


COMANCHE PEAK RESPONSE TEAM

RESULTS REPORT


ISAP: III.c

Title: Prerequisite Testing

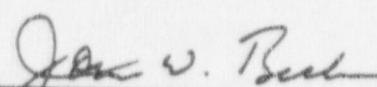
REVISION 1


Issue Coordinator

8-12-87
Date


Review Team Leader

8-12-87
Date


John W. Beck, Chairman CPRT-SRT

8/12/87
Date

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RESULTS REPORT

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Prerequisite Testing

1.0 DESCRIPTION OF ISSUE

The NRC-TRT described the issue in the CPSES Safety Evaluation Report, Supplement No. 7 at Page J-87, Item 4., "Assessment of Safety Significance," as follows:

...the TRT review found that craft personnel verified and signed for initial conditions on some prerequisite test data sheets, contrary to Section 4.10.9 of CP-SAP-21, 'Conduct of Testing,' which requires that this be done by the STE [System Test Engineer]. Further investigation revealed a memorandum issued by the Lead Startup Engineer on March 31, 1983, countermanding this requirement of CP-SAP-21. The subject of the memorandum (STM-83084) was 'ETG Personnel Schedule Change,' but it also indicated that craft personnel (ETG) [Electrical Test Group] may verify prerequisite conditions for Prerequisite Test Instructions XCP-EE-1 and XCP-EE-14. Issuing such a memorandum in lieu of executing a properly approved change to CP-SAP-21 is in violation of CP-SAP-1, 'Startup Administrative Procedures Manual,' Section 4.4.3.1, which requires a permanent or interim change to be approved and issued to all manual holders in accordance with CP-SAP-1. It appears that as a result of the memorandum, 24 of the 35 tests reviewed by the TRT had prerequisite conditions improperly verified by craft support personnel. Fifteen were XCP-EE-14, but nine were XCP-EE-24, 'Fixed Battery Pack Operated Emergency Lighting Units,' which were not authorized by the memorandum.

and summarized the issue at Page J-13, Item 3.2.3, "Findings for Test Program Issues," as follows:

...the TRT found that TUEC startup management authorized, by memorandum, test support craftsmen to verify initial conditions for certain prerequisite test procedures in violation of Startup Administrative Procedure CP-SAP-21, 'Conduct of Testing.'

2.0 ACTION IDENTIFIED BY NRC

The actions identified by the NRC-TRT in the CPSES Safety Evaluation Report, Supplement No. 7 at Page J-17, Item 4.2.3, "Prerequisite Testing," as being necessary to resolve this issue, are as follows:

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2.0 ACTION IDENTIFIED BY NRC (Cont'd)

Rescind the startup memorandum (STM-83084), which was issued in conflict with CP-SAP-21, and ensure that no other memoranda were issued which are in conflict with approved procedures. Also, conduct a review of all other prerequisite test records to determine those that had prerequisites signed by craft personnel, and assess the impact of those improperly verified on subsequent testing activities.

3.0 BACKGROUND

Startup Administrative Procedure CP-SAP-1, "Startup Administrative Procedure Manual," authorizes the Startup Manager to issue interim procedure changes or other necessary instructions on a temporary basis. These changes are required to be issued with specific instructions concerning their applicability and use. The Startup Manager is required to notify all manual holders of the interim change. Instructions issued in this manner that are intended to be long-standing are required by CP-SAP-1 to be followed with a formal procedure revision.

Startup Interoffice Memorandum, SIM-83084, assigned responsibility for verification of prerequisites/initial conditions (hereinafter referred to as initial conditions) for Prerequisite Test Instructions, XCP-EE-1, "Megger Testing," and XCP-EE-14, "Molded Case Circuit Breaker and Thermal Overload Relay/Heater Testing," to Electrical Test Group (ETG) craft support personnel. Startup Administrative Procedure CP-SAP-21, however, requires that System Test Engineers verify initial conditions prior to conducting the test. The NRC-TRT also identified other prerequisite test instructions that had initial conditions signed by unauthorized craft personnel. The Startup organization also has a Mechanical Test Group (MTG) comprised of craft support personnel.

Prerequisite testing is performed prior to preoperational testing. Prerequisite testing is component-related and engineering-discipline-oriented while preoperational testing is system-related. Prerequisite testing serves to minimize the time and effort spent resolving component-related problems during preoperational testing and, therefore, enhances the orderly and efficient conduct of preoperational testing. Prerequisite testing is performed in accordance with written instructions with the objective of assuring that personnel injury and equipment damage are prevented, to ensure that the testing is performed in a consistent manner on multiple components, and that records of the testing activity are provided. Prerequisite testing does not impact the health and safety of the

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(Cont'd)

3.0 BACKGROUND (Con't)

public because the ability of components within a system or a combination of systems to perform their safety-related function is verified directly during preoperational testing. And in most cases, safety function verifications are also reconfirmed during the post-operating-license Initial Startup Testing and Surveillance Testing with few exceptions.

The NRC-TRT evaluated the practice at CPSES of permitting Startup support craft personnel not qualified as System Test Engineers to participate in prerequisite testing. The NRC-TRT's conclusions, reported in SSER-7, were that the practice was acceptable and consistent with licensing commitments and applicable industry standards.

4.0 CPRT ACTION PLAN

4.1 Scope and Methodology

The objective of this action plan is to identify Startup Interoffice Memoranda that may be in conflict with approved Startup Administrative Procedures, identify prerequisite test records that may have initial conditions signed as complete by craft personnel, and to evaluate the impact of these actions upon required testing.

4.1.1 SIM-83084 was rescinded by issuance of SIM-84220 dated September 25, 1984.

4.1.2 System Test Engineers were instructed that SIM-83084 was rescinded, and that it is their responsibility to verify test initial conditions for each test.

4.1.3 All craft test support personnel were instructed that they shall not verify test initial conditions.

4.1.4 Startup Interoffice Memoranda were reviewed to determine if any other directives were issued that conflict with requirements of the Startup Administrative Procedures.

4.1.5 All prerequisite test records were reviewed to identify other cases where craft personnel signed initial conditions for prerequisite tests.

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4.0 CPRT ACTION PLAN (Cont'd)

- 4.1.6 All prerequisite test instructions with unauthorized verifications for the initial conditions were analyzed to determine the consequences of improper initial conditions verifications.
- 4.1.7 The results of the SIM review and prerequisite test records and instructions review were evaluated to assess the impact on subsequent testing activities.

4.2 Participants Roles and Responsibilities

- 4.2.1 The former Startup Manager, Mr. R. E. Camp, was responsible for rescinding SIM-83084 and reinstructing all STEs and craft support personnel with regard to their responsibilities relating to verification of initial conditions for prerequisite testing.
- 4.2.2 Startup Interoffice Memoranda were reviewed by the former Startup Manager and the former Startup Special Projects Group Supervisor, Mr. S. M. Franks.
- 4.2.3 The former Startup QA Specialist, Mr. H. A. Lancaster, was responsible for reviewing prerequisite test instruction records.
- 4.2.4 The Startup Special Projects Group Supervisor, Mr. G. M. McGrath, and the CPRT Test Program Review Team Leader, Mr. J. E. Rushwick, performed the SIM and prerequisite test record review evaluations.
- 4.2.5 The CPRT Test Program Review Team Leader overviewed the tasks performed by Startup personnel.
- 4.2.6 The CPRT Test Program Review Team Leader was responsible for evaluating the overall results of this action plan.

4.3 Qualifications of Personnel

- 4.3.1 The Startup personnel performing the evaluations were qualified in accordance with CP-SAP-19, "Indoctrination/Training/Qualification Requirements for Startup Personnel."

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4.0 CPRT ACTION PLAN (Cont'd)

4.3.2 The CPRT Test Programs Review Team Leader meets the qualifications prescribed by the CPRT Program Plan.

4.3.3 The Review Team Leader assures that other personnel providing assistance are appropriately qualified.

4.4 Acceptance Criteria

The judgement that there was no impact on required testing was made by the RTL if:

- o the initial condition to be verified was not pertinent to the attainment of valid test results e.g., custody tagging; and
- o the individual performing the verification possessed the necessary skills to do so, and the verification activity was subject to the overall supervision of an STE.

5.0 IMPLEMENTATION OF ACTION PLAN AND DISCUSSION OF RESULTS

The following presents the results of the CPRT Third Party review of the work performed by the Startup organization in response to the NRC-TRT's request for action. The first five sections present the various evaluations performed by the Startup organization and its related conclusions. The last section presents the RTL's evaluation.

5.1 The Startup Interoffice Memorandum Identified by the NRC-TRT

The RTL confirmed that a Startup Interoffice Memorandum (SIM) was issued in March 1983 that provided instructions that were contrary to the requirements of CP-SAP-21, "Conduct of Testing," and that the Startup Administrative Procedure (SAP) was not revised accordingly. The memorandum had been issued to establish a new policy with respect to utilization of Electrical Test Group (ETG) personnel in a more productive manner, and to improve cross-training of the ETGs in plant systems and components. The specific instructions issued included the following:

...No energized functional testing or retesting of controls or components will be performed by ETG without the responsible STE present. ETG personnel are not responsible for verifying [that] applicable

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ISAP III.c
(Cont'd)

5.0 IMPLEMENTATION OF ACTION PLAN AND DISCUSSION OF RESULTS (Con't)

prerequisites [are] complete prior to testing with the exception of XCP-EE-1 [Megger/Hi Pot Testing] and XCP-EE-14 [Molded Case Circuit Breaker and Thermal Overload Relay/Heater Testing]. (Emphasis in original memorandum.)

The memorandum, while emphasizing one requirement, issued instructions contrary to another requirement.

The specific requirement established in CP-SAP-21 that was compromised by the SIM was that the assigned STE is responsible for the following prior to commencing testing:

...Verify that the applicable prerequisites specified by the test instruction/procedure have been completed.

Prerequisite test instruction data sheets had been revised to make a provision for the STEs to document the verification of the initial conditions prior to commencing testing. When this requirement was imposed via Revision 0 of CP-SAP-21 in May 1982, prerequisite testing was approximately 45% complete and preoperational testing was scheduled to begin in the near future.

The RTL reviewed the circumstances surrounding the imposition of this requirement. The STE had always been responsible for supervising the test and verifying the test results. The supervision of the test and verification would include any initial conditions possibly affecting the test results. The new requirement simply changed the timing of the documentation of this verification. The RTL concludes that the principal motivation was to ensure an orderly transition into the more complex preoperational testing phase. The remaining prerequisite tests involved sufficient interface with energized, pressurized, and operating equipment to warrant separate initial conditions verifications prior to testing in the interest of safety.

When the existence of the memorandum with the conflicting instructions was brought to the attention of the Startup Manager, a new memorandum was immediately issued to rescind the original memorandum with the conflicting instructions.

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5.0 IMPLEMENTATION OF ACTION PLAN AND DISCUSSION OF RESULTS (Con't)

This new memorandum also established a program not only to bring to the attention of the test program personnel the fact that a conflict between an administrative procedure and a SIM had existed, and but also to instruct the STEs and ETGs in their responsibilities for implementing the requirements of the SAP related to the verification of initial conditions. Additional emphasis was placed on the fact that administrative procedures take precedence in the event of future conflicts. Subsequently, the Mechanical Test Group (MTG) personnel were included in the program of instruction. CP-SAP-21 was revised to stipulate that the required STE verification be documented on the test data sheets by the STE.

The RTL observed that the administrative infractions related to the SIM fell into three categories as follows:

- o The verification by ETG personnel of the initial conditions for XCP-EE-1 and 14, while permitted by SIM-83084, was in conflict with the requirements of CP-SAP-21;
- o The requirements of CP-SAP-1, "Startup Administrative Procedures Manual," to notify all recipients of controlled copies of the Startup Administrative Procedures of an interim change and logging the change for inclusion in the next revision of CP-SAP-21 were not adhered to, thus the conflict was not acknowledged; and
- o The performance of the initial conditions verifications for XCP-EE-24, "Fixed Battery Pack Operated Emergency Lighting Units," as noted by the NRC-TRT, was not permitted by either the SIM or CP-SAP-21.

The RTL ascertained that there were no requirements in the NRC's regulations nor industry standards that establish rigid minimum qualifications for the individuals who determine that a system or component is ready for testing by performing the initial conditions verifications. Industry standards specify the elements of an effective test program, and address explicitly the qualifications of the individuals responsible for the review and approval of test procedures, the supervision of testing, and the review and approval of the results of testing. When the Startup organization issued CP-SAP-21, "Conduct of Testing," they imposed the requirement upon themselves.

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5.0 IMPLEMENTATION OF ACTION PLAN AND DISCUSSION OF RESULTS (Con't)

5.2 Review of Startup Interoffice Memoranda

There were 717 SIMs issued between February 1982 and November 1984. This system of correspondence was initiated in February 1982 and the review to determine if other memoranda were issued with conflicting instructions was completed in November 1984. The SIM correspondence were reviewed in their entirety by the former Startup Manager and the former Startup Special Projects Group Supervisor to determine if any additional memoranda had been issued that contained instructions that conflicted with existing administrative procedures. They did not identify any additional memoranda. Eight memoranda that would appear not to be of concern based on their subject matter were not reviewed because they had been lost. Efforts to locate copies of the eight memoranda were unsuccessful.

The RTL reviewed all SIMs issued from February 1982 through June 1987. No other memoranda containing instructions contrary to an administrative procedure were identified. The RTL also reviewed correspondence from the other two correspondence systems that the Startup organization utilizes. The objective of this review was to confirm that the SIM correspondence was the only method used to provide instructions to the STEs that might conflict with the administrative procedures. The RTL confirmed that the SIM correspondence would be the only method of providing written augmenting instructions to the STEs.

The RTL concludes that there is reasonable assurance that no other Startup Interoffice Memoranda had been issued containing instructions contrary to Startup Administrative Procedure requirements.

5.3 Review of Prerequisite Test Instruction Data Sheets

The Startup Quality Assurance Specialist performed a review of the prerequisite test instruction data sheets that had been submitted to the TU Electric records vault as of December 1984. The objective of the review was to identify additional instances where the initial conditions verifications were signed by an individual other than an STE qualified to the requirements of CP-SAP-19, "Indoctrination/Training/Qualification Requirements For Startup Personnel."

Thirty-two prerequisite test instructions had been issued during the prerequisite test phase. Thirty-one instructions

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(Cont'd)

5.0 IMPLEMENTATION OF ACTION PLAN AND DISCUSSION OF RESULTS (Cont'd)

had an explicit documented verification of the initial conditions incorporated into the test data sheets. Prerequisite test instruction XCP-EE-8, "Control Circuit Functional Testing," did not require a separate documented verification of the initial conditions because only an STE may direct the performance of an energized XCP-EE-8 test instruction and, therefore, XCP-EE-8 test data sheets were not reviewed.

A total of 23,275 approved prerequisite test instruction data sheets were reviewed during this effort. From the review of the 23,275 data sheets, 2,815 administratively improper verifications of initial conditions by an individual from the Startup support staff were identified. The Startup support staff violations occurred with the testing activities involving the ETGs, the MTGs, and the TU Electric Operations Meter and Relay Section. The review results indicate that of the thirty-one prerequisite test instructions requiring documented verification of completed initial conditions by an STE, nineteen had at least one case of improper validation of the initial conditions by an individual other than the responsible STE. Sixteen of the nineteen prerequisite test instructions had improper validations during testing of safety-related equipment. Seventeen of the nineteen tests had improper validations during testing of non-safety-related equipment. All test data sheets reviewed by the Startup Quality Assurance Specialist were found to have been reviewed by the STE responsible for the test and approved by an STE certified to approve test results, confirming overall supervision of the testing by an STE.

The majority of the violations occurred in the electrical prerequisite test instruction data sheets, although a few were mechanical. See Attachment 1, "Test Data Sheet Review Results," for the detailed tabulation of the data gathered during the review. The next section presents the evaluation of the impact of the violations on subsequent testing.

The test data sheet review data were tabulated and plotted on a monthly basis. The results indicate that the first violations occurred as soon as the prerequisite test instruction data sheets were revised to include the added

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5.0 IMPLEMENTATION OF ACTION PLAN AND DISCUSSION OF RESULTS (Cont'd)

documentation requirement for verification of the initial conditions in June 1982. The violations continued until the SIM was rescinded and the corrective action program implemented on September 25, 1984. There were three distinct peaks in the number of monthly violations coinciding with: the issuance of the revised prerequisite test instructions; the preparations being made for performing the hot functional test; and the reperformance of the electrical portion of the preoperational tests due to rerouting and retermination of cables for cable separation criteria compliance.

The Startup organization qualified 121 STEs prior to January 1985. Of the 121, seventy-three were involved in allowing an ETG, MTG, or Meter and Relay support staff individual to document the initial conditions verifications at least once. Thirteen STEs from the electrical test group accounted for over 75% of the safety-related and 80% of the non-safety-related violations. This group of thirteen averaged approximately 170 violations each. Another group of fifteen STEs averaged approximately twenty-five violations each. A final group of forty-five STEs averaged approximately five violations each.

The RTL concludes that the verification of initial conditions by Startup support craft personnel was permitted by the STEs for those prerequisite test instructions that were routine and consistent with the craft support personnel capabilities. Further, the frequency of the violations varied only with the level of testing activities.

5.4 Evaluation of Instructions With SAP Non-compliances

For each of the nineteen prerequisite test instructions that had an administratively improper verification of initial conditions by an individual other than an STE, a TDR was initiated to document the review and evaluation of the impact on subsequent testing.

The evaluation documented on each TDR that had been issued for each prerequisite test instruction with a violation led to the conclusion that validation of the prerequisite test instruction initial conditions by the Startup support personnel would have no impact on the validity of test results in subsequent testing. Typical bases for these conclusions are discussed below. The TDRs also documented the conclusion that the corrective action initiated when the memorandum and SAP conflict was first identified was sufficient to resolve the issue.

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5.0 IMPLEMENTATION OF ACTION PLAN AND DISCUSSION OF RESULTS (Cont'd)

The RTL reviewed all the initial conditions in all the prerequisite test instructions. The review included the TDR evaluations of the specific initial conditions that Startup support personnel had documented as complete prior to testing. The initial condition verifications that were documented by Startup support personnel may be placed into three categories as follows:

- (a) verification that custody of the equipment was transferred from the construction organization to the Startup organization, that the equipment was prominently tagged in the plant to indicate the Startup organization's jurisdictional control of the operating status of the equipment, and that safety tags had been issued and placed on the equipment as appropriate;
- (b) confirmation that other prerequisite tests, as required, had been performed prior to commencing the specific test;
- (c) observations of a confirmatory nature that the equipment is ready for testing.

Category (a) initial conditions are verifications related to the construction status of the equipment and are safety precautions to prevent personnel injuries or equipment damage. The nature of the tags, to provide personnel safety, attached to the equipment have no bearing on the actual performance of the test nor would it impact the actual data obtained from a test. Further, safety training of craft personnel ensures their ability to make such determinations in any case.

Category (b) initial conditions are verifications that, where appropriate, testing has been accomplished in the appropriate sequence to ensure the success of the test under consideration. These verifications assure that testing proceeds in a safe and orderly manner. Examples of this type of initial condition include: cable meggering prior to initial energization of switchgear and motors, establishing that annunciators and alarms are operable, calibration of measuring and test equipment, calibration of permanent instrumentation, cleanliness in area of testing, and establishing communications. For this category of initial condition verification, no special capability beyond that routinely exhibited by Startup support craft personnel assisting in the testing would be required.

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ITEM NUMBER III.c (Cont'd)

5.0 IMPLEMENTATION OF ACTION PLAN AND DISCUSSION OF RESULTS (Cont'd)

Category (c) initial conditions are observations of the equipment analogous to those that are to be confirmed by the test under consideration. These initial conditions also assure that testing may proceed in a safe and orderly manner. For this category of initial condition verification, familiarity with the equipment involved would be required. Examples of this type of initial condition are those that support initial operation of rotating equipment or energizing high-voltage switchgear and transformers. Other examples include: lubrication, cooling water supplies, shaft seal adjustment, bus phase rotation, component protective devices, and equipment alignment. In many instances assigned craft personnel would also be capable of making these determinations. Further, the conduct of the test subsequent to these observations would typically result in the detection of any improper initial conditions verifications by erratic operation of the equipment or unacceptable test results. Nevertheless, for this category of test, the STE would be expected to perform the initial conditions verifications. Additional evaluation was required in these cases.

The evaluations by the Startup organization indicate that the majority of the violations by the STEs and Startup support personnel consisted of those described as category (b) above. In each instance where a category (c) initial condition was verified by Startup support personnel, the test was being repeated due to equipment maintenance, design change work, or hot alignment of rotating equipment. For these situations, the equipment had already been operated successfully, and the initial conditions verified properly by an STE during previous testing.

Based on the nature of the initial conditions that were verified administratively incorrectly, and the fact that test data continued to be reviewed and approved properly, the RTL concurs with the Startup organization's conclusions that the administratively improper validation of initial conditions by the Startup support personnel did not impact the performance or results of required testing.

5.5 Startup's Response to Evaluation

Subsequent to its own evaluation, the Startup organization determined that improvements in the program, going beyond the corrective action already taken to preclude recurrence, should

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ITEM NUMBER III.c (Cont'd)

5.0 IMPLEMENTATION OF ACTION PLAN AND DISCUSSION OF RESULTS (Cont'd)

be adopted. A formal program of documenting the qualifications of the personnel providing support to testing activities was concluded to be appropriate. The prerequisite test instructions were also reorganized and reissued based upon an evaluation of the experience gained during the Unit 1 and Common prerequisite and preoperational testing.

5.5.1 Startup Support Personnel Qualifications

CP-SAP-19, "Indoctrination/Training/Qualification Requirements for Startup Personnel," was revised to establish a formal program to qualify craft support personnel assigned to the Electrical and Mechanical Test Groups to perform certain prerequisite tests.

CP-SAP-19 establishes qualification requirements for the ETGs and MTGs commensurate with the prerequisite tests to be performed by these individuals. The RTLs review of those qualification requirements revealed that the requirements are more stringent than the requirements established in the ANSI N45-2.6, "Qualification of Inspection, Examination, and Testing Personnel for Nuclear Power Plants." standard.

5.5.2 Prerequisite Test Instructions

The prerequisite test instructions XCP-FE-2, -3, -4, and -15 were deleted from the prerequisite test instruction manual. These test instructions are usually one of the first group to be prepared in any Startup program. In the case of CPSES, these instructions were prepared prior to similar instructions being prepared by the Operations group. After sufficient trial use by the Meter and Relay section and Electrical Maintenance Department, the Operations group prepared similar instructions that were organized in accordance with the Operation's system of procedures and manuals. The testing conducted in accordance with these instructions had always been delegated to these groups from Operations as part of the testing program requirement for participation by the operations personnel in test program activities to the maximum extent practical.

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ITEM NUMBER III.c
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5.0 IMPLEMENTATION OF ACTION PLAN AND DISCUSSION OF RESULTS (Cont'd)

For the Unit 2 test program these groups will continue to perform this testing; however, they will use their own test procedures and are qualified according to the Operations group training program.

5.6 RTL Evaluation

The Startup organization issued instructions (SIM-83084) contrary to an administrative procedure (CP-SAP-21) without the required interim change to that procedure. In practice, the affected administrative procedure requirement was violated for the two prerequisite tests addressed by the SIM and for seventeen others. This practice was not a violation of licensing commitments nor industry standards; the requirement was self-imposed by the Startup organization. Based on the review of all the Startup Interoffice Memoranda and other correspondence, the RTL concludes that the issuance of the subject memorandum providing instructions conflicting with the SAPs was an isolated case. Further, the RTL reviewed the evaluations performed by the Startup organization of each of the administrative violations and concurs with the conclusion that the validity of required testing was not impacted.

The RTL reviewed the actions taken by the Startup organization to preclude future administratively improper verification of initial conditions for prerequisite testing. The action taken to rescind SIM-83084; the program to ensure awareness by all Startup personnel that participate in testing activities that a memorandum had been issued with instructions contrary to administrative procedures; and the revision to CP-SAP-21 was judged by the RTL to be adequate to preclude recurrence and to ensure future compliance for all prerequisite tests.

6.0 CONCLUSIONS

The RTL concludes that there is reasonable assurance that there were no impacts on required prerequisite or preoperational testing because Startup support personnel performed the initial conditions verifications for certain prerequisite test instructions for which they were not administratively authorized.

These conclusions are based upon a review of the Startup Interoffice Memoranda issued, the corrective action developed and implemented when the original memorandum was identified, and a review and evaluation of the actual initial conditions that had been documented improperly.

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7.0 ONGOING ACTIVITIES

There are no ongoing activities.

8.0 ACTION TO PRECLUDE OCCURRENCE IN THE FUTURE

The issue was resolved by a program of instruction as described in Section 5.1. CP-SAP-21 was revised to indicate the manner in which initial conditions shall be documented.

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Attachment 1
Test Data Sheet Review Results

The results of the prerequisite test instruction data sheet review are tabulated below. The number of test data sheets reviewed for each test instruction are tabulated along with the number of test data sheets that had an administratively improper validation of the initial conditions. The results are also tabulated by whether the equipment that had been tested was safety or non-safety-related.

1.0 Electrical Prerequisite Test Instruction Data Sheet Review

The following electrical prerequisite test instructions were reviewed:

- o XCP-EE-1, "Megger/Hi Pot Testing;"
- o XCP-EE-2, "Transformer Ratio/Polarity Testing;"
- o XCP-EE-3, "Relay Calibration;"
- o XCP-EE-4, "Metering Device Calibration;"
- o XCP-EE-5, "Switchgear and Motor Control Center Testing;"
- o XCP-EE-6, "Initial Motor Generator Operation;"
- o XCP-EE-7, "Power Transformer Testing;"
- o XCP-EE-9, "Initial Motor Rotation and Run-In;"
- o XCP-EE-10, "Motor Operated Valve/Damper Testing;"
- o XCP-EE-11, "Air Operated Valve/Damper Testing;"
- o XCP-EE-12, "Annunciator and Monitor/Status Light Operability Testing;"
- o XCP-EE-13, "Battery Testing;"
- o XCP-EE-14, "Molded Case Circuit Breaker and Thermal Overload Relay/Heater Testing;"
- o XCP-EE-15, "6.9KV & 48V Air Circuit Breakers;"
- o XCP-EE-17, "Generator Testing;"

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Attachment 1
Test Data Sheet Review Results
(Con't)

- o XCP-EE-18, "Power and Distribution Panel Test Procedure;"
- o XCP-EE-19, "Immersion Heater Functional Testing;"
- o XCP-EE-21, "Disconnect Switch Testing;"
- o XCP-EE-22, "Solenoid Operated Valve/Damper Testing;"
- o XCP-EE-23, "Control Circuit Dynamic Testing;" and
- o XCP-EE-24, "Fixed Battery Pack Operated Emergency Lighting Units."

The following tabulation presents the results of the review of safety-related test data sheets.

	<u>Test Records</u>	<u>Improper Validations</u>	<u>Percent</u>
EE-1	2,295	77	3.4
EE-2	107	8	7.5
EE-3	585	263	45.0
EE-4	254	87	34.3
EE-5	60	5	8.3
EE-6	2	0	0.0
EE-7	6	0	0.0
EE-9	518	3	0.6
EE-10	483	5	1.0
EE-11	1,032	8	0.8
EE-12	3,346	11	0.3
EE-13	12	0	0.0

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Attachment 1
Test Data Sheet Review Results
(Con't)

	<u>Test Records</u>	<u>Improper Validations</u>	<u>Percent</u>
EE-14	2,708	968	35.8
EE-15	142	0	0.0
EE-17	2	0	0.0
EE-18	76	15	19.7
EE-19	33	0	0.0
EE-21	135	33	24.4
EE-22	12	0	0.0
EE-23	17	0	0.0
	<u>11,825</u>	<u>1,483</u>	<u>12.5</u>

The following tabulation presents the results of the review of
non-safety-related test data sheets.

	<u>Test Records</u>	<u>Improper Validations</u>	<u>Percent</u>
EE-1	2,101	85	4.1
EE-2	73	2	2.7
EE-3	320	110	34.4
EE-4	256	137	53.5
EE-5	86	1	1.2
EE-7	10	0	0.0
EE-9	484	4	0.8
EE-10	101	2	2.0

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Attachment 1
Test Data Sheet Review Results
(Con't)

	<u>Test Records</u>	<u>Improper Validations</u>	<u>Percent</u>
EE-11	480	6	1.3
EE-12	2,547	47	1.9
EE-13	12	0	0.0
EE-14	2,022	432	21.4
EE-15	81	2	2.5
EE-18	4	0	0.0
EE-18	147	6	4.1
EE-19	44	0	0.0
EE-21	86	9	10.5
EE-22	17	0	0.0
EE-24	<u>1,055</u> 9,926	<u>472</u> 1,315	<u>44.7</u> 13.3

Totals for all electrical prerequisite test instruction data sheets reviewed:

<u>Test Records</u>	<u>Improper Validations</u>	<u>Percent</u>
21,752	2,798	12.9

2.0 Mechanical Prerequisite Test Instruction Test Data Sheet Review

The following mechanical prerequisite test instructions were reviewed:

- o XCP-ME-1, "Initial Pump Operation;"
- o XCP-ME-2, "Air Compressor Functional Tests;"

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(Cont'd)

Attachment 1
Test Data Sheet Review Results
(Con't)

- o XCP-ME-3, "HVAC Gravity & Fire Damper Testing;"
- o XCP-ME-4, "Systems Cleanliness Verification;"
- o XCP-ME-5, "Fan Functional Tests;"
- o XCP-ME-6, "Tornado Door and Fire Testing;"
- o XCP-ME-7, "Roll Filter Functional Tests;"
- o XCP-ME-10, "Pipe Support Adjustments;"
- o XCP-ME-12, "HVAC Condenser Unit Unit Functional Test;" and
- o XCP-ME-13, "Unit/Duct Heater Functional Tests."

The following tabulation is for safety-related records reviewed:

	<u>Test Records</u>	<u>Improper Validations</u>	<u>Percent</u>
ME-1	237	9	3.8
ME-2	9	0	0.0
ME-3	154	6	3.9
ME-4	18	0	0.0
ME-5	12	0	0.0
ME-10	379	0	0.0
ME-12	12	0	0.0
ME-13	<u>46</u>	<u>6</u>	<u>13.0</u>
	867	15	1.7

RESULTS REPORT

ITEM NUMBER III.c
(Cont'd)

Attachment 1
Test Data Sheet Review Results
(Con't)

The following tabulation is for the non-safety-related records reviewed:

	<u>Test Records</u>	<u>Improper Validations</u>	<u>Percent</u>
ME-1	234	0	0.0
ME-2	13	0	0.0
ME-3	117	1	0.9
ME-4	30	0	0.0
ME-5	25	0	0.0
ME-6	2	0	0.0
ME-7	23	1	4.4
ME-10	149	0	0.0
ME-12	17	0	0.0
ME-13	$\frac{47}{657}$	$\frac{0}{2}$	$\frac{0.0}{0.3}$

Totals for all mechanical prerequisite test instruction data sheets reviewed:

<u>Test Records</u>	<u>Improper Validations</u>	<u>Percent</u>
1,524	17	1.1

Totals for all electrical and mechanical safety and non-safety-related test records reviewed:

<u>Test Records</u>	<u>Improper Validations</u>	<u>Percent</u>
23,275	2,815	12.1