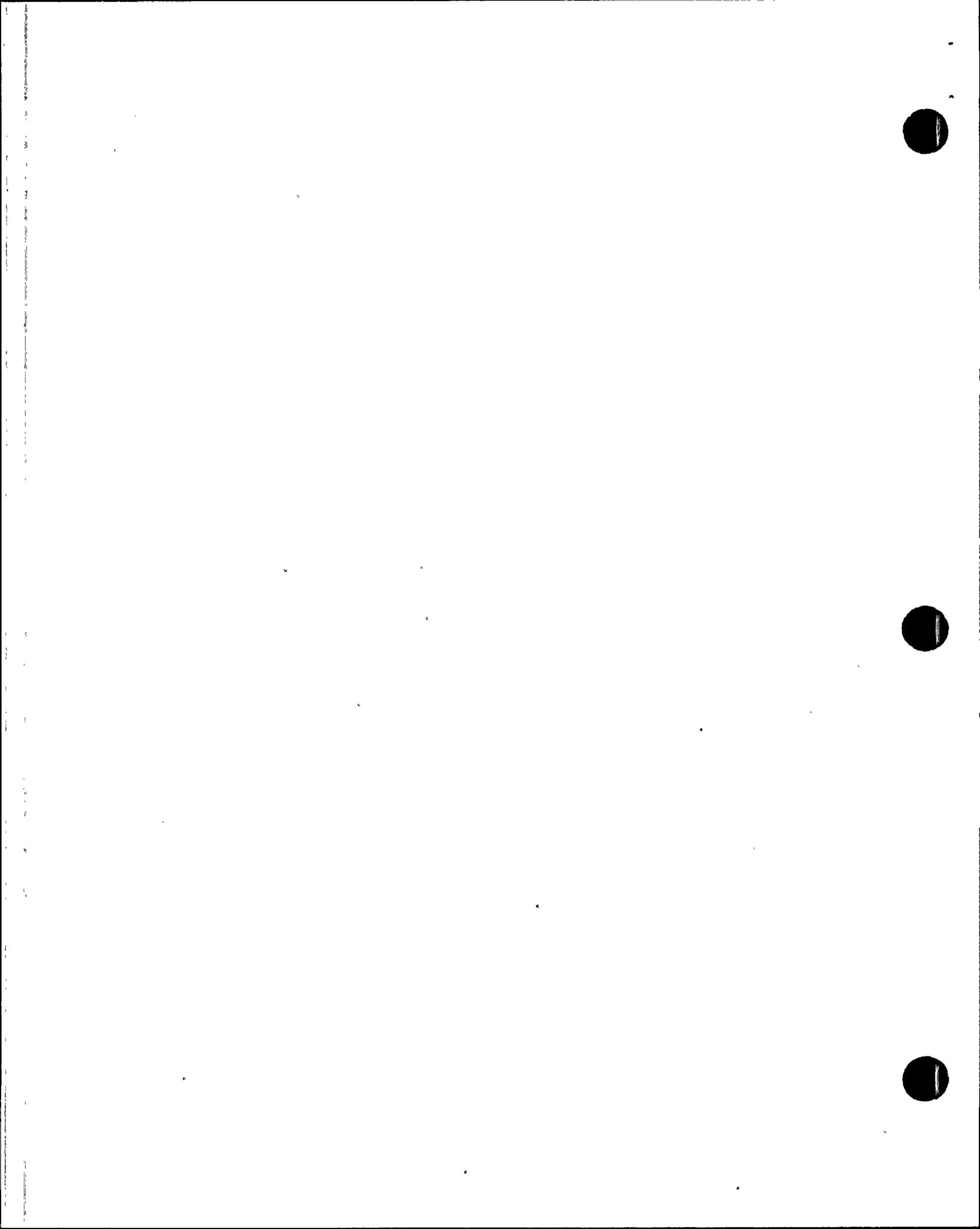
Opened

50-528;529;  
530/9713-01      VIO      Failure To Meet Measuring and Test Equipment Program  
Procedural Requirements

Closed

50-528;529;  
530/9618-01      IFI      Programmatic Weaknesses and Violations of Procedural  
Requirements in the Control, Use, and Calibration of  
Measuring and Test Equipment

50-528;529;  
530/9713-01      VIO      Failure To Meet Measuring and Test Equipment Program  
Procedural Requirements



LIST OF PROCEDURES REVIEWED

30DP-OWM07	Controls for the Use of M&TE, Revision 1
30DP-9MPO2	Fastener Tightening/Preload, Revision 4
34AC-OME01	Measuring and Test Equipment Calibration Laboratory Administrative Requirements, Revision 8
34AC-OME02	Measuring and Test Equipment Work Control, Revision 4
34AC-OME03	Calibration Requirements for Measuring and Test Equipment Calibration Standards, Revision 4
34PR-OME01	PVNGS Measuring and Test Equipment Control Program, Revision 3
34DP-OME02	Measuring and Test Equipment, Revision 0
34DP-OME02	Measuring and Test Equipment, Revision 1
73ST-9AF02	AFA-P01 - Inservice Test, Revision 5
73ST-9XI01	Containment Isolation Valve Inservice Test, Revision 8

LIST OF DOCUMENTS REVIEWED

CONDITION REPORT/DISPOSITION REQUESTS:

2-4-Q005	2-4-Q-007	9-4-Q046	9-5-Q024
9-5-Q096	9-5-Q249	9-5-Q531	9-5-Q533
9-5-Q581	9-5-Q1242	9-5-Q1259	9-6-Q119
9-7-Q126	9-7-Q140	9-7-Q728	

AUDITS

96-19, PVNGS Control of Measuring and Test Equipment

MISCELLANEOUS:

APS Specification 13-JN-702  
Quality Control Monitoring Report MC-86-0438  
Quality Control Monitoring Report MC-87-3002  
Startup Field Report 3PE-023

