NUREG-0977

NRC Fact-Finding Task Force Report on the ATWS Events at Salem Nuclear Generating Station, Unit 1, on February 22 and 25, 1983*

U.S. Nuclear Regulatory Commission

Region I Task Force

*This title supersedes the title of earlier drafts, which refers only to the February 25, 1983 event. References to the earlier title in the text and bibliographic data sheet have not been corrected in this printing.



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NRC Fact-Finding Task Force Report on the ATWS Event at Salem Nuclear Generating Station, Unit 1, on February 25, 1983

Manuscript Completed: March 1983
Date Published: March 1983

Region I Task Force

Region I
U.S. Nuclear Regulatory Commission
King of Prussia, PA 19406



ABSTRACT

An NRC Region I Task Force was established on March 1, 1983 to conduct fact finding and data collection with regard to the circumstances which led to an anticipated transient without scram (ATWS) event at the Public Service Electric and Gas Company's Salem Generating Station, Unit 1 on February 25, 1983. The charter of the Task Force was to determine the factual information pertinent to management and administrative controls which should have ensured proper operation of the reactor trip breakers in the solid state protection system. This report documents the findings of the Task Force along with its conclusions.

NRC REGION I

SALEM TASK FORCE

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ABBREVIATIONS

ac	-	Alternating current
AFW	-	Auxiliary feedwater
AP	-	Administrative procedure
BY	-	Bypass
CCI	-	Commercial catalog item
CP&L	-	Carolina Power & Light
DBE	-	Design basis earthquake
dc	-	direct current
DR	-	Deficiency report
ENS	-	Emergency notification system
EOP	-	Emergency operating procedures
FP	-	Full power
FSAR	-	Final Safety Analysis Report
FW	-	Feedwater
I&C	-	Instrumentation and control
IR	-	Incident report
LCO	-	Limiting conditions for operation
MEL	-	Master equipment list
MFP	-	Main feedwater pump
MO/IC	-	Material order/item classification
MR/RR	-	Material request/receivng record
MSIV	-	Main steam isolation valve
NED	-	Nuclear Energy Division - Westinghouse
NES	-	Nuclear Energy Systems - Westinghouse

NSSS	-	Nuclear steam supply system
OE	-	Operating engineer
PD	-	Project directive
PM	-	Preventive maintenance
PO	-	Purchase order
PORV	-	Power operated relief valve
PSE&G	-	Public Service Electric & Gas
PTN	-	Preoperational turnover notice
PWR	-	Pressurized water reactor
QA	-	Quality assurance
QAD	-	Quality assurance department
QC	-	Quality control
QCIR	-	Quality control inspection report
RCCA	-	Rod cluster control system assembly
RCP	-	Reactor coolant pump
RO	-	Reactor operator
RPS	-	Reactor protection system
RT	-	Reactor trip
RTB	-	Reactor trip breaker
SG	-	Steam generator
SNGS	-	Salem Nuclear Generating Station
SOE	-	Sequence of events
SORC	-	Site operations review committee
SPIN	-	Standard plant item number
SP(O)	-	Surveillance procedure (operations)

SQAE	-	Station quality assurance engineer
SS	-	Shift supervisor
SSPS	-	Solid state protection system
SSS	-	Senior shift supervisor
STA	-	Shift technical advisor
SUP	-	Startup test
TDC	-	Technical Document Center
UE&C	-	United Engineers and Constructors
UFSAR	-	Updated Final Safety Analysis Report
UV	-	Undervoltage
W	-	Westinghouse

NOTE ON REFERENCES

Those reports, procedures, work orders, instructions, manuals, illustrations, and the like directly related to the Task Force examination of reactor trip current breakers in the solid state protection system are incorporated into the appendixes of this report. Other materials from NRC and the licensee, PSE&G, are available in accordance with the Notice of Availability statement on the inside cover of this report.

SUMMARY

The Salem Unit 1 reactor was operating at 12% full power during a startup on February 25, 1983 following a routine refueling outage. A low-low level condition developed in the No. 12 steam generator due to normal difficulties experienced during startup operations. The low-low steam generator level condition caused a reactor trip signal to be generated by the reactor trip system at 12:21 a.m. Both reactor trip circuit breakers remained closed until plant operators manually tripped the reactor about 30 seconds later. The reactor trip circuit breakers opened at that time to insert the control rods into the core to place the plant in a stable shutdown condition.

Subsequent licensee investigation of the reactor trip system determined that failure of the reactor trip breaker to open automatically was caused by mechanical binding of the latch mechanism in the undervoltage trip attachment on the breakers. The manual trip signal initiated by the operators opened the reactor trip breakers since the manual signal operates a shunt trip attachment on the breakers in addition to the undervoltage trip attachment. The licensee declared an Alert at 1:30 a.m. on February 26, 1983, in accordance with the plant Emergency Plan to provide notifications to offsite authorities that an anticipated transient without scram (ATWS) condition had existed for 30 seconds at 12:21 a.m.

During a subsequent review of this event and of a previous reactor scram on February 22, 1983 at Salem, the licensee determined that on ATWS condition had also existed for about three seconds following a reactor trip at 9:55 p.m. on February 22, 1983. The reactor trip on February 22, 1983 had resulted from a transient initiated by the loss of the IF 4-KV group bus during a transfer of the bus to the auxiliary power transformer. The operators also manually tripped the reactor on February 22, 1983 to bring the plant to a shutdown condition. Based on these reviews, Unit 1 was placed in a cold shutdown condition pending completion of a thorough assessment of these events.

NRC Region I established a Task Force on March 1, 1983 to conduct a fact-finding study of the circumstances which led to the ATWS event on Unit 1 on February 25, 1983. The charter of the Task Force was to determine the factual information pertinent to management and administrative controls which should have ensured proper operation of the reactor trip breakers in the plant solid state protection system. The Task Force was to consider the planned and systematic actions which should have provided the necessary margin of confidence that the components would perform satisfactorily in their intended service. The Task Force gathered information on the design, procurement, handling, storage, installation, inspection, testing, servicing, maintenance and repairs provided for the Salem reactor trip breakers, based on records reviewed and interviews with licensee personnel conducted from March 2 - 6, 1983 at the Salem Nuclear Generating Station.

The Task Force developed a general operational sequence for the ATWS events on February 22 and 25, 1983 based on existing NRC Region I and licensee summaries for the events and on other plant operational information. Although not developed or evaluated in detail, the operational sequences were used to focus

on the operator's response to the plant transients on February 22 and 25 to examine the shift crew's assessments during the transients, which comprised the licensee's first-level review of the ATWS events. The licensee's initial assessments of the February 22, 1983 transient and known instances of previous reactor trip breaker problems were also considered by the Task Force. The Task Force outlined the history for the reactor trip breakers from the time of initial procurement to the present to determine what safety classification and quality assurance program controls were applied to the breakers. The testing, service, and repair history for the reactor trip breakers was also determined.

The Task Force determined that the reactor trip switchgear (inclusive of the reactor trip breakers) was originally designed, procured, stored, installed and tested as a safety-related, seismic Class I component as required by the licensee's Final Safety Analysis Report. The original quality assurance program controls applied to the reactor trip breakers were appropriate for this safety classification. Surveillance testing performed on the reactor trip breakers since initial plant operation demonstrated breaker operability. The implementation of the reactor trip breaker surveillance and corrective maintenance program was as described in the quality assurance program except as noted below. Based on information contained in the maintenance history files, the breakers provided several years of trouble free operation. However, single breaker failures occurred on February 6, 1979, August 20, 1982 and January 6, 1983.

Task Force review of the safety and quality control classifications applied to the reactor trip breakers since June, 1981 indicated that the licensee's established management controls would allow the procurement of replacement components or services for a safety system with a quality less than that of the original. Additionally, the reactor trip breakers were interchanged in such a way that traceability of the breakers for operability and maintenance history purposes was not maintained. Nor have the reactor trip breakers been included in a preventive maintenance program. The methods used to procure vendor services in January 1983, was not in accordance with QA program requirements. The application in January, 1983 of a lubricant different than that recommended for the breakers could have contributed to the failures on February 22 and 25, 1983. Aside from these findings, the Task Force identified no significant new information relating to the cause of the February 22 and 25, 1983 failures.

Information that an ATWS condition existed on February 22, 1983 was provided by control room instrumentation. The fact that the operators did not identify the ATWS condition when it existed should be judged in light of the other system conditions that existed at the time. Information that the February 22, 1983 ATWS condition had occurred was also available in the computer sequence of event summaries. The ATWS condition could have been detected on February 22, 1983 by a detailed review of the computer information.

The operator actions taken in response to the plant conditions on February 22 and 25, 1983 placed the reactor in a safe shutdown condition in spite of the failures in the automatic reactor trip system. No plant damage occurred based

on the ATWS conditions on February 22 and 25, 1983 and there was no impact on public health and safety as a result of the events.

1.0 INTRODUCTION

1.1 Background

On February 25, 1983, a signal that water in one of the steam generators was too low generated a reactor trip* signal at 12:21 a.m. with the Unit 1 reactor at 12% full power during a routine startup following a refueling outage at the Salem Nuclear Generating Station (SNGS). Both reactor trip breakers remained closed until operators manually tripped the reactor about 30 seconds later. At that time the reactor trip breakers opened and the control rods dropped into the reactor core to bring the reactor to a stable shutdown condition. Initial licensee** investigation disclosed that the reactor trip breakers failed to open because of mechanical binding of the latch mechanism in the undervoltage trip attachment on the breakers. An Alert condition was declared at 1:30 a.m. on February 25, 1983 in accordance with the Emergency Plan and terminated at 2:00 a.m. During a subsequent review of this event and a previous reactor scram* on February 22, 1983, *** the licensee determined that a trip demand condition without scram had also existed for about three seconds at 9:55 p.m. on February 22, 1983. The reactor trip had resulted from a transient initiated by the loss of the 1F group bus during transfer of the bus to the auxiliary power transformer. The Unit 1 reactor was placed in a cold shutdown condition pending completion of a review of these events.

The Task Force established by NRC Region I conducted a fact finding and data collection review to determine the management and administrative controls which should have provided for proper operation of the reactor trip breakers. Review of these controls took into account the pertinent procurement, handling, storage, installation, inspection, history, testing and maintenance activities that may have affected proper operation of the Unit 1 reactor trip breakers. The licensee's assessment of previous reactor trip breaker problems were also considered. The sequence of events for the events on February 22 and February 25, 1983 is provided below, along with a description of the controls applied to the reactor trip breakers.

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* The terms trip and scram are used interchangeably to refer to a sudden shutting down of a reactor, usually by rapid insertion of control rods.

** Public Service Electric and Gas of New Jersey (PSE&G).

*** The ATWS event of February 22, 1983, was first identified by PSE&G on February 26, 1983 after NRC requested that PSE&G study the circumstances surrounding a trip that occurred on February 22, 1983.

1.2 Reactor Trip System General Description

The reactor trip system consists of equipment which initiates a reactor trip. Duplicate rod control system trip breakers are connected in series to supply power from the rod drive power supply motor-generator sets to the full-length rod control system, which in turn distributes power to the rod drive mechanisms. Salem Generating Station has Westinghouse Type DB-50, electrically operated, trip-free, three-pole, drawout breakers. Each breaker is equipped with the following trip devices: a 48-V dc instantaneous undervoltage trip attachment, and a shunt trip attachment.

A reactor trip signal acts to open the two reactor trip breakers, which interrupts power to the rod cluster control system assembly (RCCA) drive mechanisms, permitting the RCCAs to drop by gravity into the core. The reactor trip breakers are opened automatically by undervoltage trip attachments (normally energized) that become deenergized from a reactor trip signal from the solid state protection system (SSPS). Means are also provided for manual initiation of protective system action. Failure in the automatic system does not necessarily prevent operators from manually activating the protective functions.

The SSPS is composed of two redundant, identical trains (A and B) that are physically and electrically independent of each other. Inputs to this system are derived from various nuclear and non-nuclear sensors located both inside and outside the plant containment building. Each undervoltage trip attachment on the reactor trip breakers is supplied from its respective logic train. Annunciators on the reactor control panel will light if a reactor trip occurs or if any protective channel goes to a trip mode. In addition, audible alarms sound for alarms associated with each overhead annunciator panel. Different sounds are associated with each annunicator panel. However, there is no audible discrimination of alarms on the same panel.

Normally, the reactor trip breakers 52/RTA and 52/RTB are in service, and the bypass breakers 52/BYA and 52/BYB are withdrawn (out of service). The bypass breaker is in parallel with its associated reactor trip breaker to facilitate on-line testing of the trip breakers. When the reactor trip breaker is being tested, the bypass breaker will maintain the latch coil voltage to the control rods for that train. The train A protection system deenergizes the train A reactor trip breaker and the train B bypass breaker undervoltage trip attachments. The train B reactor trip breaker and train A bypass breaker undervoltage attachments are deenergized by the train B protection system.

The undervoltage trip attachment contains a moveable core that is normally held magnetically against a stationary core to hold the reset lever in the reset position. When the coil voltage is reduced sufficiently (30 - 60% normal), the reset lever spring overcomes the magnetic attraction of the cores and rotates the reset lever. As the reset lever rotates, it carries with it the latch pin which rotates relative to the latch until the latch is released. When the latch releases, the trip spring rotates the trip lever to trip the breaker.

A manual trip signal can be initiated by the control room operator by one of two methods. The operator can depress either one of two pushbuttons on the main control board. (There is a pushbutton for each reactor trip breaker.) By depressing the breaker control pushbutton, the breaker will be opened by the actuation of the shunt trip attachment on the breaker. The shunt trip attachment consists of a coil, stationary core, and moveable core, which actuates a trip lever under the trip bar upon shunt coil energization. The breaker can also be manually tripped by the manual reactor trip switch handles on the main control board; this energizes the shunt trip attachment and deenergizes the undervoltage trip attachment. There is also a manual button located on the breaker panel and a latch on the breaker cabinet that will mechanically trip the breaker. The breaker panel and the breaker cabinet are located in the switchgear room, which is located at a lower level of the plant than the control room.

There are various instrumentation delays associated with each automatic trip function, including delays in signal actuation, in opening the trip breakers, and in the release of the control rods by the mechanisms. The total delay to reactor trip is defined as the period from the time that trip conditions are reached to the time the control rods are free and begin to fall. The licensee's Final Safety Analysis Report (FSAR) states that in preliminary startup tests, it will be demonstrated that actual instrument errors and delays are equal to or less than the assumed values. The FSAR also states that the response time of the protection system instruments is checked during preoperational testing and after replacement of any component affecting the response time. Response times are checked during refueling outages.

The delay assumed in the accident analysis in the FSAR for a low-low steam generator level is 2.0 seconds. The low-low steam generator water level trip occurs to prevent a loss of the reactor's heat sink in the case of a sustained steam/feedwater flow mismatch of insufficient magnitude to cause a low feedwater reactor trip. The trip is actuated on two out of the three (2/3) low-low water level signals (19% narrow range level) in any of the four steam generators.

The system design specification (E-Spec G-676586) requires that the breaker maximum interruption time for all currents within its rating shall not exceed 167 milliseconds (10 cycles on a 60HZ base) as measured from the time that the undervoltage trip attachment is deenergized.

Status indications of the SSPS and the reactor trip breakers are provided in the main control room. These indications include an SSPS display mimic, which shows the reactor trip status of the protection system logic channels, and therefore, the SSPS demand for trip; position indication lights on the breaker control pushbutton; and a reactor trip light on the SSPS display, which is derived from the reactor trip breaker position. Additionally, the reactor trip breakers provide position information to the plant process computer.

2.0 OPERATIONAL SEQUENCE OF EVENTS

The objective in developing the operational sequence of events of February 22 and 25, 1983, was to establish a chronology that would: (1) provide an overview of plant conditions leading to and resulting from the reactor trips; and (2) focus on the operating crews' assessments of and responses to plant conditions during the immediate period around the scram failures. No attempt was made to provide a detailed evaluation of the plant response to the transients, the various equipment malfunctions on February 22, 1983, and the exact conformance of the actions taken by the operators with the applicable operating procedures. (The Task Force determined that NRC Region I inspection personnel had previously reviewed operator actions against the operating procedures.) The operational review did confirm that no anomalous reactor conditions were apparent from the chart recordings and that the major elements of the event sequence were as expected. Neither ATWS event resulted in any apparent plant damage. The Task Force also relied somewhat on the event summaries and assessments completed by the licensee, which adequately explained the operational causes and effects.

2.1 February 22, 1983 ATWS Event

2.1.1 Discussion

At 8:36 p.m., the plant generator was synchronized and turbine loading was increasing to 20% of full power (FP) following recovery from a previous scram at 1:16 a.m.* The plant load was increased to 20% of FP and was stable at this power level.

The feedwater system was in automatic control. Preparations were made to transfer the 4-KV group bus power supplies from the station power transformer to the auxiliary transformer. The 1G bus was successfully transferred.

The reactor operators were stationed on the control boards to transfer the group bus power supplies. The shift supervisor entered the control room at 9:55 p.m. as the 1F group bus was being transferred. At 9:55 p.m., the 1F 4-KV bus deenergized during the transfer attempt caused by a faulty limit switch on the 1F 4-KV bus - auxiliary power transformer infeed breaker. Loss of the 1F 4-KV bus and associated equipment caused numerous overhead alarms to annunciate in the control room.

*The previous trip at 1:16 a.m. occurred shortly after synchronizing the generator to the grid. The reactor trip occurred following a low-low water level in No. 13 steam generator (SG). A bent position indicator misled the operator as to the amount of feedwater being sent to No. 13 SG. This problem was corrected after the trip.

At 9:55 p.m., the immediate losses as a result of losing the 1F 4-KV bus were the No. 13 reactor coolant pump (RCP), the No. 14 115V miscellaneous ac distribution panel, control power to the operating No. 12 turbine-driven main feedwater pump (MFP), normal control room lighting, and the No. 13 circulating water pump for the main condenser.

A significant amount of nonsafety related instrumentation also lost power and failed mid-scale. This included loss of indication on the feedwater pump and steam generator panel (feed flow and steam flow). However, steam generator (SG) water level indications were still available.

Following the loss of the 1F 4-KV bus, the No. 12 MFP tripped because of loss of control instrumentation. This trip caused a rapid decrease of water level in the No. 13 steam generator. Flow in the No. 13 reactor coolant loop began to decrease. The emergency lighting came on in the control room at the time the normal control room lighting was lost. The normal control room lights were out for about 40 seconds. It should be noted that a reactor trip demand did not occur with the loss of single-loop flow, since the reactor was at 20% FP, which is below the P8 set-point of 36% FP.

The shift supervisor was considering manually tripping the reactor based on the degrading plant condition of decreasing SG level, lack of feedwater flow indication and inability to bring the reactor to less than 10% power in a controlled manner without tripping the reactor. Because of loss of FW flow indication, the shift supervisor (SS) and reactor operators (ROs) did not realize that FW flow was lost. At this point they did not know why the SG water level was dropping rapidly.

At 9:56:54 p.m.,* the No. 13 SG reached the low-low level trip setpoint of 18% narrow range level on two of three channels. This condition resulted in a reactor trip demand signal from the solid state protection system (SSPS). Although this signal probably resulted in a low-low SG level first-out alarm, it could not be remembered by the SS or ROs during their later collective assessment of plant conditions. This was probably because of all the other alarms annunciating at the time.

At 9:56:54 p.m., both the No. 11 and No. 12 auxiliary feedwater (AFW) pumps started and injected into the SGs due to the low-low trip setpoint in the No. 13 SG. However, the shift supervisor and reactor operators did not appear to note the start of the AFW pumps until 10:01 p.m.

At about 9:56:54 p.m., the shift supervisor directed the reactor operator to manually trip the reactor. This action was taken by the shift supervisor based on his assessment of degraded plant conditions without specific consideration of the low-low SG level trip demand from the solid state protection system (SSPS).

*This time notation is for hours: minutes: seconds, respectively.

At this point, the operator inadvertently pulled the handle out of the Type W manual trip switch in his attempt to complete the manual scram. The trip handle is easily removed from the switch and the operator was not familiar with the feel of the switch. The trip handle is similar to the device used in other plants and simulators which have a "pull to lock" feature for control of components. It should be noted that the shift supervisor was apparently not aware of this momentary problem until several days later. The operator quickly reinserted the switch handle and completed the manual scram at 9:56:58 p.m.

The decision to manually scram the reactor occurred about 23 seconds from the time the 1F bus deenergized and plant conditions began to degrade. The computer recorded the manual scram as occurring 3.6 seconds after the low-low SG level demand signal from the SSPS. The reactor trip breakers (RTBs) opened and the reactor shutdown on the manual scram signal. At this time, all shift personnel apparently believed that the reactor had tripped manually. The operator verified that a scram occurred by noting that the control rods had inserted from the (rod bottom lights signal) and that power was decreasing.

The turbine generator tripped immediately as a result of the reactor scram. The reactor trip/turbine trip resulted in the automatic transfer of the 1F 4-KV and 1F 4-KV group busses from the auxiliary power transformer back to the station power transformer. This shift reenergized the 1F 4-KV bus. The sudden reapplication of the 1F 4-KV bus loads that do not release on undervoltage caused voltage from the No. 11 station power transformer to decrease, which caused the 1B 4-KV vital bus to transfer to the No. 12 station power transformer. This was due to the vital bus undervoltage protection. This automatic action placed all the vital buses on the same station transformer. (The reason for this automatic transfer was not understood at this point.) The No. 13 RCP locked rotor protection tripped the RCP breaker and prevented automatic restart of the No. 13 RCP.

At 10:04 p.m., safety injection was automatically initiated due to a 100-pounds-per-square-inch (psi) differential pressure (DP) between the No. 13 main steam line and the other main steam lines. The 100-psi DP was a result of several factors, including cold auxiliary feedwater flowing to the No. 13 SG; steam supplied by the No. 13 SG for the steam driven auxiliary feed pump; loss of the No. 13 RCP, and closed main steam isolation valves (MSIV).

At 10:06 p.m., the No. 11 RCP tripped for no apparent reason.* This trip in turn resulted in loss of the pressurizer spray. The pressurizer pressure increased to the power operated relief valves (PORV) setpoint, which actuated two PORVs. The PORVs relieved to the pressurizer relief tank causing this tank to reach a maximum pressure of 20 psi.

*A later investigation by the licensee did not reveal any apparent problem with the relay protection for the No. 11 reactor coolant pump, nor did it reveal any other reason for the pump tripping.

At 10:11 p.m., upon establishment of the safety injection reset criteria by the operators, the safety injection was manually terminated with the pressurizer at a maximum water level of 22%. The rupture disc on the pressurizer relief tank was not ruptured during this transient. The safety injection system was on for a total of seven minutes. As the safety injection was terminated the pressure stabilized and the PORVs closed. On termination of safety injection, the unit was returned to a stable condition in Hot Standby.

Upon termination of SI, one of the PORVs did not fully reseat. Therefore, on February 23, 1983 at 6:28 a.m., the block valve for PORV PR-2 was closed.

2.1.2 Summary Chronology of Events, February 22, 1983

Time	
9:50 p.m.	Plant stable at 20% of full power
9:55 p.m.	Group A bus deenergized during offsite to onsite power transfer - No. 13 reactor coolant pump lost - No. 12 main feed pump lost - Substantial amount of nonsafety instrumentation indication lost - SG level dropped rapidly
9:56:54 p.m.	- Reactor trip signal from low-low SG level in No. 13 SG - Auxiliary feedwater pumps start - Shift supervisor ordered manual reactor trip due to degrading plant conditions
9:56:58 p.m.	Manual reactor trip - Reactor trip breakers open - Turbine trip - Previously lost group bus reenergized - A vital bus transfered from No. 12 to No. 11 station power transformer
10:04 p.m.	- Safety injection started due to 100 psi DP between No. 13 main steamline and other steamlines
10:06 p.m.	- No. 11 reactor coolant pump tripped - Pressurizer spray lost - Two PORVs opened
10:11 p.m.	- Safety injection terminated by operators - PORVs closed - Plant stablized at hot standby

11:34 p.m. - NRC emergency notification system (ENS) notification made*

6:28 a.m. - Block valve for PORV closed due to PORV valve leakage

2.2 February 25, 1983 ATWS Event

2.2.1 Discussion

On February 24, 1983, Unit 1 was in the startup phase following the trip that occurred at 9:56 p.m. on February 22, 1983. The turbine was taken off line for an overspeed test. The block valve that had been closed following the ATWS of February 22, 1983, remained closed at the beginning of the ATWS of February 25, 1983. At 12:12 a.m. on February 25, 1983 the generator was synchronized to the grid. Reactor power was increasing from 10% to 14%. The feedwater (FW) system was in manual control. The operators were experiencing difficulty in maintaining SG levels due to control sensitivity at low steam and feedwater flow rates. The senior shift supervisor was overseeing the operator efforts to control SG level.

At 12:21:43 a.m., a reactor trip signal occurred as a result of No. 12 steam generator (SG) low-low level. The operator at the reactor control panel observing a low-low SG reactor trip signal on the "first-out" annunciator assumed a trip had occurred and announced this on the plant paging system. At 12:21:44 a.m., No. 11 and No. 12 auxiliary feedwater pumps started as a result of the low-low SG level signal.

Immediately following receipt of the low-low SG reactor trip signal, the indications that a reactor trip was in demand were the low-low SG level first-out annunciator and the reactor protection system station panel (IRP4) low-low SG level lights. An additional operator in the control room undergoing requalification training called out that the reactor had not tripped based on a check of the rod bottom lights and the rod position indicators. The senior shift supervisor noted that the turbine had not tripped as expected following a reactor trip. After checking the steam generator level indicators, the rod bottom signal lights, and the rod position indicators, he concluded that the reactor should have scrammed but had not. At this time he observed that the SG levels were at or below the 18% low-low level trip setpoint. The senior shift supervisor ordered the operator to manually trip the reactor using the manual trip switch. The question of a possible false or premature annunciator alarm, or false SSPS - IRP4 low-low SG level indication caused the control room staff to confirm that plant conditions demanded a reactor trip.

*The licensee is required to notify the NRC within one hour of the trip, which occurred at 9:57 p.m. The reason for the delay in notification is not known at this time.

At 12:22:08 a.m., as a result of the manual trip, the trip breakers opened, and the control rods dropped into the core, which was followed automatically by a turbine trip. The decision to manually scram the reactor occurred about 25 seconds from the time the first-out annunciator and the IRP4 panel indicated a low-low SG level reactor trip demand. All associated automatic controls functioned normally after the trip. The unit was immediately placed in a stable condition in Hot Standby.

Due to the concern that a failure of the first-out annunciator, steam generator level instrumentation, or SSPS circuitry had possibly caused an erroneous trip indication, the licensee's instrumentation and control department (I&C) was immediately called in to investigate the occurrence.

Between 12:48 a.m. and 1:15 a.m. the Unit 1 SSPS circuitry and the breakers were tested by the I&C department. The tests involved a check of the circuitry associated with the low-low system generator level bistable and whether the trip signals were transmitted to the reactor trip breakers. The SSPS was verified operable. However, both A and B reactor breakers failed repeated tests. The A breaker failed two out of three tests,* while the B breaker failed all five tests. It was at this point that it was determined that an ATWS had occurred at 12:21:43 a.m. rather than a false annunciator alarm or faulty SSPS signal.

At 1:13 a.m. containment building pressure relief was started following receipt of a containment building pressure alarm at about 0.2 psi. The operators relieved pressure intentionally to maintain containment pressure within the technical specification limit of 0.3 psi.

At 1:30 a.m. an Alert was declared.

At 1:46 a.m. NRC was notified** of the Unit 1 Alert and of the reactor trip. The Alert was terminated at 2:00 a.m. At 2:15 a.m. the containment building pressure relief was completed.

At 3:52 a.m. the faulty Unit 1 A and B reactor trip breakers were replaced with breakers from Unit 2. Upon testing, the replacement breakers opened successfully on eight simulated trips.

2.2.2 Summary Chronology of Events, February 25, 1983

12:12 a.m. - Reactor at 12% of full power
- Turbine on line

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* Discrepancies exist in various licensee documents regarding the number of breaker tests and the number of failures associated with these tests. At this writing, the NRC has not been able to resolve these discrepancies.

** The licensee was required to notify the NRC within one hour of the trip, which occurred at 12:22 a.m. The reason for the notification delay is not known at this time.

	-	Feedwater system in manual control
	-	SG level control difficulty
12:21:43 a.m.	-	Low-low No. 12 SG level alarm
	-	Reactor trip signal from SSPS
	-	No. 11 and No. 12 auxiliary feedwater pumps start
	-	Operators considered possibility of a false alarm
	-	Plant parameters indicated a scram has not occurred
12:22:08 a.m.	-	Manual scram ordered
	-	Plant parameters indicated scram occurred
	-	Plant stable in hot standby
12:48 a.m. - 01:15 a.m.	-	Question of false alarm, SSPS, or low-low SG level instrument failure
	-	SSPS and breaker tests conducted
	-	A & B breakers failed repeated tests
	-	Event identified as an ATWS
1:30 a.m.	-	Alert declared
1:46 a.m.	-	NRC emergency notification system notification made
2:00 a.m.	-	Alert terminated

2.3 Operator Response and Decision Making During Salem ATWS Events

2.3.1 Introduction

The comments in this section regarding Salem operator decision making at Salem are partially subjective. The information is based in part on discussions of the events provided in written form by licensee personnel who were in the control room at the time of the events and in part on interviews that were conducted by NRC with some of the control room staff. On March 3, 1983, NRC personnel from the Region I Salem ATWS fact-finding Task Force and from NRC's Office of Nuclear Reactor Regulation interviewed Salem control room personnel. Those participating in these discussions included the following:

Discussion of February 22, 1983 Event

Bill O'Brien*	PSE&G, Shift Supervisor
Keith Peterson*	PSE&G, Nuclear Control Operator
Robert Cornman*	PSE&G, Nuclear Control Operator
Nick Gerrity	PSE&G, Senior Operating Supervisor
Bob Summers	NRC, Salem Resident Inspector
Bill Lazarus	NRC, Region I
Bill Raymond	NRC, Region I Task Force
Cliff Anderson	NRC, Region I Task Force
J. T. Beard	NRC, NRR
Bill Kennedy	NRC, NRR
Ray Ramirez	NRC, NRR

Discussion of February 25, 1983 Event

Victor Lowensten**	PSE&G, Senior Reactor Operator
Pat Bowdren***	PSE&G, Nuclear Control Operator
David Loonsbury***	PSE&G, Nuclear Control Operator
Nick Gerrity	PSE&G, Senior Operating Supervisor
Bob Summers	NRC, Salem Resident Inspector
Bill Lazarus	NRC, Region I
Bill Raymond	NRC, Region I Task Force
Cliff Anderson	NRC, Region I Task Force
Ray Ramirez	NRC, NRR
Bill Kennedy	NRC, NRR
J. T. Beard	NRC, NRR

2.3.2 February 22, 1983 ATWS Event

Up to the point of the 1F 4-KV bus transfer attempt, the plant was in a stable condition. The feedwater system was in automatic control, having successfully passed the sensitive manual feedwater control operation.

At the beginning of the ATWS event, the operators' attention was focused on the bus transfer operation. The unsuccessful transfer of the bus and the resulting bus deenergization resulted in a complex sequence of events that were of concern to the operators. The bus deenergization resulted in numerous control room alarms, loss of substantial nonsafety instrumentation indication, loss of feedwater pump control power, tripping of the No. 13 reactor coolant pump, loss of a circulating water pump, and loss of the normal control room lighting.

*Present in the Salem Unit 1 control room during the ATWS of February 22, 1983

**Present in the Salem Unit 1 control room during the ATWS events of February 22 and 25, 1983

***Present in the Salem Unit 1 control room during the ATWS of February 25, 1983

Following the bus deenergization, the immediate actions of the shift supervisor were to note the loss of the reactor coolant pump and the rapidly decreasing steam generator levels. Since feed flow indications were lost and the operators were not aware that the feedwater pump had tripped, the rapid SG level drop was not immediately understood. The degraded plant condition and the recognition that a plant trip was inevitable led the shift supervisor to order a manual scram.

A low-low SG level trip alarm signal came in on the "first-out" annunciator and on the IRP4 reactor protection system station panel about 20 seconds after the bus deenergization. This information, along with other information for a period of three seconds, could, theoretically, have indicated to the operator that an ATWS condition existed. However, the first-out alarm was not distinguished from the numerous other alarms at this time. Besides, everyone in the control room heard the shift supervisor tell the operator to trip the plant, which was done. Therefore apparently no one looked to confirm the first-out alarm. The first phone report of the shift supervisor to the operations engineer was that the plant had been manually tripped. Under normal operating conditions, a key must be brought from a remote location (in a locked cabinet) to clear the first-out annunciator. During this startup operation, the key was in the console. The first-out annunciator was apparently cleared without its significance being noted or realized either immediately or in the later assessment of events.

The hesitation in initiating the manual scram that resulted from the momentary detachment of the trip handle also contributed to masking the 3.6-second ATWS event. Following the manual scram, the operator confirmed the scram, using the numerous direct and indirect scram confirmations available in the control room. The solid state protection system (SSPS) demand for a trip and the order to manually scram occurred within a narrow time frame. Therefore, all control room personnel assumed that the trip resulted from the manual scram action. In any event, whether the scram was automatically initiated by the SSPS or was manually initiated apparently was not of concern to the operators at the time, considering the numerous significant events that followed.

The successful manual trip of the reactor was followed almost immediately by a turbine trip and reenergization of the previously lost 1F 4-KV bus, as this bus automatically transferred back to the station transformer. This resulted in the restoration of some equipment, panel indications and normal control room lights that were lost for about 40 seconds. The sudden loading of the No. 11 station transformer resulted in an automatic transfer of a vital bus to the No. 12 station transformer. This action resulted in a condition where all vital buses were on the same station transformer, thus compromising redundancy of the power sources for the vital buses. At this time, the reason for this vital bus transfer was unknown and of concern to the operators.

Another significant action occurred about seven minutes after the reactor trip with the automatic initiation of safety injection, which resulted from a 100-psi pressure difference between one main steam line and the other steam lines. (For a discussion see Section 2.1.1.)

About this time, No. 11 reactor coolant pump stopped functioning for some unknown reason, which resulted in a loss of the pressurizer sprays and a rapid increase in the pressurizer level and pressure. This pressure was ultimately vented through the PORVs to the pressurizer relief tank.

The operators were following this transient closely to limit PORV relief. After seven minutes of safety injection, the operators terminated safety injection and returned the plant to a stable condition in Hot Standby. From bus deenergization to attainment of a stable hot standby condition, this transient lasted about 15 minutes.

Following the event, a substantial effort was directed towards understanding the 1F 4-KV bus deenergization, the automatic transfer of the vital bus, and tripping of the second reactor coolant pump (No. 11 RCP). These activities during and following the event obscured the 3.6-second ATWS.

2.3.3 February 25, 1983 ATWS Event

The ATSW on February 25, 1983, was markedly different from the ATWS on February 22, 1983. The events of February 22 began with the plant in a relatively stable condition and with the feedwater system in automatic control. Following the bus deenergization, a complex sequence of events occurred with numerous alarms, a rapidly dropping SG level, an unexplained trip of No. 11 RCP, an unexplained vital bus transfer, safety injection, and the opening of two PORVs.

On February 25, 1983, events began with the plant in a somewhat unstable condition. The operators were experiencing the routine difficulties associated with the sensitive manual control of the feedwater system and the wide swings in steam generator water levels that can result. Following the receipt of the manual reactor trip, the sequence of events were relatively straight forward, without SIs, PORVs opening, etc.

At the time that the low-low steam generator level was indicated on the first-out annunciator and the IRP4 reactor protection system station panel, the operator at the reactor control panel assumed that a scram had occurred and proceeded to announce this on the plant page system. He experienced some difficulty using the page system, which momentarily distracted him from confirming that a scram had actually occurred. An additional operator* in the control room noted that the rod bottom signal lights and other confirmatory signs of a scram were not evident. He called out this observation.

During the 25 seconds between receipt of the trip demand signal and the successful manual scram of the reactor, the control room was unusually quiet because the only control room alarms at this time were the first-out annunciator and the IRP4 low-low steam generator level indicator. While it was quickly recognized that a reactor trip had not occurred, there was a general belief

*The additional operator was not required in the control room according to Salem technical specifications.

that a false alarm had occurred. This impression may have been created because a year or two before at Salem, false spurious low condenser vacuum alarms apparently occurred on the first-out annunciator.

The concern now was that a failure of the annunciator, the steam generator level instruments, or the SSPS circuitry possibly had caused an erroneous trip indication and that a valid trip request did not exist. As a result, the control room staff reviewed plant conditions to determine if they warranted a trip. After a review of the steam generator level indicators, the lack of a turbine trip, and the IRP4 SSPS low-low SG level indication, the senior shift supervisor ordered the plant manually tripped. The trip occurred about 25 seconds after the receipt of the automatic SSPS trip demand.

Following the successful trip of the reactor, the instrumentation and control department (I&C) was immediately called in to address the issue of the false alarm. The I&C department determined that the annunciator, SG level instrumentation, and SSPS circuitry had functioned properly. They concluded that the fault occurred because the breaker was hanging up in the closed position. It was then determined by the shift crew that an ATWS event had occurred earlier. This finding was followed by declaration of a station Alert and notification of the various authorities, including the NRC.

2.3.4 General Observations

Specific action and decisions made by the operators during the February 22, 1983, and February 25, 1983, events lead to some general observations. Some operators lacked understanding of certain aspects of control room indications. They did not appear to understand whether specific first-out annunciator signals resulted from a trip demand or if the annunciators were confirmatory indicators. (For example, on the first-out panel, the low-low SG level annunciator is a reactor trip demand signal while the reactor trip/turbine trip annunciator is a breaker trip confirmation and a turbine trip demand.) Similarly, the operators did not know what conditions would cause a real reactor trip indication on the IRP4 reactor protection system control panel. At least one operator did not understand that the low-low SG level indicator on the first-out annunciator meant that two of three steam generator low-low water level channels had been tripped. One operator misunderstood that different set points could exist for the first-out annunciators and for the reactor trip demand signals.

There is occasional operator mistrust of control room indicators. At least one operator's judgement of the validity of the low-low steam generator level first-out annunciator was biased by previous false low-condenser vacuum alarms on this control panel a year or two ago. This was reportedly caused by a setpoint drift problem in the condenser vacuum sensing circuitry, which was subsequently corrected soon after it occurred. Additionally, a problem with a pressurizer level channel reportedly occurred during SSPS testing in August 1982, which resulted in the pressurizer level reactor first-out annunciator coming in without a reactor scram. The operator actions on February 22, 1983, indicated that the first-out annunciators are not always being used to determine the reactor trip initiating event.

The operators did act immediately based on reactor trip annunciators. Their actions on February 25, 1983, demonstrate that the Salem operators are trained to first confirm trip demands by confirming plant conditions before manually scramming the reactor.

It should be noted that on February 25, 1983, operators took between 30 and 60 minutes to recognize failure of the automatic trip system after the ATWS had occurred. The operator's apparent impression was that a false alarm had occurred associated with a possible failure of the annunciator, SG level instrument, or SSPS circuitry. It was not until after tests of these systems and the breakers were completed that the significance of the event was fully appreciated. These factors also reflected the lack of an in-depth understanding of the SSPS design and operation and the associated indicators.

It is understandable on February 22, 1983 that the operators did not recognize the 3.6-second ATWS event. The activity in the control room following the nonsafety bus deenergization and the large number of associated unusual events contributed to the masking of the automatic scram failure. However, a post-trip assessment, including a detailed evaluation of the sequence of events to identify the cause of the trip, did not identify the ATWS event.

The 20 to 30 seconds taken by the operator in the two ATWS events to determine the overall plant status and initiate a manual scram was reasonable for performing such tasks. However, operator actions to verify plant conditions were carried out beyond the station emergency procedural requirements and may have delayed implementation of emergency operating procedures (EOP) on February 25, 1983. The Salem EOP states that "If an automatic reactor trip Has Not occurred as indicated by reactor power remaining high and/or multiple control rods failing to insert, ... Initiate a manual reactor trip." The times from the initiating event to the manual scram were comparable for the two ATWS events.

Although complete failure of the automatic trip system was not recognized immediately for either event, manual reactor trips were initiated and the plant was quickly returned to a stable condition both times.

2.4 Control Room Reactor Trip Indication and Display Information

The control room contains a number of different instruments that provide the operators with information regarding the need for a reactor trip ("trip demand"). Numerous instruments will also provide the operator with information to show that a trip (rods inserted/decreasing power) has actually occurred. The operator has numerous direct and indirect indications that a trip has occurred. If the operator fully understands his instruments, they will provide the other information, such as if the reactor trip breakers have opened. Typical of the instruments in these categories are the following:

Trip Demand

- first-out annunciator
- SSPS display
- low-low levels in SGs

Breaker Position

- breaker control pushbutton light
- SSPS display (reactor trip light)
- reactor trip/turbine trip first-out annunciator

Control Rods Inserted (Direct Information)

- rod bottom signal lights
- nuclear instrumentation
- rod position indication

These indicators are typical of the instrumentation available that provides both direct and indirect information to allow operators to determine if an ATWS condition exists. Accordingly, there is sufficient information available to the operators in the control room to immediately identify a failure-to-scram conditions.

2.5 Control Room Staffing

Salem Unit 1 control room staffing requirements are found in the following documents:

-- PSE&G Administrative Procedure AP-5, Rev. 13, September 22, 1982

-- Salem Unit 1 Technical Specification, Section 6.2.2

-- Title 10, Code of Federal Regulations, Part 50.54 Subsection (e), (j), (k), (l) and (m)

-- NRC letter, July 29, 1982 to PSE&G (Steven A. Varga, NRC, to Richard A. Uderitz, PSE&G).

Under the operating conditions that existed at Unit 1 at the time, the following control room personnel were required:

Position	No. of Individuals
Shift Supervisor with a Senior Reactor Operator's License on Unit 1, SS/SRO	(1)
Additional Individual with a Senior Reactor Operator's License on Unit 1, SRO	(1)
Individual with a Reactor Operator's License on Unit 1, RO	(2)
Shift Technical Advisor, STA	(1)

NRC discussions with some of the operators on duty on February 22 and 25, 1983, and a review of Salem Unit 1 operations department personnel assignments, indicate that each of these positions was filled at the time of each of the two events. On February 22, 1983, the position of SRO and STA was filled by a single individual who had qualifications to satisfy two positions designated Shift Supervisor - Engineer on SS-E, as per NRC letter to PSE&G of July 29, 1982, Steven A. Varga, NRC to Richard A. Uderitz, PSE&G.

3.0 PREVIOUS BREAKER PROBLEMS AND FAILURE ASSESSMENTS

3.1 Review of Previous Breaker Operation

At this point the Task Force has only been abie to identify the two anticipated transients without scram (ATWS) events of February 22, 1983 and February 25, 1983, where the reactor failed to trip on an actual solid state protection system (SSPS) reactor trip signal. It is very difficult to reconstruct subtle failures of the reactor trip system, where the A and B breakers might have failed to open for only a few seconds. The information necessary to reconstruct this type of failure can only be found in the detailed computer sequence sheets for these events. The NRC does not require that this or any other licensee save these computer sequence sheets. Because of the large numbers of computer sequence sheets generated, they are usually discarded after several days. Less subtle failures, where the A and B breakers might both remain closed upon demand for minutes, rather than seconds, would have been noticed and reported.

The Task Force requested that the licensee provide copies of sequence of events (SOE) computer printouts so that it could review reactor trip breaker (RTB) operation in response to trip signals from the SSPS. RTB operations prior to February 22, 1983 were of interest. Information on all reactor trips and RTB surveillance tests since January 1, 1983 was requested, along with printouts for the following specific events: a Unit 1 reactor scram which occurred at 1:16 a.m. on February 22, 1983; two Unit 1 reactor scrams that occurred at 8:32 a.m. and 9:58 p.m. on February 20, 1983; and the printouts which correspond to periods of SSPS surveillance testing since January 1, 1983. After extensive attempts to locate records, only the SOEs for Unit 1 RTB surveillance testing on February 14, 1983, a Unit-1 reactor scram at 6:00 a.m., February 14, 1983, and a Unit-2 reactor scram on January 21, 1983, were found to be retrievable by the licensee. The SOEs for reactor trips on February 20 and 22, 1983 could not be retrieved.

3.1.1 Unit 2 Reactor Trip on January 21, 1983

The reactor was at about 12% FP at 10:22 p.m. on January 21, 1983 while proceeding to cold shutdown for a scheduled refueling. The turbine generator automatically tripped off line at 10:22 p.m. due to a high-high water level in the No. 12 steam generator. The turbine trip with reactor power above 10% caused a reactor trip demand at 232 cycles into the sequence. The A and B RTBs were both open within 10 cycles of the demand from the SSPS. Westinghouse Equipment Specification G 676586 (November 29, 1967, Revision 1) states that the DB-50 breaker maximum interrupting time for all currents within its rating shall not exceed 167 milliseconds (or 10 cycles on a 60-hertz base) as measured from the time that the undervoltage trip device is deenergized. The RTB operation described above was within the specified operating time.

3.1.2 Unit 1 Reactor Trip on February 14, 1983

During a reactor coolant system dilution to critical for a startup on February 14, 1983, the Unit 1 reactor tripped at about 6:00 a.m. due to a low-low water level in the No. 14 steam generator (SG), coincident with high steam flow. The No. 14 steam generator steam flow channel II bistable had been previously tripped to allow the Performance Department to perform a channel calibration. Low-level in the No. 14 SG coincident with high steam flow initiated the SOE program. The SOE printout showed that both the A and B RTBs were open within 10 cycles from the SSPS trip demand.

3.1.3 Unit 1 RTB Surveillance on February 14, 1983

Prior to the reactor startup on February 14, 1983 (discussed in Section 3.1.2), the Unit 1 RTBs were tested in accordance with Technical Specifications Sections 4.3.1.1.1. After closing the A RTB and the B bypass RTB, manual trip switch 1 was used to initiate a reactor trip at 12:28 a.m. Both the main and bypass breakers opened within 10 cycles of the trip demand. Similarly, after closing the A bypass RTB and the B main RTB, manual switch 2 was used to initiate a reactor trip at 12:22 a.m. Both the RTB and bypass breakers opened within 10 cycles of the trip demand.

Following the RTB surveillance test discussed above, the SOE file recorded other manipulations of the A and B reactor trip breakers at about 12:30 a.m. Based on the SOE printout, it appeared that the B RTB was cycled open and closed eight times over a period of about 35 seconds. Such breaker cycling is not required by a surveillance procedure and the reason for this repeated cycling of the B RTB was not determined.

Immediately following these breaker operations, both RTBs were closed and then tripped open manually with the main control panel RTB pushbuttons. Some apparently anomalous alarms of breaker trips were recorded on the SOE printouts, thus suggesting abnormal breaker operation. The reasons for the anomalies could not be completely explained after an extensive review of the printout by an engineer in the Performance Department. The alarms were considered anomalous and thus not valid indicators of abnormal breaker operation.

3.2 Other Single Breaker Failures

There is a record of reactor breaker failures at Salem Unit 1 and 2 associated with the undervoltage attachment going back to February 1979. However, these failures were associated with an individual reactor trip or bypass breaker. These single breaker failures did not prevent the reactor from tripping upon SSPS demand.

Three separate single breaker failures are known to have occurred prior to February 22, 1983: February 6, 1979 (Unit 2 startup testing); August 20, 1982 (Unit 2 trip breakers surveillance testing); and January 6, 1983 (Unit 2 trip

on low-low SG level). These breaker failures are discussed in detail in Section 6 of this report.

Other instances of breaker "failure" may have occurred when a single breaker stayed closed for several seconds. However, an event of that duration is almost impossible to reconstruct. The bimonthly testing of the breakers concentrated on breaker functions, but no attempt was made to measure the time it takes for breakers to open (time response) during these tests. Information on breaker timing is usually only collected during the refueling outage tests. (Refueling outages usually occur every 18 months.)

3.3 Assessment of Breaker Failures

Operational problems with the reactor trip breakers (RTBs) occurred on four occasions prior to February 25, 1983. Licensee review and assessment of the operational problems were as summarized below. See Section 6.1 of this report for examples of other maintenance-related breaker problems.

3.3.1 Breaker Failure During Preoperational Testing - Unit 2 on February 6, 1979

The B bypass breaker (BYB) failed to operate during pre-operational testing on Unit 2 on February 6, 1979. This failure was identified by a licensee review of the Maintenance Department Work Order File at the request of the Region I Task Force. (Repairs were completed under Work Order TM-00530.) A faulty position switch on the B RTB was also repaired under this work order. The licensee determined that the undervoltage coil did not trip the bypass breaker upon receipt of a trip signal from the SSPS. The description of the repair recorded on the work order indicated that the undervoltage attachment was recalibrated (adjusted) to restore proper operation.

Based on discussions with the maintenance, operations, and QA personnel on March 5, 1983, it could not be determined whether the licensee conducted any further review of the undervoltage attachment problem for bypass breaker B beyond that required to repair it and return it to service for preoperational testing.

3.3.2 Breaker Failure During Testing on August 20, 1982 - Unit 2

The B RTB failed to open upon receipt of a trip signal at 8:00 p.m. on August 20, 1982 during routine surveillance testing of SSPS train B. The plant was operating at 82% of full power at the time of the failure. Actions to comply with the Technical Specification Section 3.3.1 were taken to shut down the reactor. The failed B RTB was removed and the Unit 2 A train bypass breaker was installed in its place. Power reduction was stopped at about 10:00 p.m. upon satisfactory completion of surveillance testing.

The results of the licensee's review and evaluation of the failure were described in LERs 82-072 of September 8, 1982, 82-072 Supplement 1 of October 20, 1982, and Site Operations Review Committee (SORC) minutes for meetings 82-82 and 82-94B. The RTB failure was caused by a malfunction of the undervoltage attachment, which was replaced. The malfunction of the undervoltage attachment was attributed to the binding of the solenoid-shaft mechanism, such that the solenoid would not fully drop out when deenergized. This prevented the coil from tripping the breaker. The undervoltage attachment was replaced and the B RTB was returned to service in Unit 2. Based on discussions with maintenance personnel, the repaired breaker was returned to service as the A train bypass breaker. However, this replacement could not be positively verified because of a lack of traceability for the breakers. No further corrective actions were planned at that time. The SORC reviewed both incidents and determined that the failure created no unreviewed safety questions.

3.3.3 RTB A Failure on January 6, 1983 - Unit 2

RTB A failed to open at 7:53 p.m. on January 6, 1983 when the reactor tripped at 46% FP on low-low level in the No. 21 SG. The low SG level was the result of loss of control air pressure, which caused the air operated feedwater regulating valves to close. The RTB failure was indicated by both control room and local breaker indicators. Since opening the B RTB caused a reactor trip and placed the reactor in a safe shutdown condition, the operators left the A RTB in the closed position pending investigation of the problem. Twenty-five minutes after the reactor trip, RTB A tripped open with apparently no operator intervention.

Initial investigations by the performance department determined that although the SSPS had supplied a trip demand to the RTB, an apparent electrical or mechanical failure within the breaker had prevented its operation. The Unit 2 A RTB was removed and replaced with the A RTB from Unit 1. Upon completion of surveillance testing, for operability, Unit 2 returned to operation and was synchronized with the electrical grid at 9:17 a.m. on January 7, 1983.

Subsequent corrective actions and the results of the licensee's assessment of the failure were provided in LER 272/83-001 of January 27, 1983. Subsequent inspection by the performance department on January 8, 1983 identified no apparent reason for the malfunction when the breaker was operated both manually and automatically after being installed in Unit 1. The licensee concluded that the RTB failure was due to a malfunction of the undervoltage relay, which was apparently caused by dirt or corrosion interfering with proper operation of the relay. Accumulated dirt or corrosion apparently caused mechanical binding of the relay operating mechanism. A breaker vendor representative performed preventive maintenance (PM) checks on and lubricated the operating mechanism. The vendor representative also recommended that the breakers be included in a preventive maintenance program to provide for their periodic inspection and cleaning. The lack of a reactor trip breaker PM program was previously identified in Region I Inspection Report No. 50-311/82-23-03. This item was tracked as an open item by the NRC resident inspectors.

Minutes from the SORC meeting in which LER 83-001 was reviewed were not available to the task force since they had not been comple'ed and resubmitted to the SORC for approval. Based on a discussion with the SORC secretary, who presented LER 83-001 for discussion, it was determined that the SORC reviewed LER 83-001 and accepted it without comment. No recommendations for followup were made. The SORC determined that the failure created no unreviewed safety question. The SORC review of the on January 7, 1983 failure should be reviewed by the NRC at a subsequent time.

3.3.4 Trip Failure on February 22, 1983 - Unit 1

Both A and B RTBs failed to open in response to a scram signal from the SSPS at 9:56 p.m. on February 22, 1983 due to low-low level in the No. 13 SG. Licensee review of the scram and assessment of the failures are discussed in Section 4.0 of this report. Since the failure of the RTBs to open was apparently not identified by the licensee until after February 25, 1983, no immediate assessment of the failure was conducted.

4.0 LICENSEE REVIEW AND ASSESSMENT OF EVENTS

4.1 Administrative Procedures for Post-Trip Review

The licensee's procedures for the review and assessment of reactor trips, and their review of the February 22, 1983 events prior to startup, were derived primarily from NRC interviews with the operation's staff and a separate interview with the licensee's assistant general manager. Those participating in these discussions are listed below.

March 4, 1983

Russell H. MacWatters	PSE&G, Sr. Operations Supervisor
Nick Gerrity	PSE&G, Sr. Operations Supervisor
Jim Gueller	PSE&G, Operating Engineer
Bill Raymond	NRC, Region I
Cliff Anderson	NRC, Region I

March 6, 1983

John Driscoll	PSE&G, Asst. General Manager
Bill Raymond	NRC, Region I

In addition to these interviews, the Task Force reviewed the following written operating procedures:

-- Administrative Procedures Salem Generating Station, Administrative Procedure No. 5, Revision No. 13, Operating Practices Program, September 22, 1982

-- Administrative Procedure No. 6, Revision No. 7, Incident Report and Reportable Occurrence Program, October 8, 1981

-- Emergency Instruction I-43, Reactor Trip, September 19, 1980

4.1.1 Licensee Reviews of Past Reactor Trips

Reactor trips are common during plant startup. They are not considered, by themselves, particularly significant. On the average one reactor trip occurs per plant startup. As a result, before February 25, 1983 the licensee did not have written detailed review procedures to address reactor trips. Only a few general written procedures (i.e., AP-5 and AP-6 above) apply to a reactor trip. AP-5 Section 5.3 states that:

> The reactor shall not be taken critical following a reactor trip until a determination of the cause of the trip has been made and subsequently corrected. If a definite cause has not been clearly identified, the authorization for a reactor startup shall be obtained from the General Manager - Salem Operations, Assistant General Manager or the Operations Manager if the General Manager is unavailable.

Other directions regarding restart authority are provided in AP-5 Section 6.3 which includes the statement that:

> The Operations Manager/Operating Engineer shall approve taking the reactor critical at any time. In the event the Operations Manager and Operating Engineer are not available, the General Manager may grant the necessary approval. . . .

The reporting requirements following a reactor trip are described in AP-6 in Section 5.2 where the shift supervisor/shift technical advisor is directed to "conduct an investigation of all incidents" and "complete the initiation section of the Incident Report (IR) from Form AP-6-1," and "determine the reporting requirements of the incident." This form allows space for a single paragraph description of the events. The written guidance given to the shift supervisor for preparing the IR is sketchy. There is no requirement that the IR be written and approved before startup.

The licensee does have a general set of unwritten procedures to follow after a reactor trip and prior to startup. The shift supervisor reviews the sequence of events. The sequence of events printout is reviewed to determine the general sequence of events; however, a detailed review of the SOE printout is not ordinarily performed. The senior shift supervisor (SSS) notifies his management, either the operating manager or the operating engineer, and discusses the trip and the SSS evaluation of events. Higher management (general manager or assistant general manager), is then notified of the trip. If the trip appears routine and everything looks normal, the decision to restart can be made at the operating engineer (OE) level; otherwise, higher management concurrence is required. The OE, in assessing the reactor trip, determines: (1) the plant condition (is it stable?), (2) the root cause of the event, (3) what happened during the event, (4) the sequence of events, (5) if the plant requires an action statement, and (6) whether plant conditions warrant implementation of the emergency plan. The shift supervisor usually completes the Incident Report prior to the end of the shift. There is no safety review committee involvement in the event review prior to restart, unless the cause of the event is unknown or something unusual has occurred.

On the morning following a trip, though the plant may already have restarted, events such as plant trips are discussed by staff members of the operations department. The OE is involved in these discussions and the IR is referenced. This review group ensures that the facts are clear and determines if the event was caused by procedural, maintenance, or design problems and decides what further corrective actions should be initiated. The shift supervisor initially establishes the degree of event reportability (if a Licensee Event Report

(LER) is needed). The operations department reviews the initial determination of the reporting requirement. If the occurrence is adequately understood within the operations department and there are no reporting requirements, then no other technical groups are involved. Otherwise, the information is transferred to the technical department for preparation of the draft LER and further investigation of the event. Next, the plant station operation review committee (SORC) reviews the LER and recommends its acceptance or rejection to the general manager.

During discussions with members of the operations and performance departments, it was determined that both groups would use the sequence of event (SOE) printout as necessary during post-trip reviews to help evaluate portions of the operational sequence. It became clear during these discussions that both operators and performance department personnel were sufficiently familiar with the SOE printouts to extract general information on event sequences and initiators. However, the individuals interviewed also commented that additional training on the information presented in the SOE printout would be beneficial in providing a fuller understanding of all information on the printout. This training would be particularly beneficial to operators.

It was also noted during the interviews that the individuals who use the SOE printouts feel they are unfamiliar with how the plant computer processes the information on the printout and that further training in this area would provide for better assessment of the sequences.

4.2 Licensee Post-Trip Review of the February 22, 1983 ATWS Event

On the evening of February 22, 1983, the operating engineer (OE) received a call from the shift supervisor informing him of the reactor trip. They were in the process of discussing the events associated with the loss of the 1F 4-KV bus when the safety injection (SI) was automatically initiated. At this point the shift supervisor ended the phone call. After the SI was terminated the shift supervisor again called the OE to provide him the current status of the plant. Although the plant was in a stable condition at that point, the OE decided to come to the plant because of a number of unanswered questions relating to (1) the initiation of safety injection, (2) the root cause of the 1F 4-KV bus deenergization, (3) the unexplained 1B vital bus transfer, and (4) the unexplained loss of the No. 11 reactor coolant pump.

Upon arrival at the site, the OE made a cursory review of the sequence of events. Later the OE, along with members of the instrumentation and control department (I&C), reviewed the sequence of events in more detail. At this point, it appeared to them that the automatic trip signal occurred before the manual trip. However, they apparently did not attempt to sort out the initiating events based on timing (cycles) information found in the SOE printout. They were primarily concerned with sorting out the other questions mentioned above and dealing with these issues. The timing (3.6 seconds) of the steam generator low-low level SSPS signal and the manual trip was indicated on the printout. They were not looking for an ATWS event and the question of whether

an automatic or manual trip had occurred appeared academic at that point. During the night of February 22, 1983, the assistant general manager was informed of the events and the plant status by telephone.

A rough draft of the Incident Report was prepared indicating that the plant had tripped automatically on a low-low steam generator level signal. The SOE indicated that the automatic trip signal was received first. The IR was reviewed by the operation's department. At that point, the alternate sequence (i.e., automatic rather than manual trip) was mentioned to the reactor operator who had manually tripped the plant. While he still believed that he had manually tripped the plant, he accepted the possibility of an alternate sequence since the two actions occurred very close in time and it did not appear significant to the operator which action occurred first. On the morning of February 23, 1983, a member of the operation's department and the assistant general manager discussed the events of the previous day in preparation for upper management meetings. They focused on understanding and correcting what they perceived to be the important issues at that time. While the assistant general manager reviewed the SOE, that an ATWS might have occurred was lost to them in the midst of the other issues. On February 23, 1983, the OE sent a copy of the previous night's reactor trip report to the plant general manager. In this report the OE stated that "It was originally thought the reactor was manually tripped. A more detailed investigation showed that while the operator did hit the manual trip the reactor had automatically tripped about 1 second earlier on the low-low steam generator level in No.13 steam generator."

On the afternoon of February 23, the problems that needed to be addressed and their resolution were discussed with the assistant general manager. After being convinced that the problems of the previous day were understood and corrected, he gave approval to restart the plant.

Following the February 22, 1983 event, the OE and shift supervisor discussed the operator actions to manually trip the reactor. The thrust of the discussion was to establish future procedures to handle the loss of a nonvital bus when the reactor is below 36% power. Above this power level the plant will trip automatically. Below this power level, depending on the nonvital bus that is lost, a plant trip is not always necessary. The loss of other non-vital busses would not have resulted in the loss of control power to the main feed pumps with the resulting drop in steam generator water level. Technical Specifications allow one hour to bring the plant down in a controlled manner without a reactor trip.

5.0 REACTOR TRIP BREAKER AND QUALITY ASSURANCE CLASSIFICATION

5.1 Original Design, QA Specification, and Safety Classification

5.1.1 Original Design

In November 1967 the Westinghouse Electric Corporation, Atomic Power Division, issued Equipment Specification (E-Spec) G676586, Revision 1, which provides the design requirements for the reactor trip switchgear of a rod control system. This switchgear is made up of four reactor trip circuit breakers, accessories and housing. Paragraph 3 of the E-Spec, "circuit breakers," specifies that four Westinghouse Type DB-50, electrically operated, trip-free, three-pole, drawout circuit breakers shall be furnished as part of the reactor trip switchgear, and includes related design requirements.

As part of the contract to provide a nuclear steam supply system (NSSS) to the Salem Nuclear Generating Station Unit 1 and 2 (SNGS), Westinghouse Electric Corporation Nuclear Energy Systems PWR Systems Division (Westinghouse-PWR System Division) agreed to supply a reactor trip system (paragraph 1.2) This Westinghouse-supplied system included the reactor trip breakers.

5.1.2 Procurement

On July 1, 1970, the Westinghouse-PWR System Division issued to the Westinghouse-Switchgear Division purchase order (P.O.) 546-GLG-123134-BN, for a reactor trip switchgear unit, per E-Spec G-676586, Rev. 1, as modified by stipulated exceptions. The equipment was purchased as part of the SNGS Unit 1 NSSS. This process was repeated on September 1, 1970 for the Unit 2 NSSS by issuance of P.O. 546-GLG-123135-BN. Because of the similarity of treatment through the various processes, only the switchgear for SNGS Unit 1 will be discussed.

In accordance with the P.O. requirements for Unit 1, a reactor trip switchgear system, Serial Number 24Y7268, was received at the site on November 19, 1970. As a result of a design modification to internal wiring, the switchgear was returned to Westinghouse in East Pittsburgh, Pennsylvania on December 23, 1970. On March 12, 1971 the switchgear was returned to Unit 1 and placed in long-term storage in Warehouse No. 2 of United Engineers and Constructor's (UE&C) Gage Facility. This facility housed electrical, instrumentation, and control equipment under temperature and humidity-controlled conditions. From a review of UE&C records, since they were the contractor assigned the responsibilities of storage and handling, the switchgear remained in the facility until approximately June 1974.

At this time a Material Release Notification Report was issued that indicated that final release was authorized. Following this, UE&C, the authorized installation contractor, would have removed the equipment from the warehouse for installation.

One item in the procurement of the switchgear that could not be explained involved the voltage rating of the coil on the undervoltage (UV) attachment. The E-Spec specified that each circuit breaker shall be equipped with a 125-V dc instantaneous undervoltage trip device, in addition to the shunt trip coil. As indicated before, this specification was to be complied with as a condition of the purchase order. No exception was taken in the P.O. to this specification requirement. Since the reactor trip system uses a 48-V dc output signal, which cannot operate the purchased UV attachment, some change would be required in the procurement cycle to resolve the apparent conflict. The voltage rating of the UV attachments must have been corrected, as evidenced by the successful completion of the required preoperational testing program. Currently, the E-Spec indicates the requirement for a 125-V dc coil on the UV attachment.

5.1.3 Switchgear Modifications Prior to Installation

A review of the licensee's records from March 1971 to June 1974 indicated that two modifications were performed on the reactor trip switchgear. Other modifications may have occurred but were not evident from the records review or as a result of discussions with licensee personnel.

The first modification was initiated by Deficiency Report (DR) No. 22 on April 20, 1971 indicating a violation of the PSE&G design criterion for channel separation, since wires were installed in a common conduit run. The deficiency was not with the DB-50 reactor trip breakers but with wiring in the switchgear common to reactor trip bypass breakers A and B. The action required by the DR included that Westinghouse revise the wiring, with UE&C performing the work under Westinghouse supervision. UE&C Quality Control Inspection Report (QCIR) No. 155 clearly follows the actual wiring changes made. The QC inspector noted on August 4, 1972 that surveillance and reassembly of the entire unit was taking place. The report further stated that "awaiting placement of the undervoltage device tentatively scheduled for Monday (Gage Facility)." The Deficiency Report indicated that "changes [were] made in accordance with Westinghouse Representatives," and was signed by the construction engineer and the construction manager on December 7, 1972. Based upon QCIR-155, QC personnel signed the DR as complete on December 12, 1972. The item on the QCIR relating to the UV trip attachment did not provide evidence that in fact the replacements were made.

The second modification involved the replacement of undervoltage attachments on reactor trip breakers in the switchgear and was addressed in a Westinghouse Nuclear Energy Systems (NES) document, NCD-Elec-18, of December 17, 1971. This document reported the malfunctioning of an undervoltage (UV) trip attachment at Carolina Power & Light's H. B. Robinson Station and, following investigation by the Westinghouse-Switchgear Division, the following modifying measures were established:

1. Relieve the radius at the base of "reset lever arm" to prevent striking upon the "latch guide pin"

2. Revise centering spacers for the "trip lever" U-plate

3. Perform an additional anti-friction polishing of the "latch" faces

4. Make a minor dimensional change on the armature "rod."

The document specifies that the style number will be the same for modified and unmodified UV attachments but that the Switchgear Division bears responsibility to see that all future shipments of reactor trip breakers will be equipped with the modified UV attachments. Furthermore, the Westinghouse - NES bears responsibility to see that modified attachments are supplied and installed on all previously shipped breakers.

The Region I Task Force did not become aware of the existence of the required modification until, at a meeting with the licensee on March 2, 1983, the NCD-Elec-18 document was provided by the licensee. A review of the licensee's documents covering the purchasing, receiving, handling, and storage activities between December 1971 and June 1974 uncovered no evidence to support a finding that Westinghouse - NES did in fact supply and install the modified UV trip attachment on all reactor trip breakers at Units 1 and 2 (in all, a total of eight devices).

On March 5, 1983 the licensee responded to a request to provide documentation that the subject modifications were installed. The licensee's Maintenance Department provided completed copies of Attachment No. 3, Report of Compliance (a part of the NCD-Elec-18 document), indicating that replacement undervoltage attachments have been installed and tested according to NCD-Elec-18 for all eight reactor trip breakers at Units 1 and 2 on August 8, 1972.

Further information provided by the licensee indicated that the NCD-Elec-18 document, and completed Reports of Compliances, were given to the licensee by Westinghouse representatives at a meeting held on site on February 27, 1983. The licensee indicated that up to this point they were unaware of the existence of the reliability modification, or even that it had been previously implemented in August 1972. A request was made of the licensee's engineering staff by an NRC inspector on March 5, 1983, to provide the contents of engineering files that related to the modification or its implementing documentation. The only document that the licensee's engineering staff submitted in regard to this request was the completed Reports of Compliance already obtained by the NRC inspector from the licensee's Maintenance Department.

When the licensee became aware of the existence of the NCD-Elec-18 document, they were also told to reference it when procuring UV trip attachments. According to Westinghouse, failure to specify the applicability of the

modification on the P.O. would not ensure obtaining the correct (i.e., more reliable) units for reactor trip circuit breaker service. This is due to the fact that specifying style number alone will not ensure receipt of modified units. This issue is further discussed in Section 5.4.2.

5.1.4 Original Quality Assurance for Procurement, Receipt, Inspection, Storage and Handling

As indicated earlier, the reactor trip switchgear is part of the NSSS supplier's responsibilities; they in turn provided the equipment through their supplier - Westinghouse Switchgear Division. The Westinghouse PWR Systems Division QA Plan, as described in the original FSAR, stipulates that Westinghouse engineering is responsible for designing or specifying equipment that conforms to the requirements of the applicant and the use for which it is intended. This responsibility includes specifying quality control requirements that will assure that the equipment will function as required in the system and plant. Furthermore, detailed quality control requirements are specified in the equipment specification, or its references.

The Westinghouse PWR Systems QA plan further indicates that quality control requirements that apply specifically to a component are contained in the Equipment Specification and that Quality Program requirements of a general nature are contained in two standard documents.

The first, "Administrative Specification for the Procurement of Nuclear Steam Supply System Components," is applied in component purchase orders. The Administrative Specification requires the supplier not only to manufacture equipment that conforms to purchase order requirements, but to assure himself and Westinghouse by means of appropriate inspections and tests that the equipment conforms to these requirements. The quality control section of this specification contains specific requirements in areas such as:

Calibration of measurement and test equipment

Control of drawings, specifications, procedures and other documents used in design or manufacture, and revisions to these documents

Control and identification of material

Maintenance of quality control records

Test control through written test procedures and test records

Nonconforming supplier, including identification and control to preclude further use.

The second document that specifies quality requirements is QCS-1, "Manufacturer's Quality Control Systems Requirements." This document is applied to orders for more critical safety equipment and requires the supplier to maintain an adequate quality control system. It requires, among other things:

Establishment and maintenance of a system for the control of quality that assures that all supplies and services meet all specifications, drawings, and contract requirements.

Application of the system to subcontracted items.

Implementation of the system with written procedures.

Qualification of personnel.

Qualification and control of processes, including welding, heat treating, nondestructive testing, quality audits and inspection techniques.

Operation under a controlled manufacturing system such as process sheets, travelers, etc.

Written inspection plans for in-process and final inspections.

Submittal of inspection checklists for approval by Westinghouse to show inspection and test status.

Recording of results of each inspection operation.

Procedures for written work and inspection instructions for handling, storage, shipping, preservation and packaging.

The P.O. to the supplier of the switchgear referenced the E-Spec G676586, Rev. 1 (Section 7.1) stipulates that, the requirements of QSC-1, Control System Requirements, and Purchasing Administrative Specification apply to the manufacture of this equipment. (See Section 5.1.1)

The original FSAR describes UE&C Quality Assurance Plan, and includes detailed descriptions relating to site quality control and inspection activities involving inspection and storage upon receipt of equipment. Utilizing the QA records, the history of receiving and storage of the equipment was detailed in Section 5.1.2. This even included the ability to verify that temperature and humidity conditions for stored reactor trip switchgears were being audited and maintained as required by the plan and its implementing procedures.

In the instruction manual (I.B. 33-850-3D of May, 1970), issued by Westinghouse for Type DB-50 air circuit breakers, receiving, handling, and storage conditions are described. The implementation records of the QA program in the areas of receiving, handling, and storage conditions were reviewed and

demonstrated that the licensee complied with the program requirements and those specified in the manufacturer's instruction manual for DB-50 style breakers.

Based on the above, it is evident that quality assurance and control measures appropriate to safety-related equipment were applied to the reactor trip breakers during original procurement, receipt and storage on the Salem site.

5.2 Original Installation QA and Testing

5.2.1 Installation, Inspection and Construction

The licensee's FSAR specifies that the responsibility for the quality of installation, inspection, and construction work rests with the UE&C Construction Department. The applicable section of the FSAR indicates that electrical equipment and instrumentation would be surveilled by the UE&C Field Quality Control Group from the time it is received at the site until it has been installed and responsibility turned over to PSE&G. Surveillance is performed in accordance with approved procedures. The licensee provided the UE&C procedure's manuals for review by the inspector.

Inspection of equipment installation was intended primarily as a check upon the workmanship in mounting and wiring the equipment, conduit, tray and cables for conformance with diagram requirements and manufacturer's special instructions.

The licensee was requested to provide the installation, inspection and construction records associated with the reactor trip switchgear to NRC inspection personnel. This could not be accomplished by the licensee in the time frame required by the Region I Task Force.

5.2.2 Testing

5.2.2.1 Preoperational Testing

The inspectors reviewed the Unit 1 preoperational turnover notice (PTN) package for the solid state protection system (SSPS). This package was reviewed since SSPS includes the reactor trip breakers as a component and to determine if any defects were identified for the reactor trip breakers prior to their being turned over PSE&G.

The PTN included various tests and inspections which were conducted on SSPS equipment in 1975 and 1976. These inspections identified numerous deficiencies in the SSPS system, including defective power supplies, defective control cards, defective wiring, defective lights, defective switches, defective logic cards, etc. However, the inspector did not observe any instance of defective RTBs or reactor trip bypass breakers (RTBPBs) or improper operation of these breakers.

All identified defects were apparently corrected and the system satisfactorily tested prior to receipt by PSE&G. The PTN provides documentation of final testing of the SSPS.

At the time of this review the licensee was unable to retrieve the PTN for the Unit 2 SSPS because their computer system was "down" and paper copy documents were at out-of-state storage.

5.3 Design Suitability for Environmental and Seismic Conditions

5.3.1 Environmental Conditions

The installed locations for Unit 1 and 2 reactor trip switchgears are the switchgear rooms on the 84-ft level in the auxiliary buildings. Both rooms were surveyed by the Region I Task Force on March 2, 1983.

In Unit 2 switchgear room, it appeared that construction activities were in progress and the room temperature appeared to be normal. Two breakers for the switchgear were sitting on the floor. The serial numbers indicated that these breakers were originally installed in the Unit 1 switchgear. The inside of the switchgear had a heavy layer of dust on the bottom of each breaker position. Whether this dust was attributable to normal operation or construction activity was unknown.

The Unit 1 switchgear room appeared to be quite warm and the switchgear outer-shell metal felt quite warm to the touch. Approximately four feet across from the switchgear front was a 10KVA security inverter blowing hot air directly onto the switchgear. On March 3, 1983, inside surfaces of the switchgear appeared dust free. The room also appeared to be very clean from a housekeeping point of view.

The licensee was questioned about the relationship between the apparent warm conditions and the problems experienced with the UV attachments. Additionally, the licensee was requested to provide the ambient temperature of the switchgear room in Unit 1 and the Switchgear metal temperature. The licensee indicated that the items would be looked into. On March 4, 1983, the licensee indicated that the Unit 1 reactor trip switchgear room ambient temperature was in the mid 80s °F and that the metal temperature was in the mid 90s °F. The licensee personnel indicated that they believed there was no relationship between the Unit 1 switchgear having the security inverter blowing on it and the recent UV trip attachment problems. Unit 2 reactor trip switchgear does not have a similar situation due to the absence of a security inverter near its location. No further exploration of this item was conducted.

In the FSAR, the switchgear room ventilation system is described as designed for continuous operation to maintain safe levels of temperature and cleanliness in the rooms served. Standby equipment is included in the system

to assure the maintenance of these design conditions. The system is classified as seismic Class I. The ventilation system is designed to maintain a year-round range of temperature between 65-105°F within the areas served.

The Quality Assurance Manual contains procedure QAI 2-14, Quality Assurance for Environmental Qualification of Equipment, which provides a reference to the PSE&G Environmental Qualification Review Report. The environmental zones section of the report stipulates that the switchgear rooms are not to have a harsh environment caused by high energy break accidents, main steam line breaks, LOCA, or recirculated fluids. The room is served by class 1E redundant ventilation equipment, which is also not subject to harsh environments and is located in "benign" areas for radiation doses following an accident (approximately 10 rem). Furthermore, the room is accessible to personnel should any equipment malfunction.

The applicable equipment specification for the reactor trip switchgear does not specify the design ambient or worst-case temperature for the equipment. The licensee was unable to provide the rated maximum temperature for the switchgear when requested but did indicate that this type of equipment is quite capable of withstanding temperatures far in excess of the temperature-controlled conditions of the switchgear rooms. The licensee does not record or maintain records of the temperature within the switchgear room.

The Task Force did not identify any unsatisfactory conditions with regard to the service conditions applied to the reactor trip breakers.

5.3.2 Seismic Classification

The equipment specification (E-Spec) for the reactor trip switchgear (Section 4) "Seismic," indicates a "LATER" designation. As part of the Purchase Orders for Unit 1 and 2 switchgears, the following exception to the E-Spec was specified:

> Seismic requirements for switchgear are such that in the presence of a seismic disturbance the switchgear's ability to open the circuit shall not be impaired. It is acceptable if the circuit breakers trip open during this event. Satisfactory verification of this capability is contained in switchgear divisions shock test report prepared for low voltage switchgear supplied under G. O. NA-44100-ZY showing post shock operability following test shocks of 10G in the vertical direction and 5G in the horizontal direction.

The updated FSAR specifies (Section 3.2) that equipment of the reactor protection system be made up of Seismic Class 1 components. The FSAR also discusses seismic qualification by type test and provides a reference to Westinghouse document "Seismic Testing of Electrical and Control Equipment," WCAP-7817 (Non-Proprietory). The licensee provided the Task Force with a copy of supplement 6 of WCAR-7817 (August, 1974), which is for the Seismic Testing of Electrical and Control Equipment (Type DB Reactor Trip Switchgear). As a basis for determining the functional integrity of the switchgear, the following function monitoring was employed:

The electrical functions of the equipment tested were monitored both during and after the seismic test to ensure that the equipment was operating properly and performing the required safety related functions. This monitoring consisted of recording output signal voltages and the undervoltage trip input signal voltage. The tripping action of each breaker through the undervoltage trip circuitry was checked during and after each series of tests to ensure that the simulated earthquake had not impaired this function.

Section 7.1.2.5 of the updated FSAR, "Conformance to IEEE Standard 344-1971," specifies that the reactor protection system (RPS) had been designed to assure that it will not lose its capability to perform the required functions in the event of a design basis earthquake (DBE). The reactor trip switchgear and its component parts are seismic Category I as indicated by the above reference. This classification is consistent with NRC Regulatory Guide 1.29.

5.4 Safety Classification and Current Procurement Practices

5.4.1 History of Safety Classification for the Reactor Trip Breakers

As described in Section 5.1.1, the reactor trip switchgear E-Spec developed in 1967 required compliance with Westinghouse PWR System Division's QCS-1, "Manufacturer's Quality Control Systems Requirements," to the reactor trip switchgear. This document is applied to orders for more critical safety equipment. Westinghouse required the inclusion of QC requirements in the E-Spec to assure that equipment functions as required in the systems.

The purchasing documents in 1970 for the reactor trip switchgears applied the E-Spec and provided a baseline for equipment and QA requirements. It is important to recognize the nature of the original procurement due to the procurement document control requirements specified in Section 17.2.4 of the updated FSAR. This section specifies that the Quality Assurance Department (QAD) review assures that spare and replacement parts are procured utilizing controls which are at least equivalent to the original procurement. The review assures that procurement documents adequately and correctly identify applicable QA program requirements.

The original FSAR describes the safety-related reactor protection system (RPS) and indicates in Section 7.2.1.1 that the reactor trip breakers are part of that system. The FSAR instrumentation controls description, Section 7.1, references the "SNGS Units 1 and 2 Controls and Electrical Drawings" for safety-related equipment (submitted in January 1974 as part of the licensing requirements). In Volume III, Tab N, schematics for the reactor trip breakers show all components and functional electrical relationships of the breaker.

As part of the classification process, the FSAR specified that the RPS contains Seismic Class 1 components and referenced the applicable proof-testing document for the reactor trip switchgear and its component parts. In Section 5.3.2, above, it was shown that the reactor trip breakers were tested to "ensure that the equipment was operating properly and performing the required safety-related functions."

Subsequently, the licensee initiated activity to generate an Equipment Classification List. This activity was governed by an Engineering Department directive called Project Directive-7 (PD-7). Administrative Procedure 19, Procurement, Receiving, Storage, Issue and Shipping of Spare Parts and Material, Revision 1 (January 25, 1977) stated that the safety-related and quality-assurance classifications are those shown in PD-7. The Task Force was unable to locate documents that show when PD-7 activity existed prior to January 1977.

During a routine, announced, Region I inspection from January 24-28, 1977 (Inspection Report 50-272/77-04), inconsistencies were identified in the PD-7 when it was reviewed on a sampling basis. The licensee took corrective action prior to May 1977 to attempt to eliminate inconsistencies. The revision process continued until October 24, 1977. This was the last update of the document as it exists in distribution today. The licensee transferred, in part, the contents of the PD-7 listing into a new document called the Master Equipment List (MEL).

In Section 17 of the updated FSAR, and QA Instruction 2-1 of the QA Manual, a Q-list is provided to identify in one place all the activities, items, components and structures to which the operational QA program applies. Basically, there are three ways for equipment to be classified in an attempt to arrive at applicability of the QA program requirements when using the Q-list:

1. Equipment, components, and structures principally listed on a system basis (The reactor protection system, for example, is listed as item II.A.43)

2. Items designated in the Salem MEL as safety-related "Yes" and other items designated safety-related "No"/QA "Yes" (There is no listing of any kind related to the reactor trip switchgear or breakers).

3. Items required by NRC Regulatory Guide 1.29 "Seismic Design Classifications" (Applicable to the reactor trip breakers as shown in Section 5.3.2 of this report).

From a classification standpoint, and utilizing the licensee's own Q-list, it is evident that the reactor trip breakers or their component parts require detailed review to assure appropriate design and quality requirements are applied.

A current revision to Administration Procedure 19 (Rev. 4, September 18, 1980) references the MEL and describes it as a list of Salem items and appropriate safety, seismic and QA-required ("QA") classification. The list is maintained and distributed by the PSE&G Engineering Department. The MEL was last issued in November 1980 for Unit 2 and July 1981 for Unit 1. On July 15, 1981, a memorandum was issued by the Chief Mechanical Engineer, transmitting 20 copies

of the Electrical Division - MEL. The memorandum indicates the MEL is being distributed for information purposes and in accordance with NRC requirements. This distribution was not controlled and included the Station, Engineering and Corporate groups.

Administrative Procedure 3 (Revision 12, January 1, 1983), Document Control Program, specified that the MEL is a non-station-originated document but that distribution by the Technical Document Room will be performed in a controlled manner.

In Task Force personnel interviews with various departments, it became obvious that considerable confusion existed as to the status, use, and procedural requirements associated with PD-7 and the MEL.

With regard to the classification of the reactor trip switchgear, PD-7 lists the switchgear equipment as safety-related, safety class 1, with QA applicable (pages 99-100). The MEL has no listing for the reactor trip switchgear. The licensee has indicated that this is an inconsistency that should be corrected. Asked how to use the MEL, the licensee handed the Task Force a three-page typewritten document entitled "Instructions for Itemizing Equipment for MEL."

No instructions exist to control the initial distribution of the MEL or that indicate how it is to be revised. Even with the instructions, the administrative controls for the MEL are far from clear. The instruction sheet references two items under the categories "SEISMIC CLASS" and "ENVIRONMENT CLASS." These are designated CD-M-37, Rev. 3 and CD-M-33, Rev. 3, respectively, which the licensee indicated are memoranda numbers. The Task Force obtained CD-M-37 from the engineering department.

CD-M-37, "Seismic Class" (December 8, 1980), is for the SNGS Units 1 and 2 Seismic and Environmental classification, instrumentation and controls. One of the pages shows the reactor trip breaker and classifies it as Seismic Class 1 and Environment Class C. The classification page listing the breaker is dated November 1, 1973. The CD-M-37 document specifies that the following definitions apply for the seismic/environmental classification of equipment:

Seismic Class I

Applies to equipment which is essential to the safe shutdown and isolation of the reactor or whose failure or damage could result in a significant release of radioactive material. This includes equipment which initiates reactor trip and containment isolation, actuates engineered safeguards and maintains post-accident cooling and heat removal.

Environmental Class C

Applies to safety related equipment located outside of the reactor containment and which must operate in the normal and transient environmental conditions anticipated at its location.

From the above, it is clear that the reactor trip breakers were considered safety related, and by referencing back to the CD-M-37 on the MEL instructions, though unofficial, a thorough reviewer would be able to obtain the proper classification.

As implemented by station procedure, including QA-related instructions, the classification process appears to be complex. As demonstrated in Section 5.4.2 of this report, a few procurements were made for parts or services, which yielded an inappropriate classification for components used by the reactor trip breakers. It is clear that many of the considerations relevant to returning to the original procurement were ignored in the practice used by the licensee.

In part, this situation may have occurred as a result of a Westinghouse-Nuclear Service Division Spare Parts Report, of which the latest revision is dated December 3, 1982. In this document the Reactor Trip Switchgear is classified Safety Class 2. Based upon instructions contained in the report, the safety class is that defined in ANSI Standard N18.2. The Spare Parts Report breaks down the switchgear into four type DB-50 reactor trip switchgears and 19 of the breaker's subparts, although the UV trip attachment is not listed. All listed items specify for QA Code (i.e., quality level code recommended by Westinghouse) a "C" designation, which stands for "Does not require review (off shelf items)." The report also indicates that the provisions of 10 CFR 21 do not apply.

5.4.2 Current Procurement Program

5.4.2.1 Salem Program Requirements

Salem Generating Station Administrative Procedure No. 19 (AP-19), Revision 4, Material Procurement, Receiving, Storage, Issue, Transfer, Shipping and Service Program (September 18, 1980), delineates the methods to be used when procuring material. Procurement is a two-step process. First, the item is identified/classified and the applicable quality requirements are established utilizing the Material Order/Item Classification Form (MO/IC). The second step consists of formalizing the order and performing the final administrative review and approval utilizing the Material Request and Receiving Record (MR/RR).

The requesting supervisor completes the MO/IC with the information required by Quality Assurance Instruction (QAI) 7-1, Rev. 8, Procurement Control System, of December 17, 1979, which includes applicable standards or codes, engineering specifications, quality classification, intended use, quality documentation required, etc., and forwards it to his department head. The department head reviews the MO/IC and normally forwards it to the Station Quality Assurance Engineer (SQAE). The SQAE reviews the MO/IC for entry information. He then reviews it for safety classification and QA provisions in accordance with the applicable Operational Quality Instruction and enters the information. He must determine if the item classification should include any of the following requirements:

-- Seismic Class 1, 2, 3
-- Nuclear Class 1, 2, 3
-- Class IE Electrical Equipment
-- 10 CFR 21 applicability
-- Safety Related/QA Provision
-- Non-Safety related/QA Provisions
-- Commercial Catalogue Item (CCI)
-- Non-Safety-related/No QA Provisions

If the item is not listed in the Master Equipment List (MEL), the SQAE transmits the form to the Engineering Department Coordinator for classification. Once the item is classified and the QA provisions are obtained the MO/IC is returned to the SQAE. He then forwards the form to the Office Administrator who issues the purchase requisition number.

In the case of a confirming order (items of an emergency nature verbally passed through the Purchasing Department) the Engineering Department and SQAE are bypassed and the form goes directly from the department head to the QA Department (QAD), and then to the Office Administrator.

Upon receipt of a completed MO/IC, the Office Administrator prepares an MR/RR which is approved and forwarded to the corporate purchasing department.

Quality Assurance Instruction (QAI) 4-1, Revision 9, Procurement Document Control (February 16, 1979), states that the procurement documents shall be controlled through a review and approval process which assures the requirements necessary to achieve requisite quality are stated. The SQAE is responsible for assuring that the appropriate quality assurance requirements are included in the procurement documents.

QAI 4-3, Revision 10, Review of Procurement Documents (May 13, 1982) describes the processing of the MO/IC Form. It states that if the item is already included on the MEL, the MO/IC need not be forwarded to the Engineering Coordinator. The QAI also states that if an item is classified as a commercial catalog item (CCI), it cannot also be classified as Seismic, Nuclear, class 1E, or subject to 10 CFR 21. The MO/IC is forwarded to the Engineering Department Engineering Coordinator for review of the classification for concurrence and for use in updating the Master Equipment List (MEL).

5.4.2.2 Review of Procurement Documents Related to Reactor Trip Breakers

The Task Force reviewed procurement documentation for components relating to the reactor trip breakers for June 1981 to March 1983. The documents were reviewed to verify the following:

(1) that completion of the documentation was in accordance with the quality assurance instructions and administrative procedures,

(2) that accurate classification and identification of the items was accomplished by the appropriate personnel,

(3) that procurement documents contained requirements for the vendor to supply appropriate documentation of quality, and

(4) that component traceability was documented.

The following is a chronological listing of the procurement documents reviewed and applicable comments:

June 1, 1981	MO/IC No. 9944 was issued for a DB-50 type A circuit breaker and separate components of the breaker (except UV attachment) for use with the reactor trip breaker. The item was classified both as a commercial catalog item (CCI) and Seismic Category 2, contrary to the QAI 4-3, which prohibits such a contrary classification. The FSAR states that the reactor protection system is Seismic Class 1. The MO/IC was not a confirming order, yet neither the SQAE nor the Sponsoring Engineer reviewed the item classification, contrary to AP-19 and the QAIs.
September 28, 1981	Requisition (MR/RR) No. 2754 was issued to purchase the components identified in MO/IC 9944. The items were identified as CCI and required no QA provisions. The order identified the items by folio numbers, and referenced Westinghouse Standard Part Item Numbers (S.P.I.N.)
January 27, 1982	Purchase Order (P.O.) No. 839270 was issued to purchase items identified in MO/IC 9944
August 27, 1982	Change Order No. 1 was issued to cancel two items on P.O. No. 839270 because the vendor could not supply them, due to "improper identification."
August 27, 1982	MO/IC 20299 was issued to request two undervoltage trip units, part number 23A9019G75 and two coils, part number S-1491404, for DB-50 breaker serial No. 224Y7268B. The item was classified as CCI and issued as a confirming order; therefore, no engineering review was conducted, only a QAD review.
August 27, 1982	MR/RR No. 7518 was issued for two undervoltage trip attachments identified as CCI and QA provisions not required.
August 31, 1982	Purchase Order 866077 was issued for requisition (MR/RR) 7518 for UV attachments. The items were received that same day.

September 15, 1982	MO/IC No. 21762 was issued for Change Order No. 2 to P.O. No. 839270 that added a complete DB-50 breaker to the items ordered. The item classification was changed to CCI only and the Seismic 2 Classification was deleted. The Department Head, SQAE and Sponsoring Engineer did not review the MO/IC, although the classification was changed. The MO/IC was changed to a Confirming Order. Change Order No. 2 was issued to the requisition. The documents continue to use incorrect serial number 2447628B, vice 2447268B for the breaker.
September 29, 1982	Change to purchase order 839270 was issued to add a complete DB-50 breaker.
February 25, 1983	MO/IC 28445 was issued for eight undervoltage coils part number 23A9019G75. This was a confirming order and was reviewed by QAD and classified as CCI. MR/RR 1644-M was issued to requisition eight UV trip attachments per MO/IC 28445. These undervoltage trip attachments were received onsite and delivered directly to the maintenance department, which circumvents the normal receipt inspection process.
February 28, 1983	MO/IC 28450 was issued to cover the cost of returning a shipment of four 48-V dc undervoltage trip devices, three 125-V dc undervoltage trip coils and two trip attachment pins for Westinghouse testing and inspection. It was requested that all components be returned after completion of the testing.
March 1, 1983	Purchase order 885297 was issued for eight undervoltage trip attachments. MO/IC No. 42080 was issued to change purchase order no. 885297 in order to delete the CCI classification and add a Certificate of Compliance requirement. It also changed item classification to Seismic Class 1, Class 1E, safety-related, and that 10 CFR 21 requirements applied. The Sponsoring Engineer reviewed the classification, although it was a confirming order.
March 2, 1983	Change No. 1 to P.O. 885297 was issued to add the requirements of MO/IC 42080.
March 2, 1983	Change No. 2 to P. O. 885297 to request Westinghouse to provide technical direction for installation, adjustment calibration and testing was issued. It also requested that the devices ordered be modified in accordance with NCD-Elec-18.

March 3, 1983 Change No. 3 to P. O. 885297 was issued to request implementation of QA/QC during the site installation activities.

Summary of Document Review

-- The completion of the MO/ICs was inconsistent with the station procedures and each other. For example, the breaker and components were ordered as Seismic class on some forms and non-Seismic on others. One breaker was ordered as Seismic class 2, yet the FSAR states it is Seismic Class 1.

-- The majority of the purchase orders for reactor trip breaker components were purchased as a Confirming Order, therefore, the Sponsoring Engineer did not become involved in the classification process. There was also an example of a normal purchase order that was not a confirming order, yet the SQAE and the Sponsoring Engineer did not review the classification as required.

-- The identification of components was not consistent in the documentation. Folio numbers, Westinghouse Standard Part Item Numbers (SPIN), and serial numbers were all used on occasion for identification.

-- Cases were noted when the wrong serial numbers were used to purchase breaker components.

-- One case was noted when the item classification was changed, yet a review was not conducted by the department head, SQAE or Sponsoring Engineer.

-- Cases were noted where components were ordered for DB-50 breakers but were not needed for the reactor trip breakers (i.e. overcurrent device).

-- On August 27, 1982, February 25, 1983, and March 1, 1983 undervoltage (UV) trip attachments were purchased without any reference to the recommended modifications specified in Westinghouse document NCD-Elec-18, dated December 17, 1971.

-- On one case, QA receipt was not performed prior to delivery to the requesting department.

5.4.2.3 Discussion

Based on discussions with licensee personnel, the Task Force determined that the Commercial Catalog Item (CCI) Classification for the reactor trip breakers was based on the quality level code recommended by Westinghouse in their Spare Parts Report. The Westinghouse Spare Parts Report is a compilation of recommended spare parts for the Nuclear Steam Supply System furnished by the Westinghouse Water Reactor Division. The Spare Parts Report is arranged according to a standard plant item number (SPIN). The SPIN page for the reactor trip switchgear designates the switchgear as Safety Class 2, and Quality Assurance Level Code C. It also states that 10 CFR 21 requirements

are not applicable. Safety Class 2 is defined as safety systems that function to shutdown the reactor or cool the core. QA Level Code C is defined as off-the-shelf items (items which do not require review). Based on this QA level Code, the reactor trip breaker was classified as CCI. QAI 7-1, Attachment 2, states that a commercial catalog item is an item which:

(1) Is not unique to facilities licensed by the NRC,

(2) Is manufactured in quantity to published manufacturer's fixed design and quality requirements,

(3) Is ordered as an authorized replacement for the original or existing item (i.e. manufacturers part list), and that a document exists which so identifies the item.

(4) Has a part number listed in the supplies sales catalog,

(5) Requires no supplier documentation,

(6) Is identifiable.

The procurement documents reviewed, with the exception of the noted cases, classified the breakers and components as CCI. Upon review of the SPIN it was noted that the undervoltage trip attachments were not listed on the parts lists. The undervoltage trip attachments were also not listed in the DB-50 Technical Manual spare parts listing. Licensee personnel stated that the part number was obtained from the Resident Westinghouse Service Manager, and not from station documents. The classification CCI was based on the fact that the other parts of the reactor trip breaker were classified CCI, and all previous procurement documents were CCI. The quality assurance personnel interviewed stated that if previous procurement documents were available, this information was used and the classification was not researched. So, once the incorrect classification of the undervoltage trip attachments occurred, the incorrect classification continued through the remainder of the purchases reviewed.

Also contributing to the inappropriate classification was the fact that the majority of the purchase orders for the reactor trip breakers and components were completed by confirming order, which allows circumventing the engineering review of standard MO/ICs.

6.0 TESTING AND SERVICE/MAINTENANCE HISTORY

6.1 Service/Maintenance History and Quality Assurance

6.1.1 History

The Unit 1 solid state protection system (SSPS), which includes the reactor trip breakers and bypass breakers, was tested during the preoperational and startup test phases at Salem in 1976. (Unit 1 went commercial in late 1976.) The Unit 2 solid state protection system was tested during the preoperational and startup test phase in 1979 and went commercial in October 1981. The licensee reviewed the work order logs to identify all work orders written against the reactor trip and bypass breakers.

The following is a chronological listing provided by the licensee of the corrective maintenance for Units 1 and 2 and includes (1) safety-related work orders issued, (2) maintenance findings and repairs, and (3) retest/operability tests performed as required. The first problem identified with reactor trip breaker operability was discovered during startup testing.

-- Unit 2 - February 6, 1979, B Bypass Breaker failed to open during startup testing. Safety-related Work Order TM-0053 was issued for troubleshooting and repair of the bypass breaker undervoltage (UV) attachment. The maintenance department used Procedure M3Z, "Electrical Equipment Troubleshooting and Repair," to perform the troubleshooting of the UV attachment. The attachment was found to be hanging up and adjustments were made which included adjusting the reset lever spring tension to balance the coil voltage (with the startup engineer present). The reactor trip breaker was subsequently tested during the completion of the startup test. The coil was repaired without the use of the Technical Manual (IB 33-850-3D).

-- Unit 1 - NRC Bulletin 79-11 was issued to inspect DB-50 breakers with overcurrent devices for cracks at the end caps. The licensee evaluated their use of DB-50 breakers in Unit 1. The rod control MG set "infeed" and "outfeed" breakers have overcurrent protection but the reactor trip or bypass breakers do not. Safety-related Work Order 902975 was issued and the licensee inspected those breakers. No abnormal conditions were identified.

-- Unit 1 - On August 25, 1980, during routine calibration of a time-delay relay for bypass breaker position indication in the control room, the relay was found to be out of tolerance and could not be corrected. Safety-related Work Order 936283 was issued to replace and recalibrate the time delay relay. This relay has indication but no protective functions.

-- Unit 2 - On May 5, 1981 the A reactor trip bypass breaker was dropped on the floor when being racked out. Safety-related Work Order 948069 was issued for the breaker's repair. The maintenance department used Procedure M3Z and the Technical Manual to troubleshoot and repair the breaker. The breaker's control relay, which is used for breaker closing only, was found to be damaged. The maintenance department replaced the control relay with a spare procured from Kearny Station Warehouse (a fossil plant). The breaker was then tested for operability by the performance department.

-- Unit 2 - On August 20, 1982, the B reactor trip breaker failed to open during the performance of a technical specification-required surveillance test on the SSPS and reactor trip breaker. The licensee replaced the inoperable breaker with the A reactor trip bypass breaker and completed the surveillance test to verify system operability. Safety-related Work Order 909110 was issued to troubleshoot and repair the B trip breaker. Initial breaker inspection indicated no abnormalities in the UV attachment and/or trip latch mechanism but the UV coil was damaged during this inspection, which required that it be replaced. After replacement, maintenance checks were performed in accordance with Procedure M3ZO. The breaker was then reinstalled (in the A bypass position) and tested for operability. The replacement UV attachment was procured as a commercial catalogue item (CCI).

-- Unit 2 - On January 6, 1983, the A reactor trip breaker failed to open on an actual reactor trip signal (steam generator low-level), although the breaker opened approximately 20-25 minutes later. Safety-related Work Order 930402 was issued for replacement of the Unit 2 A reactor trip breaker with the Unit 1 A reactor trip breaker; it also required the licensee to troubleshoot and repair the Unit 2 A reactor trip breaker. Using Procedure M3Z, the breaker was inspected and tested and no functional problems were identified.

This was the second incident of a reactor trip breaker failing to open on demand and prompted the licensee to contact the vendor (Westinghouse) concerning the problem.

-- Unit 1 - On January 11, 1983, non-safety-related Work Order 925774 was written in support of the Westinghouse technical service representative in inspecting and cleaning the Unit 1 reactor trip breakers. The four Unit-1 breakers (trip and bypass breakers) were disassembled, inspected, cleaned, and tested. The service representative used "CRC-2-26" cleaner/solvent to clean and lubricate the breaker, which was contrary to the recommendations in the 1974 Westinghouse Technical Bulletin and Data Letter. The Bulletin and Data Letter recommend lubrication with dry or near dry molybdenum disulfide, which is to be used sparingly. The breakers were subsequently tested by the licensee's operations and performance departments to verify operability prior to Unit 1 startup. New time responses for the breakers were not determined at this time.

-- Unit 1 - On February 22, 1983, the dust cover on the B reactor trip breaker came loose and jammed against the breaker fingers, causing an electrical short in the breaker. The breaker opened, causing a reactor trip. The short also caused a voltage/current transient within the electrical distribution system that in turn caused failure of the 48-V dc power supplies in the rod control power cabinets. Safety-related Work Order 925080 was issued to troubleshoot and repair the affected breaker. Initial inspection indicated that the breaker overheated; it failed to remain closed on successive attempts. The breaker was removed and its dust cover was straightened and reinstalled; after it cooled the breaker was inspected and tested satisfactorily. At this point, the breaker remained closed and opened on demand. The breaker was exchanged with the B reactor trip bypass breaker. The B reactor trip bypass breaker now installed in the B reactor trip breaker position was tested for operability prior to unit startup, except for time response tests.

-- Unit 1 - On February 25, 1983, the reactor trip breakers failed to open after receiving an actual SG low-low level trip signal. The breakers were opened with the manual reactor trip switch. Safety-related Work Order 925216 was issued to troubleshoot and repair the inoperable breakers. The performance department tested each breaker and its associated solid state protection system (SSPS) logic train shortly after the reactor trip. The test was performed by inserting a test signal into the SSPS logic circuitry to simulate a trip signal and verifying with a voltmeter that the UV attachments deenergized. Each breaker was tested, with the following results: Reactor trip breaker A tripped once out of three tests and reactor trip breaker B did not trip on any of the five tests. From these test results, it was concluded that the undervoltage trip mechanisms were binding, thus preventing the reactor trip breaker from being tripped on an automatic protection signal.

   The reactor trip breakers were replaced with Unit 2 breakers. The SSPS and the breakers were tested eight times successfully using the same testing technique, which confirmed that the SSPS was functional and that the Unit 1 reactor trip breakers must have failed to open due to mechanical binding.

6.1.2 Maintenance Program and Applicable QA Program Requirements

The Task Force inspector reviewed the work orders and corrective maintenance actions performed on the reactor trip and bypass breakers to verify that corrective maintenance was completed in accordance with Station Administration Procedure (AP)-9, "Control of Station Maintenance" and the Quality Assurance Program. The review included the following checks:

-- that administrative approval was obtained prior to initiating the work

-- that approved maintenance procedures were used to perform the work activities

-- that proper QA notification and QA review were completed

-- that equipment tagging was completed and controlled as required

-- that work activities were accomplished by qualified personnel

-- that vendor work performance was controlled by the QA plan

-- that tests/retests and operability tests were identified and completed

-- that spare or replacement parts were properly identified and traceable to procurement documents

-- that component safety classification was in accordance with approved guidance, and

-- that control of test equipment for troubleshooting and calibration was adequate.

The inspector identified the following discrepancies:

1. With one exception, the work orders associated with the reactor trip and bypass breakers were all classified as safety related. The exception was non-safety-related Work Order 925774, which was written to procure the services of a Westinghouse technical service representative from the Apparatus Services Division to perform a complete inspection and servicing of the breakers. The maintenance department representative indicated that the non-safety-related classification was caused by using the wrong page and line item on that page of Project Directive (PD) - 7, "Equipment Classification List," to determine safety classification.

   By Procedure AP-9, the Master Equipment List (MEL) was to be used for equipment classification, but the maintenance department did not have a MEL issued to their department. Additional information with regard to improper procurement for replacement parts is discussed in Section 5 of this report.

2. The spare parts used during repair of the reactor trip breakers were identified and traceable to specific purchase orders, with one exception. Reactor A bypass breaker was repaired in May 1981, with safety-related Work Order 948069. After the control relay was found defective, it was replaced with a spare relay that was procured without using approved station procurement policies and procedures. The replacement relay was

procured from the PSE&G fossil station (Kearny) by a telephone call; since no traceability exists for the spare part, its safety classification can be questioned. When the inspector questioned this procurement technique, the licensee stated that Westinghouse could not provide the relay for approximately 12 weeks, which is why they decided to obtain the spare from the Kearny Station.

This control device serves no safety-related functions; it is used only for breaker closing. However, since it is installed within a safety-related breaker, it requires replacement in kind or that an engineering evaluation be made to permit its use.

3. Administrative Procedure AP-9, "Control of Station Maintenance," requires notification of the QA staff prior to performing safety-related work and a QA review of completed safety-related work orders. For all safety-related work orders on the reactor trip and bypass breakers, prior notification was made; however, work orders TM-0053 (for Unit 2 prior to receipt of operating license), 902975, 917753, and 936238 did not receive QA review after work was completed.

4. Work orders require the identification of the "Followup/Retest Required" at the completion of maintenance. Retest requirements were entered as "Not Applicable" on work orders 925080 (February 22, 1983), 930402 (January 7, 1982), and 909110 (August 23, 1982) concerning RTB failures. For each of these work orders, the breakers were declared inoperable, and an operability test was required prior to returning the breaker to service.

   In order to meet technical specification operability requirements as soon as possible, substitute breakers (see item 5) from other locations were installed. A licensee representative stated that the "Not Applicable" noted on the work order applied to the original inoperable breaker which was to be repaired and returned to service at a later date. The inspector did verify that operability tests were performed prior to returning the breaker to service (see item 5). Although actual retests were performed, the entry of "Not Applicable" for retest requirements is confusing and does not accurately reflect what retests were necessary to prove operability prior to returning the system or component to service (i.e., time-response and trip attachment testing).

5. FSAR Section 7.1.2.4, "Periodic Testing of the Protection Systems (IEEE-338-1971)," requires that the response time of protection system instruments be checked after replacement of any component affecting response time. As detailed below, the licensee substituted components which affect response time without performing additional response-time checks.

Based on the Task Force review of work orders and discussions with licensee representatives, it was determined that reactor trip breakers (RTBs) and RTB bypass breakers were occasionally switched during maintenance. For instance, if a Unit-2 RTB were to fail, it would be replaced by a Unit-2 bypass breaker or by a Unit-1 RTB or bypass breaker. Any of the eight breakers involved (four for Unit 1 and four for Unit 2) could be interchanged. The licensee does not maintain a system to trace breaker location (i.e. which breaker by serial number is in which position).

Although the breakers are functionally tested after installation, not all aspects of breaker operability are tested. A reactor trip bypass breaker is not time-response tested, nor is the undervoltage attachment specifically tested. Hence, a bypass breaker substituted for an RTB would invalidate the previous 18-month time-response tests (PDs 18.04.002 or .005) and the monthly solid state protection system (SSPS) tests (PDs 18.1.008 or .009), which also check operability of the RTB undervoltage attachment. The SSPS reactor trip breaker test (PD 18.1.004-P4 permissive) -- usually performed after such maintenance--actuates only the RTB shunt coil.

In some instances Surveillance Procedure (operations) (SP(O)) 4.3.1.1.1 ("Manual Trip of the Breakers Using the Reactor Trip Switch") may also be performed. In this case both the undervoltage and shunt attachments should actuate but the test can only determine that the RTB tripped and not if one or both attachments actuated. Since RTBs are components which affect scram response time, replacing a breaker with an untested breaker would require a new time-response test. In addition, placing an untested or, at best, a partially tested breaker into an RTB position would make the breaker technically inoperable according to technical specification requirements until all required operability tests are done. In doing this, the licensee appears to have been in violation of Technical Specification Section 4.3.1.1.3 and the limiting conditions for operation (LCO) noted in Table 3.3-1 of plant technical specifications.

If a fully tested RTB (to include time-response and UV attachment testing) is moved from one unit to the other as a substitute, full testing during installation may not be required. But, depending on the actual date that the last complete testing of the substitute breaker was performed, the substitute breaker may invalidate the due date of the next 18-month full operability test (PD 18.04.002 or .005) by causing this date to occur before the next scheduled outage. If not recognized by the licensee, this ultimately could cause a violation of LCOs in Table 3.3.1 of plant technical specifications.

In addition, moving breakers without recording their new location may prevent the required traceability for procurement and quality assurance. These gaps would also not permit trends for individual breaker service and maintenance to be observed.

6.2 Preventive Maintenance

IEEE Standard 338-1971, "Periodic Testing of Nuclear Power Generating Station Protection System," Appendix A states:

> It is generally recognized that a good preventive maintenance program is essential to assure continued and proper operation of any protection system. Such a program is in addition to the "go, no - go" system checks of availability as discussed in this guide.

The Westinghouse Technical Manual for Type DB-50 air breakers states in the following sections:

I. General Section

IMPORTANT: To assure proper functioning, inspect each breaker at regular intervals in accordance with a systematic maintenance schedule. The frequency and character of the inspections will for the most part be determined by the severity of the duty performed. The minimum requirements, however, should consist of a light monthly inspection, with a thorough inspection semi-annually. Occasional checks on calibration as well as a coordination and freedom of all moving parts, must be included in the maintenance schedule. Consult Westinghouse engineering and service personnel for recommendations pertaining to special operating or maintenance conditions.

II. Receipt Storage and Handling

NOTE: It is not advisable to lubricate any parts of the breaker. The lubrication supplied during factory assembly is sufficient for years of service. The lubricant is of a special form which is used sparingly. The addition of oil will only promote the accumulation of dust and dirt.

In January 1974 a Westinghouse Technical Bulletin (NSD-74-1) was issued which describes a reactor trip breaker failure caused by excessive friction of the latch mechanism and recommended that reactor trip breakers be given regularly scheduled periodic inspections and maintenance. In addition, the Technical Bulletin recommended lubricating the undervoltage attachment occasionally with a molybdenum disulfide lubricant (Molykote G). The recommendation to use Molykote G was superseded in Westinghouse Data Letter 74-2 (February 1974). The Data Letter recommended molybdeum disulfide be used with an alcohol base rather than the mineral oil base of Molykote G.

Other information that could have prompted the licensee to evaluate the need for preventive maintenance on the DB-50 breakers was included in IE Bulletin 79-09, "Failures of GE Type AK-2 Breaker in Safety Related Systems," issued April 17, 1979. It describes twelve failures of the General Electric (GE) type AK-2 Breakers installed in safety-related systems.

The causes of the failures In GE AK-2 breakers were attributed to either binding within the linkage mechanism of the undervoltage (UV) trip device and trip shaft assembly or out-of-adjustement conditions in the same linkage mechanism. It was determined that the binding and out-of-adjustment condition resulted from inadequate maintenance programs. In the cases discussed, cleaning and relubricating the trip shaft mechanism within the circuit breaker was required to correct the problem. The bulletin requires that licensees with GE AK-2 breakers establish a preventive maintenance schedule for the breakers.

PSE&G replied to the bulletin on May 15, 1979, and stated that Salem did not utilize General Electric Type AK-2 breakers and had no future plans to utilize them.

From initial operation to January 1983, the licensee did not perform preventive maintenance on the reactor trip and bypass breakers. In January 1983, with the second failure of a reactor trip breakers in a five-month period, the licensee contacted Westinghouse Apparatus Services Division and contracted to have the reactor trip and bypass breakers for both units disassembled, inspected, cleaned, reassembled, and tested by a Westinghouse technical service representative. The licensee also arranged to have a preventive maintenance procedure developed by the technical representative for future use.

The Task Force inspector discussed the DB-50 Instruction Manual's preventive maintenance
requirements with the licensee's maintenance department representative, who indicated that the breaker duty cycle was evaluated and determined to be light (approximately once per month until August, when the surveillance frequency was changed to weekly) and was therefore not included in the preventive maintenance program. In addition, the licensee's representative indicated that the maintenance department did not receive the 1974 Westinghouse Technical Bulletin or Data Letter 74-2 from Westinghouse.

The Task Force discussed control of Technical/Service Manuals and Technical Bulletin/Letters with the licensee. If a Service Bulletin, Technical Bulletin or Technical Manual Revision is received by PSE&G, it is to be forwarded to the sponsor engineer for evaluation. It is then to be forwarded to the Technical Document Center (TDC) for distribution to those locations that have received the Technical Manual. The instruction manual for the DB-50 air-breakers was received as a section of the entire instruction manual for the reactor switchgear but was never officially incorporated into the document control system.

6.3 Startup and Operational Surveillance Testing

The inspectors reviewed the licensee's startup tests (SUPs) and technical specification surveillance tests for Units 1 and 2 to determine if reactor trip breakers (RTBs) operated satisfactorily. In some instances, 100% of the tests were reviewed and in other instances a sampling review was performed. The following surveillance tests were reviewed:

Startup Tests

-- SUP 20.1, Instrument Response-Time Test - Master - Unit 1 test completed August 1976. Within the time frame of this inspection the licensee was unable to locate documentation of the Unit 2 test.

-- SUP 20.2, Reactor Protection System Operational Test - Unit 1 test completed July 1976, and Unit 2 test completed March 1979.

-- SUP 20.3, Safeguards System Operational Test - Unit 1 test completed August 1976 and Unit 2 test completed February 1979.

Operational Surveillance Tests

-- PD 18.1.008 SSPS, Functional Test - Train A (Performed every other month).

-- PD 18.1.009 SSPS, Functional Test Train B (Performed every other month).

-- PD 18.1.001, Solid State Protection System (predecessor to procedure 18.1.008 and 18.1.009 prior to May 1982. Performed each month for one train).

-- PD 18.1.004, SSPS Reactor Trip Breaker and P-4 Permissive Test (Reactor trip test is required within seven days of any reactor startup and has been performed weekly at the licensee's discretion since August 1982).

-- PD 18.04.002, Response Time Test of SSPS Logic - Reactor Trip Train A (Performed every 18 months).

-- PD 18.04.005, Response Time Test of SSPS Logic - Reactor Trip Train B (performed every 18 months).

-- SP (O) 4.3.1.1.1, Instrumentation - Reactor Trip Breakers (performed within seven days prior to any startup and activates the RTBs by use of the reactor trip switches).

Tests SUP 20.1, 20.2, 20.3, PD 18.1.008, 18.1.009, 18.1.001, 18.04.005, and 18.04.002 specifically test the breakers by actuation of the undervoltage attachments. Test SP(O) 4.3.1.1.1, which tests the RTBs by use of the reactor trip switches, actuates both the breaker undervoltage attachments and the breaker shunt tripping attachment. However, from this test it can be determined only that the breakers tripped and not whether the undervoltage or shunt attachment actually tripped the breaker. Test PD 18.1.004 trips the breaker by actuation of the shunt coil.

Data from the following tests were reviewed:

-- PD 18.04.002 (18 month) - all tests since 1976 except for the 1979 test, which could not be located

-- PD 18.004.005 (18 month) - all tests since 1979

-- PD 18.1.008, 18.1.009, 18.1.001 (Each train every other month) - all tests for 1980, 1981, and 1982, and a small sampling of tests from 1976 - 1979

-- PD 18.1.004 - a sampling of 1982 tests for Units 1 and 2

-- SP(O) 4.3.1.1.1 - three tests

-- SUP 20.1, 20.2, and 20.3 - all tests reviewed, except SUP 20.1 for Unit 2, which could not be located during the inspection.

Based on the above reviews, it was determined that the RTBs were satisfactorily tested. Operational testing was within frequencies specified by the technical specifications. The inspector reviewed approximately 100 surveillance tests, which included testing the undervoltage latch mechanism. Of the tests reviewed, only two instances were identified in which the breaker failed to trip -- once during performance of SUP 20.3 in February 1979 and once during performance of PD 18.04.005 during August 1982. (Both occurrences were in Unit 2.) Both breakers were repaired by use of work orders and these repairs are addressed in Section 6.1.1 of this report.

Additional concerns were identified in Section 6.1 of this report pertaining to the need for operational surveillance testing when reactor trip bypass breakers replace an RTB during maintenance.

All surveillance procedures and SUPs are reviewed by the site quality assurance department prior to issuance. QA (or QC) personnel are not routinely involved in performing surveillance testing. QA personnel randomly observe testing in progress, specifically observe QC hold points, and are required to be present on the recalibration of any safety-related instrument found to be out of calibration during testing. QA personnel are not required to review completed test procedures. In order to improve the QA program, a QC inspector has been assigned full time to review work orders in progress and completed test procedures in the performance department.

7.0 OVERVIEW AND FINDINGS

The Task Force identified no new significant information relating to the cause of the failures that occurred on February 22 and February 25, 1983. A breakdown in administrative controls related to the procurement of vendor services in January 1983 could have contributed to the February 1983 failures. However, other factors, that the Task Force did not evaluate, may have contributed to the failure of the breakers.

The reactor trip switchgear was originally designed, procured, received, handled, stored, installed, and tested as a safety-related, seismic Class I component, as required by the FSAR. The service and environmental conditions for the reactor trip breakers were found to be within the design guidelines established by the FSAR for the switchgear room.

Review of current safety and quality classifications for the reactor trip breakers indicates that the licensee's established management and administrative controls would allow the procurement of replacement components or services for a safety system with a quality less than that of the original.

The practice of switching reactor trip breakers between alternate locations within one unit and between units does not ensure operability for technical specification requirements nor maintain traceability for maintenance history.

With the exception noted above, the implementation of the breaker surveillance testing and corrective maintenance program was as described within the QA program.

Overall, surveillance tests for the SSPS and reactor trip breakers were performed adequately. Surveillance testing performed since the start of initial operation for Units 1 and 2 demonstrated operability of the reactor trip breakers.

Vendor modifications and service information and bulletins to improve reliability for the reactor trip breakers were included neither in the maintenance program, nor in engineering files as baseline data.

The reactor trip breaker[illegible] not been formally included in a preventive maintenance program. [illegible] failures in reactor trip breaker operation occurred at Salem from the [illegible] of installation up to January 6, 1983.

Based on a review of three other factor trip events at Salem, in January and February 1983, the Task Force identified no other evidence of reactor trip breaker malfunctions.

A detailed review by the operating shift crew of the sequence of event printout following the event on February 22, 1983 was hampered because the crew lacked formal training on the printout and lacked detailed familiarity with information provided on the printout.

APPENDIX A

Basic Diagrams of Undervoltage Attachment, Shunt Trip Attachment, and Solid State Protection System Logic

(Cross Referenced to Section 1 of Report)

Contents

A.1 Rod Drive Power Supply One Line Diagram A-1

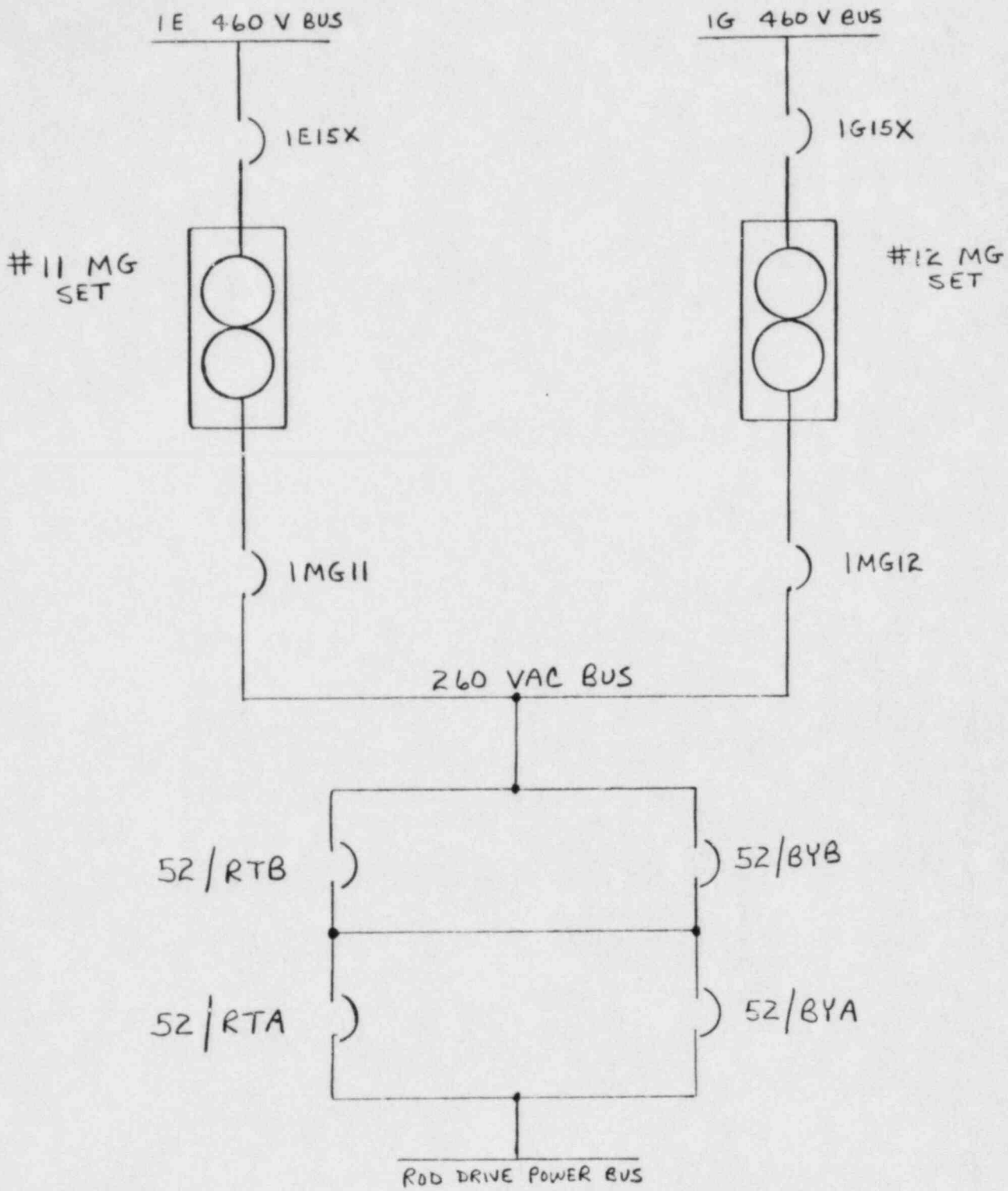
A.2 Reactor Trip Logic One Line Diagram A-2

A.3 Reactor Trip System A-3

A.4 Undervoltage Trip Attachment - Construction Details A-4

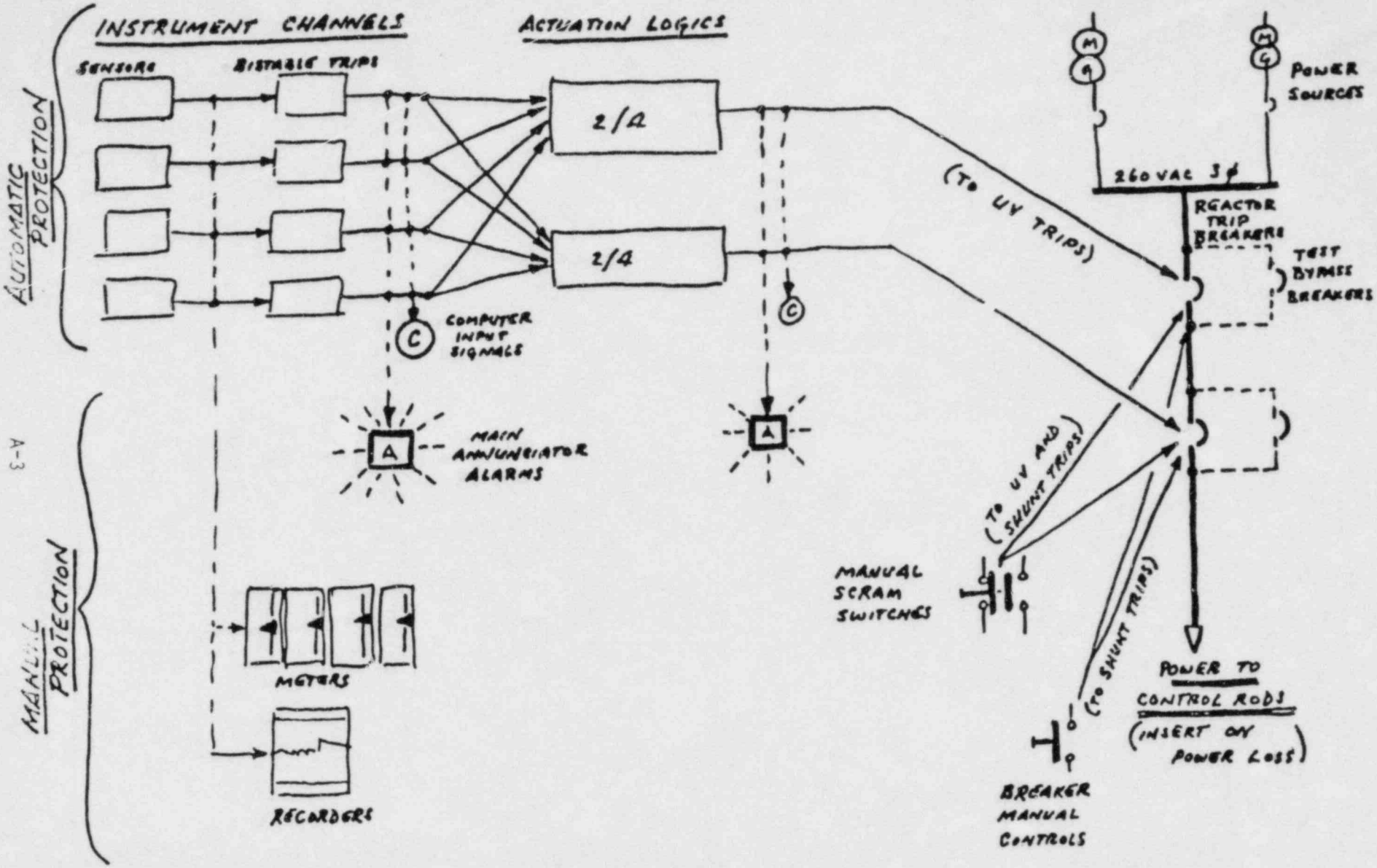
A.5 Undervoltage Trip Attachment - Latch Mechanism A-5

A.6 Shunt Trip Attachment - Location and Construction Details A-6



ROD DRIVE SUPPLY

INSTRUMENT CHANNELS
INSTRUMENT CHANNELS
REACTOR TRIP SWITCH (2)
LOGIC TRAIN "A"
LOGIC TRAIN "B"
BREAKER CONTROL PUSHBUTTON
BREAKER CONTROL PUSHBUTTON
UV
SHUNT
UV
SHUNT
SHUNT
UV
SHUNT
UV
52/RTB
52/BYA
52/BYB
52/RTA



J. T. Beard
2/27/83

REACTOR TRIP SYSTEM

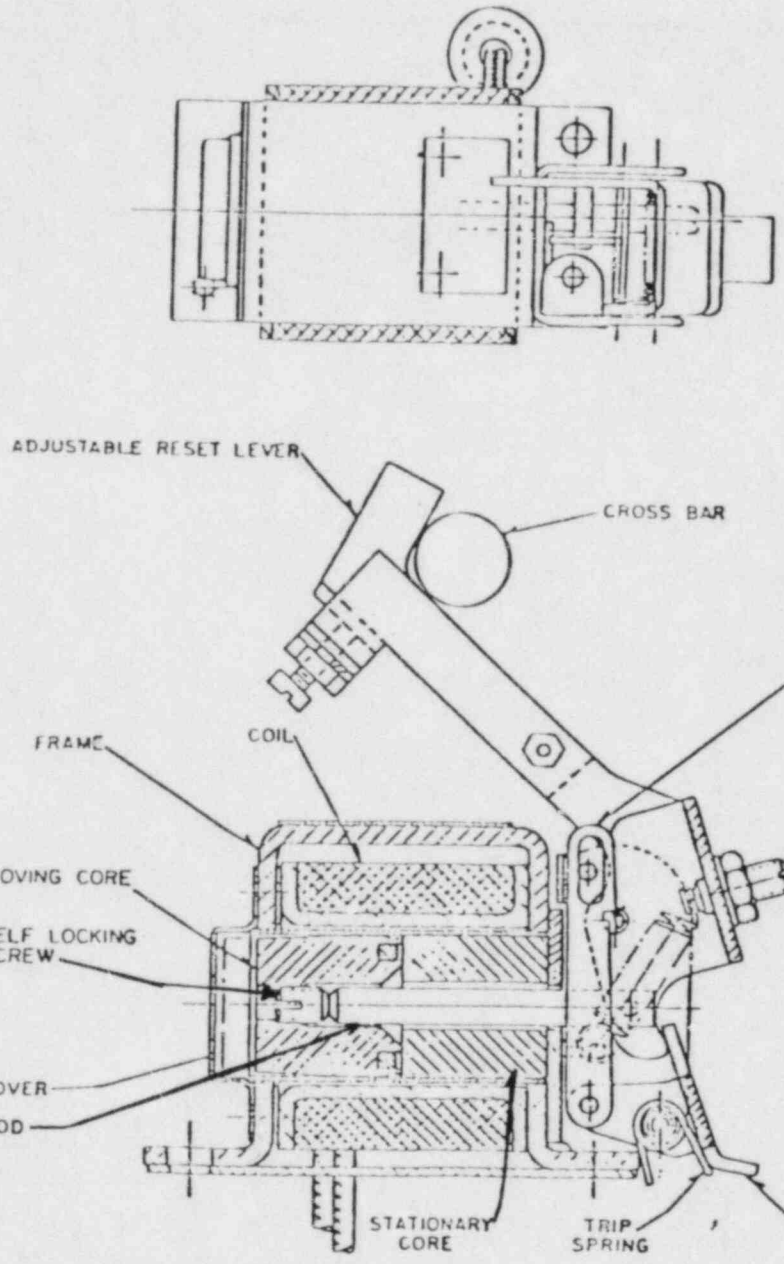
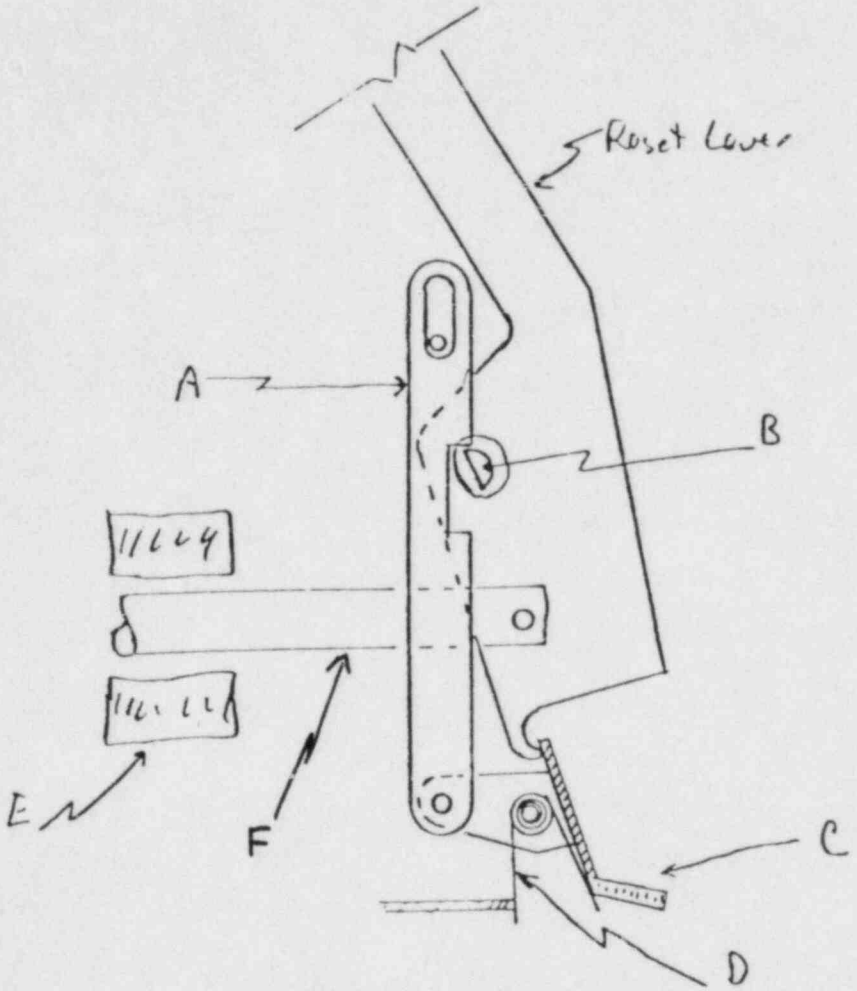
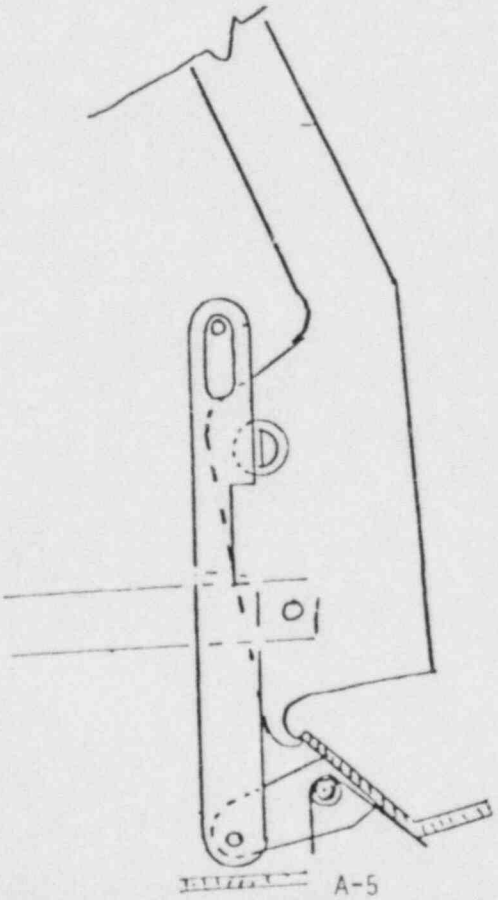


Fig. 17 - Undervoltage Trip Attachment - Construction Details





A- LATCH

B- LATCH PIN

C- TRIP LEVER

D- TRIP SPRING

E- STATIONARY CORE

F- ROD

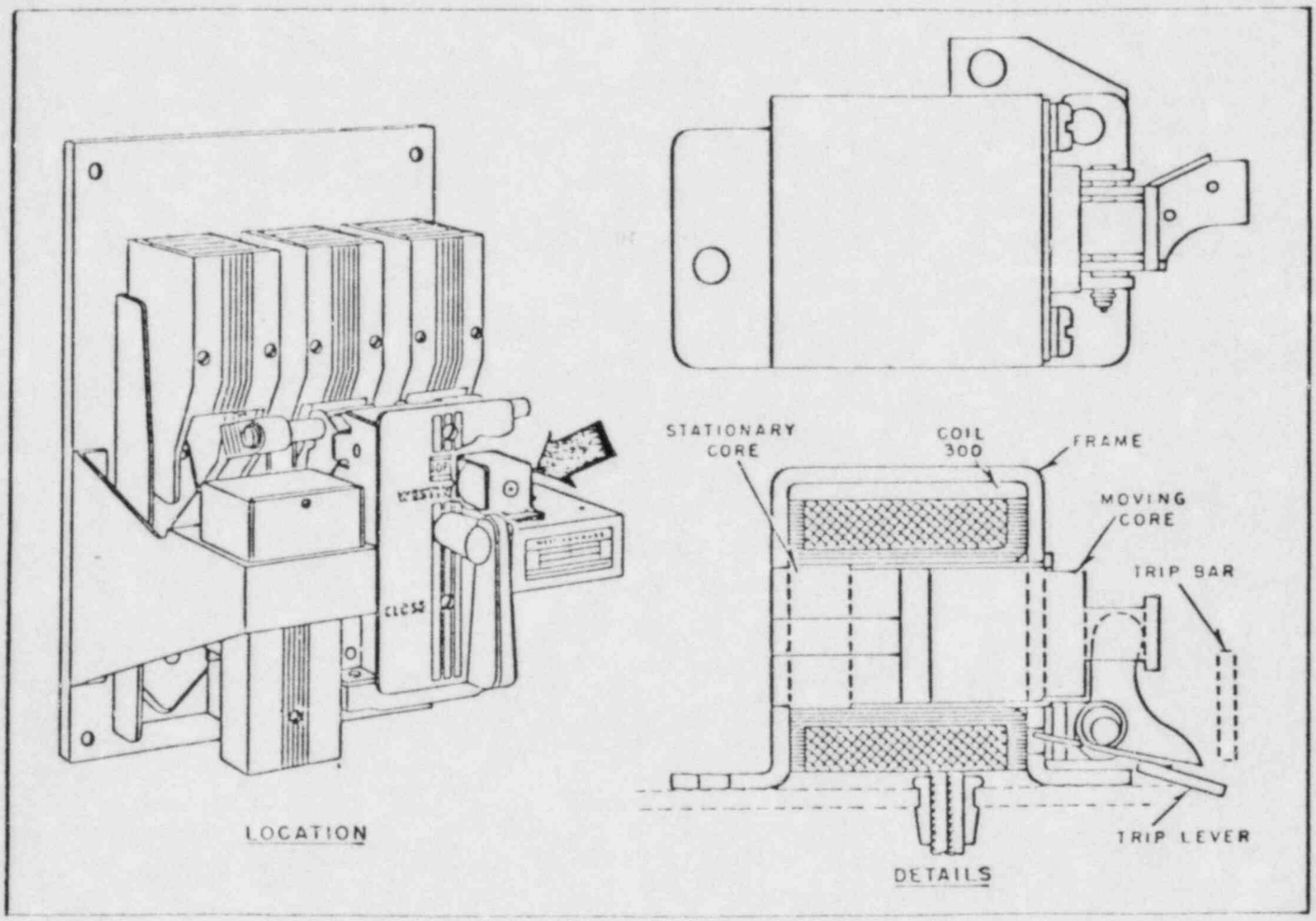


Fig. 16. Shunt Trip Attachment - Location and Construction Details

APPENDIX B

Control Room Staffing

(Cross Referenced to Section 2 of the Report)

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B.2 Operations Department Personnel Assignments, February 22, 1983 . . . . . B-2

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B.4 Letter USNRC to PSE&G dated July 29, 1982 re: Shift Supervisor - Engineer B-4

CONTROL ROOM STAFFING

SALEM UNIT 1

2/22/83 and 2/25/83 ATWS EVENTS

FEBRUARY 22, 1983

SS

LOWENSTEN

SRO (or SS-E)*

TIMM/O'BRIEN

RO

CORNMAN

RO

PETERSEN

STA

*

*Filled by same individual

FEBRUARY 25, 1983

SS

LOWENSTEN

SRO

SAUNDERS

RO

BOWDREN

RO

LOUNSBURY

STA

FLORES/OTT

OPERATIONS DEPARTMENT
PERSONNEL ASSIGNMENTS

DATE 2-22-83 DAY Tuesday SHIFT 15:15 23:1

RELIEF SRO STA Timm / O'BRIEN SC Yoder

S3 Lowenstein REPLD. SRO Policzzi

UNIT I	UNIT II	
S2 Gallaher	S2 Jino	SSS Warren
TRNG	TRNG Mesrud	
NCO	NCO	SE
C Groetsch	C Wilbur	ST
D Peterson	D Wallace	FD Miller
PRIMARY	PRIMARY	
EO Roman (Pelasco)	EO Sheridan (M Price)	
UO Willoughby		
SECONDARY	SECONDARY	CWI Dubay
EO Price	EO Parker	RWO Mathews
UO Stewart		RNCO

Tool Control Keever / Braatad

Braatad

Williams

Ammon

MISC:

FIRE BRIGADE

Miller CHIEF

Williams ASS'T

Willoughby

Sheridan

Roman

REV.3

OPERATIONS DEPARTMENT
PERSONNEL ASSIGNMENTS

W SHIFT

DATE 2-25-83 DAY Friday SHIFT 2315-1715

S3 Lowenstein S/A SAUNDERS SC Hess

UNIT I

S2 FLORES/OTT

NCO
C Bowdeen
D Lounsbury

PRIMARY
EO Thompson
UO Dunn

SECONDARY
EO Pompper
UO Schumacher

UNIT II

S2 Herrell/MAIER

NCO
C Wolk
D Lyons

PRIMARY
EO Priestley
UO McGee/Braudis

SECONDARY
EO O'Grady
UO Holmes

SSS Ravelli
SE
ST

FD Sinotte
CWI-EO Miller
CWI-UO
RHO Rodriguez
RNCO

EXTRA SUPERVISOR

TOOL CONTROL Braudis/McKee

EXTRA:
Anderson
Becker

MISC:
Janssen-Vac.
Huntsman-Sick
Quinn-Sick

FIRE BRIGADE
CHIEF Swope
ASS'T Priestley
Rodriguez
McKee, Braudis
Becker

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

July 29, 1982

Docket Nos. 50-272
and 50-311

Mr. Richard A. Uderitz
Vice President - Nuclear
Public Service Electric and Gas Co.
Mail Code T15A
P. O. Box 570
Newark, New Jersey 07101

Dear Mr. Uderitz:

In your letter of June 16, 1982 you requested staff approval of a proposed program that would add an additional Senior Reactor Operator (SRO) to the staff of the Salem Nuclear Generating Station. This additional SRO would be designated Shift Supervisor - Engineer (SS-E) and would also fulfill the requirements of the Shift Technical Advisor.

On the basis of the information you have provided, we consider a SS-E to be an acceptable equivalent to a STA. You should revise the Salem Technical Specifications accordingly.

Sincerely,

Steven A. Varga, Chief
Operating Reactors Branch #1
Division of Licensing

cc: See next page

APPENDIX C

Incident Reports and Sequence of Events

(Cross Referenced to Section 3 of the Report)

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C.1 Incident Report - August 20, 1982 . . . . . C-1

C.2 Incident Report - January 6, 1983 . . . . . C-2

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C.6 Incident Report - February 20, 1983 . . . . . C-9

C.7 Incident Report - February 22, 1983 . . . . . C-10

C.8 PSE&G Report on February 23, 1983 Trip C-11

C.9 Incident Report - February 25, 1983 . . . . . C-21

C.10 Sequence of Events - February 25, 1983 . . . . . C-22

PSEG

SALEM GENERATING STATION

INCIDENT REPORT

1.1 REPORT NO. 82-246

SECTION 1 – INITIATION 1.2 DATE 8-20-82 1.3 TIME 2000

1.4 REPORT SUBJECT REACTOR TRIP SYSTEM INSTRUMENTATION

1.5 UNIT 2 1.6 MODE I 1.7 RX POWER 82% 1.8 UNIT LOAD 890 MWe

1.9 DESCRIPTION OF EVENTS: ACTION STATEMENT NO. 3.3.1 act. 1 ENTERED 2000 TERMINATED 2206

DURING SURVEILLANCE TESTING ON SSPS TRAIN "B", IT WAS DISCOVERED THAT Rx TRIP BREAKER "B" ~~WOULD~~ WOULD NOT TRIP AS REQUIRED WHEN A TRIP SIGNAL WAS GENERATED. THE BREAKER WAS DECLARED INOPERABLE AND T.S. A/S 3.3.1 act. 1 ENTERED AT 2000. AT ~~2000~~ 2040 THE REACTOR BEGAN A POWER REDUCTION TO COMPLY WITH THE A/S, WHICH REQUIRES HOT STANDBY IN 6 HOURS. UNUSUAL EVENT DECLARED DUE TO THE SHUTDOWN REQUIRED BY AN L.C.O. IN THE TECHNICAL SPECIFICATIONS. NOTIFICATIONS MADE IAW EP-I-1 ATTACHMENT 1.

1.10 RESULTS OR POSSIBLE RESULTS OF INCIDENT: LOSS OF REDUNDANCY IN Rx TRIP SYSTEM

1.11 REPORTED TO SR. SHIFT SUPERVISOR BY RON HEATON

1.12 NOTIFIED OF THE INCIDENT: ☐ OPERATING ENGINEER OR ☑ L. Fay 2045 TIME 8/20/82 DATE

1.13 REPORT SUBMITTED R.R. Stw SR. SHIFT SUPERVISOR 8/20/82 DATE

SECTION 2 – FOLLOW-UP

2.1 SQAE NOTIFIED DATE 9/1/82

2.2 MAJOR CAUSE: ☒ EQUIPMENT FAILURE ☐ PROCEDURE INADEQUACY ☐ PERSONNEL ERROR ☐ _____

2.3 INCIDENT CLASSIFICATION: ☒ REPORTABLE LER # _____ ☐ NOT REPORTABLE

2.4 JUSTIFICATION OF CLASSIFICATION: ~~6.9.1.8a~~ #
6.9.1.9b

REPLACED BKR WITH "A" TRAIN BYPASS BKR, COMPLETED SURVEILLANCE TEST "SAT." A/S TERMINATED @2206. W.O. #OD-909110 WRITTEN TO MAINTENANCE FOR REPAIR. PRJ

2.5 INCIDENT AND PROCEDURE REVIEW COMPLETE _____

2.6

OPERATING ENGR.	DATE	SQAE	DATE	CHIEF ENGR.	DATE

DISTRIBUTION: MANAGER – SGS, CHIEF ENGR., SHIFT SUPV'S. FOFICE, MANAGER – QA, SQAE

AP-6-1 REV. 6

PSE&G

SALEM GENERATING STATION

INCIDENT REPORT

1.1 REPORT NO. 83-008

SECTION 1 – INITIATION 1.2 DATE 1/6/83 1.3 TIME 1953

1.4 REPORT SUBJECT REACTOR TRIP BREAKER 'A' – FAILURE TO OPEN ON RX. TRIP SIGNAL

1.5 UNIT 2 1.6 MODE 3 1.7 RX POWER 0% 1.8 UNIT LOAD 0 MWe

1.9 DESCRIPTION OF EVENTS: ACTION STATEMENT NO. N/A ENTERED — TERMINATED —

ON 1/6/83 @ 1953, UNIT #2 EXPERIENCED A REACTOR TRIP AND REACTOR TRIP BREAKER 'A' FAILED TO OPEN ON THE SSPS SIGNAL. AFTER THE TRIP, ALL INDICATION REVEALED THAT TRIP BREAKER HAD NOT TRIPPED, HOWEVER AFTER ABOUT 25 MINUTES THE TRIP BRK 'A' DID FINALLY OPEN (BY ITSELF).

INVESTIGATION BY THE PERFORMANCE DEPARTMENT REVEALED THAT THE PROBLEM WAS WITH THE BREAKER ITSELF (MECHANICAL/ELECTRICAL), AND NOT WITH THE SSPS SYSTE

REACTOR TRIP BREAKER 'A' IS BEING REPLACED WITH THE BREAKER FROM UNIT #1 SIDE AND WILL BE TESTED PRIOR TO STARTUP.

1.10 RESULTS OR POSSIBLE RESULTS OF INCIDENT:

1.11 REPORTED TO SR. SHIFT SUPERVISOR BY _____

1.12 NOTIFIED OF THE INCIDENT: ☒ OPERATING ~~ENGINEER~~ Manager OR ☐ _____ 2050 TIME 1-6-83 DATE

1.13 REPORT SUBMITTED D. O. Jansen SR. SHIFT SUPERVISOR 1-7-83 DATE

FQ

SECTION 2 – FOLLOW-UP

2.1 SQAE NOTIFIED DATE 1-21-83

2.2 MAJOR CAUSE: ☒ EQUIPMENT FAILURE ☐ PROCEDURE INADEQUACY ☐ PERSONNEL ERROR ☐ _____

2.3 INCIDENT CLASSIFICATION: ☒ REPORTABLE LER # _____ ☐ NOT REPORTABLE

2.4 JUSTIFICATION OF CLASSIFICATION: POSSIBLE PROMPT NOTIFICATION?

PROMPT NOT REQUIRED. REPORTABLE IAW STS 6.9.1.9.b.

LER COORD

2.5 INCIDENT AND PROCEDURE REVIEW COMPLETE _____

2.6

OPERATING ENGR.	DATE	SQAE	DATE	CHIEF ENGR.	DATE
R					

C-2

DISTRIBUTION: MANAGER – SGS; CHIEF ENGR.; SHIFT SUPV'S. FOFICE; MANAGER – QA; SQAE

AP-4-1 REV.

```
2221 * REL FUEL ASS PWR THIMB C13  U1175 =? 0.869206
2221 * REL FUEL ASS PWR THIMB D09  U1210 =? 0.862076
2221 C REL FUEL ASS PWR THIMB E14  U1212 =?   1.0156
2221 * REL FUEL ASS PWR THIMB H11  U1220 =? 0.886577
2221 * REL FUEL ASS PWR THIMB H14  U1221 =? 0.840480
2222 * REL FUEL ASS PWR THIMB P07  U1233 =? 0.886001
2222 * PWR RNG 4 P10 PRT PRM  N0014D=  0,RESET


SEQ OF EVENTS AT 22:22:26
0000* N0014D=0 PWR RNG 4 P10 PRT PRM RESET
0181* N0013D=0 PWR RNG 3 P10 PRT PRM RESET

2222 * REACTOR TRIP
0218* Y2003D=1 TURBINE TRIP TRIP                    -TT demand
0218* Y2005D=1 TURBINE REMOTE EMERG TRIP TRIP
0232* Y0390D=1 REACTOR TURBINE TRIP +P7 TRIP SGFP DEMAND
-0232C Y0392D=1 TURBINE STOP VA 22 CLOSED
0234* Y2609D=1 22 SGFP TURBINE HRH STOP VA CLOSED
0234C Y0391D=1 TURBINE STOP VA 21 CLOSED

2222 C PWR RNG 4 P10 PRT PRM  N0014D=  0,RESET
0234C Y0394D=1 TURBINE STOP VA 24 CLOSED
0240* Y2604D=1 22 SGFP TURBINE MS STOP VA CLOSED
-0240C Y0393D=1 TURBINE STOP VA 23 CLOSED
0241* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP
0242* Y0006D=0 REACTOR MAIN TRIP BKR A TRIP
0246C Y0390D=0 REACTOR TURBINE TRIP +P7 NT TRP
0246* N0012D=0 PWR RNG 2 P10 PRT PRM RESET
0246* Y0003D=1 REACTOR TRB PWR P7 PRMSSVE RESET

2222 C REACTOR MAIN TRIP BKR A  Y0006D=  0,TRIP
0246C N0016D=0 PWR RNG LO Q 2 TRP BLK RESET
0246C N0015D=0 PWR RNG LO Q 1 TRP BLK RESET
0247* N0011D=0 PWR RNG 1 P10 PRT PRM RESET
0285* Y9033D=1 PWR RNG CHAN 2 HI Q RATE PRT TRP SET
0287* Y9031D=1 PWR RNG CHAN HI Q RATE REACTOR TRIP
0287* Y9032D=1 PWR RNG CHAN 1 HI Q RATE PRT TRP SET
0287* Y9035D=1 PWR RNG CHAN 4 HI Q RATE PRT TRP SET

2223 * 22 STM GEN LO LVL 4 PRT TRP  L0421D=  1,SET

2223 C REACTOR MAIN TRIP BKR B  Y0007D=  0,TRIP

2223 C 22 SGFP TURBINE OUT BRG ECCENTY  Y2621D=  0,NT HI
```

0232 ↑ 10 ops plus
02A2 ↑

Unit 2

① Shutting down for ref
② SG #21 hi hi level caus
③ TT plus P7 caused THJ2 from ~10% FP

1/21/83

Unit #1 clean figment tw/3 2/14/93 (2001 N

Unit 1

RTB surveillance

pre-startup

2/14/93

0005 * VOLUME CONTROL TANK PRESS PG139A= 15.0

FLAG 0010 * REACTOR MAIN TRIP BKR A YG006D= 1.NT TRP

SEQ OF EVENTS AT 00:10:57

A 00000 YG006D=1 REACTOR MAIN TRIP BKR A NT TRP

0015 C REACTOR TRIP

0016 * REACTOR TRIP AUX1 BKR B YG027D= 1.NT TRP

TRIP SEQ OF EVENTS AT 00:16:48

00000 YG027D=1 REACTOR AUX1 TRIP BKR B NT TRP

C-4

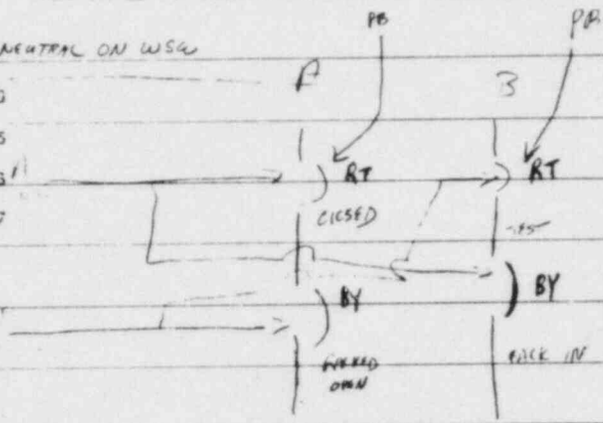
```
0018 * REACTOR TRIP
0018 C REACTOR MAIN TRIP BKR A  Y0006D=  0,TRIP
0018 C REACTOR TRIP AUX1 BKR B  Y0027D=  0,TRIP

SEQ OF EVENTS AT 00:18:01
0000C Y0005D=0 REACTOR MANUAL TRIP 2 NT TRP
0005* Y2003D=1 TURBINE TRIP TRIP
0005* Y0006D=0 REACTOR MAIN TRIP BKR A TRIP
0005* Y0027D=0 REACTOR AUX1 TRIP BKR B TRIP
0040* Y0005D=1 REACTOR MANUAL TRIP 2 TRIP
0019 * REL FUEL ASS PWR THIMB L11  U1228 =?-0.062570
0020 C REL FUEL ASS PWR THIMB L11  U1228 =?-0.054645
0021 * REL FUEL ASS PWR THIMB L11  U1228 =?-0.062683
0022 C REL FUEL ASS PWR THIMB L11  U1228 =?-0.065137
0022 * REACTOR MAIN TRIP BKR B  Y0007D=  1,NT TRP

SEQ OF EVENTS AT 00:22:33
0000C Y0007D=1 REACTOR MAIN TRIP BKR B NT TRP
0004* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP
0226C Y0007D=1 REACTOR MAIN TRIP BKR B NT TRP
0024 C REACTOR TRIP
0024 * REACTOR TRIP AUX1 BKR A  Y0026D=  1,NT TRP
0025 C REACTOR MAIN TRIP BKR B  Y0007D=  0,TRIP
0025 * REACTOR TRIP
0025 C REACTOR TRIP AUX1 BKR A  Y0026D=  0,TRIP

SEQ OF EVENTS AT 00:24:40
0000C Y0026D=1 REACTOR AUX1 TRIP BKR A NT TRP
1675C Y0004D=0 REACTOR MANUAL TRIP 1 NT TRP
1699* Y0026D=0 REACTOR AUX1 TRIP BKR A TRIP
1700* Y2003D=1 TURBINE TRIP TRIP
1700* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP
1729* Y0004D=1 REACTOR MANUAL TRIP 1 TRIP
0025 * REACTOR MAIN TRIP BKR A  Y0006D=  1,NT TRP

SEQ OF EVENTS AT 00:28:55
0000C Y0007D=1 REACTOR MAIN TRIP BKR B NT TRP
0003* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP
0128C Y0007D=1 REACTOR MAIN TRIP BKR B NT TRP
0131* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP
0467C Y0007D=1 REACTOR MAIN TRIP BKR B NT TRP
0469* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP
0613C Y0006D=1 REACTOR MAIN TRIP BKR A NT TRP
0697C Y0007D=1 REACTOR MAIN TRIP BKR B NT TRP
```



Rack in A B/B

Apparent manual cycling of the B RTB

```
0834C Y0007D=1 REACTOR MAIN TRIP BKR B NT TRP
0836* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP
1053C Y0007D=1 REACTOR MAIN TRIP BKR B NT TRP
1056* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP
1249C Y0007D=1 REACTOR MAIN TRIP BKR B NT TRP
1252* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP
1612C Y0007D=1 REACTOR MAIN TRIP BKR B NT TRP
1615* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP
2073C Y0007D=1 REACTOR MAIN TRIP BKR B NT TRP

0029 C REACTOR MAIN TRIP BKR A  Y0006D=  0.TRIP

SEQ OF EVENTS AT 00:29:29
0000* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP
1521* Y2003J=1 TURBINE TRIP TRIP
1521* Y0006D=0 REACTOR MAIN TRIP BKR A TRIP
1796C Y0007D=1 REACTOR MAIN TRIP BKR B NT TRP
1799* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP

0031 * REL FUEL ASS PWR THIMB L11  U1228 =?-0.062648

0032 C REL FUEL ASS PWR THIMB L11  U1228 =?-0.064921

0037 C REACTOR TRIP

0037 * REACTOR MAIN TRIP BKR A  Y0006D=  1.NT TRP

0037 * REACTOR MAIN TRIP BKR B  Y0007D=  1.NT TRP

0038 * SHTDOWN ROD BNK POSITON ERROR

0038 * SHTDOWN ROD BNK A STEPCNT  U0053 =        4.

0038 * SHTDOWN ROD BNK B STEPCNT  U0054 =        0.

0038 * SHTDOWN ROD BNK C STEPCNT  U0055 =        0.

0038 * SHTDOWN ROD BNK D STEPCNT  U0056 =        0.


SEQ OF EVENTS AT 00:37:43
0000C Y0007D=1 REACTOR MAIN TRIP BKR B NT TRP
0083C Y0006D=1 REACTOR MAIN TRIP BKR A NT TRP

0053 * REL FUEL ASS PWR THIMB L12  U1194 =?-0.062734

0054 C REL FUEL ASS PWR THIMB L12  U1194 =?-0.070512

0055 C SHTDOWN ROD BNK A STEPCNT  U0053 =      228.

0106 * REL FUEL ASS PWR THIMB L12  U1194 =?-0.062593

0107 C REL FUEL ASS PWR THIMB L12  U1194 =?-0.075997

 0108   2/14 SALEM 1

RCS WATER INVENTORY STOP

0108 C SHTDOWN ROD BNK B STEPCNT  U0054 =      228.

0170 C SHTDOWN ROD BNK POSITON ERROR
```

Apparent manual cycling of the B RTB

opened RTB B with PB • no message from turb's ETS

After 1521 cycles, opened RTA to "generate a Rx trip" → open RTA closes 52H/RTA to energize 21 AST and give TT

closed RTB's and cleared Reactor Trip

sequence end point to proceed w/ FX S(

00:29:29

+ Trip RTB B - PB
+ 25 sec
+ Trip RTB A - PB
+ ↓ sequence ..
+ close/trip RTB B

C-6

```
0120 C SHTDOWN ROD BNK C STEPCNT  U0055 =      229.
0120 C SHTDOWN ROD BNK D STEPCNT  U0056 =      229.
0136 * 14 STM LNE HI P 2 SI PRT TRP  FD4670=  1.SET
0136 * 14 STM GEN LO P 2 PRT TRP  FD465D=  1.SET


SEQ OF EVENTS AT 01:36:17.
0000* FD4670=1 14 STM LNE HI P 2 SI PRT TRP SET
0429* FD465D=1 14 STM GEN LO P 2 PRT TRP SET
0149 * SHTDOWN ROD BNK POSITON ERROR
0149 * SHTDOWN ROD BNK B STEPCNT  U0054 =      221.
0149 * SHTDOWN ROD BNK C STEPCNT  U0055 =      230.
0151 C SHTDOWN ROD BNK POSITON ERROR
0151 C SHTDOWN ROD BNK B STEPCNT  U0054 =      228.
0151 C SHTDOWN ROD BNK C STEPCNT  U0055 =      230.
0154 * SHTDOWN ROD BNK POSITON ERROR
0154 * SHTDOWN ROD BNK C STEPCNT  U0055 =      221.
0154 * SHTDOWN ROD BNK D STEPCNT  U0056 =      230.
0156 C VOLUME CONTROL TANK PRESS  PG139A=      17.0
0156 C SHTDOWN ROD BNK POSITON ERROR
0156 C SHTDOWN ROD BNK C STEPCNT  U0055 =      230.
0156 C SHTDOWN ROD BNK D STEPCNT  U0056 =      230.
0159 * SHTDOWN ROD BNK POSITON ERROR
0159 * SHTDOWN ROD BNK D STEPCNT  U0056 =      221.
0200 C SHTDOWN ROD BNK POSITON ERROR
0200 C SHTDOWN ROD BNK D STEPCNT  U0056 =      230.
0232 * REL FUEL ASS PWR THIMB C08  U1175 =?-0.062530
0234 C REL FUEL ASS PWR THIMB C08  U1175 =?-0.060014
0235 * REL FUEL ASS PWR THIMB M10  U1197 =?-0.062735
0236 C REL FUEL ASS PWR THIMB M10  U1197 =?-0.062469
0248 * REL FUEL ASS PWR THIMB L11  U1228 =?-0.062733
0247 C REL FUEL ASS PWR THIMB L11  U1228 =?-0.057849
0302 * REL FUEL ASS PWR THIMB A11  U1204 =?-0.062562
0303 C REL FUEL ASS PWR THIMB A11  U1204 =?-0.062935
0308 * REL FUEL ASS PWR THIMB L14  U1229 =?-0.062739
```

```
0559 C REACTOR MAIN TRIP BKR A  Y0006D=  0,TRIP

0559 C REACTOR MAIN TRIP BKR B  Y0007D=  0,TRIP

0559 * 14 STM GEN LO LVL + LO FW REACTOR  Y0461D=  1,TRIP

0559 * VOLUME CONTROL TANK LVL 1  L0112A=      87.3


SEQ OF EVENTS AT 05:58:54
0000* Y0461D=1 14 STM GEN LO LVL + LO FW REACTOR TRIP
0000* L0461D=1 14 STM GEN LO LVL 4 PRT TRP SET
0006* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP
0010* Y2003D=1 TURBINE TRIP TRIP
0010* Y0006D=0 REACTOR MAIN TRIP BKR A TRIP

0600 C VOLUME CONTROL TANK LVL 1  L0112A=      84.5

0600 * 14 STM GEN LO LVL 3 PRT TRP  L0460D=  1,SET


SEQ OF EVENTS AT 06:00:48
0000* L0460D=1 14 STM GEN LO LVL 3 PRT TRP SET


SEQ OF EVENTS AT 06:05:40
0000C Y0007D=1 REACTOR MAIN TRIP BKR B NT TRP
0003* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP
0221C Y0007D=1 REACTOR MAIN TRIP BKR B NT TRP
0224* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP
0381C Y0006D=1 REACTOR MAIN TRIP BKR A NT TRP
0384* Y2003D=1 TURBINE TRIP TRIP
0384* Y0006D=0 REACTOR MAIN TRIP BKR A TRIP

0607 C 14 STM GEN LO LVL 3 PRT TRP  L0460D=  0,RESET

0608 C 14 STM GEN LO LVL + LO FW REACTOR  Y0461D=  0,NT TRP

0608 C 14 STM GEN LO LVL 4 PRT TRP  L0461D=  0,RESET

0608 * VOLUME CONTROL TANK PRESS  P0139A=      15.0


SEQ OF EVENTS AT 06:08:00
0000C Y0461D=0 14 STM GEN LO LVL + LO FW REACTOR NT TRP
```

Unit 1 Reactor Trip
2/14/83 5:58 am
Dilution to critical in progress
#14 SG lo lvl with hi stm (f/w b/s tripped for calib)

PSEG

SALEM GENERATING STATION

INCIDENT REPORT

1.1 REPORT NO. 83-048

SECTION 1 – INITIATION 1.2 DATE 2-20-83 1.3 TIME 2158

1.4 REPORT SUBJECT RX TRIP

1.5 UNIT 1 1.6 MODE 2 1.7 RX POWER 4% 1.8 UNIT LOAD —

1.9 DESCRIPTION OF EVENTS: ACTION STATEMENT NO. _____ ENTERED _____ TERMINATED _____

At 2158 Unit 1 reactor tripped — 14 & 13 Hi Hi Level. Turbine Trip and Rx power > P7.

At time of Trip Rx power ≈ 4% and 14 SG Level ≈ 58%.

Steam dump valve opening may have caused SG Level and Rx Power to increase, resulting in Trip

1.10 RESULTS OR POSSIBLE RESULTS OF INCIDENT:

1.11 REPORTED TO SR. SHIFT SUPERVISOR BY _____

1.12 NOTIFIED OF THE INCIDENT: ☑ OPERATING ENGINEER OR ☐ _____ 2200 TIME 02/20/83 DATE

1.13 REPORT SUBMITTED [signature] SR. SHIFT SUPERVISOR 2-21-83 DATE

SECTION 2 – FOLLOW-UP

2.1 SQAE NOTIFIED DATE 3-6-83

2.2 MAJOR CAUSE: ☐ EQUIPMENT FAILURE ☐ PROCEDURE INADEQUACY ☐ PERSONNEL ERROR ☑ DESIGN

2.3 INCIDENT CLASSIFICATION: ☐ REPORTABLE LER # _____ ☑ NOT REPORTABLE

2.4 JUSTIFICATION OF CLASSIFICATION:

NO WRITTEN REPORT REQUIRED – REQUIRED NOTIFICATIONS COMPLETED.

2.5 INCIDENT AND PROCEDURE REVIEW COMPLETE _____

2.6 _____ OPERATING ENGR. _____ DATE _____ [illegible] _____ DATE _____ CHIEF ENGR. _____ DATE

R

DISTRIBUTION: MANAGER – SGS; CHIEF ENGR.; SHIFT SUPV'S. FOFICE; MANAGER – QA; SQAE

AP-6-1 REV. 6

PSE&G

SALEM GENERATING STATION

INCIDENT REPORT

1.1 REPORT NO. 83-049

SECTION 1 – INITIATION 1.2 DATE 2-22-83 1.3 TIME 0116

1.4 REPORT SUBJECT Reactor trip

1.5 UNIT one 1.6 MODE 1 1.7 RX POWER ≈10% 1.8 UNIT LOAD 35 MWe

1.9 DESCRIPTION OF EVENTS: ACTION STATEMENT NO. — ENTERED — TERMINATED —

Shortly after synchronizing the generator to the grid - a reactor-turbine trip occurred - first out - 13 S/G low-low water level.
It was determined that the cause for the trip - was 13BF40 being closed due to a bent position indicator, which misled the operator as to how much feed water was being sent to 13 S/G.
P.D, shortly after the Trip corrected the problem.

W.R.C notified

1.10 RESULTS OR POSSIBLE RESULTS OF INCIDENT: —

1.11 REPORTED TO SR. SHIFT SUPERVISOR BY _____

1.12 NOTIFIED OF THE INCIDENT: ☒ OPERATING ENGINEER OR ☐ J. Queller 0116 (TIME) 2-21-83 (DATE)

1.13 REPORT SUBMITTED W M Ralf (SR. SHIFT SUPERVISOR) 2-21-83 (DATE)

RHW

SECTION 2 – FOLLOW-UP

2.1 SQAE NOTIFIED DATE 3-6-83

2.2 MAJOR CAUSE: ☑ EQUIPMENT FAILURE ☐ PROCEDURE INADEQUACY ☐ PERSONNEL ERROR ☐ _____

2.3 INCIDENT CLASSIFICATION: ☐ REPORTABLE LER # _____ ☑ NOT REPORTABLE

2.4 JUSTIFICATION OF CLASSIFICATION:

NO WRITTEN REPORT REQUIRED - REQUIRED NOTIFICATIONS COMPLETED.

2.5 INCIDENT AND PROCEDURE REVIEW COMPLETE _____

2.6 R _____ (OPERATING ENGR.) _____ (DATE) _____ (DATE) _____ (CHIEF ENGR.) _____ (DATE)

DISTRIBUTION: MANAGER – SGS; CHIEF ENGR.; SHIFT SUPV'S. FOFICE; MANAGER – QA; SQAE

AP-4-1 REV. 6

TO: H. Midura

FROM: J. Gueller

DATE: February 23, 1983

SUBJECT: REACTOR TRIP AND SAFETY INJECTION

Attached a copy of the report on last nights reactor trip and safety injection.

It was originally thought the reactor was manually tripped a more detailed investigation showed that while the operator did hit the Manual Trip the reactor had automatically tripped about 1 second earlier on low low steam generator level in 13 Steam Generator.

REACTOR TRIP AND SAFETY INJECTION OF FEBRUARY 22, 1983

Unit was operating at 20% reactor power with 12 steam generator feedwater pump inservice at 2155 while attempting to tranfer 1F 4160 volt bus from the station power tranformer to the auxilary power tranformer the 1F 4160 volt bus was de-energized. This caused 13 reactor Coolant Pump to trip. It also caused 12 steam generator feedwater pump to start coasting down due to loss of 14 MAC distribution cabinet.

At 2157 the unit tripped due to low low level in 13 Steam Generator. This trip occurred slightly ahead of a manual reactor trip ordered by the shift supervisor. The low low level in 13 Steam Generator was due to shrink in the steam generator caused by loss of 13 Reactor Coolant Pump, and by the coasting down of 12 Steam Generator Feedwater Pump.

The low low level steam generator levels caused all the auxilary feedwater pumps to start. The combination of no reactor coolant flow through 13 Steam Generator, while feeding 13 Steam Geneator with cold auxilary feedwater, and drawing steam from 11 and 13 Steam Generators to run 13 Auxilary Feedwater Pump caused Main Steamline Pressure to be lower than 12 and 14 Main Steamline Pressure. This pressure differential of greater than 100 psi caused a safety injection at 2204.

At 2206 11 Reactor Coolant Pump tripped for no apparent reason. Due to the loss of both 11 and 13 Reactor Coolant Pumps with a Safety Injection present all pressurizer spray capability was lost. Thus the power operated relief valves lifted. The Pressurizer Relief Tank reached a maximum of pressure of 20 psi.

At 2211 the Safety injection was terminated and these systems were then returned to normal.

During the course of this transient 1B 4160 volt vital bus infeed breakers swapped from 11 Station Power Tranformer over to 12 Station Power Tranformer. At this writing both Maintenance and the Relay group are looking into 11 Reactor Coolant Pump trip and the transfer of 1B vital bus.

February 23, 1983

START UP SCHEDULE

0800	Bit Filled and inservice 11,000 gallon dilution completed 11RCP inservice.
	Reactor Trip Breaker Tested.
1000	Reactor Critical
1300	Steamline Warmed Up Feedwater pump inservice
1400	Turbine Roll-up and online

103.10 v

15 . Rx Critical

1540 3.1.3.2A 26A1 Shutdown Rod 1707 3.1.3.2A 26A1

1805 Latched Turb

1812 Turb Trip

1922 Turb Latched

2036 Synch Unit 2

2155 11 = bus diesel transfer to aux power
13 Rep Trip

2157 Manual Rx Trip

2204 - SE Steam ΔP P3 13 SG (all equipment operating)

2206 - 11 Rep Trip no flags 12 FCU -

2211 Term SE
PORV Lifted

NUREG 737

SE = reset -

vital bus supplies to 11

ATTACHMENT NO. 1
POST SAFETY INJECTION DATA

INITIAL PRESSURIZER LEVEL	26 %
FINAL PRESSURIZER LEVEL	36 %
INITIAL PRESSURIZER PRESSURE	2240 PSIG
FINAL PRESSURIZER PRESSURE	2350 PSIG
INITIAL TAVG	554 °F
FINAL TAVG	510 °F
RWST TEMPERATURE (T0650A)	81 °F
DURATION OF SAFETY INJECTION	7 MIN.

RECORDED BY Robt A Coraman DATE 2-22-83

REVIEWED BY W. O'Brien DATE 2-22-83
SENIOR SHIFT SUPERVISOR/SHIFT SUPERVISOR

MASTER

At 2155 I walked into one control room and saw that R. Corman and K. Petersen (N.C.O.'s) were about to swap 1F bus infeed breaker to the aux power transformer infeed breaker. (1G Bus had just been swapped). When they depressed the closed pushbutton for the aux power transformer infeed breaker the infeed breaker from 12 S.P.T. opened but the aux power transformer infeed breaker did not close causing 1F BUS TO lose power. I walked over to the reactor coolant pump levels and saw that 13 reactor coolant pump did indeed trip I then checked #13 Stm. Gen. and saw that level had already began to drop. I also saw that 11B circulator had tripped leaving one circulator in service. At this point I did not think we could bring the reactor below P-7 in a controlled shutdown without tripping so I instructed R. Corman to manually trip the reactor. All equipment responded normally to the trip. A short time after the trip the group bus infeed breakers swapped back to the station power transformer infeed breakers. It was at this time that 1F bus re-energize While recovering from the trip the Stm. Generators were being fed by all 3 aux feed pumps. This in coincidence with 13 aux feed pump removing st in from 11 and 13 Stm Generators and not having 13 Rx coolant pump in service caused an S.I. on Hi ΔP on 13 S/G. When the S.I. actuated all equipment started normally.

The combination of aux feed to the generators and the S.I. flow from the charging pumps caused RCS temperature to decrease which caused pressurizer level to decrease to ≈ 1% before it started to turn around. It was at this point that R. Gallaher told me that 11 R.C.P. also tripped. We wanted to terminate the S.I. as soon as pressurizer level increased above 22% because the level increase was causing the PORV's to lift on high pressure. (We had no pressurizer spray or aux spray because of 11 and 13 R.C.P.'s being tripped and we had letdown isolation.) When we were above 22% pressurizer level we terminated the S.I. and returned the reactor to stable conditions.

W. O'Brien

```
SEQ OF EVENTS AT 21:56:35
0000* V03270=1 13 RCP BUS UNDER V PRT TRP SET
0002* Y03220=1 13 RCP UNDER FREQ PRT TRP SET
0042* F04410=1 13 RCL LO F 2 PRT TRP SET
0036* F04400=1 13 RCL LO F 1 PRT TRP SET
0044* F04420=1 13 RCL LO F 3 PRT TRP SET
0050* F04400=1 13 RCL LO F 1 PRT TRP SET
0051* F04420=1 13 RCL LO F 3 PRT TRP SET
0073* Y20070=1 12 SGEF TURBINE MAN STOP VA CLOSED
0075* L04410=1 13 STM GEN LO LVL 4 PRT TRP SET
1137* L04430=1 13 STM GEN LO LO L 3 PRT TRP SET
1137* L04400=1 13 STM GEN LO LVL 1 PRT TRP SET
1163* L04460=1 13 STM GEN LO LO L REACTOR TRIP
1163* L04430=1 13 STM GEN LO LO L 1 PRT TRP SET
1168C Y20050=1 11 AUX FW PUMP START
1168C Y20060=1 12 AUX FW PUMP START
1170* L04430=1 13 STM GEN LO LO L 3 PRT TRP SET
1761C Y00050=0 REACTOR MANUAL TRIP 2 NI TRP
1355* Y20030=1 TURBINE TRIP TRIP
1365* Y00060=0 REACTOR MAIN TRIP BKR A TRIP
1366* Y00070=0 REACTOR MAIN TRIP BKR B TRIP
```

21:56:58 ✓ Rx Trip

21:56:59 - Turb Trip

```
SEQ OF EVENTS AT 21:56:55
0000* Y20050=1 TURBINE REMOTE EMERG TRIP TRIP
0000C Y03330=1 TURBINE STOP VA 13 CLOSED
0002C Y03710=1 TURBINE STOP VA 11 CLOSED
0004C Y03940=1 TURBINE STOP VA 14 CLOSED
0006* Y03700=1 REACTOR TURBINE TRIP +F7 TRIP
0008* Y70310=1 PWR RNG CHAN HI Q RATE REACTOR TRIP
0008* Y70320=1 PWR RNG CHAN 1 HI Q RATE PRT TRP SET
0008* Y70350=1 PWR RNG CHAN 4 HI Q RATE PRT TRP SET
0009* Y70330=1 PWR RNG CHAN 2 HI Q RATE PRT TRP SET
0009* Y70340=1 PWR RNG CHAN 3 HI Q RATE PRT TRP SET
0016* N00110=0 PWR RNG 1 P10 PRT PRM RESET
0017* N00130=0 PWR RNG 3 P10 PRT PRM RESET
0017* N00140=0 PWR RNG 4 P10 PRT PRM RESET
0017C N00160=0 PWR RNG LO Q 7 TRP BLK RESET
0017C N00150=0 PWR RNG LO Q 1 TRP BLK RESET
0018* N00170=0 PWR RNG 7 P10 PRT PRM RESET
0022C Y03720=1 TURBINE STOP VA 12 CLOSED
0046* F04660=1 14 STM LNE HI P 1 SI PRT TRP SET
0048* F04670=1 14 STM LNE HI P 2 SI PRT TRP SET
0073* F04660=1 14 STM LNE HI P 1 SI PRT TRP SET
0074* F04260=1 12 STM LNE HI P 1 SI PRT TRP SET
0074* F04270=1 12 STM LNE HI P 2 SI PRT TRP SET
0074* F04670=1 14 STM LNE HI P 2 SI PRT TRP SET
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SEQ OF EVENTS AT 21:57:00
0000* F04070=1 11 STM LNE HI P 2 SI PRT TRP SET
0000* F04060=1 11 STM LNE HI P 1 SI PRT TRP SET
0000* F04460=1 13 STM LNE HI P 1 SI PRT TRP SET
0001* F04470=1 13 STM LNE HI P 2 SI PRT TRP SET
0010* F04690=1 14 STM GEN LO P 2 PRT TRP SET
0012* F04240=1 12 STM GEN LO P 1 PRT TRP SET
0029* N0001D=0 TRO PWR 1 P13 PRT PRM RESET
0040*  3900=0 REACTOR TURBINE TRIP +F7 NI TRP
0010* N0020=0 TRO PWR 2 P13 PRT PRM RESET
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C-19

PSE&G

SALEM GENERATING STATION
INCIDENT REPORT

1.1 REPORT NO. _____

SECTION 1 – INITIATION 1.2 DATE [illegible] 1.3 TIME [illegible]

1.4 REPORT SUBJECT [illegible]

1.5 UNIT 1 1.6 MODE 1 1.7 RX POWER [illegible] 1.8 UNIT LOAD [illegible]

1.9 DESCRIPTION OF EVENTS: ACTION STATEMENT NO. _____ ENTERED _____ TERMINATED _____

AT 2155 THE CONTROL OPERATORS WERE SWITCHING IN PREPS ON 2F GROUP BUS AS PER OPERATING PROCEDURE BUT THE ENGINEER DID NOT SWAP CAUSING 2F BUS TO LOSE POWER WHICH ENTERED 13 STATE ISOLATION. AT 2156 UNIT 2 REACTOR TRIPPED ON LOW LEVEL IN 13 STEAM GENERATOR. AT 2204 THERE WAS A SAFETY INJECTION ACTUATION ON 13 STEAM LINE HI ΔP. THIS WAS CAUSED BY A MOMENTARY LOSS OF 13 REACTOR COOLANT PUMP (RCP) WHEN THE PUMP'S CIRCUIT BREAKER TRIPPED. STEAM FLOW #13 STM. GEN. WAS LEADING THE STEAM GENERATOR WATER FEED. THE SAFETY INJECTION WAS TERMINATED AT 2214.

1.10 RESULTS OR POSSIBLE RESULTS OF INCIDENT:

SEE ATTACHED REPORT

1.11 REPORTED TO SR. SHIFT SUPERVISOR BY [illegible]

1.12 NOTIFIED OF THE INCIDENT: ☒ OPERATING ENGINEER OR ☐ _____ _____ TIME _____ DATE

1.13 REPORT SUBMITTED [illegible] SR. SHIFT SUPERVISOR [illegible] DATE

SECTION 2 – FOLLOW-UP

2.1 SQAE NOTIFIED DATE _____

2.2 MAJOR CAUSE: ☒ EQUIPMENT FAILURE ☐ PROCEDURE INADEQUACY ☐ PERSONNEL ERROR ☐ _____

2.3 INCIDENT CLASSIFICATION: ☒ REPORTABLE LER # _____ ☐ NOT REPORTABLE

2.4 JUSTIFICATION OF CLASSIFICATION:

[illegible]

DRAFT

2.5 INCIDENT AND PROCEDURE REVIEW COMPLETE _____

2.6 _____ OPERATING ENGR. _____ DATE _____ _____ DATE _____ CHIEF ENGR. _____ DATE

DISTRIBUTION: MANAGER – SGS, CHIEF ENGR., SHIFT SUPV'S. OFFICE, MANAGER – QA, SQAE

AP-01 REV. 6

PSE&G

SALEM GENERATING STATION

INCIDENT RE ORT

1.1 REPORT NO. _____

SECTION 1 – INITIATION 1.2 DATE 2/25/93 1.3 TIME 0021

1.4 REPORT SUBJECT

UNIT #1 REACTOR TRIP (#12 S/G LOW LOW LEVEL) - AT WAS MANUAL REACTOR TRIP AFTER AUTOMATIC TRIP DID NOT OCCUR

1.5 UNIT 1 1.6 MODE 1 1.7 RX POWER 12% 1.8 UNIT LOAD 70 MWe

1.9 DESCRIPTION OF EVENTS: ACTION STATEMENT NO. A.S. 3.3.1.1 ENTERED N/A TERMINATED N/A

AT 0021, UNIT #1 RECIEVED A RX. TRIP SIGNAL DUE TO ACTUAL LOW LOW W LEVEL ON #12 STEAM GENERATOR. THE OVERHEAD ANNUNCIATOR ALARMED AND THE AC TRIP CONDITION (#12 S/G LOW-LOW LEVEL) EXISTED, HOWEVER THE REACTOR TRIP BREAKERS DID NOT TRIP OPEN.

REALIZING THE REACTOR WAS STILL CRITICAL AND A TRIP CONDITION DID EXIST, THE CONTROL OPERATOR IMMEDIATELY MANUALLY TRIPPED THE REACTOR AT THE CONTROL CONSOLE.

THE CONTROL OPERATORS RE-COVERED FROM THE MANUAL TRIP AND ARE CURRENTLY MAINTA THE UNIT IN HOT STANDBY (MODE 3).

I&C WAS IMMEDIATELY CALLED AND THEY ARE CURRENTLY INVESTIGATING WHY THE REAC TRIP BREAKERS DID NOT AUTOMATICALLY TRIP OPEN.

AFTER REVIEWING THE ACCIDENT CLASSIFICATION GUIDE, THE SENIOR SHIFT SUPERVISOR ENTERE EPI-2 (ALERT) @ 0130 DUE TO THE FACT THE REACTOR PROTECTION SYSTEM FAILED TO INITIATE THE AUTOMATIC TRIP. THE ALERT WAS TERMINATED AT 0200. ALL CALLS WERE MADE IAW EPT-2.

1.10 RESULTS OR POSSIBLE RESULTS OF INCIDENT:

FAILURE OF REACTOR PROTECTION SYSTEM TO INITIATE AND COMPLETE A TRIP.

1.11 REPORTED TO SR. SHIFT SUPERVISOR BY _____

1.12 NOTIFIED OF THE INCIDENT: ☒ OPERATING ENGINEER OR ☐ _____ 2132 TIME 2/25/93 DATE

1.13 REPORT SUBMITTED Richard W. Swanton Jr. SR. SHIFT SUPERVISOR 2/25/93 DATE

P.O.

SECTION 2 – FOLLOW-UP

2.1 SQAE NOTIFIED DATE _____

2.2 MAJOR CAUSE: ☐ EQUIPMENT FAILURE ☐ PROCEDURE INADEQUACY ☐ PERSONNEL ERROR ☐ _____

2.3 INCIDENT CLASSIFICATION: ☒ REPORTABLE LER # _____ ☐ NOT REPORTABLE

2.4 JUSTIFICATION OF CLASSIFICATION:

PROMPT NOTIFICATION WITH WRITTEN FOLLOWUP

6.9.1.8a

2.5 INCIDENT AND PROCEDURE REVIEW COMPLETE _____

2.6

_____	_____	_____	_____	_____	_____
OPERATING ENGR.	DATE	SQAE	DATE	CHIEF ENGR.	DATE

DISTRIBUTION: MANAGER – SGS, CHIEF ENGR., SHIFT SUPV'S. FOFICE, MANAGER – QA, SQAE

Unit #1
Main Feed
Pump
C 0021

0021 * 12 STM GEN LO LO L 3 FRT TRF LO424D= 1.SET

0021 * 12 STM GEN LO LO L 4 FRT TRF LO425D= 1.SET

0021 * 12 STM GEN LO LO L 1 FRT TRF LO423D= 1.SET

C-22

SEQ OF EVENTS AT 00:21:38

0022 * REACTOR TRIP
0000* L0425D=1 12 STM GEN LO LO L 4 FRT TRF SET
0322* L0426D=1 12 STM GEN LO LO L REACTOR TRIP
0322* L0424D=1 12 STM GEN LO LO L 3 FRT TRF SET
0328C Y2605D=1 11 AUX FW PUMP START
0328C Y2606D=1 12 AUX FW PUMP START
0807* L0423D=1 12 STM GEN LO LO L 1 FRT TRF SET
0760* L0424D=1 12 STM GEN LO LO L 3 FRT TRF SET

0822 C CONTROL ROD BNK SEQ ERROR
1820C Y0004D=0 REACTOR MANUAL TRIP 1 NT TRF
1824* Y2003D=1 TURBINE TRIP TRIP
1824* Y0006D=0 REACTOR MAIN TRIP BKR A TRIP
1824* Y0007D=0 REACTOR MAIN TRIP BKR B TRIP
1847* Y2005D=1 TURBINE REMOTE EMERG TRIP TRIP
1847C Y0371D=1 TURBINE STOP VA 11 CLOSED
1848* Y0004D=1 REACTOR MANUAL TRIP 1 TRIP
1849* N0013D=0 FWR RNG 3 F10 FRT FRM RESET
1850C Y0373D=1 TURBINE STOP VA 13 CLOSED
1850* N0012D=0 FWR RNG 2 F10 FRT FRM RESET
1851* N0011D=0 FWR RNG 1 F10 FRT FRM RESET
1851C N0016D=0 FWR RNG LO 0 2 TRF BLK RESET
1851C N0015D=0 FWR RNG LO 0 1 TRF BLK RE

C10R 10. JE TRIP *E7 TRIP ITION ERROR SEQ OF EVENTS AT 00:22:08 0000* N0014D=0 FWR RNG 4 F10 FRT FRM RESET 0001* Y0350D=1 REA
0002C Y0374D=1 TURBINE STOP VA 14 CLOSED

APPENDIX D

Shift Supervisor Logs

(Cross Referenced to Section 3 of the Report)

Contents

D.1 Shift Logs January 21, 1983, Unit 2 Reactor Trip D-1

D.2 Shift Logs February 14, 1983, Unit 2 Reactor Trip D-23

9542510

SENIOR SHIFT SUPERVISOR'S LOG

DAY Friday.

DATE 1/21/83 SHIFT 2315 - 0715 S.S.S John a Stanwood

UNIT 1 MODE 4 Tave 240 °F
STATUS Rx Power 0 % RCS Press 293 psig
Load 0 Mwe Gross Boron Conc. 2134 ppm

COMMENTS coming To mode 5 To work on 151 4 65

UNIT 2 MODE I Tave 559 °F
STATUS Rx Power 53 % RCS Press 2240 psig
Load 520 Mwe Gross Boron Conc. 55 ppm

COMMENTS

UNIT 3 AVAILABLE ____ UNAVAILABLE ✓ SINCE 1-17-83 @0830

COMMENTS

TECH SPEC ACTION STATEMENT

UNIT	EQUIPMENT	A/S NUMBER	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
2	PORV's	3.4.5 A	10-6-81 1131		
1-2	FIRE BARRIERS	3.7.11 A	10-28-81 0001		
2	23 MSIS	3.7.1.1 A	7-7-82 0001		

Salem Unit 1/2 OD-18-A-1 Rev. 1

MASTER

9542511

UNIT ONE SHIFT SUPERVISOR'S LOG

DATE 1-21-83 SHIFT MIDS SHIFT SUPV. J Scriven / [illegible]

UNIT STATUS MODE IV → V Tave 205 °F

Rx Power — % RCS Press 300 psig

Load — Mwe Gross Boron Conc. 2117 ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP
12 CVCS MT	CHROMATES DEMINING TO 352				
12 BDT	1-19-83 1000	2100 1-20-83			
11 CVCS MT	1-20-83 1954	0400 1-21-83	0530 HIGH CHROMATES		

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
FIRE DOORS & DAMPERS	3.7.11	10-29-81 0633		

Salem Unit 1/2 OD-18-B-1 MASTER Rev. 1

9542512

COMMENTS FOR TURNOVER

COMMENCED COOLDOWN TO MODE V at 0001
0246 NOTIFIED US NRC OF PROBLEMS WITH
B.I.T. AND THE FACT THAT WE ARE PROCEEDING
TO MODE V
INITIATED RHR TO FACILITATE COOLDOWN I.A.W. SJ.OP.
POPS ARMED
TAGS GENERATED FOR SS 4 & 5 REPAIR
BIT RECIRC FLOW XMITTER BEING WORKED
AND REMOVED BY P.D
11 CVCS MT - 1 HIGH CHROMATES

9542513

UNIT two SHIFT SUPERVISOR'S LOG

DATE Jan 21. 1983 SHIFT midnights SHIFT SUPV. D. Carow

UNIT STATUS MODE one Tave five hundred fifty eight °F

Rx Power fifty three % RCS Press twenty two forty psig

Load five hundred thirty Mwe Gross Boron Conc. less than five (5) ppm

COMMENTS EOC COASTDOWN

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP
23 gas decay tank	1610 1-20-83				
24 gas decay tank	1610 1-20-83				

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
Power Oper Relief Valves	3.4.5	10-6-81 @ 1131		
Fire Doors & Barriers	3.7.11	10-29-81 @ 0001		
Low Temp Safety 23 MS15	3.7.1.1	7-7-82 @ 0001		
Manual Fire Cardet	3.7.10.3a	1-17-83 @ 0800		

9542514

COMMENTS FOR TURNOVER Turbine rpm reading .738 Accum Levels Sat.
- Boric Acid Loop - maint working on chromite leak (Grafton/Huckle)
- #3 Unit - maint working - various problems (A Ketcham)
- Chem requested to cutback on blowdown (D Zak), pH gen prob
- Continue working on SP(O) 4.3.2.1.3 (on unit shutdown)
- Problems with Sanitary Plumbing System, line blockage
- Gas Decay Tanks #23 & 24 in hold up need present analysis for Lic Rptr
- M.T.L.O. taken out of service, oil leaking from lower portion - investigating

Salem Unit 1/2 OD-18-B-3 MASTER Rev. 1

9512515

SENIOR SHIFT SUPERVISOR'S LOG

DAY FRIDAY

DATE JAN. 31, 1983 SHIFT 8-4 S.S.S. W. M. Ball

UNIT 1 MODE 5 Tave 174 °F
STATUS Rx Power — % RCS Press 28° psig
Load — Mwe Gross Boron Conc. 2134 ppm

COMMENTS Mode 5 - 0635

UNIT 2 MODE 1 Tave 558 °F
STATUS Rx Power 52 % RCS Press 2340 psig
Load 520 Mwe Gross Boron Conc. — ppm

COMMENTS

UNIT 3 AVAILABLE ____ UNAVAILABLE ✓ SINCE 1-17-83 0830

COMMENTS

TECH SPEC ACTION STATEMENT

UNIT	EQUIPMENT	A/S NUMBER	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
2	PORV	3.4.5 A	10-6-81 1131		
1-2	FIRE BARRIERS	3.7.11 A	10-28-81 0001		
2	23 MSIS	3.7.1.1 A	7-7-82 0001		

Salem Unit 1/2 OD-18-A-1 Rev. 1

MASTER

9542516

All P. S and Catalytic Supervisor

as Per O. D 8

TAGGING OPERATIONS - TEMPORARY RELEASES

Policy - Temporary Releases are normally to be used by the requesting supervisor when it is necessary to release some of the tags temporarily in order to test equipment that has been tagged out.

eg. maintenance has the #12 Charging Pump tagged out for repairs. They want to test the motor. The Maintenance Supervisor releases the tags on the motor breaker and test the motor. The tags are then reapplied until all the tags can be released permanently.

Temporary Release are not to be used for releasing tags for the convenience of others. If the supervisor is not working the job for an extended period of time then either all the tags remain hung or all the tags are permanently released and and a new tagging release initiated when the job is ready to be worked again.

UNIT I SHIFT SUPERVISOR'S LOG

DATE 1-21-83 SHIFT 0715-1515 SHIFT SUPV. R Sampson

UNIT STATUS MODE V Tave 177 °F

Rx Power 0 % RCS Press 304 psig

Load 0 Mwe Gross Boron Conc. 2117 ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP
12 GDT		1-20-83 / 2100	1-21-83 / 1200		

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
Fire doors + Barriers	3.7.11	10-29-81/0623		

Salem Unit 1/2 OD-18-B-1 MASTER Rev. 1

9542518

COMMENTS ON A/S ITEMS _____

_____

_____

_____

FIRE PROTECTION SYSTEM IMPAIRMENTS/PROBLEMS

_____

Time Identified _____ Expected Duration _____

Location & Description of Impairment _____

_____

_____

Probable Cause _____

Corrective Action Taken _____

_____

WO Number if Issued _____

Tech Spec LCO YES _____ NO _____ LCO A/S _____

_____

Time Identified _____ Expected Duration _____

Location & Description of Impairment _____

_____

_____

Probable Cause _____

Corrective Action Taken _____

_____

WO Number is Issued _____

Tech Spec LCO YES _____ NO _____ LCO A/S _____

Salem Unit 1/2 OD-B-2 MASTER Rev. 1

9542519

...MENTS FOR TURNOVER _____ _____

1) 12 Cond. ate pump ½ to fill + vent condensate system through bypass line.

2) SJ 4 & 5 ready to be pulled. Leak-off lines are cut and bonnet bolts removed as of 1237.

3) Releasing #12 gas decay tanks.

4) Re-testing #11 chilled water pump SP(S) 4.0.5 (P). Pump was in alarm range.

5)

Salem Unit 1/2 OD-18-B-3 **MASTER** Rev. 1

9542520

UNIT TWO SHIFT SUPERVISOR'S LOG

DATE 1-24-83 SHIFT 08x16 SHIFT SUPV. Timm

UNIT STATUS MODE I Tave 557 °F

Rx Power 52 % RCS Press 2235 psig

Load 520 Mwe Gross Boron Conc. 45 ppm

COMMENTS

MICROFILMED AS RECEIVED
ONLY COPY AVAILABLE

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes 1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP
23 GDT	1610 1-20-83				
24 GDT	1610 1-20-83	0900	1200		

TECH. SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
2PRI & 2 Fire Door & Barr	3.4.5 3.7.11	100681 1131 102981 0001		
23MS15	3.7.11	070782 0001		
2D/G CO2	3.7.10.5a	1-17-83 0800		

Salem Unit 1/2 OD-18-B-1 Rev. 1

9542521

COMMENTS FOR TURNOVER

① #2 BAE Released

② CJ Conner • D Elliott will be in Sat morning to work with Ray MaC.

③ Starting up Waste Evap, Suction from 22 WHUT

④

Salem Unit 1/2 OD-18-B-3 MASTER Rev. 1

9542522

SENIOR SHIFT SUPERVISOR'S LOG

DAY FRIDAY

DATE JAN 21 1983 SHIFT 4-12 S.S.S. W. M. Bell / V. Lowenstein

UNIT 1 MODE 5 Tave 173 °F
STATUS Rx Power 0 % RCS Press 300 psig
Load 0 Mwe Gross Boron Conc. 2117 ppm

COMMENTS

UNIT 2 MODE III Tave 547 °F
STATUS Rx Power 0 % RCS Press 2235 psig
Load 0 Mwe Gross Boron Conc. <5 ppm

COMMENTS Commenced Unit Shutdown @ 2030 hrs. - OFF LINE @ 2222 hrs

UNIT 3 AVAILABLE ____ UNAVAILABLE ✓ SINCE 1-17-83 0830

COMMENTS

TECH SPEC ACTION STATEMENT

UNIT	EQUIPMENT	A/S NUMBER	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
2	PORV	3.4.5 A	10-6-81 1131		
1-2	FIRE BARRIERS	3.7.11 A	10-24-81 0001		
2	23 MS IS	3.7.1.1 A	7-7-83 0001		

Salem Unit 1/2 OD-18-A-1 Rev. 1

MASTER

8542523

UNIT 1 SHIFT SUPERVISOR'S LOG

DATE 1/21/83 SHIFT 1515 - 2315 SHIFT SUPV. Geo. Hallgren

UNIT STATUS MODE V Tave 170 °F

Rx Power 0 % RCS Press 300 psig

Load 0 Mwe Gross Boron Conc. 2117 ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP
12 GDT		1/20/83 2100	1/21/83 1200	1327 1/21/83	1505 1/21/83
12 CVCS MT	1/21/83 1425	1935 1/21/83	HI CHROMATES .38		
13 GDT	1/21/83 1330	1935 1/21/83			

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
FIRE DOORS & BARRIERS	3.7.11	10/29/81 0633		
DIESEL GEN.	3.7.10.3.2	1/21/83 1030	1/21/83 2242	

Salem Unit 1/2 OD-18-B-1 MASTER Rev. 1

9542524

1.) Cond. sys., ~~illeb~~ drained & vented. 5000 G. going thru cond. pol. sys. D.M. water backed up to #12 cond. pump suction.

2.) N42 is out of service, feeds going to reactivity computer

3.) 12 CVCS MT has high chromates, 38

4.) 12 CN 108 will not ~~open~~ close from control room. W.O. issued. Valve is manually closed and breaker is off.

5.) SI 455 reported to be done sometime tomorrow.

6.) 14 F.C.U. drained & vented - flange leak in pen. area. Checking to see if water can be pumped out.

7.) Making release of #11 sea pump.

Salem Unit 1/2 OD-18-B-3 MASTER Rev. 1

9542525

VII-2

UNIT 2 SHIFT SUPERVISOR'S LOG

DATE 1-21-83 SHIFT 16-24 SHIFT SUPV. J. morrison

UNIT STATUS MODE III Tave 547 °F

Rx Power <1 % RCS Press 2240 psig

Load 0 Mwe Gross Boron Conc. BORATING ppm

COMMENTS @ 2222 Rx TRIP FROM 10% Rx POWER DUE TO 21 S/G HIGH LVL. (21BF19 DID NOT HAVE "BUMPLESS TRANSFER". FLOW OPEN FROM 30% WHEN SWITCHED FROM AUTO - MAN.)

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1. 53	530	2028	1-21-83	<1	0	2222	1-21-83
2.							
3.							

Reason for Load Changes
1. REDUCE POWER @ 20%/HR FOR OUTAGE.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
PORV's	3.4.5	10-6-81 1131		
FIRE DOORS	3.7.11	10-29-81 0001		
25MS15	3.7.1.1.	7-7-82 0001		
2/6 CO_2	3.7.10.3a	1-17-83 0400		

UNITS ENV. 2.1.3. 1-21-83 2222

COMMENTS ON A/S ITEMS ENVIRON. TECH. SPEC - 2.1.3 - BOTH UNITS SHUT DOWN BETWEEN NOV & APRIL.

FIRE PROTECTION SYSTEM IMPAIRMENTS/PROBLEMS

Time Identified _____ Expected Duration _____

Location & Description of Impairment _____

Probable Cause _____

Corrective Action Taken _____

WO Number if Issued _____

Tech Spec LCO YES _____ NO _____ LCO A/S _____

Time Identified _____ Expected Duration _____

Location & Description of Impairment _____

Probable Cause _____

Corrective Action Taken _____

WO Number is Issued _____

Tech Spec LCO YES _____ NO _____ LCO A/S _____

COMMENTS FOR TURNOVER

-1300 COMMENCED 10000 GAL DILUTION JAW NIGHT ORDERS OF 1/20.

-RELEASING KEYCHAINS TAGS FROM GAS TURBINE. -STILL UNAVAILABLE

-M.D. REPAIRED C.C. DRAW VALVE FOR BA EVAP RELEASING TAGS.

- TAKE 22 RCP OUT FIRST

- USING N_2 FOR VCT PRESSURE CONTROL

- PERF DEPT TO ATTACH VISICORDER FOR TURBINE TRIP TIMING ON MONDAY. (ITS PRESENTLY TIED UP ON UNIT 1 FOR ROD DROP TIMING). DON'T TAG E.H. OR AUTO STOP OIL SINCE TURBINE LATCH IS REQD FOR TEST.

-SAMPLE REQUEST FOR CONTAINMENT PURGE SENT TO CHEMISTRY

- WASTE EVAP - 22 WHUT → 1 WMHUT

- NRC INFORMED OF S/D / TRIP (V. HODGE @ 2225)

- CONDENSATE RECIRC. FLOW ESTABLISHED.

- TIMED MS167's

SALEM GENERATING STATION UNIT 2

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 1/21/83

TIME	APPARATUS	REMARKS:
0700	X-Shift	
	S^3	Rahl
	S^2	Tsimm
	N.C.O.	Peterson, Hijman
	E.O.	M. Cardenas, Clair
	V.O.	R. Elliott, W. Malony
	STA	Villar
	CWI	Phillips
	RWO	Conner
	Fire Brigade	W. Malony - chief, Kawecki - asst., H. Elliott, M. Malay, Conner
0731	Pri Chem	accumulator from samples: 21-2057, 22-2077, 23-2087 ppm
		22 BAT Tank: 21093 ppm
0759	CVCS	let down to 120 gpm per ST
1021	ECCS	21 SI pump T/S to fill accumulators: (21, 22, 23)
1045	ECCS	21 SI pump T/S - called for sample
1045	Pri Chem	RCS Iron 25 ppm - Holly
1204	Pri Chem	accumulator samples: 21-2072 ppm, 22-2069 ppm, 23-2088 ppm - Holly
1205		Entered containment to verify accumulator levels per SP01 45.1
		23 - 55°, CS/58 on Fuel
		24 - 57°, 21/72 on Fuel
1418	ECCS	21 SI pump T/S to fill accumulators (21+22)
1432	ECCS	21 SI pump T/S - called for sample

(A) Use apparatus to provide a description of the event being logged.

(B) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

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SALEM GENERATING STATION UNIT 2

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 1-21-83

TIME	APPARATUS	REMARKS:
1500	7 Shift	
	S^3	W. Rahl / V. Lowensten
	S^2	J. Morrison
	NCO	T.K. Floyd, W. Cornman
	EO	R. Sharp, C. Hughes
	UO	T. McKee, H. Elliott
	Fire Brigade	P. Wilson, R. Sharp, D. Myers, J. Sabla R. Clair / E. Rubish
1530	Pri Chem	Accumulator Boron Sample Results
		#21 - 2071 ppm #22 - 2073 ppm
		Batch Tank Boron - 20,206 O.K. to
		transfer - Robinson
1608	CV	Transferred Contents of Batch Tank
		to #22 BAST.
1656	PR	Started Draining PRT, level 72 %
1706	PR	Stopped Draining PRT, level 60 %
1840	CW	#22A Circulator ½ to inspect pump packing
1906	CW	#22A Circulator taken o/s
1914	SI	#22 S.I. Pump ½ to fill #21, #22, & #23
		Accumulators
1938	SI	#22 S.I. Pump taken o/s
1955	Main Turb	Turbine Casing Expansion Local Reading - 736 mils
2000	ECCS	Accumulator Local Levels
		#23 - 55" at 62/56 % on console
		#24 - 55¼" at 70/71 % on console
2028	Gen Load	Started reducing generator load at 20 %
		per hour LD informed

(A) Use apparatus to provide a description of the event being logged.

(B) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

Page 4 of 4 Rev. 6

SALEM GENERATING STATION UNIT 2

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 1-21-83

TIME	APPARATUS	REMARKS:
2034	BF	#21 SGFP taken O/S
2034	CW	#22A Circulator O/S to inspect pump packing
2038	Pri Chem	#22 RAST Boron - 21,616 ppm
2105	HD	#21 & #23 Heater Drain Pumps taken O/S
2118	CN	#23 Condensate Pump taken O/S
2136	CW	#22B Circulator taken O/S
2157	BS	#21 BSCDT Pump taken O/S
2202	CN	#22 Condensate Pump taken O/S
2204	Aux Pwr	#2 Aux Power Transformer taken O/S. 4 KV Group Busses E, F, G & H being fed from station power
2205	Pri Chem	Results of Accumulator Boron Samples #21 - 2073 ppm #22 - 2070 ppm #23 - 2084 ppm
2222	Rx Prot	#2 UNIT Reactor TRIP - TURBINE TRIP due to #21 S/G Hi-Hi Level. Rx Power was 11% and bank D was at 157 steps
~~2259~~		
2259	RCS	RCS Boron - 23 ppm

(A) Use apparatus to provide a description of the event being logged.

(B) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

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EM GENERATING STATION UNIT 2

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE JAN 21 1983

TIME	APPARATUS	REMARKS:
2300	V-Shift	
	S^3	J. Starsevich
	S^2	D. Caron / NCO's L. BROOKS, W. GIGGETTS
	S/B/S	C. Warren
	S/T/A	G. Reggio
	E/O	S. Duty, G. Matera
	R/W/O	P. Price
	GW	B. Geary.
	Fire Brigade	Wallace, Bubier, Miller, Duty, McKee/Phillips.
0150	Accum	"21 SI pump T/S to min to Accum
0215	Accum	"21 SI pump o/s
@300	Accum. (cb)	"21 = 2073 ppm
		"22 = 2064
		"23 = 2090
0320	BA	transferred Batch TK to 22 BAT.
	Accum levels	"23 = 56" (63/56%)
		"24 = 56" (72/72%)
0425	PRT	drained PRT from 80-58%.
0540	Accum	21 SI pump T/S to min to Accum. (21,22,23)
0559	Accum	21 SI pump o/s
		W. Giggetts

(A) Use apparatus to provide a description of the event being logged.

(B) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

SENIOR SHIFT SUPERVISOR'S LOG

DAY MONDAY

DATE FEB. 14, 1983 SHIFT 1600-2400 S.S.S. J.A. Pinson

UNIT 1 STATUS MODE II Rx Power 10-8 AMPS % Load — Mwe Gross
Tave 547 °F RCS Press 2235 psig Boron Conc. 1499 ppm

COMMENTS LOW POWER PHYSICS TESTING IN PROGRESS

UNIT 2 STATUS MODE VI Rx Power — % Load — Mwe Gross
Tave 98 °F RCS Press VENTED psig Boron Conc. 2216 ppm

COMMENTS

UNIT 3 AVAILABLE ✓ UNAVAILABLE ____ SINCE ____

COMMENTS

TECH SPEC ACTION STATEMENT

UNIT	EQUIPMENT	A/S NUMBER	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
1-2	FIRE BARRIERS	3.7.11.A	10-28-81 @ 0001		
1-2	UNITS	E.T.S. 2.1.3.	1-21-83 @ 2232		
2	22 EMERG. A/C FAN	3.7.6.A	2-12-83 @ 1330	2-14-83 @ 1630	
1	FIRE DETECTION	3.3.3.6	2-9-83 @ 0955		
1	#14 STEAM FLOW	3.3.3.1 & 3.3.2.1	2-14-83 @ 1139	2-14-83 @ 1635	

MASTER

COMMENTS ON A/S ITE

SIGNIFICANT STATION PROBLEMS/EVENTS

A. OPERATIONAL

1630 - NOTIFIED BY M.D. THAT OVERSPEED TEST ON #12 SGFP WAS COMPLETED & SAT. TEST #1 @ 6275, #2 @ 6235 RPM. POSSIBLE COUPLING OF PUMP TONIGHT.

LOW POWER PHYSICS TESTING IN PROGRESS. ITC, & BORON END POINT COMPLETE, ROD SWAP I/P.

#2 UNIT - INCREASED LEVEL TO 102'6", DAM INSPECTION FOR LEAKAGE.

TOOL CONTROL ESTABLISHED.

HEAD LIFT 18" TO INSPECT SEAL & FLANGE. WHEN SAT PLAN TO FLOOD TO ≈ 4' CHECK FOR LEAKS & DRAIN DOWN

UNIT 1 SHIFT SUPERVISOR'S LOG

DATE 2-14-83 SHIFT Swings SHIFT SUPV. W. Gran

UNIT STATUS MODE 2 Tave 547 °F

Rx Power 10^{-8} Amps % RCS Press 2235 psig

Load — Mwe Gross Boron Conc. 1499 ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP
11CVCS MT	1130	1610	2000	2133	

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
Fire Doors & Barriers	3.7.11	10/29/81 0001		
Both Units S/D	ETS 2.1.3	1/21/83 2048		
Charcoal Filter Fire Det	3.3.3.6	2/9/83 0955		
14 3/6 Chan. II Stm Flow	3.3.2.1	2/14/83 1139	3/14/83 1635	

COMMENTS FOR TURNOVER

(1) COMPLETED CAL. OF REACTIVITY COMPUTER COMMENCING BORON ENDPOINT DETERMINATION

(2) TERMINATED T.S. A/S 3.3.2.1 FOR 14 3/6 STM FLOW, BISTABLE RESTORED

(3) MEMUSIA C/T 11MS9 TO WORK ON SIGNAL INPUT TO 11MS10. VALVE IS OPEN WHEN IT SHOULDN'T BE AT SETPOINT

(4) COMPLETED OVERSPEED TEST ON 12 SGFP - SAT, MD TO BEGIN COUPLING UP (POSTPONED TILL TOMORROW)

(5) COMPLETED BORON ENDPOINT COMMENCING ISOTHERMAL TEMP COEFFICIENT

(6) ADDED OIL TO 13A CIRCULATOR UPPER BEARING

(7) COMPLETED ISOTHERMAL TEMP COEFFICIENT (POSITIVE T.S) COMMENCING BANK AND INDIVIDUAL ROD WORTH

(8) REMOVED TAGS ON 12 TURB. OIL COOLER, NO LEAKS DETECTED

(9) RAISED GEN. H_2 PRESS. TO 70" (FROM 46") ADDED 10K cu. ft FINISHED @ 0920

(10) 13A TRAVELING SCREEN, DRIVE SPROCKET IS TURNING BUT SCREEN IS NOT MOVING, W/O ISSUED

(11) 1915 WASTE EVAP T/S 2 WMHT → 1 WMHT

Salem Unit 1/2 OD-18-B-3 MASTER Rev. 1

UNIT II SHIFT SUPERVISOR'S LOG

DATE 14 FEB. 1983 SHIFT 1515-2315 SHIFT SUPV. G.T. SLABY

UNIT STATUS MODE VI Tave 99 °F

Rx Power 0 % RCS Press Ø psig

Load 0 Mwe Gross Boron Conc. 2216 ppm

COMMENTS 102.5'

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
FIRE DOORS & BARRIER	3.7.11	10-29-81 / 0001		
DIESEL CARDOX	3.8.10.3a	1-17-83 / 0802		
BOTH UNITS SHUTDOWN	SAN 2.1.3	1-12-83 / 2028		
2B EMERG SUPPLY FAN	3.7.6.a	2-12-83 / 1330	2/14/83 - 1630	
RHR LOOPS	3.9.8.1a	2/14/83 / 1800	2/14/83 - 1832	

Salem Unit 1/2 OD-18-B-1 MASTER Rev. 1

COMMENTS ON A/S ITEMS_____

_____

_____

_____

FIRE PROTECTION SYSTEM IMPAIRMENTS/PROBLEMS

_____

Time Identified_____ Expected Duration_____

Location & Description of Impairment_____

_____

_____

Probable Cause_____

Corrective Action Taken_____

_____

WO Number if Issued_____

Tech Spec LCO YES_____ NO_____ LCO A/S_____

_____

Time Identified_____ Expected Duration_____

Location & Description of Impairment_____

_____

_____

Probable Cause_____

Corrective Action Taken _____

_____

WO Number is Issued_____

Tech Spec LCO YES_____ NO_____ LCO A/S_____

COMMENTS FOR TURNOVER

(1) - 1630 - RELEASED TAGS & CHECKED ROTATION OF 22 EMERG SUPPLY FAN

(2) 1800 → STARTED Level increase to test DAMS - SAT! Used SJ69 - with RHR pump O/S - fast level increase - but controllable

(3) 2142 - Lifting head - ≈ 18", inspect seal + flange TOOL CONTROL ESTABLISHED.

(4) PLANS ARE TO FLOOD to ≈ 4' - check for leaks, drain back down

SENIOR SHIFT SUPERVISOR'S LOG 005

DAY MONDAY

DATE FEB 14 1983 SHIFT 8-4 S.S.S. W. M. Ball

UNIT 1 STATUS
MODE 2
Rx Power 10^{-8} AMPS %
Load — Mwe Gross
Tave 548 °F
RCS Press 2235 psig
Boron Conc. 1432 ppm

COMMENTS RX Critical 1139

TECH. SPEC. 3331-3332 inoperable steam flow channels 12+14 L.S.

UNIT 2 STATUS
MODE 6
Rx Power — %
Load — Mwe Gross
Tave 94 °F
RCS Press — psig
Boron Conc. 2230 ppm

COMMENTS

UNIT 3 AVAILABLE ✓ UNAVAILABLE ____ SINCE ____

COMMENTS 0951 Base load. Trip 1132 A Eng initiation

1305 Base load. 1320 Ond. S.D.

TECH SPEC ACTION STATEMENT

UNIT	EQUIPMENT	A/S NUMBER	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
1-2	FIRE BARRIERS	3.7.11 A	10-28-81 0001		
1-2	UNITS	ET 2.1.3	1-21-83 2222		
2	22 EMERG. A/C FAN	3.7.6 A	2-12-83 1330		
1	FIRE DETECTION	3.7.3.6	2-9-83 0958		
1	12 & 14 STEAM FLOWS	3331-1S	2-14-83 1139	2-14-83 1406	1256. A.S TERMINATED
		3321-f	2-14-83 1139		

Salem Unit 1/2 OD-18-A-1 Rev. 1

MASTER

UNIT 1 SHIFT SUPERVISOR'S LOG

DATE 2-14-83 SHIFT 0715-1515 SHIFT SUPV. W. CIANFRANE / C. FENN

UNIT STATUS MODE 2 Tave 548 °F

Rx Power 5×10^{-4} Amps % RCS Press 2240 psig

Load 0 Mwe Gross Boron Conc. 1429 @ 1320 ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP
11 CVCS MT	RECIRC. 2/14/83 1130				

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
FIRE DOORS & BARRIERS	3.7.11	10/29/81 0001		
BOTH UNIT S/G (2)	ENV. 2.1.3 (2)	11/21/83 2028		
CHARCOAL FILTER FIRE DETECTION	3.3.3.6	2/9/83 0955		
12 S/G ENT, 14 S/G ENT & STM FLOW	3.3.1.1 (7)	2/14/83 1139	12/14/83 1406	FOR 12 S/G ONLY
	3.3.2.1 (14)	2/14/83 1139	12/14/83 1406	

MASTER

COMMENTS ON A/S ITEMS _____

_____

_____

_____

FIRE PROTECTION SYSTEM IMPAIRMENTS/PROBLEMS

_____

Time Identified _____ Expected Duration _____

Location & Description of Impairment _____

_____

_____

Probable Cause _____

Corrective Action Taken _____

_____

WO Number if Issued _____

Tech Spec LCO YES _____ NO _____ LCO A/S _____

_____

Time Identified _____ Expected Duration _____

Location & Description of Impairment _____

_____

_____

Probable Cause _____

Corrective Action Taken _____

_____

WO Number is Issued _____

Tech Spec LCO YES _____ NO _____ LCO A/S _____

COMMENTS FOR TURNOVER

- #1 Rx CRITICAL @ 1139 HRS - NRC NOTIFIED @ 1141 HRS
- #16 SW Pp C/T FOR LAHAM TO REPAIR BACKWASH VLV.
- #11 MIXED BED - RESIN SLUICED
- #13 CHG. Pp - DID NOT DO 4.0.5.P DUE TO Rx STARTUP. TRUSTON LOCATED HIS TACH & CAN DO TOMORROW.
- I.R. HI FLUX TRIP SET @ 17.5% PWR., CURRENT EQUIV.
- #11 SW Pp → 4.0.5.P COMPLETED SAT. - MIXED MIST.
- BISTABLES TRIPPED FOR #12 S/G STM FLO CH I & #14 S/G STM FLO CH II - SEE T.S.A.S.
- #12 SGFP → PUMP UNCOUPLED FRM. TURB. - PERFORMING OVERSPEED TRIP TEST @ J. GRAYTON.
- #11 C.S PUMP IN ALERT RANGE - DUE 2/25/83
- H.P. & MAINT. REMOVING DEBRIS FROM AROUND PER. FROM 1PS1 JOB. - TO NOTIFY S² WHEN COMPLETE
- 3 UNIT - VIB. CH I - #6 READING ∠
- GEN Hz → 51.5# @ 1025 HRS
  55 # @ 0000 HRS.
- W. PETERSON JR. - EMERG. VAC. → WIFE HAS A CONCUSSION
- Rx ENGR. CALIBRATING REACTIVITY COMPUTER - THEN PLANS ARE TO:
  - ROD WORTH @ ALL RODS OUT
  - ISOTHERMAL TEMP. COEFF.
  - BANK (ROD WORTH) & INDIVID. ROD WORTH
- DOOR to PIPE ALLEY - GETTING LOCK & DOOR APPEARS TO BE SPRUNG.

UNIT 2 SHIFT SUPERVISOR'S LOG

DATE 2-14-83 SHIFT 0715-1515 SHIFT SUPV. VARGA/TIMM

UNIT STATUS MODE 6 Tave ~ °F

Rx Power ~ % RCS Press ~ psig

Load ~ Mwe Gross Boron Conc. ~ ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
Fire doors + Barriers	3.7.11	10/29/81/0001		
06 CO2	3.7.10.3A	1-12-83/0806		
Both Vents S/D	ETS 2.1.3	1-12-83/2028		
22 Emerg Supp FAN	3.7.6.A	2-12-83/1330		

Salem Unit 1/2 OD-18-B-1 MASTER Rev. 1

COMMENTS ON A/S ITEMS_____

FIRE PROTECTION SYSTEM IMPAIRMENTS/PROBLEMS

Time Identified_____ Expected Duration_____

Location & Description of Impairment_____

Probable Cause_____

Corrective Action Taken_____

WO Number if Issued_____

Tech Spec LCO YES_____ NO_____ LCO A/S_____

Time Identified_____ Expected Duration_____

Location & Description of Impairment_____

Probable Cause_____

Corrective Action Taken_____

WO Number is Issued_____

Tech Spec LCO YES_____ NO_____ LCO A/S_____

COMMENTS FOR TURNOVER

① 215 & 134 needs I Florey tags released for 405 V maint - two other sets of tags already released

SENIOR SHIFT SUPERVISOR'S LOG

DAY MONDAY

DATE FEB. 1st, 1983 SHIFT 2315-0715 S.S.S. Victor W. Lowensten, Jr.

UNIT 1 MODE III Tave 547 °F
STATUS Rx Power 0 % RCS Press 2235 psig
Load 0 Mwe Gross Boron Conc. 1786 ppm

COMMENTS ALL F.L.C.R. WITHDRAWN TO BANK D @ 160 STEPS AND DILUTION TO CRITICALITY IN PROGRESS.
Rx TRIP @ 0600 hrs. (#14 S/G Lo Lvl + Hi Stm Flo)

UNIT 2 MODE VI Tave 88 °F
STATUS Rx Power 0 % RCS Press VENTED psig
Load 0 Mwe Gross Boron Conc. 2230 ppm

COMMENTS

UNIT 3 AVAILABLE ✓ UNAVAILABLE ____ SINCE ____

COMMENTS

TECH SPEC ACTION STATEMENT

UNIT	EQUIPMENT	A/S NUMBER	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
1/2	Fire Barriers	3.7.11a	10/28/81@ 0001		
1/2	UNITS	ETS 2.1.3	1/21/83 @ 2222		
2	22 EMERG. A/C FAN	3.7.6 a	2/2/83 @ 1330		2/19/83 @ 1330
1	FIRE DETECTION	3.3.3.6	2/9/83 @ 0955		

UNIT ONE SHIFT SUPERVISOR'S LOG

DATE 3/14/83 SHIFT 2315-0715 SHIFT SUPV. JNR

UNIT STATUS MODE II Tave 547 °F

Rx Power — % RCS Press 2245 psig

Load — Mwe Gross Boron Conc. _____ ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1. —	—						
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP
12CVCMT	2/3/83 1700	2200	2/14/83 0330	0339	

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
FIRE DOORS & BARRIER	3.7.11	10/29/81 0001		
BOTH UNIT S/D	Gen. 2.1.3.(2)	1/21/83 2028		
FIRE DETECTION CHARCOAL FILTER	3.3.3.6	2/9/83 0955		

COMMENTS FOR TURNOVER

① PD COMPLETED ROD IND. POSITION IND. CALIBRATION

② PERFORMED P-4 TEST (REACTOR TRIP BREAKER TEST) PER SP(O) 4.3.1.1.1 — SATISFACTORY

③ CONDUCTING ROD WITHRAWAL TO CRITICAL ROD POSITION ESTIMATED AT 160 STEP @ D BANK.

④ PD CHECKING ON 11 SG STM FLOW CH I & 14 SG STM FLOW CH II. READINGS AT 15%. SHOULD BE ZERO. CHANNELS NEED TO BE RE-CALIBRATED BEFORE ENTER MODE II

⑤ APPROACHING REACTOR CRITICALITY BY DILUTION OF RCS AT 75 GPM. ESTIMATED CRITICAL BORON CONCENTRATION IS 1456 PPM. APPROXIMATELY FIVE HOURS IS REQUIRED FOR DILUTION PROCESS

⑥ COMPLETED CFCU TEST, SP(O) 4.6.2.3(A) PER. IO# 100730 AND 100732

⑦ LOOSE TOOLS WERE FOUND ON 130'EL IN THE CONTAINMENT. HP TOOK OUT.

⑧ REACTOR TRIP @ 0600 UPON 14 SG LOW LVL IN COINCIDENT WITH HI STM FLOW. 14 SG STM FLOW CH II B/S BEEN TRIPPED. PD WAS CALIBRATING THE CHANNEL.

⑨ CONTROL BANK D POSITION RECORDER INDICATION AT ABOUT 15 STEPS HIGHER THAN STEP COUNTER READINGS. W/O ISSUED.

⑩ AFD RECORDER NEED CALIBRATION, W/O ISSUED.

⑪ RESET REACTOR TRIP. PERFORMED ICRR ON CONTROL BANK WITHRAWAL. CONTINUED DILUTION

UNIT 2 SHIFT SUPERVISOR'S LOG

DATE 2-14-83 SHIFT 2315-0715 SHIFT SUPV. OBRIEN

UNIT STATUS MODE 6 Tave 88 °F

Rx Power — % RCS Press ATMOS psig

Load — Mwe Gross Boron Conc. 2230 ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP
22CVCSMT				2030 2-13	0020 2-14

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
FIRE DOORS & BARR.	3.7.11	10-29-81 0001		
D/G CO.	3.7.10.3A	1-17-83 0832		
BOTH UNITS S/D	ETS 2.1.3	1-12-83 2028		
22 EMER. SUAR FAN	3.7.6A	2-1-83 1330		

COMMENTS FOR TURNOVER

1.) ACCUMULATORS ARE STILL DRAINING THRU 21-24 SJ-1's TO RCDT FOR ORIGINAL TAKEOUT. WHEN THEY FINISH DRAINING HANG TAGS ON DRAIN.

2) VESSEL LEVEL 97'3"

3.) CONT. ELEVATOR STUCK BETWEEN FLOORS. OTIS WILL BE IN TODAY

Salem Unit 1/2 OD-18-B-3 MASTER Rev. 1

SENIOR SHIFT SUPERVISOR'S LOG

DAY SUNDAY

DATE FEB. 13, 1983 SHIFT 1600-2400 S.S.S. J.A. Pinson

UNIT 1 MODE III Tave 547 °F
STATUS Rx Power — % RCS Press 2235 psig
Load — Mwe Gross Boron Conc. 2005 ppm

COMMENTS

UNIT 2 MODE VI Tave 94 °F
STATUS Rx Power — % RCS Press VENTED psig
Load — Mwe Gross Boron Conc. 2230 ppm

COMMENTS

UNIT 3 AVAILABLE ✓ UNAVAILABLE SINCE

COMMENTS

TECH SPEC ACTION STATEMENT

UNIT	EQUIPMENT	A/S NUMBER	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
1/2	FIRE BARRIERS	3.7.11.A.	10-28-81 @ 0001		
1/2	UNITS	E.T.S. 2.1.3.	1-21-83 @ 2222		
2	22 EMERG. A.C. FAN	3.7.6.A.	2-12-83 @ 1330		

Salem Unit 1/2 OD-18-A-1 MASTER Rev. 1

COMMENTS ON A/S ITE

SIGNIFICANT STATION PROBLEMS/EVENTS

A. OPERATIONAL

1950 - NOTIFIED BY R. VANDER DECKER THAT CALIBRATIONS ON CONTROL BANKS, GROSSLY OUT. DOES NOT ANTICIPATE COMPLETION OF ROD CALIBRATIONS TILL MIDNIGHT.

2135 - NOTIFIED BY R. VANDER DECKER THAT IRPI CALIBRATIONS ARE NOW COMPLETE.

BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 2/14/83

TIME	APPARATUS	REMARKS:
0001	V. Shift	
	S3	Lowenstein
	S2	Tang, O'Brien
	N.C.O.	K. Peterson, Hyeman / Gwirtz
	E.O.	Miller, Shemley
	V.O.	Willoughby, Stewart
	CWI	Singleton
	RWO	Dusty
	Fire Brigade	Dusty - Chief, Willoughby - Asst., Mattina, Roman
0037	Rods	Started pulling shutdown rods in preparation for dilution to criticality
0100	Pri Chemistry	RCS boron 1997 ppm @ 0120 PZR 1995 Lehman
0130	Rods	Shutdown banks @ 228 steps
0140	CVCS	Isolated hut tanks per procedure and transferred water to RWST tank
0200	Pri Chemistry	RCS 1998 ppm, ~~PZR @~~ Lehman
0230	Pri Chem.	RCS 2002 ppm, PZR 2009 ppm - Lehman
0230	Rods	Started pulling control banks in preparation for dilution to criticality
0300	NCO	Relieved the desk NCO, MD Gwirtz
0300	RCS	RCS boron 1997 ppm 2009 PZR @0320
0339	WL	Commenced liquid release of 12 CVCS MT release # ~~GILL~~ - 035-83
0330	RCS	RCS boron 2005 ppm

Use apparatus to provide a description of the event being logged.

(8) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

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SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE:

IME	APPARATUS	REMARKS:
0350	Rods	Bank D at 160 steps
0400	CU	commenced RCS dilution for criticality
0400	RCS	RCS boron 2000 ppm
0420	RCS	PZR boron 1997 ppm
0430	RCS	RCS boron 1958 ppm
0452	CU	11 Chg pump I/s
0454	CU	13 Chg pump O/s
0500	RCS	RCS boron 1898 ppm
0520	CU	12 BAST boron concentration 21,015 ppm
0520	RCS	RCS PZR boron 1882 ppm
0530	RCS	RCS boron 1846 ppm
0600	Rods	Tc tripped, Lo S/G level and flow 14 S/G terminated dilution
0600	RCS	RCS boron 1786 ppm
0615	Rods, RCS	RCS temp. 547°F, reclosed & trip breakers commenced pulling SD banks
0630	Rods	Commenced pulling control banks
0652	WL	Terminated release on 12 CVCS MT
Late entry 0620	RCS	PZR boron 1830 ppm
Late entry 0630	RCS	RCS boron 1747 ppm
		MD Hunt

(1) Use apparatus to provide a description of the event being logged.

(2) The CO need only sign the remarks page once immediately following his last entry or Shift Relief.

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SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 2/14/83

IME	APPARATUS	REMARKS:
0700	"X" SH. CT	SSS W. RAHL
		SS N. CIANFRANI
		NCO'S A. FOEHNER, K. GOEBEL
		ED'S T. WOOD, M. MALONY
		UO'S J. WILLOUGHBY, C. CONNER
		FIRE BRIGADE - H. ELLIOTT, L. CRAWFORD
		M. MALONY, R. CLAIR, R. PHILLIPS
0700	RCS	BORON CONC 1743 PPM
0720	PRZ	BORON CONC 1767 PPM
0730	RCS	BORON CONC 1724 PPM.
0850	#3 Unit	ON THE LINE
0857	#3 Unit	TRIPPED 86E A&B
0905	RCS	BORON @ 0900 1685 PPM
		@ 0830 1693 PPM
	PRZ	BORON @ 0820 1697 PPM.
0917	RCS	BORON @ 0900 1678 PPM
0920	PRZ	BORON CONC 1689 PPM
0930	RCS	BORON CONC 1655 PPM
0951	#3 Unit	ON THE LINE BASE LOAD FOR L.D
1000	RCS	BORON 1618 PPM.
1020	PRZ	BORON 1615 PPM
1030	RCS	BORON 1563 PPM.
1058	CVCS	BATCH TK BORON CONC 20326 PPM.
1100	RCS	BORON 1527 PPM.
1104	CV	REDUCED DILUTION RATE TO 50 GPM
1125	CV	REDUCED DILUTION RATE TO 25 GPM.
1132	#3 Unit	TRIPPED 86GX "A" FT V.B

Use apparatus to provide a description of the event being logged.

(s) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

Page 4 of 4 Rev. 6

BLUE

LEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 2/14/83

TIME	APPARATUS	REMARKS:
1134	CV	STOPPED DILUTION OF RCS
1135	TAVG	LOOP 11 - 547°F
		LOOP 12 - 547°F
		LOOP 13 - 546.5°F
		LOOP 14 - 548°F
1139	#1 Unit	CRITICAL. BANK D-1316 STEPS
		RCS BORON 1453 PPm
1140	PRZ	BORON 1551 @ 1120
	RCS	BORON 1446 @ 1130
1142	SW	11 SW PUMP'S FOR SP @ 405 P
1149	CV	TRANSFERED BATCH TIC TO 12 BAT
1200	RCS	BORON 1453 PPM
1220	RCS	BORON 1447 PPM.
1240	RCS	BORON 1436 PPM.
1250	SW	11 SW PUMP O/S
LOGS ENTRY	@ 1244	BISTABLES FOR 12 S/G SF CHI & 14 S/G
		SF CII TRIPPED TO COMPLY WITH T.S.AS
		3.3.1.1 & 3.3.2.1
1331	#3 UNIT	OFF THE LINE
1333	RCS	BORON @ 1300 WAS 1432 PPM.
1335	SGFP	#12 SGFP LATCHED & ROLLING FOR
		OVERSPEED TEST
1340	PRZ	BORON CONC 1442 PPM @ 1320
	RCS	1429 PPM BORON CONC
1400	RCS	1434 PPM BORON CONC.
1420	RCS	1432 PPM BORON CONC.
		[signature]

Use apparatus to provide a description of the event being logged.

8) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

Page 4 of 4 Rev. 6

BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 2/14/83

TIME	APPARATUS	REMARKS:
1500	Y-Shift	
	S^3	Pierson
	S^2	Crow
	N.C.O	Hjemen, Goetel / Leggett
	E.O.	Walters, Thomson
	V.O.	Simpkins, Brewer
	STA	Massa
	F.O	Shindel.
	CWI	Kaweski / Miller
	RWO	Escalmendo
	Fire Brigade	Shindel - Chief, Simpkins - Asst., Brewer, Quinn / Vickers, Thom
1501	Pri Chem	RCS boron 1430 ppm @ 1440 - Fehrman
1517	CVCS	started addition of 115 gal B.A. - to allow 24 steps step with deviation of control rods
1527	NI	IR trip setpoint current equal to 17½ % Rx power
1528	Pri Chem	RCS boron 1434 ppm @ 1500 - Fehrman
1535	CVCS	boration (115 gal) completed
1535	Pri Chem.	RCS boron 1434 ppm @ 1520 - Stevens
1600	Pri Chem.	RCS boron 1444 ppm @ 1540 Stevens.
1604	CVCS	started 30 gallon BA addition to get boron and print with batch of 328 - will continue to borate
1608	CVCS	added 30 gallon BA.
1618	Pri Chem	RCS Boron 1436 ppm Smith @ 1600
1633	WL	B cont Sump level indic adjusted - Belanger
1634	CVCS	added 30 gal B.A. to RCS
1638	E.O Shift/Lee	terminated test procedure attachment 3.3.1.1 and

Note: Use apparatus to provide a description of the event being logged.

(a) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 2/4/83

TIME	APPARATUS (CO)	REMARKS:
		3.3.2.1 - 14 S/G SF channel II - declared operable after performance dept. agrees
1641	Pri Chem.	RCS boron 1465 ppm @ 1620 - Thrower
1654	Pri Chem	RCS boron 1485 ppm @ 1640 - Smith
1712	Pri Chem	RCS boron 1490 ppm @ 1700 - Smith
1731	Pri Chem	RCS boron 1481 ppm @ 1720 - Smith
1751	Pri Chem	RCS boron 1491 ppm @ 1740 - Smith
1820	Pri Chem	PZR and RCS boron 1497 ppm @ 1800 - Roberson
1834	Pri Chem	RCS boron 1499 ppm @ 1820 Byers
		12 BAST 21,200 ppm - Smith @ 1800 dr to unisolate storage tanks.
1850	Pri Chem	RCS Boron 1498 ppm @ 1840 Byers
1912	Pri Chem	RCS boron 1499 ppm @ 1900 Byers
1929	Pri Chem	RCS boron 1498 ppm @ 1920 Byers
1931	CVCS	BAST is unisolated & returned to normal
1957	Pri Chem	RCS boron 1494 ppm @ 1940 - Byers
2012	Pri Chem	RCS boron 1497 ppm @ 2000 Byers
2030	Pri Chem	RCS boron 1492 ppm @ 2020 - Byers
2030	Pri Chem	Boted daily samples - noted - Roberson
2050	Pri Chem	RCS boron 1494 ppm @ 2040 - Byers
2111	Pri Chem	RCS boron 1497 ppm @ 2100 - Byers
2130	Pri Chem	RCS Boron 1496 ppm @ 2120 - Byers
2133	WL	overboard release of 11 CVCS Boric tank dr circ water ~~11-35-83~~ 2 11-3583
2134	CV	13A Circulator 9/5 Screen portion.
2153	Pri Chem	RCS boron 1496 ppm @ 2145 - Byers
		PZR boron 1499 ppm @ 2135 - Byers

1 Use apparatus to provide a description of the event being logged.

2 The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

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BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 2/14/13

IME	APPARATUS	REMARKS:
2154	R.d-	Bank "D" @ 228 Test started @ 1604 completed
2207	CVCS	started 5000 gallon dilution to get Bank "D" in to zero steps – to get bank "D" rod worth – @ 50 gal/minute.
2235	Pei Chen	RCS boron 1496 ppm @ 2215 - Byes
2240	Pei Chen	RCS boron 1503 ppm @ 2230 - Byes
2255	Pei Chen	RCS boron 1482 ppm @ 2245 - Byes
2315	SW	1/SWP-P1s to increase header pres
2322	CVCS	Stopped 5000 gal dilution @ 380 gal
2324	Pei Chen	RCS boron ~~1483~~ 1448 ppm @ 2315 - Rotman
2340	Pei Chen	RCS boron 1455 ppm @ 2330 - Rotman
2350	CVCS	started 5000 gal primary water to RCS
2355	Pei Chen	RCS boron ~~1440~~ ppm @ 1425 ppm @ 2345 - Holly

Use apparatus to provide a description of the event being logged.

(s) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

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APPENDIX E

Design, Procurement and Classification Documents

(Cross Referenced to Section 5 of this Report)

Contents

E.1 Westinghouse Purchase Order for Unit 1 Reactor Trip System E-1

E.2 Equipment Specification G676S86 for Reactor Trip Switchgear E-5

E.3 Procurement Documents for Breaker Spare Parts E-17

E.4 Project Directive PD-7, Equipment Classification List with memorandum E-29

E.5 Master Equipment List (MEL) with Distribution Memo E-33

E.6 Instruction for Itemizing Equipment for MEL E-37

E.7 Spare Parts Lists for DB-50 Breakers E-40

E.8 Modification Instructions for Replacement Undervoltage Attachments E-42

WESTINGHOUSE ELECTRIC CORPORATION
SWITCHGEAR DIVISION
700 BRADDOCK AVE., E. PGH., PA. 15112
ATTN: L. E. KECK, B-N

1844

SALESMAN 25

DIV ORDER SERVICE PWR-SD 546-GLG-123134-BM

SHIP VIA	F.O.B.	REQ'D				CUSTOMER ORDER NO	DATE	REQ NO		DATE	NUMBER
		MO	DAY	YR							
		7	1	70						5 13 70	NA-32027 AR6Y2

AMOUNT	SLS NO	MARKS	SPLIT ORDER CODES	PUR BY	DATE - NEG NO
		NOTE "1"			

SHIPMENT LIMITATIONS IF OTHER THAN AS REQUESTED

CHARGE TO

WNES - ACCTS. PAYABLE
P.O. BOX 355
PITTSBURGH, PA. 15230

SHIP TO

SEE NOTE "1"

PRIORITY RATING

REGIONAL OFFICE PWR

REQ ORDER CONF R.L.GABLER

SHIP COST

ITEM NO	QUANTITY	DESCRIPTION	UNIT PRICE	MULT	AMOUNT
		DISTRIBUTION			
		R. HAYFORD J. SWOGGER - PSE-385 J. HALLER H. SKOW C. MADONTI R. CARPENTER D. BEATTY (3) W. WEBER PURCH. SYSTEMS (2) ACCOUNTING N.D. WOODSON			
		REACTOR TRIP SWITCHGEAR SPIN: PSE -ESPDTS-01			
1.	1	REACTOR TRIP SWITCHGEAR SYSTEM PER WNES E-SPEC. G-676586, REV. 1 WITH THE FOLLOWING EXCEPTIONS:			
		A. INTERCONNECTING WIRING CABLES OR HARNESSES BETWEEN MODULES, CHASSIS, PANEL, TERMINAL BOARDS, ETC. SHALL BE TEFLON TYPE FEP. NORMALLY, REPLACEABLE COMPONENTS OR MODULES MAY CONTAIN THE MANUFACTURER'S STANDARD WIRE. ALL CONTROL WIRING SHALL BE NO. 14 AWG EX-			

1

SWITCHGEAR DIVISION

DIV ORDER SERVICE 5 13 70 NA-32627 Amd 1

QUANTITY	DESCRIPTION	UNIT PRICE	MULT	AMOUNT
	CEPT CT CIRCUITS, 10 TO 20 AMP CONTINUOUS DUTY CIRCUITS, AND PANEL HEATING CIRCUITS WHICH SHALL BE NO. 12 AWG.			1845
	B. SEISMIC REQUIREMENTS FOR SWITCHGEAR ARE SUCH THAT IN THE PRESENCE OF A SEISMIC DISTURBANCE THE SWITCHGEAR'S ABILITY TO OPEN THE CIRCUIT SHALL NOT BE IMPAIRED. IT IS ACCEPTABLE IF THE CIRCUIT BREAKERS TRIP OPEN DURING THIS EVENT. SATISFACTORY VERIFICATION OF THIS CAPABILITY IS CONTAINED IN SWITCHGEAR DIVISIONS SHOCK TEST REPORT PREPARED FOR LOW VOLTAGE SWITCHGEAR SUPPLIED UNDER G.O. NA-44100-ZY SHOWING POST SHOCK OPERABILITY FOLLOWING TEST SHOCKS OF 10G IN THE VERTICAL DIRECTION AND 5G IN THE HORIZONTAL DIRECTION.			
	C. "PSE" EQUIPMENT SHALL HAVE STANDARD CONFIGURATION. "PNJ" EQUIPMENT SHALL BE "OPPOSITE HAND".			
	D. ONE (1) SET OF DRAWINGS SHALL BE SUBMITTED FOR "PSE" & "PNJ" CONSISTING OF AN OUTLINE DRAWING, SCHEMATIC DIAGRAM, CONNECTION DIAGRAM, AND AN ASSEMBLY DRAWING (SHOWING COMPONENT LOCATION).			
	NOTES:			
	1. "PSE" SHIPPING INSTRUCTIONS DATED 3-69 SHALL APPLY.			
	2. MNES ADMINISTRATIVE SPECIFICATION 54823, REV. 3 APPLIES.			
	3. MNES QUALITY CONTROL FORM QCS-1, REV. 3 APPLIES AS PREVIOUSLY AGREED TO WITH SW/GEAR DIVISION.			
	4. ADDITIONAL CONTRACT REQUIREMENTS FOR "PSE" PROJECT APPLIES.			
	5. 30 COPIES OF INSTRUCTION BOOKS ARE REQUIRED.			

1846 #001

CHANGE NOTICE

REGIONAL ACCOUNTING SALES RECORD 21

TO W SWITCHGEAR DIVISION
700 BRADDOCK AVE., PGH., PA. 15112
ATTN: J. K. HENSLER, S-N

OPERATING DIV. ORDER SERVICE 2 Dolan
DIVISION ORDER CORRESPONDENT
PWRSD 7546-GLS-123134-BN

REGIONAL OFFICE	REGIONAL ORDER CONFIRM.	DATE OF THIS CHANGE	REFER TO OUR ORDER	SR
PWR	R. L. SADLER	09-25-70	GO NA 32027 ABGT2	
			DATE OF ORDER 05 13 70	S.S. NO.

PSE R. T. SWITCHGEAR

ITEM	QUANTITY	DESCRIPTION	UNIT PRICE	MULT.	AMOUNT
001	1 Lot	OUTGOING BUS CONNECTION TO SOLID STATE ROD CONTROL CABINET SHALL BE CHANGED TO THE FOLLOWING PHASE ARRANGEMENT: "A-N-B-C" RIGHT TO LEFT WHEN FACING THE FRONT OF R. T. SWITCHGEAR CABINET. THIS CHANGE ROTATES THE PHASE ARRANGEMENT 90 DEGREES CLOCKWISE FROM THE PRESENT ARRANGEMENT OF "A-N-B-C" BACK TO FRONT WHEN FACING CABINET. CORRESPONDENCE: ALL CORRESPONDENCE WITH PWR SYSTEMS DIVISION RELATING TO THIS ORDER MUST REFERENCE BOTH THE G.O. NUMBER AND THE PWRSD NUMBER (546-GLS--23134-BN) SHOWN ABOVE THE G.O. BLOCK. DISTRIBUTION: R. MAYFORD J. SWOGGER - PSE-385 G. KRAUSE R. CARPENTER D. BEATTY (3) W. WEBER PURCHASING SYSTEMS (2) ACCOUNTING N. D. WOODSON			

RECEIVED NUCLEAR POWER SERVICE OCT 13 1970

RECEIVED OCT 15 1970 SALEM

JD - 10/14
JG
LR 10/16

SHEET CONTINUED FINAL

DISPOSITION OF EXPENSE

R. T. Switchgear

AUTHORITY FOR CHANGE J. SWOGGER DATE

CHANGE APPROVED BY R. VELARDE

E-3

PREVIOUS TOTAL

IF NO CHANGE IN PRICE WRITE "NONE" INCREASE

DECREASE

REVISED TOTAL

DIVISION ORDER C

20

CHANGE NOTICE 002

ORDERING OFFICE ORDER FILE 18

TO W SWITCHGEAR DIVISION — OPERATING DIV. ORDER SERVICE
MR. 700 BRADDOCK AVE., E. PGH., PA. — DIVISION ORDER CORRESPONDENT
C.C. ATTN: R. C. PUPP 8-N — PWR-SD 546-GLG-123134-BN

REGION OFFICE	REGIONAL ORDER CORRES.	DATE OF THIS CHANGE	REFER TO OUR ORDER	E1
PWR	R. L. GABLER	12 08 70	GO NA-32027-AR6Y2	
FOR PSE R.T. SWITCHGEAR			DATE OF ORDER 05 13 70	SLS. NO.

ITEM	QUANTITY	DESCRIPTION	UNIT PRICE	MULT.	AMOUNT
01.	1 LOT	PROVIDE A PROTECTIVE METAL SHROUD OVER EACH REACTOR TRIP BREAKER & BY-PASS BREAKER MANUAL TRIP PUSH-BUTTON - 4 SHROUDS REQUIRED. PROVIDE FOR INTERNAL JUMPERING OF ALL WIRING BETWEEN SWITCHGEAR UNIT #1 & UNIT #2 ----------			

DISTRIBUTION

R. HAYFORD
J. SWOGGER - PSE-385
G. KRAUSE
R. CARPENTER
D. BEATTY (3)
W. WEBER
PURCHASING SYSTEMS (2)
ACCOUNTING
N. D. WOODSON

REACTOR TRIP SWITCHGEAR SPIN: PSE-~~ES015~~-0SITE

RECEIVED DEC 19 1970 NUCLEAR POWER SERVICE

RECEIVED DEC 11 1970 SALEM SITE

CORRESPONDENCE

ALL CORRESPONDENCE WITH PWR SYSTEMS DIVISION RELATING TO THIS ORDER MUST REFERENCE BOTH THE G.O. NUMBER AND THE PWR-SD NUMBER (546-GLG-123134-BN) SHOWN ABOVE THE G.O. BLOCK.

M.P.G. SALES DEPT.
E.E. 12 14
M.E. 12 15
M.E. 12 15
M.E.E.
M.C.E.
E.S.
DRSG.
FILE ACTION

SHEET 1 ~~OF 1~~ FINAL

DISPOSITION OF EXPENSE R. J. Dabler

PREVIOUS TOTAL [redacted]

AUTHORITY FOR CHANGE J. W. SWOGGER — DATE

IF NO CHANGE IN PRICE WRITE "NONE"

INCREASE [redacted]

DECREASE

CHANGE APPROVED BY R. I. HAYFORD

REVISED TOTAL [redacted]

E1

EQUIPMENT SPECIFICATION COVER SHEET
WESTINGHOUSE FORM 54064 A

EQUIPMENT SPECIFICATION	DATED	REVISION NO.	DATED	ORIGINAL ISSUE	SUPERSEDES PREVIOUS REVISIONS
G676586	11/29/67	1		☐	XX

ATTACHMENTS

PROJECT: GENERAL

SHOP ORDER: GENERAL - 380/385

SYSTEM: ROD CONTROL

EQUIPMENT: REACTOR TRIP SWITCHGEAR

FOR SUPPLIER'S CONVENIENCE

REV. NO.	REVISION ENTERED BY & DATE

WESTINGHOUSE ELECTRIC CORPORATION
Atomic Power Division
P.O. Box 355
Pittsburgh, Pennsylvania, 15230

APPROVAL

	ORIGINAL ISSUE	REV. 1	REV. 2	REV. 3	REV. 4
AUTHOR	R. Seid				
SHOP ORDER HOLDER	R. Seid				
PROJECT MANAGER					

1. SCOPE

a. This specification covers the requirements for the reactor trip switchgear of a rod control system. The system includes two identical M-G sets, each with a voltage regulator, reverse current relay, and generator output, circuit breaker, one automatic synchronizer to parallel the generator outputs, one common generator ground relay, and four reactor trip circuit breakers. The system is shown in Figure 1. The rated output of each generator is 400 KVA, 260 volts line to line, three phase, four wire, 58.3 Hz.

b. The load supplied by the M-G sets consists of a number of control rod drive mechanisms, which are used to position neutron absorbing control rods within a nuclear reactor core. Positioning of control rods is accomplished by using thyristor silicon controlled rectifiers to sequentially energize highly inductive electromagnetic circuits. Typical connections between the three phase half wave thyristor silicon controlled rectifier controller and the control rod drive mechanism coils are shown in Figure 2. For proper operation of the controller, the inductance of the power circuit from the generator to the controller input terminals, including the generator line to neutral commutating inductance, must not exceed 76 michohenries.

c. The reactor trip circuit breakers, accessories, and housing are covered by this specification. The remainder of the power supply system and the silicon controlled rectifier controller are covered by separate specifications.

2. SWITCHGEAR ASSEMBLY

a. The switchgear assembly shall consist of two low voltage metal enclosed switchgear sections, each 26 inches wide, 90 3/8 inches high, and 60 inches deep, arranged as shown in Figure 3. One section will contain two series connected reactor trip circuit breakers. The second will contain two bypass circuit breakers connected so that a bypass breaker parallels each reactor trip breaker. The bypass circuit breaker is used to bypass the reactor trip breaker for

on-line testing of the latter with the reactor in operation.

b. A vertical steel barrier with appropriately insulated inserts for the horizontal bus connections to pass through shall separate the two switchgear sections. In addition, steel barriers shall separate the bus compartment horizontally into incoming, tie and outgoing sections.

c. Control wiring for each circuit breaker shall be run to terminal blocks in the unoccupied breaker compartments. This compartment shall be subdivided vertically so that there is a distinctly separate space for the control connections of each circuit breaker. The control connections for each circuit breaker shall be in separate wiring channels and in addition, the undervoltage trip device leads shall be separated from other control leads and terminated on a separate covered terminal blocks clearly marked "Trip Channel A" for trip breaker A and bypass breaker B and "Trip Channel B" for trip breaker B and bypass breaker A.

d. The bypass circuit breaker units shall have close and trip pushbuttons which operate the circuit breaker only when it is in the "Test" position.

e. Each circuit breaker shall have provisions for locking it in the "Test" and "Disconnected" drawout positions. Padlocking provisions will be acceptable.

f. The switchgear assembly shall be arranged for close-coupled connection to the generator output circuit breaker switchgear covered by a separate specification. Each of the two generator output breakers (Westinghouse type DB-50) are housed in a switchgear section, 26 inches wide, 90 3/8 inches high, and 60 inches deep. This switchgear and the reactor trip switchgear will form one lineup with the generator switchgear on the left when facing the front. The outgoing circuit for the reactor trip switchgear will leave at the top of the assembly. Low impedance bus duct will be used to connect this circuit to the controller cabinets.

3. CIRCUIT BREAKERS

a. Four Westinghouse type DB-50, electrically operated, trip free, 3 pole, drawout circuit breakers shall be furnished as part of the reactor trip switchgear. The circuit breakers shall be rated 1000 amperes. Overcurrent trip units shall be omitted.

b. The circuit breakers shall be designed to operate from a control voltage of 125 volts dc, ± 10 percent.

c Each circuit breaker shall be equipped with a 125 volt DC instantaneous undervoltage trip device, in addition to the shunt trip coil.

d. The circuit breaker maximum interrupting time for all currents within its rating, including a minimum current of 75 amperes, shall not exceed 167 milliseconds (10 cycles on a 60 Hz base) as measured from the time that the undervoltage trip device is de-energized.

e. Each circuit breaker shall be equipped with 3 breaker auxiliary switch assemblies (four contacts each). Auxiliary switch contacts not utilized for breaker control functions shall be wired out to terminal blocks for future use. The spare contacts shall be usable as "a" or "b" contacts but do not need to be provided as double throw.

f. Circuit breakers shall be wired as in Figure 4, 5 and 6.

4. SEISMIC - LATER"

5 TESTING

The equipment shall be tested in accordance with standard commercial practice. A Test specification shall be prepared and approved by WAPD prior to testing. (Westinghouse Swgr. Div. "Class A" Test fulfills the requirements of this specification.) Sufficient notice of the test schedules shall be given so that WAPD representatives may be present.

6.0 DRAWINGS - Supplier shall submit outline , schematic and connection diagrams of the equipment for approval.

7.0 QUALITY ASSURANCE

The reliability of the equipment identified in this specification is dependent upon good design plus control of quality during fabrication of the equipment.

7.1 SUPPLIER QUALITY CONTROL REQUIREMENTS

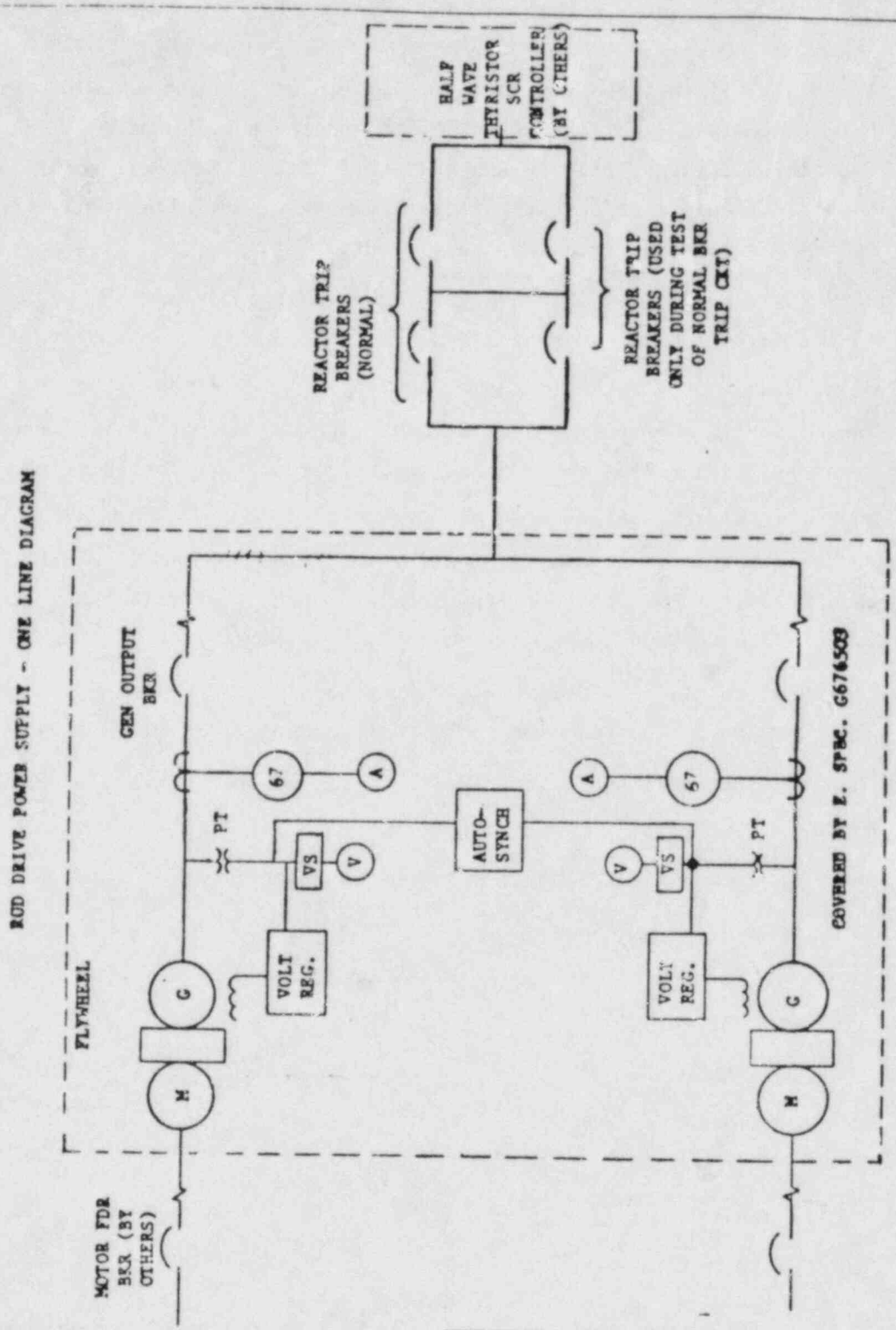
The supplier is responsible for maintaining the quality level identified in this specification, or specification data sheets attached. The supplier is responsible for sub-contracted work.

The requirements of QCS-1, Quality Control System Requirements, and Purchasing Administrative Specification apply to the manufacture of this equipment.

The supplier shall submit his inspection/test plan for WNES approval.

7.2 DOCUMENTATION REQUIREMENTS

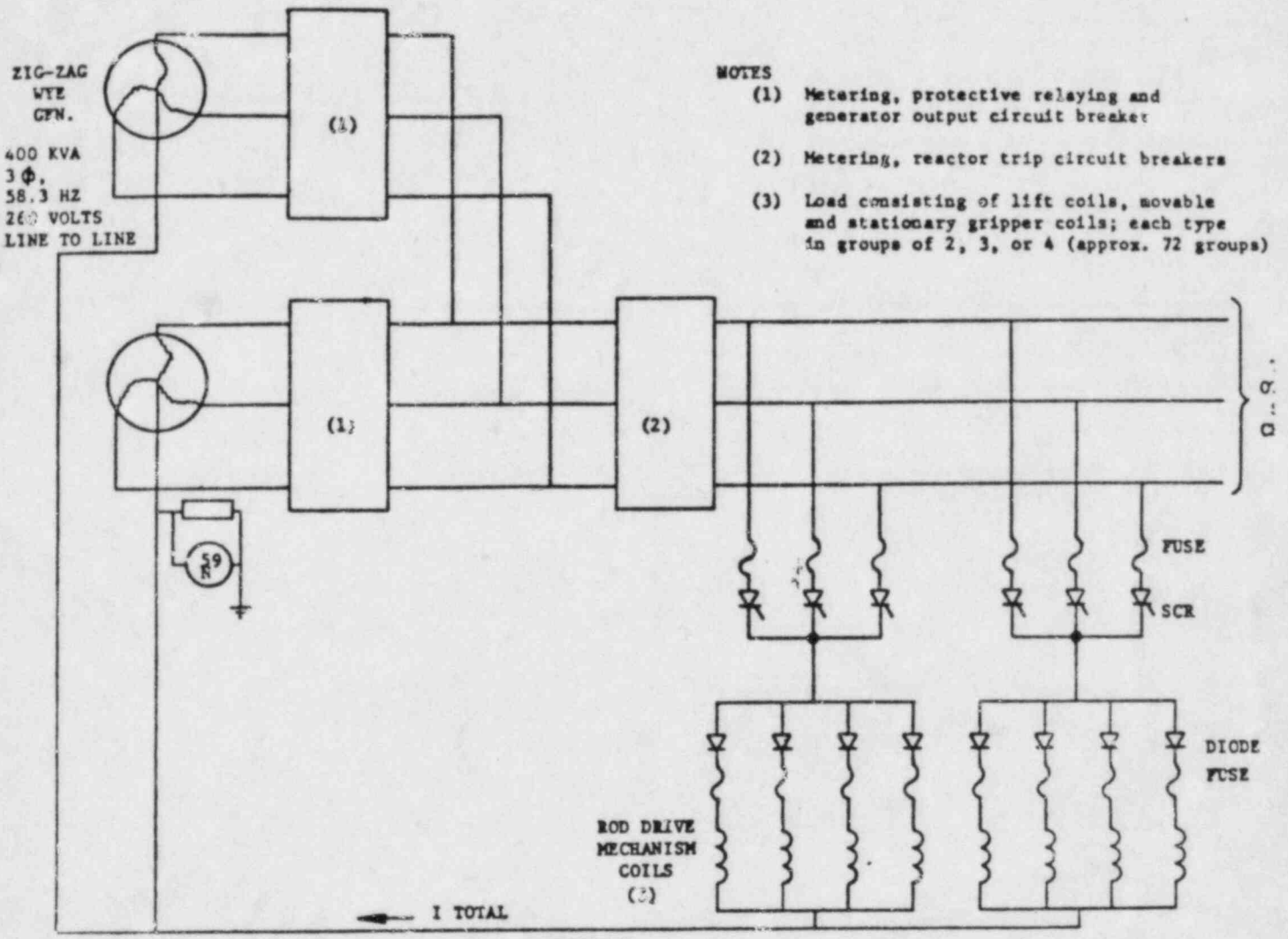
Attachment No. 1 is a list of documentation requirements for this equipment.



WESTINGHOUSE ELECTRIC CORPORATION
ATOMIC POWER DIVISIONS

Revision No. 1	
to	
E-Spec. G677586	Page 6 of 12 Pa

ROD DRIVE POWER SUPPLY DIAGRAM



NOTES

(1) Metering, protective relaying and generator output circuit breaker

(2) Metering, reactor trip circuit breakers

(3) Load consisting of lift coils, movable and stationary gripper coils; each type in groups of 2, 3, or 4 (approx. 72 groups)

FIGURE 2

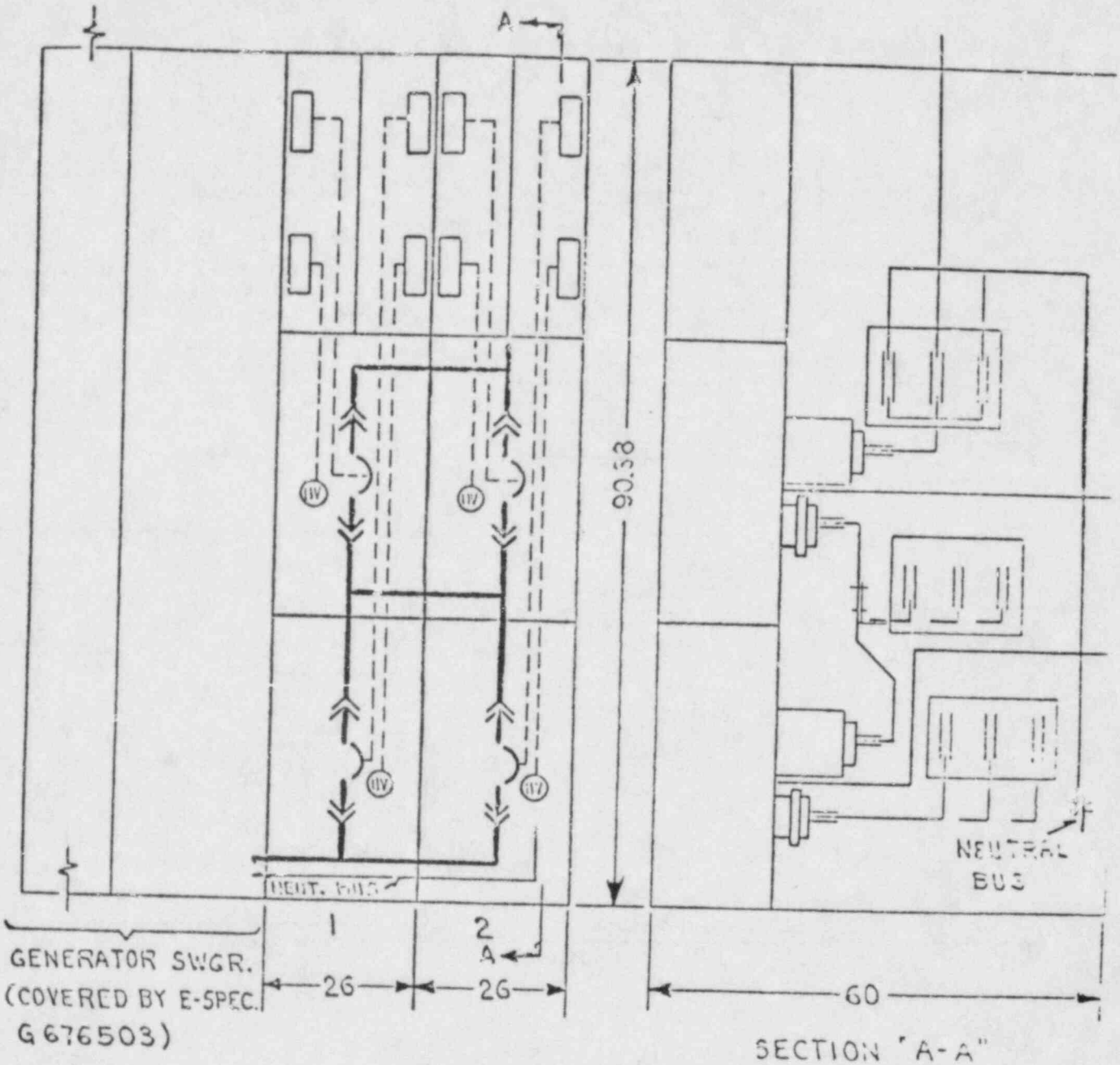

A
90.38
NEUTRAL BUS
1
2
A
GENERATOR SWGR.
(COVERED BY E-SPEC.
G676503)
26
26
60
SECTION "A-A"

FIGURE 3

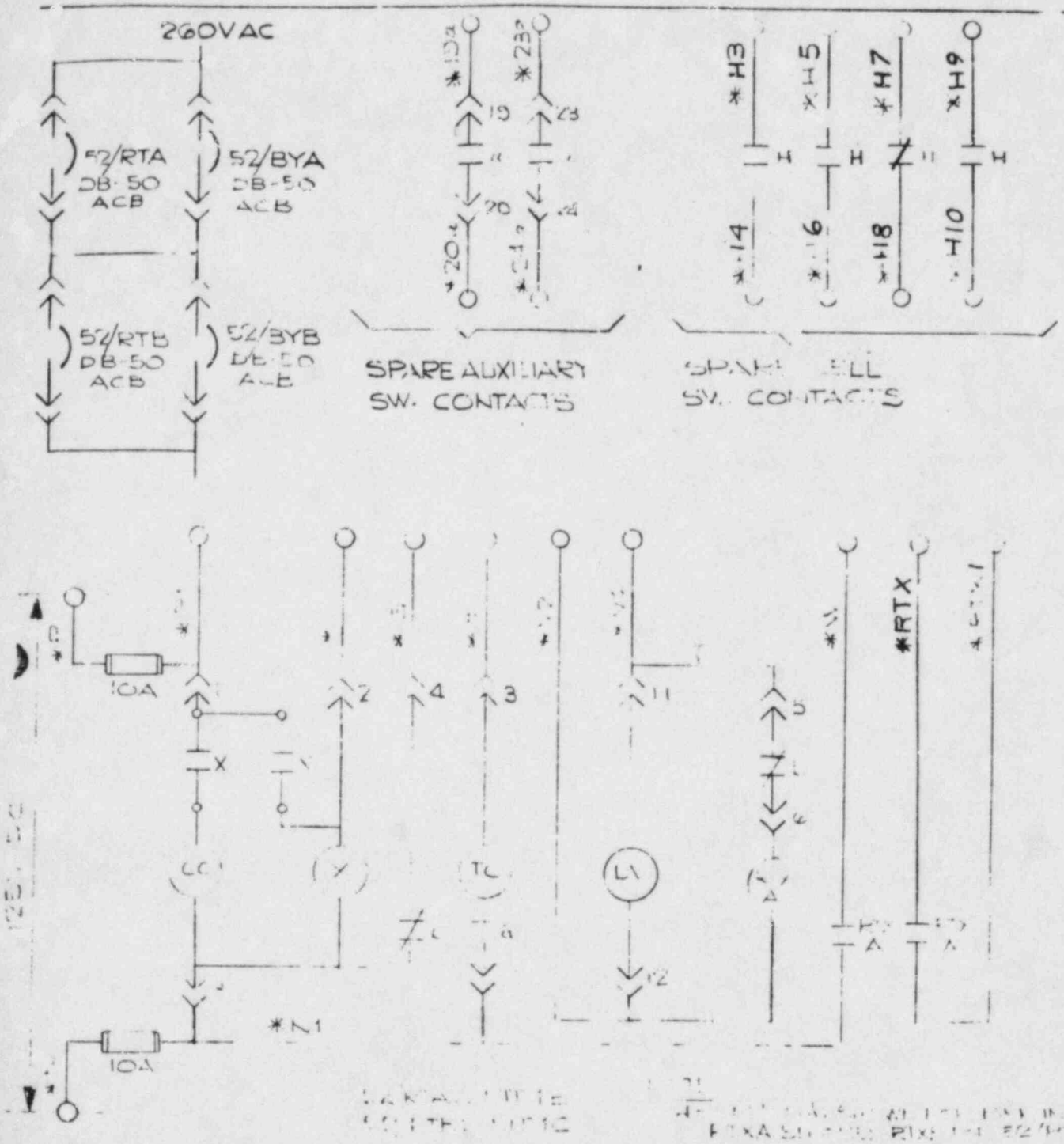

260VAC
52/RTA DB-50 ACB
52/BYA DB-50 ACB
52/RTB DB-50 ACB
52/BYB DB-50 ACB
SPARE AUXILIARY SW. CONTACTS
SPARE BELL SW. CONTACTS
10A
CC
Y
TC
LI
*RTX
*N1
10A

FIGURE 4

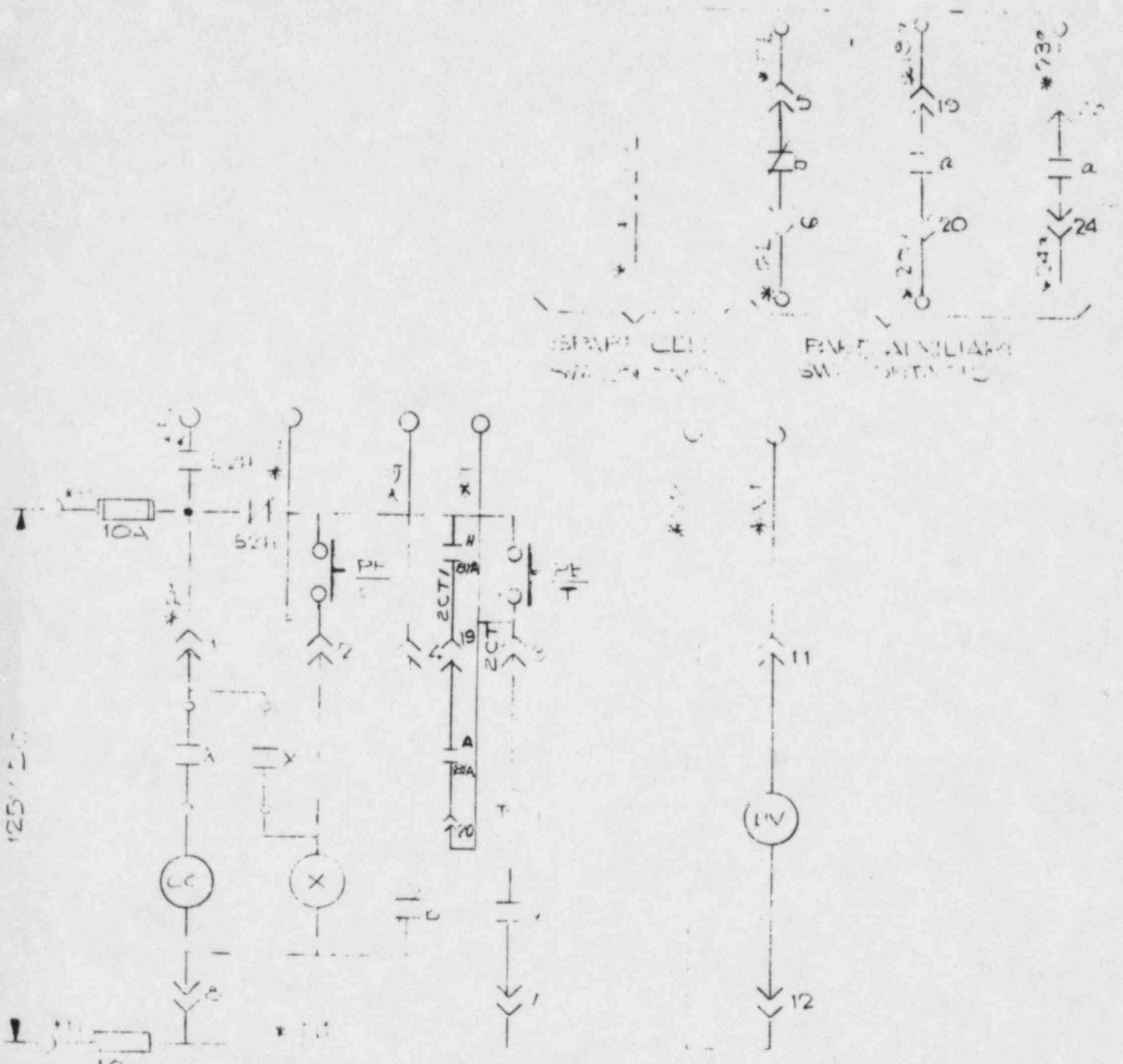


FIGURE E

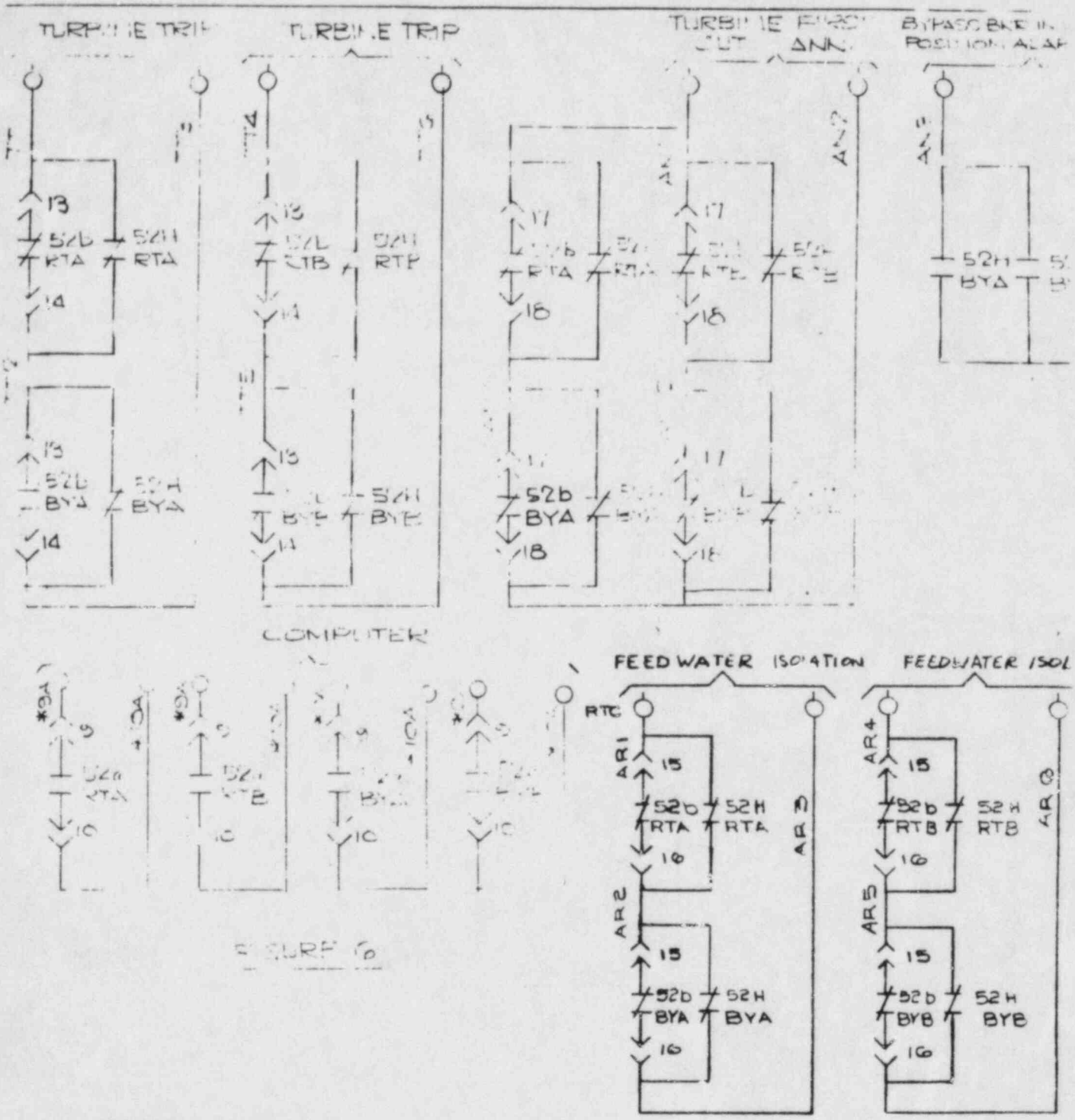
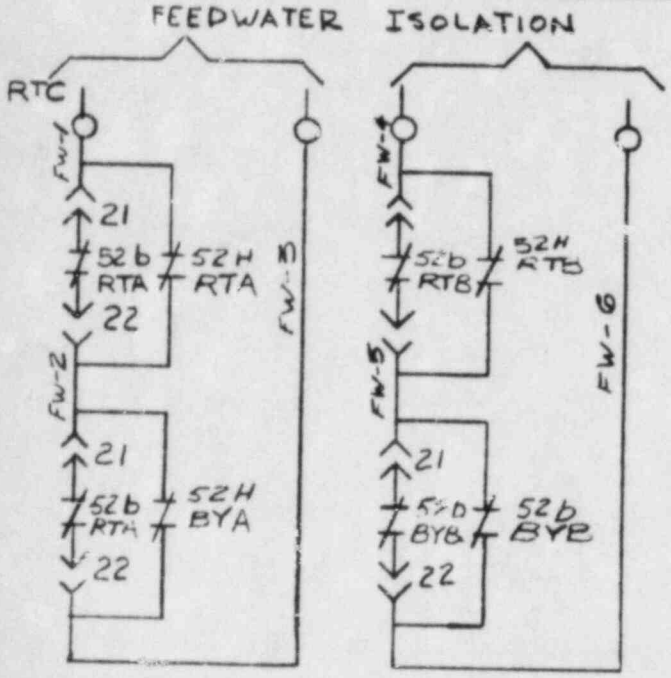

TURBINE TRIP
TURBINE TRIP
TURBINE TRIP
BYPASS VALVE
52b RTA
52H RTA
52b BYA
52H BYA
COMPUTER
FEEDWATER ISOLATION
FEEDWATER ISOL
RTC
AR1
AR2
AR3
AR4
AR5
AR6
52b RTB
52H RTB
52b BYB
52H BYB

FIGURE 6


FEEDWATER ISOLATION
RTC
FW-1
21
52b RTA
52H RTA
22
FW-2
21
52b RTA
52H BYA
22
FW-4
52b RTB
52H RTB
FW-5
21
52b BYB
52b BYB
22
FW-6

MATERIAL ORDER/ITEM CLASSIFICATION

WESTINGHOUSE
1447 CHESTNUT AVE.
HILLSIDE, N.J. 07205
~~SUPPLIER~~ TRIP BREAKER
~~SOLE SOURCE~~ YES ☐ NO ☒ DATE REQ.

R/C 063 EST. COST $9,000
AUTH. CE 36.10
ACCT. N530.000 LOC. CODE 1614
W.O. # 948069 OCR #
SUPERVISOR'S CONTROL # 009944

MATERIAL DESCRIPTION/SERVICE REQUIRED	FOLIO INFORMATION REQ	CL	CODE	OPT.	OR	*ITEM CLASSIFICATION SE	NU	1-E	10 CFR 21	QA	QUALITY PROVISIONS QAF-19/OTHER
REFER TO WESTINGHOUSE INSTRUCTION I.B. 33-850-3D											
COMPLETE DB-50 TYPE A CIRCUIT BREAKER	YES	34	2004	0		2	NA	NA	N	3	
FOR ITEMS 2 - 13 REFER TO ATTACHED SHEET	YES										
S.P.I.N. ESPOTS											
PAIR OF RAIL EXTENDERS (USE FOR REMOVAL OF ACB FROM THE CUBICLE)	NO					2	NA	NA	N	3	
A VERBAL EST. COST OF $9,000 WAS GIVEN BY WESTINGHOUSE											

Habet DATE 5/27/81 DEPT. HEAD [signature] DATE 5/28/81

SPONSOR ENG. DATE

DATE QAD [signature] DATE 6/4/81

SE: SEISMIC 1, 2, 3, NA
NU: NUCLEAR CLASS 1, 2, 3, NA
1E: CLASS 1E ELECTRICAL EQUIP. N.A
10CFR21 APPLIES: Y-YES N-NO
QA: 1 - SAFETY-REL./QA PROVISIONS
2 - NON-SAFETY-REL./QA PROVISIONS
3 - COMMERCIAL CATALOG ITEM
4 - NON-SAFETY-REL./NO QA PROVISIONS

2764

LOCAL P. O. NO. BLANKET REQ. NO. P. O. NO.

Take it
9-24-81 ll

FORM AP-134 REV. 4

OFFICE

E-17

MATERIAL REQUEST AND RECEIVING RECORD

PSE&G Public Service Electric and Gas Company

NEW JERSEY SALES AND USE TAX
DIRECT PAYMENT PERMIT – DP-221-212-800

☐ PURCHASE REQUISITION NO. 2764
☐ LOCAL PURCHASE ORDER NO.
☐ SHIPMENT OF MATERIAL RELEASE
☐ MEMORANDUM FOR CHANGE-IN-ORDER
☐ RECEIVING AND INVOICE RECORD (NON-GENERAL STORES MATERIAL OR SERVICE)

DATE PREPARED	LOCATION CODE NO.	STOREROOM NO.
0..20..81	1614	105
DATE OF P.O.	PURCHASE ORDER NO.	
INVOICE NO.	INVOICE DATE	DATE INV. APP'D.
RESPONSIBILITY CENTER	COST ELEMENT	
063	36.10	

VENDOR

SHIP TO: PUBLIC SERVICE ELECTRIC AND GAS CO.
SALEM GENERATING STATION
END OF BUTTONWOOD ROAD GATE #2
HANCOCKS BRIDGE, N.J. 08038

VIA

QUALITY ASSURANCE

NUCLEAR SAFETY RELATED ☐ YES ☐ NO ☑ CCI
QA PROVISIONS ☐ YES ☑ NO
10CFR PART 21 APPLIES ☐ YES ☑ NO
QAF-29 CONTROL NO.
QAF-19 CONTROL NO.
OTHER
REQUISITIONER
QA APPROVAL

ITEM NO.	QUANTITY REQUIRED	DESCRIPTION: MATERIAL OR SERVICES	AUTH/ACCT. NO. STOCK CODE NO.	QUANTITY RECEIVED	COST DATA
		PLEASE SUPPLY THE MATERIAL PER THE ATTACHED SHEET	N530.000		
		"COMMERCIAL CATALOG ITEM" NO SUBSTITUTIONS PERMITTED			
		W.O. #948069			
		MG/IC #9944			
		SUGGESTED VENDOR WESTINGHOUSE ELECTRIC 1447 CHESTNUT AVE. HILLSIDE, N.J. 07205 (4) CAPEL/11			

DELIVERY REQUIRED	TO BE USED FOR	ESTIMATED COST ☐ UNDER $500 ☐ $500 & OVER AMOUNT	REQUISITIONER TEL. EXT.
	REACTOR TRIP BREAKER	$9,000.00	
TERMS OF SHIPMENT	TERMS OF PAYMENT		APPROVED
			APPROVED

DELIVERED BY	DELIVERY TICKET NO.	WEIGHT	NO./KIND CONTAINERS	DATE RECEIVED
TRANSPORTATION CHARGES ☐ PREPAID ☐ TO FOLLOW	☐ PAID LOCALLY – AMOUNT	ACCOUNT	RECEIVED BY	APPROVED

E-18
3-80

SUPERVISOR

DATE: 3-28-81

ORDER ATTACHMENT (1)

SALEM NUCLEAR GENERATING STATION

REQ. NO. 2764
or
P.O. NO.
REL. NO.

ITEM	QUANTITY	MATERIAL	FOLIO	COST
		REFER TO WESTINGHOUSE INSTRUCTION I.B. 33-850-3D		
1	1	COMPLETE DB-50 TYPE A CIRCUIT BREAKER FOR ITEMS 2-13	34-2004	
2 *	2	AUXILIARY SWITCH FIG. 21 COMPLETE SWITCH	34-8945	
3	3	CONTROL RELAY FIG. 15 COMPLETE RELAY	37-5524	
4 *	2	OPERATING COIL NO. 166	28-0005	
5 *	6	POLE UNIT FIG. 3 STATIONARY ARCING CONTACT NO. 314	28-2006	
6 *	3	STATIONARY MAIN CONTACT NO. 313	28-2007	
7	6	MOVING ARCING CONTACT NO. 301	28-2010	
8 *	4	MOVING MAIN CONTACT NO. 312 2008570G01	28-2008	
9 *	4	AUXILIARY MAIN CONTACT NO. 310	28-2009	
10 *	2	ELECTRIC OPERATION CLOSING COIL FIG. NO. 304	28-0006	
11 *	2	SHUNT TRIPPING COIL FIG. 16 NO. 320	28-0007	
12 *	3	OVERCURRENT DEVICE COMPLETE FIG. 6	34-8946	
13 *	2	RETAING RINGS ASSORTMENT 497A346G03 S.P.I.N. ESPUTS	34-8947	
14	2	PAIR OF RAIL EXTENDERS (USE FOR REMOVAL OF ACB FROM THE CUBICLE)		

A VERBAL EST. COST OF $9,000. WAS GIVEN BY WESTINGHOUSE.

*. ALREADY ASSIGNED

"COMMERCIAL CATALOG ITEM"
NO SUBSTITUTIONS PERMITTED

REACTOR TRIP BREAKER

(4) GABEL/11

** WHEN SHIPPING AND BILLING, PLEASE LIST OUR FOLIO NUMBER NEXT TO ITEM SHIPPED AND BILLED.

Stan - Duke Berg. 201-926-6587 — CALL W PO # ASAP — LEO RANDE DELY INFO.

HOT.

MATERIAL ORDER/ITEM CLASSIFICATION

VENDOR: WESTINGHOUSE
ADDRESS: 1447 CHESTNUT AVE
Hillside, N.J 07205
SYSTEM/COMPONENT: Reactor Trip/Bypass BKR.
CONFIRMING ORDER: YES X NO ☐ DATE REQ.
WAIK THRU

R/C: 06-3
AUTH.:
ACCT.: P530.000
W.O. #: OD 704110
SUPERVISOR'S CONTROL #:

EST. COST: $1500.00 NTE
CE: 36.10
LOC. CODE: 1614
DCR #:

02029

ITEM NO.	QTY.	U/M	MATERIAL DESCRIPTION/SERVICE REQUIRED	FOLIO INFORMATION REQ	FOLIO INFORMATION CL	FOLIO INFORMATION CODE	FOLIO INFORMATION OR PT.	FOLIO INFORMATION OR	*ITEM CLASSIFICATION SE	NU	1-E	10 CFR 21	QA	QUALITY PROVISIONS QAF-19/OTHER
1	2	ea	Coil # 5-1491404.						NA	NA	NA	N	3	NONE
2	2	ea	Undervoltage Trip # 23A9019G75 with above coil installed						NA	NA	NA	N	3	"
			Parts for Westinghouse DB-50 Code A, 1600A frame breaker Serial 224Y7268B											
			On 8/27/82											

E-20

SUPERVISOR: [signature] DATE 8/26/82 DEPT. HEAD: [signature] DATE 8/26/82

SPONSOR ENG. _____ DATE _____

SQAE _____ DATE _____ QAD: W. W. Lowe DATE 8-27-82

*SE: SEISMIC 1, 2, 3, NA
NU: NUCLEAR CLASS 1, 2, 3, NA
1E: CLASS 1E ELECTRICAL EQUIP. NA
10CFR21 APPLIES: Y-YES N-NO
QA: 1 - SAFETY-REL./QA PROVISIONS
2 - NON-SAFETY-REL./QA PROVISIONS
3 - COMMERCIAL CATALOG ITEM
4 - NON-SAFETY-REL./NO QA PROVISION

REQ. NO. 7518 LOCAL P. O. NO. _____ BLANKET REQ. NO. _____ P. O. NO. 866077

K. 8/26/82

AP-19 FORM AP-19-1

MATERIAL RELEASE AND RECEIVING RECORD

PSE&G Public Service Electric and Gas Company

NEW JERSEY SALES AND USE TAX
DIRECT PAYMENT PERMIT – DP-221-212-900

☒ PURCHASE REQUISITION NO. 7518
☐ LOCAL PURCHASE ORDER NO.
☐ SHIPMENT OF MATERIAL RELEASE
☐ MEMORANDUM FOR CHANGE-IN-ORDER
☐ RECEIVING AND INVOICE RECORD (NON-GENERAL STORES MATERIAL OR SERVICE)

VENDOR
WESTINGHOUSE
1447 CHESTNUT AVE
MILLSIDE, NJ 07205

COMMERCIAL CATALOG ITEM

SHIP TO
PUBLIC SERVICE ELECTRIC AND GAS CO.
SALEM GENERATING STATION
END OF BUTTONWOOD ROAD, GATE #4 WHSE. 2
HANCOCKS BRIDGE, N.J. 08038

VIA

DATE PREPARED	LOCATION CODE NO.	STOREROOM NO.
8/27/82	1614	185

DATE OF P.O.	PURCHASE ORDER NO.	CONFIRMING
		8Q1.077

INVOICE NO.	INVOICE DATE	DATE INV. APP'D

RESPONSIBILITY CENTER	COST ELEMENT
063	36.10

QUALITY ASSURANCE

NUCLEAR SAFETY RELATED ☐ YES ☐ NO ☒ CC
QA PROVISIONS ☐ YES ☒ NO
10CFR PART 21 APPLIES ☐ YES ☒ NO
QAF 28: CONTROL NO. NP
Q.F-19: CONTROL NO. NP
OTHER NONE
REQUISITIONER
QA APPROVAL

ITEM NO.	QUANTITY REQUIRED	DESCRIPTION, MATERIAL OR SERVICES	AUTH/ACCT. NO. STOCK CODE NO.	QUANTITY RECEIVED	COST DATA
		CONFIRMING ORDER – DO NOT DUPLICATE	P530.000		Pdq-24
	2/EA	COIL P S-1491404		2	45.00
	2/EA	UNDER VOLTAGE TRIP #23A9019G75 WITH ABOVE COIL INSTALLED PARTS FOR WESTINGHOUSE DB-50 CODE A, 1600 A FRAME BREAKER SERIAL 224Y7268B.		B/O	Packed
		"COMMERCIAL CATALOG ITEM" NO SUBSTITUTIONS PERMITTED	Order confirmed.		
		MO/ICI 20299			
	(4)	RANDEL/cash	Received	2	TBD

INSPECTED BY E Bell
M Sutton INT.

DELIVERY REQUIRED	TO BE USED FOR	ESTIMATED COST	☐ UNDER $500 ☒ $500 & OVER AMOUNT $1,890.00	REQUISITIONER	TEL. EXT.
	REACTOR TRIP/BY PASS BKR.				

TERMS OF SHIPMENT	TERMS OF PAYMENT	APPROVED
RECEIVING INSPECTION SATISFACTORY	Net 30	
		APPROVED

DELIVERED BY	DELIVERY TICKET NO.	WEIGHT	NO./KIND CONTAINERS	DATE RECEIVED
Air Freight	07041		1 bx	8-31-82

TRANSPORTATION CHARGES	☐ PREPAID ☐ TO FOLLOW	☐ PAID LOCALLY – AM ACCOUNT	E-21	RECEIVED BY	APPROVED
				DP	

95-0936 12M 1-82

PSE&G An Equal Opportunity Employer

Public Service Electric and Gas Company
80 Park Plaza Newark, N.J. 07101 Phone 201/430-7000

Accounting 866077
Purchase Order Date 8/31/82

Vendor → WESTINGHOUSE
1447 CHESTNUT AVE.,
HILLSIDE, N.J. 07205

Follow Up

Promised Shipment Date

Shipped Via

Expected Delivery Date

Telephone Number

Public Service Electric and Gas Company

Ship To → P.O. BOX J., STATION B66077
END OF BUTTONWOOD RD.,
GATE NO. 4 - WHSE. #2
HANCOCKS BRIDGE, NJ 08038

Mark On Your Invoice: Order No. 866077
and Location 1614

Randel

Ship Via BEST WAY-PRPD., AIR MOORE → Material To Be Delivered Week of:

Item No.	Quantity	Material/Services	Price
		COMMERCIAL CATALOG ITEM NO SUBSTITUTIONS PERMITTED CONFIRMING ORDER - DO NOT DUPLICATE ORDER CONFIRMED WITH DICK BERG ON 8/27/82 BY M. SUTTON ITEM*9/1/82 (*NO.1) DELIVERY - ITEM #2 - TBD	
	2 EA.	COIL #S-1491404	$45.00E
	2 EA.	UNDER VOLTAGE TRIP #23A9019G75 WITH ABOVE COIL INSTALLED PARTS FOR WESTINGHOUSE DB-50 CODE, A, 1600 A FRAME BREAKER SERIAL 224Y7268B. REQ.#7518 063 - 3610 - P530.000	$900.00E

If information as to material covered by this order is required, please communicate with buyer R.W.MOORE-609-935-1291

Terms of Shipment: F.O.B. S/P AIR FREIGHT FROM PITTSBURGH PA.

John G. Gill
General Manager - Purchasing

Terms of Payment N/30

OB:

EG700

MATERIAL ORDER/ITEM CLASSIFICATION

R Westinghouse Electric
S 1447 Chestnut St.
Hillside, N.J. 07205

COMPONENT

ING ORDER: YES X NO ☐ DATE REQ.

R/C 063 EST. COST 13,450.00
AUTH. CE
ACCT. N530.210 LOC. CODE 1614
W.O. # 948069 DCR #
SUPERVISOR'S CONTROL # 021762

U/M	MATERIAL DESCRIPTION/SERVICE REQUIRED	FOLIO INFORMATION REQ	CL	CODE	OR PT.	OR	*ITEM CLASSIFICATION SE	NU	1-E	10 CFR 21	QA	QUALITY PROVISIONS QAF-19/OTHER
	Change In Order #2											
	Add the following to order:											
ea	Type DB-50 Electrically						NA	NA	NA	N	3	NONE
	Operated (non-automatic) Breaker											
	complete, duplicate of Serial											
	244 7628B, Type A @ ~~$13,450.00~~											
	20 week delivery.											
	Ref: Westinghouse Order NA-30599											
	~~dated~~ ~~Requisition~~ 9-15-82 MP											

E-23

DATE 9/15/82 DEPT. HEAD DATE

*SE: SEISMIC 1, 2, 3, NA
NU: NUCLEAR CLASS 1, 2, 3, NA
1E: CLASS 1E ELECTRICAL EQUIP, NA
10CFR21 APPLIES: Y-YES N-NO
QA: 1 - SAFETY-REL./QA PROVISIONS
2 - NON SAFETY-REL./QA PROVISIONS
3 - COMMERCIAL CATALOG ITEM
4 - NON-SAFETY-REL./NO QA PROVISIONS

(E)

SPONSOR ENG. DATE

DATE QAD H.B. Lowe DATE 9-15-82

2604 LOCAL P. O. NO. BLANKET REQ. NO. P. O. NO. C/O #2 839270

FORM AP-19-1

ACCOUNTING

PSE&G

Public Service Electric and Gas Company
80 Park Plaza, P. O. Box 570, Newark, N. J. 07101
Phone 201/430-7000

Purchase Order No. 83270 2

Purchase Order Date 1/27/82

Change Order No. 2

Change Order Date 9/29/82

Vendor
WESTINGHOUSE ELECTRIC
1447 CHESTNUT AVE.
HILLSIDE, N.J. 07205

Public Service Electric and Gas Company
Ship To
SALEM GENERATING STA. 839270
END OF BUTTONWOOD RD. GATE #4
WHSE #2
HANCOCKS BRIDGE, N.J. 08038

Mark On Your Invoice:
Order No. and Location 839270 1614
REQ. #2764 MOORE

Item No.	Quantity	Material/Services	Price
		"COMMERCIAL CATALOG ITEM" NO SUBSTITUTIONS PERMITTED CONFIRMING ORDER - DO NOT DUPLICATE ADD THE FOLLOWING TO ORDER:	
	1 EA.	TYPE DB-50 ELECTRICALLY OPERATED (NON-AUTOMATIC) BREAKER COMPLETE, DUPLICATE OF SERIAL 2A476283, TYPE A, 20 WEEK DELIVERY CONFIRMED VERBALLY TO CHARLES BAYLAY ON 9/10/82 BY D. CRAIG DELIVERY 2/2/82 ALL OTHER TERMS & CONDITIONS REMAIN THE SAME.	13,450.00 EA.

CHANGE-IN-ORDER

John G. Gill
General Manager - Purchasing

If information as to material covered by this order is required, please communicate with buyer R.W. MOORE Tel. 430-4972

E-24

CHARLEY BARCLAY 201-663-7479 WALK THRU

MATERIAL ORDER/ITEM CLASSIFICATION

VENDOR WESTINGHOUSE ELECTRIC

ADDRESS P.O. Box 3000 1447 CHESTNUT AVE
HILLSIDE, NEW JERSEY 07205

SYSTEM/COMPONENT REATOR TRIP BREAKERS

CONFIRMING ORDER: YES X NO ☐ DATE REQ. 2/25/83
WALK THRU

R/C 063 EST. COST $3,500.00

AUTH. ~~D60798~~ D60799 ~~D67994~~ CE 36.10

ACCT. NS30.141 LOC. CODE 1614

W.O. # 097-925217 DCR #

SUPERVISOR'S CONTROL # 028445

ITEM NO.	QTY.	U/M	MATERIAL DESCRIPTION/SERVICE REQUIRED	FOLIO INFORMATION REQ	CL	CODE	OR PT	OR	*ITEM CLASSIFICATION SE	NU	1-E	10 CFR 21	QA	QUALITY PROVISIONS QAF-19/OTHER
1	8	EA	UNDERVOLTAGE TRIP COILS ~~FOR~~						N/A	N/A	N/A	N	3	N/A
			(WESTINGHOUSE P/N 23A9019G75											
			DB50 STYLE											
			PROVIDE AIR FREIGHT DELIVERY											

E-25

REFUELING

RECEIVED
FEB 25 1983
MATERIAL CONTROL GROUP

bdl 8-25-83

SUPERVISOR [signature] DATE 2/25/83 DEPT. HEAD [signature] DATE 2/25/83

*SE: SEISMIC 1, 2, 3, NA
NU: NUCLEAR CLASS 1, 2, 3, NA
1E: CLASS 1E ELECTRICAL EQUIP, NA
10CFR21 APPLIES: Y-YES N-NO
QA: 1 - SAFETY-REL./QA PROVISIONS
2 - NON-SAFETY-REL./QA PROVISIONS
3 - COMMERCIAL CATALOG ITEM
4 - NON-SAFETY-REL./NO QA PROVISIONS

SPONSOR ENG. _____ DATE _____

SQAE _____ DATE _____ QAD [signature] DATE 2/28/83

REQ. NO. 1164-M LOCAL P. O. NO. _____ BLANKET REQ. NO. _____ P. O. NO. 885297

AP-19 FORM AP-19-1 4/25/83 REV. 4

OFFICE

REQUEST FOR CHANGE IN ORDER REQ. NO. 1644-M

DATE	PURCHASE ORDER NO.	CHANGE NO.	VENDOR NO.
3/2/83	885297	#1	026262

SAME TERMS _____ DO NOT PRINT C.O. _____

DO NOT SEND TO VENDOR _____ CANCEL P.O. _____ CLOSE P.O. _____

CODE	LINE ITEM NO.	CHANGES FROM	CHANGES TO

FORWARDED VIA TWX MAR 2 1983 P.E.S.

E-26

☐ OVERRIDE SHIP TO ADDRESS

ADD ITEM	QUANTITY	U/M	DLV'Y. DATE	SUP. IND.	PRICE	U/M	DISCOUNTS	MULTIPLIER
								COMM. NO.

CONVERSION FACTOR

ORDER U/M = PRICE U/M

☐ DO NOT EXPEDITE

LINE ITEM DESCRIPTION

DELETE CCI CLASSIFICATION. NEW CLASSIFICATION: SAFETY Related, QA Position. Stated on QRF 24 Mo. 2.477 4c. 10CFR. Part 21 Applies.

ADD: CERTIFICATE OF COMPLIANCE WITH SHIPMENT TO STATE THAT "THIS EQUIPMENT MEETS ORIGINAL SUPPLIED SPECIFICATION" AS SPECIFIED BY WESTINGHOUSE.

ADDITIONAL 1E CERTIFICATION FROM WESTINGHOUSE TO BE SUPPLIED AFTER SHIPMENT.

QUANTITY OF EIGHT (8) REMAINS THE SAME.

NOTE: 1E IS DEFINED AS MEETING IEEE323-74 AGING AND 344-75 SEISMIC

MO/IC 42080

USE: REACTOR TRIP BREAKERS
R. TIERNEY/mp

VENDOR: WESTINGHOUSE ELECTRIC
P.O. BOX 3000
1447 CHESTNUT AVE.
HILLSIDE, N. J. 07205

NOTES

CONFIRMED VERBALLY
TO: Marilyn Paulson
ON: 3/1/83 BY: R.E. Strong Jr.
DELIVERY 3/4/83

NUCLEAR SAFETY REL. ☒ YES ☐ NO ☐ CCI

QA PROV. APPL. ☒ YES ☐ NO

QA APPROV. R.E. Tierney

CODES

UP - UNIT PRICE
COP - CHANGE TOTAL PRICE
QTY - QUANTITY
PRUM - PRICING U/M
ORDER U/M
NT
ICTIONS

STDN - STANDARD NOTES
LIST - LINE ITEM STATUS (O OPEN, C CLOSE, D DELETE)
BOA - BLANKET ORDER TOTAL AMOUNT
BOE - BLANKET ORDER EXPIRATION DATE
BOS - BLANKET ORDER START DATE
QA - QUALITY ASSURANCE REQUIREMENTS
BRL - BLANKET ORDER RELEASE LIMIT

MULT - MULTIPLIER
CVOR - CONV. FACT. ORDER U/M
CVPR - CONV. FACT. PRICE U/M
DLVY - LINE ITEM DLVY. DATE
PAY - TERMS OF PAYMENT
FOB - TERMS OF SHIPMENT

SIGNED

APPROVED

R. DeYoung 3/3

CERTIFICATE OF CONFORMANCE

Switchgear Division

Westinghouse Electric Corporation

Purchaser PSE & G CO Salem

Purchaser's Order No. NA37013-01

Westinghouse G.O. No. RPS20009Y8 Item - A

Westinghouse S.O. No.

Description of Equipment/Material Undervoltage Trip Assy

S-23A9019G75 Qty-4

We hereby certify that the equipment/material listed above is in accordance with the purchaser's specifications and has been designed, manufactured, inspected and tested in accordance with the Switchgear Division Quality Assurance Program as detailed in the Switchgear Division Quality Assurance Manual. S-23A9019G75 is the same as S-23A9019G61 modfied.

R. Jones

Customer Order Engineering

Date 3/4/83

Q.W. Wagner

Quality Control Supervisor

Date 3/4/83

SW-974A

EQ/CP(83)-475

Westinghouse Electric Corporation
Water Reactor Divisions

Strategic Operations Division
Box 598
Pittsburgh Pennsylvania 15230

(412) 733-6391

March 3, 1983

Site Manager
Public Service Electric & Gas Co.
Salem Nuclear Station
Buttonwood Road
Hancocks Bridge, New Jersey 08038

CERTIFICATE OF QUALIFICATION

W Purchase Order RFS 20009Y8
Customer Order 385297
G.O. NA37013
Westinghouse P.O. Item #1

All material on the above orders are designed as replacement parts on switchgear at PSE&G, Salem. The components being supplied are under voltage relays PN 23A9019G75 and Dwg. 23A9019G75, Rev. 42.

The materials supplied conforms to all the quality assurance requirements and seismic requirements of the original equipment, Reference WCAP 7817, Supp. 6 (IEEE 344-71).

The installation of these replacement parts in no way affects the seismic qualification of the switchgear.

Very truly yours,

WESTINGHOUSE ELECTRIC CORPORATION

L. W. Gaussa, Sr. Engineer
Environmental Qualification
Customer Programs

LWG/tm

cc: QA File
PO File

LAR

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ENGINEERING AND CONSTRUCTION DEPARTMENT

CHIEF MECHANICAL ENGINEER
ENGINEERING DEPT.
Noted
DEC 1977
Sponsor
Due
Filed
Route
Copies
Distribution

GENERAL MANAGER—ENGINEERING
Engineering and Construction Dept.
DEC 6 1977
JJK
WAM
WDB
RDR
PRHL

DATE: December 2, 1977
RESPONSE DUE:

TO: Distribution
Project Manager - Salem

SUBJECT: PROJECT DIRECTIVES

OUR REF: SPD NO. 77-254

Wayne
Pls let you are ready we will talk about this. Joe

As a result of departmental responsibility changes and resultant changes in department procedures, this memo is issued to clarify the applicability of previously issued Project Directives to the Salem Unit 2 Project.

The following directives shall continue in effect with comments as noted:

2-01	Milestone Event Problem List
2-02	Milestone Event Achievement
2-06	Stop Work Order Request
2-10	Distribution of Drawings
2-11	Configuration Control Plan
PD-7	Equipment Classification List

Note: The responsibility for updating and distribution of this list has been assigned to the Engineering Department Project Engineer. This directive will remain in effect until a procedure covering this item has been issued by the Engineering Department.

PD-15	Plant Security System

Note: Directive to remain in effect until the Engineering Department issues an appropriate procedure.

CONTROLS DIV. FILE
FAC
DEC 06 1977
JFW | EWM
RWR | DN
RLG | JJW

2-02

DC II for action
Em

All other Project Directives as tabulated below are hereby cancelled effective immediately. Please remove these directives from your manual and file.

2-03 - copy
2-04 - [redacted] - FAC to review
2-05 - HCGS to review and notify FAC if replacement to issued.
2-07 - copy
2-08 - cancel

PD's 1 through 6
PD's 8 through 14
PD's 16 through 21

DJJ:sy

Distribution:

General Manager - Licensing and Environment
General Manager - Engineering
General Manager - Construction
General Manager - Electric Production
Manager - Quality Assurance
Manager - Methods
Manager - Energy Laboratory
Manager - Salem Nuclear Generating Station
Assistant Manager - Quality Assurance
Manager Nuclear Operations
Chief Mechanical Engineer
Chief Controls Engineer
Chief Electrical Engineer
Chief Structural Engineer
Chief Designing Engineer
Chief Cost Engineer
Construction Manager - Projects
Project Engineer - Salem
Assistant Project Manager - Salem
J. A. Slusarz
J. D. Gassaway
Project Manager - Salem
SPD File (3)
Project Manager - Hope Creek
Project Manager - Atlantic
R. W. Skwarek
E. W. Barradale
H. P. Sciaraffa
E. A. Liden
H. D. Reppin
S. Chawaga
M. Koenig
P. L. Moyer

IDENT NO	EQUIPMENT/STRUCTURE/COMPONENT	UNIT	SYS CODE	NO REQ	SPON DIV	SR	S CL	N CL	E CL	VENDOR NAME	PO-CO NO.	DEL DATE	QAF-19 REP. NO	SPEC NO.	QA
00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
601038A B	RC POWER CABINETS	1	R100	5	E	YES	1	-	-	W NICD	W120090 CN 1-2	70-12-22	CR-12	CAT NO	YES
601039A B	RC DC HOLD CABINETS	1	R100	1	E	YES	1	-	-	W NICD	W120090 CN 1-2	70-11-25	CR-12	CAT NO	YES
601040A	RC 5 KVA REGULATOR	1	R100	1	E	YES		-	-	RCP ELTIN	W112[illegible]	70-02-20		CAT NO	YES
601041A	RC 5 KVA TRANSFORMER	1	R100	1	E	NO	3	-	-	WARD LENRD	W112193	70-06-09	CR-3	CAT NO	NO
601042A	RC VOLTRAP	1	R100	1	E	NO	3	-	-	W BUFFALO	W126104	70-02-20	CR-3	CAT NO	NO
601043A B C D E	FLUX MAPPING DRIVE UNITS	1	R100	1	E	NO	3	-	-	TELEFLEX	W91315 CN 6 CN 8 CN 9 CN 17	70-11-12	CR-3	CAT NO	NO
601044A B C D E	FM DETECTOR DRIVE CABLES	1	R100	1	E	NO	3	-	-	TELEFLEX	W91315 CN 6 CN 8 CN 9 CN 17	70-11-12	CR-3	CAT NO	NO
601045A B C D E	FM ROTARY XFER UNITS	1	R100	1	E	NO	3	-	-	TELEFLEX	W91315 CN 6 CN 8 CN 9 CN 17	70-11-12	CR-3	CAT NO	NO
601046A B	REACTOR TRIP SWITCHGEAR	1	R100	1	E	YES	1	-	-	W SWGR	W123134 CN 1-2	71-03-09	ER-14	CAT NO	YES
601050A B	AUXILIARY RELAY RACKS	1	R100	1	E	YES		-	-	W NICD	W93481 CN1-8	71-10-01	CR-12	CAT NO	YES

P.S.E.&G. ELECTRIC ENGINEERING DEPARTMENT SALEM NUCLEAR GENERATING STATION
EQUIPMENT MASTER FILE NO. 255

DATE 10/24/77
PAGE 0100

IDENT NO	EQUIPMENT/STRUCTURE/COMPONENT	UNIT	SYS CODE	NO REQ	SPON DIV	SR	S CL	N E CL CL	VENDOR NAME	PO-CO NO.	DEL DATE	QAF-19 REP. NO	SPEC NO.	QA
00	01	02	03	04	05	06	07	08 09	10	11	12	13	14	15
601074A B	ROD CONTROL SYS POWER CABINET	2	R100	5	E	YES	1	- -	W NICD	W120098 CN 1-4	71-02-26		CAT NO	YES
601075A B	RCS DC HOLD CABINET	2	R100	1	E	YES	1	- -	W NICD	W120098 CN 1-4	71-03-02		CAT NO	YES
601076A	RCS 5 KVA TRANSFORMER	2	R100	1	E	YES	1	- -	WARD LENRD	W112193	70-02-20		CAT NO	YES
601077A	RCS 5 KVA REGULATOR	2	R100	1	E	YES	1	- -	RPC ELTN	W112191	70-02-20		CAT NO	YES
601078A	RCS VOLTRAP	2	R100	1	E	YES	1	- -	W BUFF	W126105	70-02-18		CAT NO	YES
601079A B C D E	FLUX MAPPING DRIVE UNITS	2	R100	1	E	YES	1	- -	TELEFLEX	W91315 CN 6 CN 8 CN 9 CN 17	71-07-14		CAT NO	YES
601080A B C D E	FLUX MAPPING DETECTOR DRIVE CABLES	2	R100	1	E	YES	1	- -	TELEFLEX	W91315 CN 6 CN 8 CN 9 CN 17	71-07-14		CAT NO	YES
601081A B C D E	FLUX MAPPING ROTARY TRANSFER UNITS	2	R100	1	E	YES	1	- -	TELEFLEX	W91315 CN 6 CN 8 CN 9 CN 17	71-07-14		CAT NO	YES
601082A B	ELEC SYS REACTOR TRIP SWITCHGEAR	2	R100	1	E	YES	1	- -	W SWGR	W123135 CN 1-2	70-12-04		CAT NO	YES
601086A B	ELEC SYS AUXILIARY RELAY RACKS	2	R100	1	E	YES		- -	W NICD	W93477 CN 1-7			CAT NO	YES

RECORD SHEET

Date - 8/11/81
Ent. PDC -

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ENGINEERING AND CONSTRUCTION DEPARTMENT

DATE: July 15, 1981
RESPONSE DUE: None

TO: Distribution

FROM: R. D. Rippe
Chief Mechanical Engineer

SUBJECT: MASTER EQUIPMENT LIST
UNIT NO. 1
SALEM NUCLEAR GENERATING STATION

Attached is the Master Equipment List (MEL) for the Salem Unit No. 1. This list is issued for information purposes and in accordance with NRC requirements.

R. D. Rippe /lr

Distribution:

General Manager - Engineering
General Manager - Nuclear Production (6)
General Manager - Corporate Quality Assurance
Chief Electrical Engineer
Chief Designing Engineer
Chief Controls Engineer
Chief Structural Engineer
Manager - Salem Projects
Nuclear Plant Engineer (2)

CG:gs

Attach.

GK 05

RECEIVED
SALEM GEN. STA.
AUG 5 1981
TECHNICAL DOCUMENT ROOM

department ups
signed for MEL
from TDR

PSE&G

Public Service Electric and Gas Company 80 Park Plaza Newark, N.J. 07101 Phone 201/430-7000

RECEIVED
AUG - 5 1981
SALEM GEN. STA.

August 4, 1981

TDR.

To the Manager - Salem Generating Station

MASTER EQUIPMENT LIST
SALEM GENERATING STATION
NO. 1 UNIT

Attached are five copies of the Master Equipment List (MEL) for your information.

R. A. Uderitz
General Manager -
Nuclear Production
By: J. M. Zupko Jr. /cj

CPJ:rp
Attachment

CC Nuclear Plant Engineer

PUBLIC SERVICE ELECTRIC & GAS COMPANY

ENGINEERING AND CONSTRUCTION DEPARTMENT

TRANSMITTAL LETTER

DATE 7/17/81

OUR REF. _____

YOUR REF. _____

RESPONSE DUE DATE _____

TO:

_____ VICE PRES. - ENGG. AND CONST.
_____ GENERAL MANAGER - ELECTRIC PRODUCTION
_____ GENERATING STATION - MANAGER _____
_____ GENERAL MANAGER - ELEC. TRANSM. & DISTN.
_____ DIVISION MANAGER, ELECTRIC _____
_____ SYSTEM PROTECTION ENGINEER
_____ GENERAL MANAGER - ENGINEERING
_____ GENERAL MANAGER - CONSTRUCTION
_____ GENERAL MANAGER - PURCHASING
_____ GENERAL MANAGER - LICENSING & ENVIRONMENT
_____ MANAGER - QUALITY ASSURANCE
_____ MANAGER - METHODS - ENGG. & CONST.
_____ MANAGER - ENERGY LABORATORY
_____ CONSTRUCTION SUPERINTENDENT, U.E. & C. INC.

_____ MANAGER - NUCLEAR FUEL
_____ MANAGER - NUCLEAR OPERATIONS
_____ CONSTRUCTION MANAGER - DISTN. PROJECTS
_____ CONSTRUCTION MANAGER - METHODS
_____ CONSTRUCTION MANAGER - PROJECTS
_____ CHIEF COST ENGINEER
20 CHIEF MECHANICAL ENGINEER
_____ CHIEF ELECTRICAL ENGINEER
_____ CHIEF STRUCTURAL ENGINEER
_____ CHIEF CONTROLS ENGINEER
_____ CHIEF DESIGNING ENGINEER
_____ PROJECT MANAGER - SALEM
_____ PROJECT MANAGER
_____

SALEM GENERATING STATION AUTH. A6300.1

SUBJECT: ELECTRICAL DIVISION - MASTER EQUIPMENT LIST

WE ATTACH THE NUMBER OF COPIES INDICATED ABOVE OF EACH OF THE FOLLOWING:

_____ P.S.E.&G. CO'S.
_____ MANUFACTURER'S
_____ U.E. & C'S
_____ BECHTEL'S
_____
_____
_____

_____ DRAWINGS
_____ MICROFILM
_____ EXPLANATION SHEETS
_____ INSTRUCTIONS
_____ SCHEDULES
_____ SPECIFICATIONS
_____ PROCEDURES

_____ INSTRUCTION BOOKS
_____ LETTERS
_____ MEMORANDA
_____ SKETCHES
20 REPORTS MEL
_____ MANUAL REVISIONS
_____

FOR: _____ APPROVAL _____ CONSTRUCTION
_____ COMMENTS _____ INFORMATION

T. J. MARTIN
VICE PRESIDENT
ENGINEERING AND CONSTRUCTION
BY ORIGINAL
G.W. SUPPLEE

GWS/JAD:bE

THE VICE PRESIDENT - ENGINEERING AND CONSTRUCTION

C/O - NAME _____ TITLE _____ LOCATION _____

_____ WE HAVE NO COMMENTS
_____ OUR COMMENTS ARE ATTACHED
_____ COMMENTS ON REVERSE SIDE

DATE _____

MASTER EQUIPMENT LIST-ELECTRICAL DIVISION

IDENT NO	EQUIPMENT/STRUCTURE/COMPONENT	SYST CODE	SR	S CL	N C	E CL	VENDOR NAME	PO CO NO.	MODEL NUMBER	SPEC NO	Q
601000A	CORY INTERLOCKS FOR 500KV SWITCHYARD	E110	NO	3	-	-	SUPERIOR	E197627		CAT NO	NO
601040A	500KV DISCONNECT SWITCH	E110	NO	3	-	-	I.T.E.			681306	NO
601046A	500KV LINE DISCONNECT SW	E110	NO	3	-	-	I.T.E.	E157576		681307	NO
601050A	500KV LOAD INTERRUPING SW	E110	NO	3	-	-	S.C. ELEC	E157575		69361	NO
601074A	500KV INSULATORS	E110	NO	3	-	-	LAPP. INS.			68369	NO
601075A	500KV CIRCUIT BREAKERS	E110	NO	3	-	-	WEST.			66220	NO
601077A	500KV COUPLING CAP. POTENE DEV.	E110	NO	3	-	-	G.E.	E159084		691308	NO
601086A	500KV SWITCHYARD POWER PANELS	E110	NO	3	-	-	F.P.E.	E157836		69311	NO
610073A	SUPERIOR KEY LOCKING UNITS	E110	NO	3	-	-	SUPERIOR	E198945		CAT NO	NO
610100A	CORY INTERLOCK	E110	NO	3	-	-	SUPERIOR	E200494		CAT.NO.	NO
610168A	LIGHTNING ARRESTOR STACK UNIT NO.705	E110	NO	3	-	-	GEN.ELEC.	E202262		CAT.NO.	NO
610299A	REPLACEMENT PARTS FOR 500KV BREAKERS	E110	NO	3	-	-	WESTINGHOUS	E206604		CAT NO	NO

INSTRUCTIONS FOR ITEMIZING EQUIPMENT FOR MEL

The Master Equipment List will be keyed by panel, rack, and cabinet numbers. Entry of information will always start in the extreme left hand column of the field.

EQUIPMENT THAT WILL BE LISTED

All equipment for Units 1 and 2 which does not have an associated instrument number will be listed.

PANEL/RACK/CABINET NUMBER

The panel number will be written in the form NAA-NNN-AA; where N is a one digit number which designates the unit involved, AA is the alphabetical abbreviation of the panel (See Table 1), NNN is the numeric designation of the panel and AA is an alphabetic designation used to differentiate between multiple panels with the same numeric designation. Rack and cabinet numbers will follow the same format (NAA) for the first three (3) figures only.

EQUIPMENT NOT MOUNTED ON PANELS, RACKS, OR CABINETS

Use the dummy panels 1PL-MISC. or 2PL-MISC. Examples of such equipment are gaskets, tubing, fitting, lubricating oil, etc.

EQUIPMENT IDENTIFICATION

This designation will be either numeric or alpha-numeric as indicated on the schematic drawing.

SYSTEM CODE

This code will be a designation consisting of either one or two alphabetical symbols followed by either a two or three digit number, e.g., M940, MC00. This information can be obtained from either the arrangement drawing, wiring diagram, schematic or the document entitled, "Controls Division's System Code and Assignments."

SAFETY RELATED

The designations for safety related will be F, N, or S, where F is safety related (functional), N is non-safety related and S is safety related (non-functional). This information can be obtained by consulting the appropriate sponsor engineer or referring to the purchase requisition, if one is available.

SEISMIC CLASS

If the equipment is safety related, then the seismic class designation is "1". The other designations are classes 2 and 3. This information can be obtained by consulting the sponsor engineer or referring to the definitions in CD-M-33, Rev. 3

QUALITY ASSURANCE

Quality assurance provisions will be either yes "Y" or no "N". This information can be obtained by consulting the appropriate sponsor engineer or by referring to a purchase requisition, if one is available.

ENVIRONMENT CLASS

The designation will be either A, B, C, or P. Refer to CD-M-37, Rev. 3.

MANUFACTURER CODE

This will be a two or three letter code. Refer to Table 2.

MAKE/MODEL/TYPE/QUANTITY

The make or manufacturer, model number, type, and quantity of equipment will be indicated here. This information may be obtained from the panel arrangement drawing, wiring diagram, purchase requisition or the sponsor engineer. If no information on manufacturer is available, indicate supplier.

TYPE CODE

An alphabetical code for the type of equipment will be indicated here. Refer to Table 3.

MODEL CODE

The first thirteen alphabetical symbols, digits, or both, of the model number will be indicated.

TAGGING INFORMATION

The basic function of the equipment or where it is located, is indicated here. This information may be obtained from the arrangement drawing or the sponsor engineer.

PURCHASE/CHANGE ORDER

This number will be written in the form A-NNNNNN, where A represents the alphabetical symbol E in the purchase order number, and the six N's represent the numeric portion of the number.

COMMERCIAL CATALOG ITEM (CCI)

The designation of CCI will be either "Yes" or "No". This decision may be made by referring to QAI 7-1, Attachment No. 2, attached.

PUBLIC SERVICE BLUEPRINT (PSBP)

If a PSBP number exists, it will be referenced on either the schematic, wiring diagram, instrument schematic, or the panel arrangement drawing. This number has six digits.

WIRING DIAGRAM, ELECTRICAL SCHEMATIC & INTERCONN. DIAGRAM

These drawings will be six digit numbers and they will be referenced on the panel arrangement drawings.

Instructions for Types DB-50, DBF-16 and DBL-50 Air Circuit Breakers



E-40

Westinghouse Electric Corporation

Switchgear Division, East Pittsburgh, Pa.

I.B. 33-850-3D, Effective May, 1970. Supersedes I.B. 33-850-3-C, March, 1966.

Recommended Spare Parts for DB50 Air Breaker

NAME OF PART (ALWAYS GIVE BREAKER S.O. REFERENCE)	STYLE NUMBER OR REFERENCE	NUMBER PER BREAKER OR DEVICE	NUMBER RECOMMENDED FOR BREAKERS		
			1	2 TO 5	6 UP
AUXILIARY SWITCH	FIG. 21				
4 POLE SWITCH UNIT	NO. 187	1 OR 2	-	1	2
FRONT COVER	NO. 186	1	-	-	1
CONTACT FINGER 184	1397624	8	-	4	8
CONTACT ROTOR 185	1397641	4	-	4	8
CONTROL RELAY	FIG. 15				
OPERATING COIL	NO. 166	1	-	1	2
BLOWOUT COIL & CIRCUIT-DC	NO. 161	1	-	1	2
MOVING CONTACT-LEFT POLE	NO. 153	1	-	2	4
MOVING CONTACT-RIGHT POLE	NO. 163	1	-	1	2
STATIONARY CONTACT-LEFT POLE	NO. 160	1	-	2	4
STATIONARY CONTACT-RIGHT POLE	NO. 165	1	-	1	2
COVER	NO. 159	1	-	-	1
POLE UNIT	FIG. 3				
STATIONARY ARCING CONTACT	NO. 314	3	3	6	12
STATIONARY MAIN CONTACT	NO. 313	3	-	1	3
MOVING ARCING CONTACT	NO. 301	3	3	6	12
MOVING MAIN CONTACT	NO. 312	6	-	2	4
AUXILIARY MAIN CONTACT	NO. 310	12	-	2	4
ELECTRIC OPERATION					
CLOSING COIL	FIG. 3 NO. 304	1	-	1	2
SHUNT TRIPPING COIL	FIG. 16 NO. 320	1	-	1	2
OVERCURRENT DEVICE COMPLETE	FIG. 6	3	-	1	2
RETAINING RINGS ASSORTMENT	497A346G03	1	1	2	3

NCD-ELEC-18

REPLACEMENT OF UNDERVOLTAGE ATTACHMENTS ON BREAKERS IN REACTOR TRIP SWITCHGEAR

December 17, 1971

Westinghouse Nuclear Energy Systems
Monroeville Nuclear Center
P. O. Box 355
Pittsburgh, Pennsylvania 15230

Prepared by:

W. H. Furfari
Electric Equipment Service

Approved by:

R. I. Hayford, Manager
Electrical Power Systems

Approved by:

S. G. Caslake, Manager
Electric Equipment Service

Approved by:

George Tabak, W East Pgh
Switchgear Eng'g

REPLACEMENT OF UNDERVOLTAGE ATTACHMENT ON BREAKERS IN REACTOR TRIP SWITCHGEAR

References:

1. W. L. McKeithan Trip Report dated 9/25/71
2. Letter E-EPS-619 (Hayford to Peterman) 9/29/71
3. Letter QAE 460 (Sossman to Durfee) 10/1/71
4. Letter NPSE-2472 (Caslake to various) 10/1/71

Attachments:

No. 1. Undervoltage Trip Attachment
No. 2. Cross-section of DB-50 Breaker
No. 3. Report of Compliance

Background:

Following reports of malfunctioning Undervoltage (UV) Attachments at CP&L H.B. Robinson Station, an investigation was undertaken by W Swgr. Division to establish the source(s) of the malfunctions, and to initiate any corrective action required for all breakers now in service or shipped.

Following extensive investigation by Switchgear Division, several modifying measures were established which will improve the reliability of the UV Attachment. These modifications are:

1. Relieving the radius at the base of "reset lever arm" to prevent striking upon the "latch guide pin"

2. Revised centering spacers for the "trip lever" U-plate.

3. An additional anti-friction polishing of the "latch" faces.

4. A minor dimensional change on the armature "rod".

Although the modified and non-modified UV attachments bear the same style number, Switchgear Division bears responsibility to see that all future shipments of Reactor Trip Breakers will be equipped with the modified UV attachments. WNES bears responsibility to see that modified attachments are supplied and installed on all previously shipped breakers.

Following is a procedure for exchanging the UV trip attachment on the reactor trip (and trip by-pass) breakers. It is recommended that the operation be performed under the supervision of an engineer who has a working knowledge and experience on the DB-50 breakers.

NOTE: This procedure in no way supplants required plant tests of the Reactor Protection System, but only provides a check on the replacement and operation of the UV Trip Attachment.

Prerequisites:

1. Replacement undervoltage attachment of the proper style is available with appropriate Certificate of Compliance.

2. The breaker is withdrawn from the cell onto extension rail, or removed to a work bench.

3. The lever is available for manual breaker operation.

Precautions:

1. Confirm that no electrical portions of the breaker, power and control, are, or can be, electrically energized.

2. The breaker exerts substantial kinetic energy during travel, whether manually or electrically operated. Observe appropriate precautions against personal injury.

Procedure:

1. Confirm that Prerequisites and Precautions listed above are complied with.

2. Confirm that the breaker is in the tripped position.

3. Remove the Arc Chutes from the center and right side (as viewed from outside) poles.

4. Separate the UV coil leads at the in-line connection beneath the platform.

5. Remove the two mounting screws, and take away the original UV attachment.

6. Install the new UV attachment in place, making certain that the "Trip Lever" does not bind with, and is beneath, the breaker "Trip Bar". Bolt in place with the original mounting hardware.

7. Run the coil lead via the same grommet and routing as the original coil, and reconnect to leads beneath the platform. Either polarity is satisfactory. Confirm electrical continuity by means of a multimeter check at terminals 11 and 12.

8. The UV attachment will be shipped with reset adjustment all "out" (i.e. minimum space between the fixed and movable reset arms), and therefore should remain in the TRIPPED condition with the breaker fully open. However, a false RESET usually occurs during the installation and mounting process. Therefore, the initial step is to cycle the UV attachment by manually moving the breaker toward the closed position to allow the UV attachment to trip.

   For finite observation of UV operation, breaker operation is obtained by manually pushing the center "moving arcing contact" in a slow but continuous motion. Pushing on one of the side contacts is not acceptable, as there may be some undesirable cocking of the moving assembly, and operation by the "lever handle" is not acceptable because the rapid movement and overtravel shock do not provide a critical check.

   With the UV deenergized, and the breaker in the open position, confirm that the UV attachment is in the TRIPPED condition as indicated by zero clearance between the "trip lever" and "trip bar". (The "trip lever" will actually be suspending the "trip bar" about 1/4 inch).

9. Confirm that the "reset lever" pivot/lock screw is sufficiently loose to permit movement between the fixed and movable "reset arms"; and loosen the lock-nut on the "reset lever" adjust screw.

10. Slowly increase the "reset lever adjustment" by turning the screw clockwise until RESET occurs. On initial adjustment, as much as 10 to 20 turns of the screw may be required. RESET action will be indicated by an audible click, slight dropping of the "trip lever" and "trip bar", and raising of the "trip latch".

11. After RESET action has occurred in step 10, turn the "reset adjust screw" <u>one additional turn</u>. Then relock the adjust screw and the pivot/lock screw.

12. Move the breaker toward the closed position until a TRIP occurs as denoted by a readily audible click, dropping of the "latch", and kick-out of the "trip lever".

13. Allow the moving assemble to move slowly toward the open position and confirm that RESET occurs just as the moving assemble comes to rest. (See step 10.)

14. Repeat steps 12 and 13 a sufficient number of times to be assured that TRIP action (on closing motion) and RESET action (just as the moving assemble comes to rest on opening motion) are correct. If, however, there are any malfunctions or questionable actions, readjust the "reset lever" and repeat steps 9 through 13.

15. Satisfactory deenergized operations, per the preceding step, is all that is required to prove the adequacy of the replacement UV attachment. If however, either temporary or permanent electrical power of the appropriate voltage (125 V dc, or 48 V dc) is available for energizing the UV coil, the UV portion of the breaker operation may be checked electrically as follows:

    15a. With the UV attachment remaining deenergized, operate the breaker by means of the manual lever, and confirm that the breaker trips "free" (open) on closing motion.

    15b. Energize the UV coil, and close the breaker by means of the manual lever. Normal breaker full and maintained closed operation should occur.

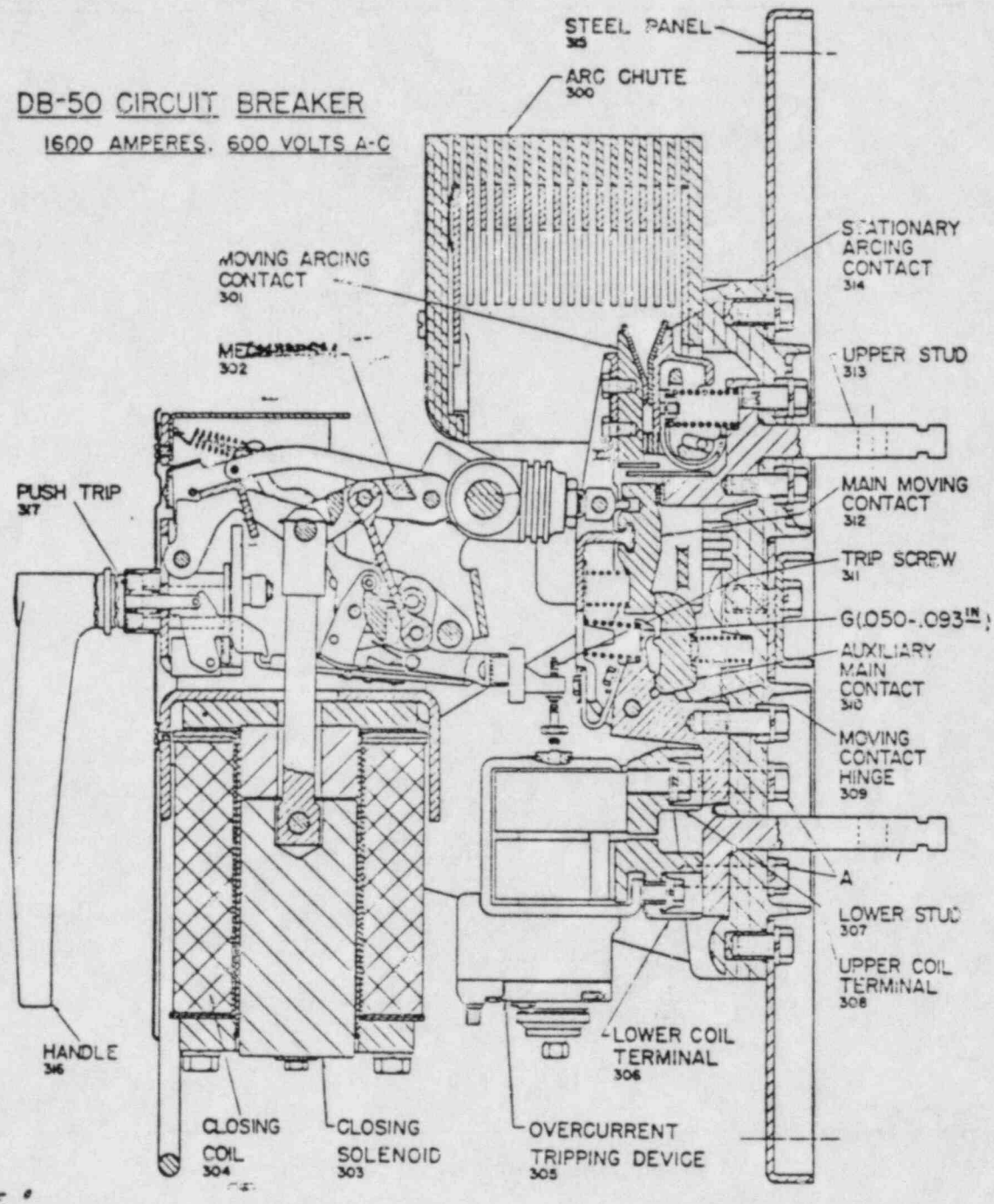
    15c. Deenergize the UV and confirm that the breaker immediately trips open.

    15d. Repeat step 15a.

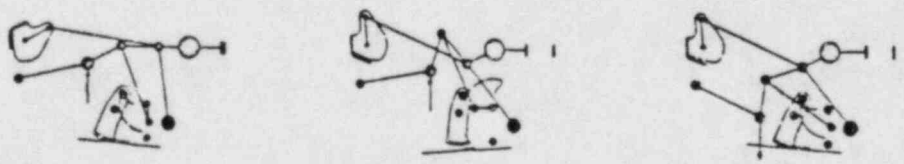
16. Restore the breaker to normal configuration including removal of any temporary wiring, and re-installation of arc chutes.

17. Make appropriate entry in the Plant equipment history records for this breaker to indicate that the modified UV attachment has been installed and checked.

18. Complete a Report of Compliance (Attachment No. 3) and return to S. G. Caslake at WNES, along with the original UV attachments.



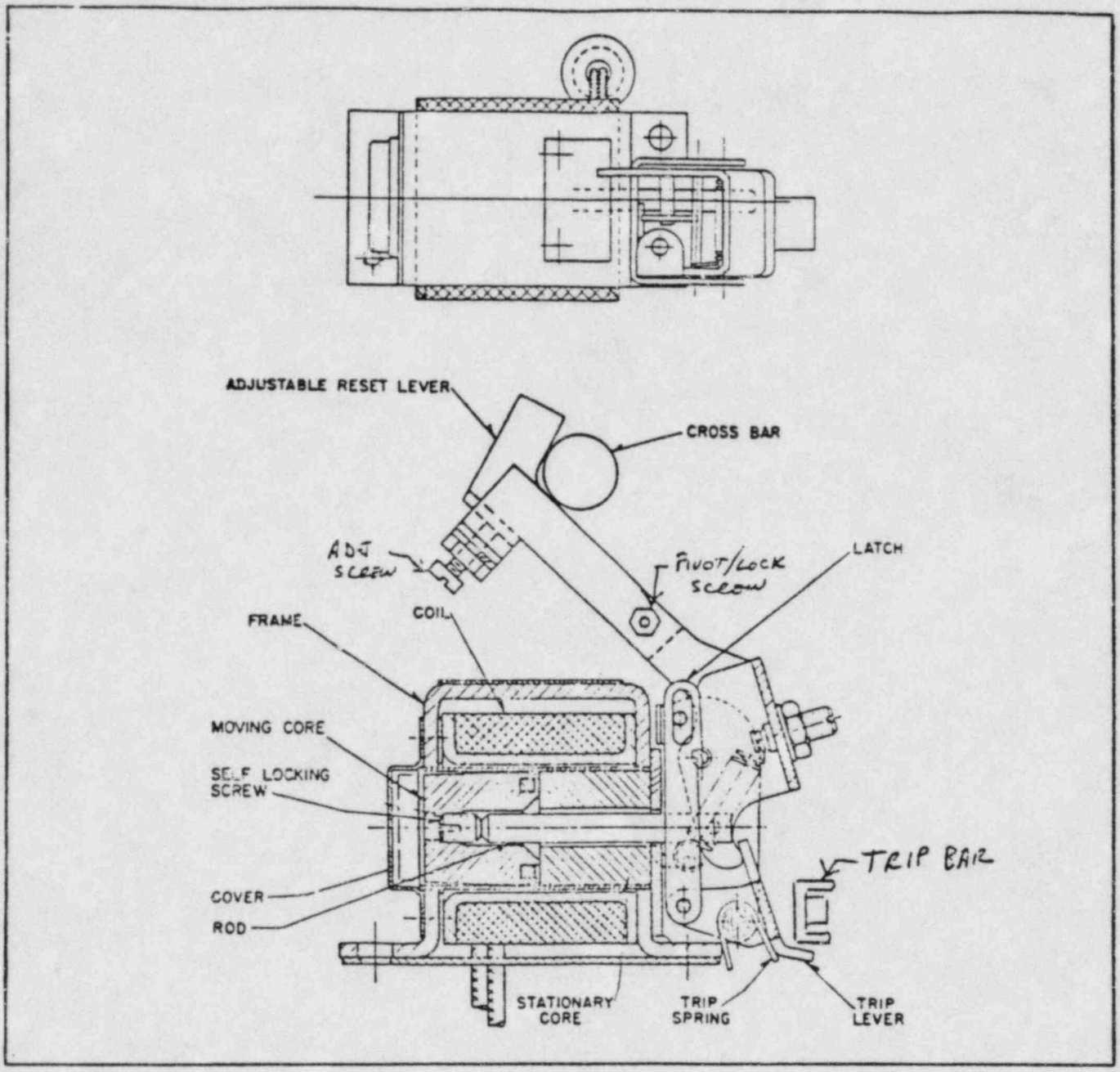
NOTE:
NO UV ATTACHMENT SHOWN



CLOSED TRIPPED OPEN (RESET)

ATTACH. No 2

- Cross-Sectional View of Type DB-50 Circuit Breaker



- Undervoltage Trip Attachment - Construction Details

ATTACH. No. 1

Attachment No. 3

Report of Compliance

Replacement undervoltage attachment(s) have been installed and tested according to NCD-ELEC-18

Station_____

Breaker(s)_____

Date(s)_____

Performed by_____

Observed by_____

FDR Number_____

NCD-ELEC-18

Attachment No. 3

Report of Compliance

Replacement undervoltage attachment(s) have been installed and tested according to NCD-ELEC-18

Station PSE SALEM UNIT #1

Breaker(s) RTA 424Y7268B BYA 124Y7268B
RTB 224Y7268B BYB 324Y7268B

Date(s) May 8, 1972

Performed by J. F. Murphy

Observed by [illegible] Snyder

FDR Number 10079

NCD-ELEC-18

Attachment No. 3

Report of Compliance

Replacement undervoltage attachment(s) have been installed and tested according to NCD-ELEC-18

Station PNJ SALEM UNIT #2

Breaker(s) RTA 1-24Y7269B BYA 4-24Y7269B
RTB 2-24Y7269B BYB 3-24Y7269B

Date(s) AUG 8, 1982

Performed by J. R. Murphy IV

Observed by [illegible]

FDR Number 10026

APPENDIX F

Work Orders and Surveillance Procedures

(Cross Referenced to Section 6 of this Report)

Contents

F.1 Work Order TM-0053, February 6, 1979 . . . . . F-1

F.2 Work Order 909110, August 20, 1982 . . . . . F-8

F.3 Surveillance Procedure SP(O) 4.3.1.1.1 . . . . . F-18

F.4 Work Order 930402, January 7, 1983 . . . . . F-21

F.5 Work Order 925774, January 20, 1983 . . . . . F-30

F.6 Work Order 925080, February 22, 1983 . . . . . F-37

F.7 Work Orders 92516 and 92517, February 25, 1983 . . . . . F-47

F.8 Westinghouse Technical Bulletin and NSD Data Letter 74-2, February 19, 1974 . . . . . F-51

TO MAINT DEPARTMENT

087-876

WORK ORDER

3562544

UNIT # 2

W.O.# TM-0057

087-877

SYSTEM: REACTOR PROTECTION EQUIPMENT: RTB & BYPASS B BKRS

INITIATION

DESCRIPTION: Please investigate & Repair
(1) Position switch Not operating on RTB
(2) UV coil doesn't drop Bypass Bkr. B out ok
UV from solid state

INITIATED BY 2/6/79 DATE Eugene M. Mapp APPROVED BY RECEIVED BY 2/6/79 DATE

REVIEW

☒ SAFETY RELATED ☐ NON-SAFETY RELATED (PD#7) PRIORITY 1 2 3 4 (AP-25)

☒ PROCEDURE TO BE USED NO. M 3 E ☐ REP REQUIRED NO

☒ QA NOTIFICATION NAME Cayhan TIME 2/6/79 1145

☒ SS/SF PERMISSION REQUIRED APPROX. MANHOURS JOB CLASS

☐ SAFETY TAGS REQUIRED:

☐ SPARE PARTS REQUIRED:

☐ SPECIAL INSTRUCTIONS:

REVIEWED BY 2/6/79 DATE SS/SF PERMISSION 2/6/79 DATE

COMPLETION

DESCRIPTION OF WORK PERFORMED: Low-voltage Relay Designed for 2nd AC Signal We want Not work on 2nd signal
Recalibrated undervoltage Relay
IF FURTHER SUPPORT IS REQUIRED ISSUE A NEW WORK ORDER GIVE TO G. HUFFMAN FOR REVIEW

DR'S INITIATED NO. (S)

ACTUAL MANHOURS: ACCT. NO. E399.210

☐ YES ☐ NO DOES THIS MALFUNCTION CONSTITUTE AN INCIDENT (AP-6)

☐ INCOMPLETE MAINTENANCE STATUS REPORTED: SS/SF TIME/DATE

☒ TAGS CLEARED AND TURNED OVER TO OPERATIONS: SS/SF TIME/DATE 11-9-79

QA SURVEILLANCE COMPLETED BY FOREMAN

REMARKS/TEST EQUIP.

15-5473 10M 8-78

3562515

SALEM GENERATING STATION

PUBLIC SERVICE ELECTRIC & GAS COMPANY

MAINTENANCE DEPARTMENT MANUAL

PROCEDURE APPROVAL COVER SHEET

PROCEDURE NO.: M3Z TITLE: Electrical Equipment Troubleshooting & Repair

REMARKS:

This procedure is safety related.

All documentation shall be maintained for a period of five (5) years.

This procedure has been reviewed and determined to be in compliance with Technical Specification Requirements.

REVISION	SUBMITTED	EED APPROVED	QA REVIEWED	S.O.R.C. REVIEWED	MAINT. ENG. APPROVED	STATION MANAGER APPROVED
0	1/14/74	N/A	3-19-74	1-16-74	3-19-74	3/29/74

REVISION	SUBMITTED	EED APPROVED	QA REVIEWED	MAINT. ENG. APPROVED	S.O.R.C. MTG. NO.	STATION MANAGER APPROVED
1	10/13/74	(Not Required)		10-24-74	(Format Revision Only)	
2	1-15-76	(Not Required)		1/15/76	(Format Revision Only)	
3	2-26-76	NA	2/26/76	2/26/76	15-76	3/76
4		NA	3/2/78	3/14/78	59-78	4/5/78

SALEM GENERATING STATION
MAINTENANCE DEPARTMENT MANUAL
MAINTENANCE PROCEDURE M3Z
ELECTRICAL EQUIPMENT TROUBLESHOOTING AND REPAIR
EQUIPMENT _____
W.O. NUMBER IM-6653

1.0 PURPOSE

The purpose of this procedure is to guide personnel investigating and repairing safety related as well as non-safety related electrical equipment malfunctions.

2.0 PRECAUTIONS

2.1 Only authorized electricians shall use this procedure.

2.2 As with all electrical circuits, voltages will be present and care must be taken to prevent electrical shock.

2.3 All circuits shall be analyzed for inadvertent starts or trips of other equipment when lifting leads or using jumpers.

3.0 APPARATUS

3.1 Test instruments required shall be currently calibrated.

Instrument 1 M99 Cal. Date Due _____
Instrument 2 _____ Cal. Date Due _____
Instrument 3 _____ Cal. Date Due _____

3.2 The following reference material shall be used for the performance of the work:

Electrical Schematics 203646 203688
_____

Technical Manuals _____
_____

Other _____
_____

35625

4.0 PREREQUISITES

4.1 Supervisor's approval to begin work with the above apparatus and reference material. Signature [signature]

4.2 Permission obtained from Watch Supervisor to perform work on the equipment. The equipment shall be lined up in the following manner: [illegible]

Signature [signature]

5.0 PROCEDURE

5.1 Analyze all reference material to determine the probable cause of the malfunction.

5.2 Use extreme caution when operating a breaker in the test position because there may be an auxiliary contact to other equipment which may cause an inadvertent trip or start of that equipment.

5.3 Only reference material shall be used to satisfactorily correct the malfunction. If the material is not sufficient, stop the troubleshooting and notify your immediate supervisor of the problem.

5.3.1 Technical Specifications shall be considered and not violated when performing these tests.

5.3.2 Jumper Logs (Form SND-20) and Disconnect Logs (Form SND-19) shall be used in the performance of the work.

6.0 REMARKS

6.1 Malfunction cause: U.V. Relay Hanging up

3562548

6.2 Correction required/Parts changed (Include P.O. Number)

Recal. UV Relay

Supervisor's Signature B Rudd

7.0 MAINTENANCE COMPLETED:

7.1 Equipment Tested Start Up & Test System

Electrician J Hunkele Date 11/7/79

Supervisor B Rudd Date 11/7/79

3562549

REFERENCE DRAWING NO. _____

SYSTEM NO. _____

JUMPER LOG

JUMPER NO.	INSTALLED							REMOVED		
	Terminal Location				Ref. Dwg. Rev. No.	Verification		Ref. Dwg. Rev. No.	Verification	
	From		To							
	Term. Block	Term No.	Term. No.	Term. No.		Initials	Date		Initials	Date

F-6

Electrician _____

Supervisor _____

1132

SND-20-1173

3502553

REFERENCE DRAWING NO. _____

SYSTEM _____

DISCONNECT LOG

Wire No.	DISCONNECTED					RECONNECTED		
	Terminal Location		Ref. Dwg. Rev. No.	VERIFICATION		Ref. Dwg. Rev. No.	VERIFICATION	
	Term. Block	Term. No.		Initials	Date		Initials	Date

Electrician _____

Supervisor _____

F-7

M3Z

SWD-10-1172

9032811

PLANT: SALEM | UNIT: 2 | INITIAL: 00 | WORK ORDER NO: 909110

PRIORITY: B | TO: ☒ ELEC'N'T ☐ PERF ☐ YARD ☐ OTHER | INDEX NO: 094 | COMPO: 972

EQUIPMENT IDENTIFICATION: "2 unit Reactor trip Bkr. "B"

PROBLEM/WORK REQUESTED ON: Bkr would not open during Perf. Rep. testing (from SSPS) Manual could open from control console P.B. Please check & repair

ISSUED BY: Fowler	REQUESTED BY: R.R. Stw	I.D. TAG NO.	APPROVED BY: R.R. Stw	DATE: 8/20/82	RECEIVED BY: V Fabel
SAFETY VIOLATED: YES ☒ NO ☐	QA REQUIRED: YES ☒ NO ☐	REP REQUIRED: NO X/R	SRO/SS PERMISSION REQUIRED: W Cullen	TIME: 0730 DATE: 8/23/82	
SECURITY: YES ☐ NO ☒	FIRE PROTECTION: YES ☐ NO ☒	QA RECERTIFICATION REVIEW (QA) NAME: Burnside	DATE/TIME: 8/23/82 0900		

SPECIAL INSTRUCTIONS:

FOLLOW-UP/RETEST REQUIRED: R/P 07

REVIEWED BY: V Fabel

PLANNER:

PLAN START DATE:

ACT START DATE:

SUPV. ASSIGNED:

WRS INITIATED: AD 1222

AUTH / ACCT: PS30.000

REPAIR CODE: 02

PERSONNEL REQUIREMENTS

CLASSIFICATION	ESTIMATED PERSONNEL	CLOCK HOURS	ESTIMATED WORK HOURS	ACTUAL WORK HOURS
ELECTRICIAN - TECHNICIAN				
MACHINIST				
BOILER REPAIR MECHANIC				
STATION MECHANIC - TECHNICAL ASSISTANT				
UTILITY MECHANIC - TECHNICAL HELPER				
TOTALS			EST / UMP	ACTUAL

UMP NO / PROCEDURE NO: M32

☒ TAGS CLEARED & RETURNED OVER TO OPERATION — SS/SS: C Jamison — DATE: 8-31-82

DOES THIS MALFUNCTION CONSTITUTE AN INCIDENT? ☐ YES ☐ NO — SS/SS: Jamison

DESCRIPTION OF WORK PERFORMED: Problem was found to be a faulty undervoltage trip coil latch mechanism. The same was removed, cleaned and reinstalled. Breaker is now in working order. New coil was installed in trip latch mechanism and is now working properly. John C. Hallett 8-31-82

SPARE PARTS USED	P.O./S.C. NO
Coil	PO 566077
Per S 149144	

COMPLETED

COMPLETED BY: [signature] — DATE: 9/1/82

QA DISPOSITION: REVIEW — 82 VERIFIED — DATE: 9/7/82

APPROVALS: [signature] — PD — DATE: 9/1/82

FOLLOW-UP/RETEST COMPLETE — SIGNATURE: [signature] — SUPERVISOR — DATE: 9/3/82

WORK ORDER RETAIN FOR HISTORY ☐

MAINTENANCE PROCEDURE A-11
ENCLOSURE 1
PROCEDURE APPROVAL COVER SHEET

PROCEDURE NUMBER: M32 TITLE: ELECTRICAL EQUIPMENT TROUBLE SHOOTING AND REPAIR

REMARKS: THIS PROCEDURE IS SAFETY RELATED.

ALL DOCUMENTATION SHALL BE MAINTAINED FOR A PERIOD OF FIVE (5) YEARS.

THIS PROCEDURE HAS BEEN REVIEWED AND DETERMINED TO BE IN COMPLIANCE WITH TECHNICAL SPECIFICATION REQUIREMENTS.

REV. NO.	5	6							
SUBMITTED DATE	12-3-80	2/18/81							
ECD APPROVED DATE	N/A	N/A							
MGR. QAD APPROVED DATE	N/A	N/A							
NDI LEVEL III APPROVED DATE	N/A	N/A							
AI REVIEWED DATE	N/A	N/A							
SQAI REVIEWED DATE	12-4-80	4/14/81							
MAINT. ENG. APPROVED DATE	12-8-80	2-19-81							
S.O.R.C. MTG. NO./ DATE	80-80 12-10-80	81-15 2-26-81							
STA. MGR. APPROVED DATE	12-11-80	4/21/81							

SALEM GENERATING STATION

PUBLIC SERVICE ELECTRIC & GAS COMPANY

MAINTENANCE DEPARTMENT MANUAL

PROCEDURE APPROVAL COVER SHEET

PROCEDURE NO.: M32 TITLE: Electrical Equipment Troubleshooting & Repair

REMARKS:

This procedure is safety related.

All documentation shall be maintained for a period of five (5) years.

This procedure has been reviewed and determined to be in compliance with Technical Specification Requirements.

REVISION	SUBMITTED	FED APPROVED	QA REVIEWED	S.O.R.C. REVIEWED	MAINT. ENG. APPROVED	STATION MANAGER APPROVED
0		N/R	3-19-74	4-16-74	3-15-74	3/21/74

REVISION	SUBMITTED	FED APPROVED	QA REVIEWED	MAINT. ENG. APPROVED	S.C.R.C. MTG. NO.	STATION MANAGER APPROVED
1		(Not Required)			(Format Revision Only)	
2	1-16-76	(Not Required)		1/16/76	(Format Revision Only)	
3	3-24-76	NA		3/24/76	15-76	3/26
4		NA			59-78	7/31/78

Rev. 4

SALEM GENERATING STATION
MAINTENANCE DEPARTMENT MANUAL
MAINTENANCE PROCEDURE M32

1.0 TITLE

Electrical Equipment Trouble Shooting and Repair.

EQUIPMENT # Spent Fuel Pit #2 WORK ORDER # 960115

2.0 PURPOSE

The purpose of this procedure is to guide personnel investigating and repairing safety related, as well as, non-safety related electrical equipment malfunctions.

3.0 APPLICABILITY/SCOPE

This procedure is applicable to both Unit #1 and Unit #2.

4.0 REFERENCES

4.1 Administrative Procedure (AP) 15 - Tagging Rules.

5.0 ENCLOSURES

Enclosure 1 - Jumper Log.

Enclosure 2 - Disconnect Log.

6.0 PRECAUTIONS AND LIMITATIONS

6.1 When Maintenance Procedures require working around electrical equipment, safety precautions and work habits specified in the Public Service Safety Manual shall be observed by all personnel involved in accomplishment of those procedures.

6.2 When slings must be used to accomplish Maintenance Procedures, they shall be visually inspected per the requirements of OSHA Regulation 1910.184. Damaged or defective slings shall not be used.

6.3 When Maintenance Procedures require working on Stainless Steel components of the primary system, the following items shall not be used:

6.3.1 Carbon Steel wire brushes and scrapers.

6.3.2 Chlorinated solvents, e.g. trichlorethylene.

6.3.3 Unapproved masking tape, other than for use on protective clothing.

6.4 Only qualified personnel shall use this procedure.

6.5 As with all electrical circuits, voltages will be present and care must be taken to prevent electrical shock.

6.6 All circuits shall be analyzed for inadvertent starts or trips of other equipment when lifting leads or using jumpers

7.0 **PREREQUISITES**

7.1 **Calibration Data:**

Equipment nomenclature: (1) Tektronix -2445

(2) _____

(3) _____

Equipment Serial Number: (1) B010125

(2) _____

(3) _____

Calibration Date: (1) N/A **Calibration Due Date:** (1) N/A

(2) _____ (2) _____

(3) _____ (3) _____

7.2 **The following reference material shall be used for the performance of the work:**

1. **Electrical Schematics:** 227415, 227414, 227415, 227416, 227414, 227446, 227415, 227929 AND 227926

2. **Technical Manuals:** TEKTRONIX MANUAL

3. **Other:** N/A

7.3 **Supervisor's approval has been obtained to begin work with the above apparatus and reference materials:**

Supervisor _____ Date 6/28/82

8.4 Permission obtained from Shift Supervisor to perform work on the equipment. The equipment shall be lined up in the following manner:

Breaker Racked out

C Jumin
Shift Supervisor

8-2387
Date

8.0 PROCEDURE

8.1 Analyze all reference material to determine the probable causes of the malfunction.

8.2 Use extreme caution when operating a breaker in the test position because there may be an auxiliary contact to other equipment which may cause an inadvertent trip or start of that equipment.

8.3 Only reference material shall be used to satisfactorily correct the malfunction. If the material is not sufficient, stop the troubleshooting and notify your immediate supervisor of the problem.

1. Technical Specifications shall be considered and not violated when performing these tests.

2. Jumper Logs (Enclosure 1) and Disconnect Logs (Enclosure 2) shall be used in the performance of the work.

9.0 CLOSE OUT AND FINAL REVIEW

9.1 Malfunction Cause: Apparent cause due to a faulty under voltage coil trip latch mechanism (2-390-196-75 S-1491404)

9.2 Correction required/parts changed (include purchase order number): ~~As per M.R. 2-390-196-75 and~~ P.O. 868077 - Coil P/N S-1491404

9.3 Maintenance completed: Latch was disassembled and cleaned and then reassembled.

MRS

Rev. 6

9033847

9.4 Equipment tested: Everyready relays to be replaced Directly New trip latch coil failed 8-21-82
Jack E. Hatch

9.5 Procedure completed: Satisfactorily ✓ Unsatisfactorily _____

9.6 REMARKS: New coil and latch supplied per WO# 0822 & cost was taken to W-1020's

Jack E. Hatch / Jack E. Hatch — 8-31-82 / 8-24-82
Electrician/Qualified Person — Date

9.7 REVIEWED BY:

[signature] — 8/31/82
Maintenance Supervisor — Date

Brian Kirkpatrick — 10/7/82
Quality Assurance — Date

REFERENCE DRAWING NO. _____ SYSTEM _____

| REMOVED | | |

REFERENCE DRAWING NO. _____

SYSTEM _____

ENCLOSURE 2

Rev. 6

9031850

DEFICIENCY REPORT

DR NO MD 1222
WO/JO NO 01909110
DCR NO

1. IDENTIFICATION

COMPONENT/CODE 972 /
UNIT NO 2 SYSTEM/CODE 097 /
SERIAL NO. 2247796B MODEL NO. DB 50 Code A
P.O. NO. VENDOR WESTINGHOUSE
TEST CONTINUED: YES ☐ NO ☒ REJECT TAG APPLIED: YES ☐ NO ☒ SUPV. INITIALS
REQUIREMENT: Reactor Trip Breaker "B" should trip with loss of voltage from SSPS

NONCOMPLIANCE:
Reactor Trip Breaker "B" did not trip with loss of voltage from SSPS. Note "A" Bypass breaker was successfully tested in "B" Trip Position.

SUPERVISOR 9/23/82 DATE

2. DISPOSITION/REVIEW

PROCEDURE NO.(S)
REWORK ☒ RTV ☐ SCRAP ☐ REPAIR ☐ USE AS IS ☐
PE SPONSOR ENGINEER DATE

SAFETY EVALUATION REQUIRED: YES ☐ NO ☒

RETEST REQUIREMENTS: REMOVE BREAKER AND CLEAN MOVING PARTS. RETEST BREAKER TO ORIGINAL TEST SPECIFICATIONS. IF RETEST IS SUCCESSFUL - REINSTALL BREAKER.

DEPARTMENT HEAD 9/6/82 DATE N/A AUTHORIZED NUCLEAR INSPECTOR DATE QAD DATE

3. ACTION TAKEN/RETEST FOUND FAULTY UNDERVOLTAGE TRIP Coil. CHANGED Coil & TESTED BREAKER

CAUSE: ☐ VENDOR ☒ OTHER Faulty Coil
RETEST COMPLETED SATISFACTORILY ☐

SUPERVISOR DATE AUTHORIZED NUCLEAR INSPECTOR DATE QAD DATE

CR#1

SALEM GENERATING STATION

OPERATIONS DEPARTMENT DOCUMENT APPROVAL COVER SHEET

Title: Instrumentaton - Reactor Trip Breakers

No.: SP(O)4.3.1.1.1 Unit: 1 Rev.: 0

Remarks: 2 pages of text

Safety Related Review (Ref. AD-13): S/R yes X no

Author's Checklist Completed: yes no X

Author Howard Conarto Date 9-2-82

SRO* [signature] Date 9/2/82

Ops. Eng. J Gueller Supt Date 9/2/82

Ops. Mgr. [signature] Date 9/2/82

QA** [signature] Date 9/2/82

SORC** 82-81 [signature] Date 9/3/82

General Manager** [signature] Date 9/3/82

* required for SPM documents only

** required for safety related documents only

MASTER

SURVEILLANCE PROCEDURE
SP(O)4.3.1.1.1
INSTRUMENTATION - REACTOR TRIP BREAKERS

1.0 PURPOSE

1.1 This procedure demonstrates the operability of the Reactor Trip breakers IAW Technical Specification 4.3.1.1.1.

2.0 INITIAL CONDITIONS

2.1 The reactor is shutdown with both Reactor Trip Breakers OPEN.

3.0 PRECAUTIONS

3.1 Performance of this test during reactor operation will result in a reactor trip.

4.0 ATTACHMENTS LIST

4.1 Figures

None

4.2 Tables

None

4.3 Check Off Sheets

None

5.0 PROCEDURE

NOTE

Initial the indicated steps after completion.

5.1 Within 7 days prior to startup, DEMONSTRATE operability of the Reactor Trip Breakers by completing steps 5.2 and 5.3.

5.2 Reactor Trip Breaker A Test

5.2.1 CLOSE the Reactor Trip Breaker A

5.2.2 RACK IN and CLOSE the Reactor Bypass Breaker B.

MASTER

5.2.3 PLACE the Reactor Trip Switch on the Control Board (Group 3) to the Trip position.

5.2.4 VERIFY the following:

a. Reactor Trip Breaker A - OPEN
b. Reactor Bypass Breaker B - OPEN

5.2.5 RACK OUT the Reactor Bypass Breaker B

5.3 Reactor Trip Breaker B Test

5.3.1 CLOSE the Reactor Trip Breaker B

5.3.2 RACK IN and CLOSE the Reactor Trip Bypass Breaker A

5.3.3 PLACE the Reactor Trip Switch on the Control Board (Group 4) to the Trip position.

5.3.4 VERIFY the following:

a. Reactor Trip Breaker B - OPEN
b. Reactor Bypass Breaker A - OPEN

5.3.5 RACK OUT the Reactor Bypass Breaker A

5.4 This surveillance shall be satisfactory if the breakers trip in response to the manual trip signal.

Performed By Martin B Mahoney DATE 2-22-83

Reviewed By K. Carlson / W. O'Brien DATE 2-22-83
Senior Shift Supervisor/Shift Supervisor

END OF PROCEDURE

FINAL PAGE

MASTER

SALEM | UNIT [redacted] | INITIAL OD | WORK ORDER NO. 930402

PRIORITY: A | TO: ☒ MAINT. ☐ PERF. ☐ YARD ☐ OTHER | INDEX NO. SYST. 047 COMPO. 964

EQUIPMENT IDENTIFICATION: Rx top heater A

PROBLEM/WORK DESCRIPTION: please remove from Unit 1 and install on Unit 2

DATE WRITTEN	REQUESTED BY	I.D. TAG NO.	APPROVED	DATE	RECEIVED BY
1/7/83	J Varga		W. Lawentis	1/7/83	L Gabel

SAFETY RELATED	QA REQUIRED	REP. REQUIRED	QA NOTIFICATION/REVIEW	(QA) DATE/TIME
YES ☒ NO ☐	YES ☐ NO ☒	☐ NO.	(QA) NAME	

SSS/SS PERMISSION REQUIRED ☒ | SSS/SS PERMISSION J Varga | TIME 2001 | DATE 1/7/83 | SPARE PARTS PLANNED

SPECIAL INSTRUCTIONS

FOLLOW-UP/RETEST REQUIRED: NA

FOLLOW-UP RETEST COMPLETE: _____ SIGNATURE

REVIEWED BY: L Gabel

PLANNER

PLAN START DATE

ACT. START DATE

SUPV. ASSIGNED

DR'S. INITIATED: D/F Dun

AUTH./ACCT.: N530.000

REPAIR CODE: 05

MANPOWER REQUIREMENTS

CLASSIFICATION	ESTIMATED NO. MEN	CLOCK HOURS	ESTIMATED MAN HOURS	ACTUAL MAN HOURS
ELECTRICIAN - TECHNICIAN				
MACHINIST				
BOILER REPAIR MECHANIC				
STATION MECHANIC - TECHNICAL ASSISTANT				
UTILITY MECHANIC - TECHNICAL HELPER				
TOTALS			EST./UMP	ACTUAL

UMP NO./PROCEDURE NO.: M32

☒ TAGS CLEARED & TURNED OVER TO OPERATIONS | SSS/SS R Sampson | DATE 1-10-83

DOES THIS MALFUNCTION CONSTITUTE AN INCIDENT ☐ YES ☒ NO SSS/SS R Sampson

DESCRIPTION OF WORK PERFORMED

CHECKED BREAKER OUT AND TESTED IT IN UNIT ONE. THE BREAKER OPERATED BOTH MANUALLY & AUTOMATIC WITH NO PROBLEM 1-8-83 T. OBRIEN

SPARE PARTS USED	P.O./Q.C. NO.
N/A Dun	

COMPLETED

S.H.

PSE&G WELD 30 MONITOR

M. Wirtz 2/10/83
QA SURVEILLANCE
Reviewed

T. OBrien
COMPLETED BY

F-21

1-10-83
DATE

J. Hutchinson
SUPERVISOR

WORK ORDER RETAIN FOR HISTORY ☐

93-0941

ENCLOSURE 1

PROCEDURE APPROVAL COVER SHEET

PROCEDURE NUMBER: M3Z TITLE: ELECTRICAL EQUIPMENT TROUBLE SHOOTING AND REPAIR

REMARKS: THIS PROCEDURE IS SAFETY RELATED.

ALL DOCUMENTATION SHALL BE MAINTAINED FOR A PERIOD OF FIVE (5) YEARS.

THIS PROCEDURE HAS BEEN REVIEWED AND DETERMINED TO BE IN COMPLIANCE WITH TECHNICAL SPECIFICATION REQUIREMENTS.

REV. NO.	5	6							
SUBMITTED DATE	12-3-80	2/18/81							
ECD APPROVED DATE	N/A	N/A							
MGR. QAD APPROVED DATE	N/A	N/A							
NDE LEVEL III APPROVED DATE	N/A	N/A							
AI REVIEWED DATE	N/A	N/A							
SQAE REVIEWED DATE	12/11/80	2/19/81							
MAINT. ENG. APPROVED DATE	12-11-80	2-19-81							
S.O.R.C. MTG. NO./ DATE	105-80 12-10-80	81-15 2-25-81							
STA. MGR. APPROVED DATE	12/10/80	2/27/81							

SALEM GENERATING STATION

PUBLIC SERVICE ELECTRIC & GAS COMPANY

MAINTENANCE DEPARTMENT MANUAL

PROCEDURE APPROVAL COVER SHEET

PROCEDURE NO.: M3Z TITLE: Electrical Equipment Troubleshooting & Repair

REMARKS:

This procedure is safety related.

All documentation shall be maintained for a period of five (5) years.

This procedure has been reviewed and determined to be in compliance with Technical Specification Requirements.

REVISION	SUBMITTED	EED APPROVED	QA REVIEWED	S.O.R.C. REVIEWED	MAINT. ENG. APPROVED	STATION MANAGER APPROVED
0	3/14/74	N/A	3-19-74	1-16-74	3-19-74	3/21/74

REVISION	SUBMITTED	EED APPROVED	QA REVIEWED	MAINT. ENG. APPROVED	S.O.R.C. MTG. NO.	STATION MANAGER APPROVED
1	10/15/74	(Not Required)		10-24-74	(Format Revision Only)	
2	1-15-76	(Not Required)		1/15/76	(Format Revision Only)	
3	2-26-76	NA	2/26/76	2/26/76	15-76	3/76
4		NA	3-4-76	3-4-76	59-78	3/15/78

1.0 TITLE

Electrical Equipment Trouble Shooting and Repair.

EQUIPMENT Reactor Trip Bkr. A WORK ORDER # OD 930402

2.0 PURPOSE

The purpose of this procedure is to guide personnel investigating and repairing safety related, as well as, non-safety related electrical equipment malfunctions.

3.0 APPLICABILITY/SCOPE

This procedure is applicable to both Unit #1 and Unit #2.

4.0 REFERENCES

4.1 Administrative Procedure (AP) 15 - Tagging Rules.

5.0 ENCLOSURES

Enclosure 1 - Jumper Log.

Enclosure 2 - Disconnect Log.

6.0 PRECAUTIONS AND LIMITATIONS

6.1 When Maintenance Procedures require working around electrical equipment, safety precautions and work habits specified in the Public Service Safety Manual shall be observed by all personnel involved in accomplishment of those procedures.

6.2 When slings must be used to accomplish Maintenance Procedures, they shall be visually inspected per the requirements of OSHA Regulation 1910.184. Damaged or defective slings shall not be used.

6.3 When Maintenance Procedures require working on Stainless Steel components of the primary system, the following items shall not be used:

6.3.1 Carbon Steel wire brushes and scrapers.

6.3.2 Chlorinated solvents, e.g. trichlorethylene.

6.3.3 Unapproved masking tape, other than for use on protective clothing.

6.4 Only qualified personnel shall use this procedure.

6.5 As with all electrical circuits, voltages will be present and care must be taken to prevent electrical shock.

6.6 All circuits shall be analyzed for inadvertent starts or trips of other equipment when lifting leads or using jumpers.

7.0 PREREQUISITES

7.1 Calibration data:

Equipment nomenclature: (1) Simpson 260

(2) _____

(3) _____

Equipment Serial Number: (1) M178

(2) _____

(3) _____

Calibration Date: (1) N/A T.O.B

(2) _____

(3) _____

Calibration Due Date: (1) N/A T.O.B

(2) _____

(3) _____

7.2 The following reference material shall be used for the performance of the work:

1. Electrical Schematic: 205615 - 203646 - 640148

2. Technical Manuals: N/A T.O.B

3. Other: N/A T.O.B

7.3 Supervisor's approval has been obtained to begin work with the above apparatus and reference materials:

J. G. Peterson
Supervisor

1/10/83
Date

7.4 Permission obtained from Shift Supervisor to perform work on the equipment. The equipment shall be lined up in the following manner:

To Remove

N/A

Shift Supervisor — Date

8.0 PROCEDURE

8.1 Analyze all reference material to determine the probable causes of the malfunction.

8.2 Use extreme caution when operating a breaker in the test position because there may be an auxiliary contact to other equipment which may cause an inadvertent trip or start of that equipment.

8.3 Only reference material shall be used to satisfactorily correct the malfunction. If the material is not sufficient, stop the troubleshooting and notify your immediate supervisor of the problem.

1. Technical Specifications shall be considered and not violated when performing these tests.

2. Jumper Logs (Enclosure 1) and Disconnect Logs (Enclosure 2) shall be used in the performance of the work.

9.0 CLOSE OUT AND FINAL REVIEW

9.1 Malfunction Cause: Found no apparent with breaker

9.2 Correction required/parts changed (include purchase order number): N/A F.O.B.

9.3 Maintenance completed: Checked breaker out and tested it in unit one. Breaker operated both manually & in automatic with no Problem

9.4 Equipment tested: Reactor trip breaker A
test in unit one OK

9.5 Procedure completed: Satisfactorily 1 Unsatisfactorily _____

9.6 REMARKS: _____

T. Brein
Electrician/Qualified Person

1-10-83
Date

9.7 REVIEWED BY:

J. G. Kitchen
Maintenance Supervisor

1/11/83
Date

M. Wita
Quality Assurance

PSE&G QAD 90 VERIFIED

2-10-83
Date

REFERENCE DRAWING NO. _____ SYSTEM _____

JUMPER NO.	INSTALLED							REMOVED		
	Terminal Location				Ref. Dwg. Rev. No.	Verification		Ref. Dwg. Rev. No.	Verification	
	From		To							
	Term. Block	Term. No.	Term. No.	Term. No.		Initials	Date		Initials	Date

Electrician/Qualified Person _____

Maintenance Supervisor _____

SND-20-1173

ENCLOSURE 1 Page 1 of 1

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Rev. 6

DISCONNECT LOG

REFERENCE DRAWING NO. _____

SYSTEM _____

WIRE	DISCONNECTED						RECONNECTED		
	Terminal Location			VERIFICATION			VERIFICATION		
	Term. Block	Term. No.	Ref. Dwg. Rev. No.	Initials	Date		Ref. Dwg. Rev. No.	Initials	Date

Electrician/Qualified Person _____

Maintenance Supervisor _____

PLANT: SALEM | UNIT: ONE | INITIAL: MD | WORK ORDER NO.: 925774

PRIORITY: 0-2 | TO: ☒ MAINT. ☐ PERF. ☐ YARD ____ OTHER | INDEX NO.: DEPT 026 COMP'D 456

EQUIPMENT IDENTIFICATION

1. REACTOR TRIP BREAKERS

PROBLEM/WORK DESCRIPTION

DISASSEMBLE, INSPECT AND CLEAN, REASSEMBLE AND TEST THE UNIT* 1 REACTOR TRIP BREAKERS. CLEAN AND INSPECT BREAKER CUBICLES AND BUS WORK

DATE WRITTEN	REQUESTED BY	I.D. TAG NO.	APPROVED	DATE	RECEIVED BY
1/10/83	D Webster		D Webster	1/10/83	D Webster

SAFETY RELATED	QA REQUIRED	REF. REQUIRED	SSS/SS PERMISSION REQUIRED	TIME
YES ☐ NO ☒	YES ☐ NO ☒	☐ NO.	SSS/SS PERMISSION L. Lauer	DATE 1-10-83

SECURITY	FIRE PROTECTION	QA NOTIFICATION/REVIEW	QA DATE/TIME
YES ☐ NO ☒	YES ☐ NO ☒	(QA) NAME MDuff	

SPECIAL INSTRUCTIONS

Decision BASE ON PD-7

Listed as NSR

P-104 ?

FOLLOW-UP/RETEST REQUIRED

MDuff

REVIEWED BY: D Webster

PLANNER

N START DATE

ACT. START DATE

SUPV. ASSIGNED

CR'S. INITIATED: MDuff

AUTH./ACCT.: D6079.8/N530.141

REPAIR CODE: 05

PERSONNEL REQUIREMENTS

CLASSIFICATION	ESTIMATED PERSONNEL	CLOCK HOURS	ESTIMATED WORK HOURS	ACTUAL WORK HOURS
ELECTRICIAN - TECHNICIAN				
MACHINIST				
BOILER REPAIR MECHANIC				
STATION MECHANIC - TECHNICAL ASSISTANT				
UTILITY MECHANIC - TECHNICAL HELPER				
UMP NO./PROCEDURE NO. MDuff	TOTALS		EST./UMP	ACTUAL

☒ TAGS CLEARED & RETURNED OVER TO OPERATIONS

SSS/SS J W Morrison DATE 1-25-83

DOES THIS MALFUNCTION CONSTITUTE AN INCIDENT ☐ YES ☒ NO SSS/SS J W Morrison

DESCRIPTION OF WORK PERFORMED

DISASSEMBLED, CLEANED, INSPECTED, REASSEMBLED, AND TESTED UNIT #1 REACTOR TRIP BKRS. "A & B", REACTOR TRIP BY-PASS BKR. "A" #11 MOTOR GENERATOR BRK., #12 MOTOR GENERATOR BRK., AND CLEANED ALL CUBICLES AND BUS WORK.

SPARE PARTS USED	P.O./Q.C. NO.
MDuff	

Bill Gross 1/24/83
COMPLETED BY DATE

APPROVALS

FOLLOW-UP/RETEST COMPLETE MDuff SIGNATURE

CA SURVEILLANCE DATE | SPD DATE | SUPERVISOR DATE

F-30

08-0531 AP 9-1 REV. 5

WORK ORDER RETAIN FOR HISTORY

SALEM | UNIT: TWO | INITIAL: MD | WORK ORDER NO.: 925775

PRIORITY: 0-2 | TO: ☒ MAINT. ☐ PERF. ☐ YARD ☐ OTHER | INDEX NO.: ACCT 026 COMPT 456

EQUIPMENT IDENTIFICATION

T. FACTOR TRIP BREAKERS

PROBLEM/WORK DESCRIPTION

DISASSEMBLE, CLEAN AND INSPECT, REASSEMBLE AND TEST THE UNIT #2 REACTOR TRIP BREAKERS. CLEAN AND INSPECT THE BREAKER CUBICLES AND BUS WORK.

NOW reclassified

DATE WRITTEN	REQUESTED BY	I.D. TAG NO.	APPROVED	DATE	RECEIVED BY
1/10/83	[signature]		[signature]	1/10/83	[signature]

SAFETY RELATED YES ☐ NO ☒	QA REQUIRED YES ☐ NO ☒	☐ REP. REQUIRED NO.	☒ SSS/SS PERMISSION REQUIRED	TIME
			SSS/SS PERMISSION	DATE
SECURITY YES ☐ NO ☒	FIRE PROTECTION YES ☐ NO ☒		QA NOTIFICATION/REVIEW	(QA) DATE/TIME
			(QA) NAME	

SPECIAL INSTRUCTIONS

NOTIFY V. GADZINSKI UPON COMPLETION TO SATISFY RESPONSE REQUEST 50017

FOLLOW-UP/RETEST REQUIRED

REVIEWED BY: [signature]

PLANNER

START DATE

ACT. START DATE

SUPV. ASSIGNED

DR'S. INITIATED

AUTH./ACCT. D6079.9/P530.141

REPAIR CODE

PERSONNEL REQUIREMENTS

CLASSIFICATION	ESTIMATED PERSONNEL	CLOCK HOURS	ESTIMATED WORK HOURS	ACTUAL WORK HOURS
ELECTRICIAN - TECHNICIAN	2	40	80	
MACHINIST				
BOILER REPAIR MECHANIC				
STATION MECHANIC - TECHNICAL ASSISTANT	1	40	40	
UTILITY MECHANIC - TECHNICAL HELPER				
UMP NO./PROCEDURE NO.		TOTALS	EST./UMP 120	ACTUAL

☒ TAGS CLEARED & TURNED OVER TO OPERATIONS

SSS/SS _____ DATE _____

DOES THIS MALFUNCTION CONSTITUTE AN INCIDENT ☐ YES ☐ NO SSS/SS _____

DESCRIPTION OF WORK PERFORMED

SPARE PARTS USED	P.O./R.C. NO.

COMPLETED BY _____ DATE _____

QA SURVEILLANCE _____ DATE _____

APPROVALS:

SPC _____ DATE _____ SUPERVISOR _____ DATE _____

FOLLOW-UP/RETEST COMPLETE _____ SIGNATURE _____

WORK ORDER RETAIN FOR HISTORY ☐

MATERIAL REQUEST AND RECEIVING RECORD

PSE&G Public Service Electric and Gas Company

NEW JERSEY SALES AND USE TAX
DIRECT PAYMENT PERMIT – DP-221-212-800

☐ PURCHASE REQUISITION NO.
☐ LOCAL PURCHASE ORDER NO.
☒ SHIPMENT OF MATERIAL RELEASE 1
☐ MEMORANDUM FOR CHANGE-IN-ORDER
☐ RECEIVING AND INVOICE RECORD (NON-GENERAL STORES MATERIAL OR SERVICE)

VENDOR
WESTINGHOUSE ELECTRIC CORP.
1447 CHESTNUT AVE.
P.O. BOX 3000
HILLSIDE, N. J. 07205

SHIP TO 01
PUBLIC SERVICE ELECTRIC AND GAS CO.
SALEM GENERATING STATION
END OF PUTTONWOOD ROAD GATE #4 WHSE. 2
HANCOCKS BRIDGE, N.J. 08038

VIA

DATE PREPARED	LOCATION CODE NO.	STOREROOM NO.
1/11/83	1614	185
DATE OF P.O.	PURCHASE ORDER NO. 834549	
INVOICE NO.	INVOICE DATE	DATE INV. APP'D.
RESPONSIBILITY CENTER 063	COST ELEMENT 40.30	

QUALITY ASSURANCE
NUCLEAR SAFETY RELATED ☐ YES ☒ NO ☐ CCI
QA PROVISIONS ☐ YES ☒ NO
10CFR PART 21 APPLIES ☐ YES ☒ NO
QAF-29: CONTROL NO. _____
QAF-19: CONTROL NO. N/A
OTHER _____
REQUISITIONER _____
QA APPROVAL HPOmohundro 1/11

ITEM NO.	QUANTITY REQUIRED	DESCRIPTION. MATERIAL OR SERVICES	AUTH/ACCT. NO. STOCK CODE NO.	QUANTITY RECEIVED	COST DATA
1	1/EA	TO COVER THE COST OF SERVICE ENGINEERS TIME AND EXPENSES DURING THE DISASSEMBLY INSPECTION AND REASSEMELY OF THE REACTOR TRIP BREAKERS (TYPE DB-50, SERIAL #4-24Y7269B) VENDOR TO PROVIDE TECHNICAL ASSISTANCE ONLY.	D6079.9 P530.141		
		REQUIRED ON SITE APPROXIMATELY 2/1/83 PRIMARY CONTACT V. GETSINGER W.O. #026-925775			
		REFUELING RELEASE NUMBER MUST BE SHOWN ON ALL INVOICES			
		MO/IC 25202 WEBSTER/mp			

DELIVERY REQUIRED	TO BE USED FOR	ESTIMATED COST	☐ UNDER $500 AMOUNT	☒ $500 & OVER $5,000.00	REQUISITIONER	TEL. EXT.
1/11/83	REACTOR TRIP BREAKER					

TERMS OF SHIPMENT	TERMS OF PAYMENT	APPROVED
		APPROVED

ERED BY	DELIVERY TICKET NO.	WEIGHT	NO./KIND CONTAINERS	DATE RECEIVED

TRANSPORTATION CHARGES	☐ PREPAID ☐ TO FOLLOW	☐ PAID LOCALLY – ACCOUNT F-32	RECEIVED BY	APPROVED

SUPERVISOR

Representative Tony [illegible] — Hillside, New Jersey 07205

☒ Service Engineer ☐ Foreman Telephone 201-926-7937
☐ Other (Specify)
Date Due on Site Expected Duration

I. SERVICE TO BE PERFORMED:
Unit No. Two System REACTOR TRIP BREAKER

Description of Service: DISASSEMBLE, INSPECT AND REINSPECT UNIT* 1 REACTOR TRIP BREAKER

Vendor Rep. Requested By J. WEBSTER (Supervisor) 1/10/83 (Date)

II. SERVICE CHARGE RESPONSIBILITY:
Vendor Service Charges will be paid/absorbed by:
☐ Public Service ☐ Vendor
☐ Under Terms of Contract/Purchase Order No. 880146
☐ Under Terms of Warranty

V. VENDOR RESPONSIBILITY:

A. ____ Vendor has been provided with copy of "General Rules for Contractors" and has signed the "Contractor Safety Requirements", Attachment No. 1.*

B. ____ Vendor has furnished a Certificate of Insurance and registration numbers for Federal Social Security and New Jersey Unemployment Compensation Acts as defined in Attachment No. 2.*

* Supervising Buyer's Initials

SERVICE TIME ACCOUNTABILITY:

Day/Date	Time In	Time Out	Meal Period	Hours Straight Time	Hours Time & Half	Hours Double Time
Monday						
Tuesday						
Wednesday						
Thursday 1/13/83	10:00	5:00				
Friday 1/14/83	0830	5:00				
Saturday						
Sunday						

Vendor Representative Courtney M. Esposito Date 1/14/83

Approved ____ (Department Head) F-33 Date ____

Time sheet must be prepared for all Vendor Representatives to be billed.

Representative TIM FERRELL [illegible]

☐ Service Engineer ☐ Foreman Telephone 201-926-7937
☐ Other (Specify) _____
Date Due on Site _____ Expected Duration _____

VI. SERVICE TO BE PERFORMED:
Unit No. Two/one System REACTOR TRIP BKRS

Description of Service: ASSESSMENT INSPECT & REPAIR AS REQUIRED UNIT #1 REACTOR TRIP BREAKERS

Vendor Rep. Requested By J. WEBSTER (Supervisor) 1/10/83 (Date)

III. SERVICE CHARGE RESPONSIBILITY:
Vendor Service Charges will be paid/absorbed by:
☐ Public Service ☐ Vendor
☒ Under Terms of Contract/Purchase Order No. 880146
☐ Under Terms of Warranty

IV. VENDOR RESPONSIBILITY:

A. ____ Vendor has been provided with copy of "General Rules for Contractors" and has signed the "Contractor Safety Requirements", Attachment No. 1. *

B. ____ Vendor has furnished a Certificate of Insurance and registration numbers for Federal Social Security and New Jersey Unemployment Compensation Acts, as defined in Attachment No. 2. *

* Supervising Buyer's Initials

V. SERVICE TIME ACCOUNTABILITY:

Day/Date	Time In	Time Out	Meal Period	Hours Straight Time	Hours Time & Half	Hours Double Time
Monday 1/17/83	0830 A	1000 P				
Tuesday 1/18/83	0830 A	1000 P				
Wednesday						
Thursday						
Friday						
Saturday						
Sunday						

Vendor Representative Anthony N. Esposito Date 1/18/83

Approved _____ Date _____
(Department Head)

Time sheet must be prepared for all Vendor Representatives to be billed.

APPARATUS SERVICE DIVISION

NAME (PRINT)	JOB OR ACCT. NO.
ANTHONY M. ESPOSITO	NYL 668
WEEK ENDING 1-16-83	CUSTOMER PSE&G (Salem Plt.)
DATE WRITTEN 1-16-83	LOCATION Salem, N.J.

DATE	TIME REPORT				
JAN	START	STOP	TIME OUT	REG. HRS.	O.T. HRS.
M	AP	AP			
T	AP	AP			
W	AP	AP			
13 T	5 AP	4 30 PP	1/	8	
14 F	8 AP	4 30 PP	1/2	8	
S	AP	AP			
S	AP	AP			
	SUB TOTALS			16	

APPROVED

APPROVED (CUSTOMER) TIME ONLY J.O. Ketchum

SIGNED (EMPLOYEE) Anthony M. Esposito

F-35

Apparatus Service Division

WE ARE service PEOPLE

Apparatus Services

ELECTRICAL AND MECHANICAL
REPAIRS AND ON SITE SERVICE
RECONDITIONING AND REWINDING

Engineering Services

ENGINEERING SUPPORT
INSTALLATION
MAINTENANCE

CUSTOMER COPY

FORM 25860-HP

F-36

APPARATUS SERVICE DIVISION

NAME (PRINT) ANTHONY M. ESPOSITO	JOB OR ACCT. NO. NYL 667
WEEK ENDING 1-29-83	CUSTOMER PSE&G (Salem St.)
DATE WRITTEN 1-29-83	LOCATION Salem, N. J.

DATE JAN	TIME REPORT				
	START	STOP	TIME OUT	REG. HRS.	O. T. HRS.
17 M	8 AM	8 30 PM	1/2	8	4
18 T	8 AM	4 30 PM	1/2	8	
W	AM	PM			
T	AM	PM			
F	AM	PM			
S	AM	PM			
S	AM	PM			
		SUB TOTALS		16	4

APPROVED

APPROVED (CUSTOMER) TIME ONLY R. Feldham

SIGNED (EMPLOYEE) Anthony M. Esposito

Apparatus Service Division

WE ARE service PEOPLE

Apparatus Services

ELECTRICAL AND MECHANICAL
REPAIRS AND ON SITE SERVICE
RECONDITIONING AND REWINDING

Engineering Services

ENGINEERING SUPPORT
INSTALLATION
MAINTENANCE

CUSTOMER COPY

FORM 36580-HP

SALEM | UNIT 1 | INITIAL 00 | WORK ORDER NO. 925080

PRIORITY: A

TO: ☑ MAINT. ☐ PERF. ☐ YARD ☐ OTHER

INDEX NO. 097 | COMPO 964

EQUIPMENT IDENTIFICATION

Rx TRIP BREAKER 'B' - ON FLOOR IN FRONT OF CUB.

PROBLEM/WORK DESCRIPTION

COVER ON BKR. CAME LOOSE & JAMMED AGAINST BKR. FINGERS. ALSO COVER HAD A FEW BURN MARKS. WHEN COVER WAS UNJAMMED & REMOVED. BKR. STILL WOULD NOT CLOSE. IT JUST TRIPPED FREE. PLEASE INVESTIGATE & REPAIR.

DATE WRITTEN	REQUESTED BY	I.D. TAG NO.	APPROVED	DATE	RECEIVED BY
2-22-83	L. Ciampi		V. McCall	2-22-83	R Hebel

SAFETY RELATED	QA REQUIRED	REP. REQUIRED	SSS/SS PERMISSION REQUIRED	TIME
YES ☒ NO ☐	YES ☒ NO ☐	☐ NO.	☒ SSS/SS PERMISSION N/A	DATE

SECURITY	FIRE PROTECTION	QA NOTIFICATION/REVIEW	(QA) DATE/TIME
YES ☐ NO ☒	YES ☐ NO ☒	(QA) NAME KIMMEL	2-21-83 0745

SPECIAL INSTRUCTIONS

FOLLOW-UP/RETEST REQUIRED

NA

REVIEWED BY: R Hebel

PLANNER

PLAN START DATE

ACT. START DATE

SUPV. ASSIGNED

DR'S. INITIATED: NONE

AUTH./ACCT. N530.140

REPAIR CODE: 02

PERSONNEL REQUIREMENTS

CLASSIFICATION	ESTIMATED PERSONNEL	CLOCK HOURS	ESTIMATED WORK HOURS	ACTUAL WORK HOURS
ELECTRICIAN - TECHNICIAN				
MACHINIST				
BOILER REPAIR MECHANIC				
STATION MECHANIC - TECHNICAL ASSISTANT				
UTILITY MECHANIC - TECHNICAL HELPER				
UMP NO./PROCEDURE NO. M3Z	TOTALS		EST. UMP	ACTUAL

☒ TAGS CLEARED & TURNED OVER TO OPERATIONS

SSS/SS N/A DATE

DOES THIS MALFUNCTION CONSTITUTE AN INCIDENT ☐ YES ☐ NO SSS/SS N/A

DESCRIPTION OF WORK PERFORMED

Reinstalled cover plate. After breaker cool down it worked fine.

~~what tests for operable?~~

SPARE PARTS USED	P.O./Q.C. NO.
N/A	

John E Miltzgen 2/22/83
COMPLETED BY DATE

QA SURVEILLANCE DATE

APPROVALS:

N/A
SPD

FOLLOW-UP/RETEST COMPLETE N/A
SIGNATURE

DATE SUPERVISOR 2-21-83
DATE

F-37

88-0041 AP 9-1 REV. 5

WORK ORDER RETAIN FOR HISTORY ☐

ENCLOSURE 1
PROCEDURE APPROVAL COVER SHEET

PROCEDURE NUMBER: M3Z TITLE: ELECTRICAL EQUIPMENT TROUBLE SHOOTING AND REPAIR

REMARKS: THIS PROCEDURE IS SAFETY RELATED.

ALL DOCUMENTATION SHALL BE MAINTAINED FOR A PERIOD OF FIVE (5) YEARS.

THIS PROCEDURE HAS BEEN REVIEWED AND DETERMINED TO BE IN COMPLIANCE WITH TECHNICAL SPECIFICATION REQUIREMENTS.

REV. NO.	7								
SUBMITTED DATE	1/17/83								
ECD APPROVED DATE	N/A								
MGR. QAD APPROVED DATE	N/A								
NDE LEVEL III APPROVED DATE	N/A								
AI REVIEWED DATE	N/A								
SQAE REVIEWED DATE	1/17/83								
MAINT. MGR. APPROVED DATE	1/20/83								
S.O.R.C. MTG. NUMBER DATE	83-09 1/27/83								
GEN. MGR. - SALEM OPS. APPROVED DATE	1/28/83								

PROCEDURE NUMBER: M3Z TITLE: ELECTRICAL EQUIPMENT TROUBLE SHOOTING AND REPAIR

REMARKS: THIS PROCEDURE IS SAFETY RELATED.

ALL DOCUMENTATION SHALL BE MAINTAINED FOR A PERIOD OF FIVE (5) YEARS.

THIS PROCEDURE HAS BEEN REVIEWED AND DETERMINED TO BE IN COMPLIANCE WITH TECHNICAL SPECIFICATION REQUIREMENTS.

REV. NO.	5	6							
SUBMITTED DATE	12-3-80	R.W. Lee 2/18/81							
ECD APPROVED DATE	N/A	N/A							
MGR. QAD APPROVED DATE	N/A	N/A							
NDE LEVEL III APPROVED DATE	N/A	N/A							
AI REVIEWED DATE	N/A	N/A							
SQAE REVIEWED DATE	12/4/80	4/14/81							
MAINT. ENG. APPROVED DATE	12-4-80	2-19-81							
S.O.R.C. MTG. NO./ DATE	105-80 12-10-80	81-15 2-25-81							
STA. MGR. APPROVED DATE	12/11/80	2/27/81							

SALEM GENERATING STATION

PUBLIC SERVICE ELECTRIC & GAS COMPANY

MAINTENANCE DEPARTMENT MANUAL

PROCEDURE APPROVAL COVER SHEET

PROCEDURE NO.: M3Z TITLE: Electrical Equipment Troubleshooting & Repair

REMARKS:

This procedure is safety related.

All documentation shall be maintained for a period of five (5) years.

This procedure has been reviewed and determined to be in compliance with Technical Specification Requirements.

REVISION	SUBMITTED	EED APPROVED	QA REVIEWED	S.O.R.C. REVIEWED	MAINT. ENG. APPROVED	STATION MANAGER APPROVED
0	[signature]	N/A	CMTramell 3-19-74	[signature] 1-16-74	J. D. Driscoll 3-19-74	[signature]

REVISION	SUBMITTED	EED APPROVED	QA REVIEWED	MAINT. ENG. APPROVED	S.O.R.C. MTG. NO.	STATION MANAGER APPROVED
1	[signature]	(Not Required)		[signature]	(Format Revision Only)	
2	[signature] 1-15-76	(Not Required)		[signature] 1/15/76	(Format Revision Only)	
3	[signature] 2-26-76	NA	[signature]	[signature] 2/26/76	15-76	[signature] 2/76
4	[signature]	NA	[signature]	[signature]	59-78	[signature] 3/13/78

Rev. 4
SND-17-774

1.0 TITLE

Electrical Equipment Trouble Shooting and Repair.

2.0 PURPOSE

The purpose of this procedure is to guide personnel investigating and repairing safety related, as well as, non-safety related electrical equipment malfunctions.

3.0 APPLICABILITY/SCOPE

This procedure is applicable to both Unit #1 and Unit #2.

4.0 REFERENCES

4.1 Administrative Procedure (AP) 15 - Tagging Rules.

5.0 ENCLOSURES

Enclosure 1 - Jumper Log.

Enclosure 2 - Disconnect Log.

6.0 RESPONSIBILITIES

As delineated in this Procedure.

7.0 PRECAUTIONS AND LIMITATIONS

7.1 When Maintenance Procedures require working around electrical equipment, safety precautions and work habits specified in the Public Service Safety Manual shall be observed by all personnel involved in accomplishment of those procedures.

7.2 When slings must be used to accomplish Maintenance Procedures, they shall be used in accordance with the requirements of Maintenance Procedure M2Q.

7.3 When Maintenance Procedures require working on Stainless Steel components of the primary system, the following items shall not be used:

7.3.1 Carbon Steel wire brushes and scrapers.

7.3.2 Chlorinated solvents, e.g. trichlorethylene.

7.3.3 Unapproved masking tape, other than for use on protective clothing.

7.4 Only qualified personnel shall use this procedure.

7.5 As with all electrical circuits, voltages will be present and care must be taken to prevent electrical shock.

7.6 All circuits shall be analyzed for inadvertent starts or trips of other equipment when lifting leads or using jumpers.

7.7 Components, equipment or material handled over or in proximity to irradiated fuel or safe shutdown equipment shall be lifted in accordance with Maintenance Procedure M2R.

7.8 During repair and maintenance of station equipment, fire barrier integrity must be maintained or restored prior to equipment operation. If integrity is questioned, evaluation should be requested from the Electrical Engineering Department.

7.9 Prior to applying solvents to electrical components, verify components are immune to the solvent. On W-2 switches, no solvent cleaning is required or authorized. Clean with a dry cloth only.

8.0 PREREQUISITES

8.1 The following reference material shall be used for the performance of the work:

1. Electrical Schematics: N/A

2. Technical Manuals: N/A

3. Other:

8.2 Supervisor's approval has been obtained to begin work with the above apparatus and reference materials:

Rx Trip Breaker 'B' — Equipment

925080 — W/O Number

C Stepko — Supervisor

2-21-83 — Date

9.0 PROCEDURE

9.1 Analyze all reference material to determine the probable causes of the malfunction.

9.2 Use extreme caution when operating a breaker in the test position because there may be an auxiliary contact to other equipment which may cause an inadvertent trip or start of that equipment.

9.3 Only reference material shall be used to satisfactorily correct the malfunction. If the material is not sufficient, stop the troubleshooting and notify your immediate supervisor of the problem.

1. Technical Specifications shall be considered and not violated when performing these tests.

2. Jumper Logs (Enclosure 1) and Disconnect Logs (Enclosure 2) shall be used in the performance of the work.

10.0 FINAL TESTING

Not applicable to this Procedure as written.

11.0 CLOSEOUT AND FINAL REVIEW

11.1 Malfunction Cause: Loss cover plate shorted out B phase of breaker

11.2 Correction required/parts changed (include purchase order number): Reinstalled cover plate

11.3 Maintenance Completed: reinstalled cover plate

11.4 Equipment Tested: Bat

What ??

11.5 Procedure completed: Satisfactorily ✓ Unsatisfactorily _____

11.6 Remarks: _____

_____

_____

_____

John E Mullegan — Electrician/Qualified Person — 2/22/83 — Date

11.7 Reviewed By:

C Stegall — Maintenance Supervisor — 2-21-83 — Date

_____ — Quality Assurance — _____ — Date

M32

ENCLOSURE

F-45 1 of 1

Rev. 7

JUMPER NO.	INSTALLED							REMOVED		
	Terminal Location				Ref. Dwg. Rev. No.	Verification		Ref. Dwg. Rev. No.	Verification	
	From		To			Initials	Date		Initials	Date
	Term. Block	Term. No.	Term. No.	Term. No.						

N/A 8

Electrician/Qualified Person _____

Maintenance Supervisor _____

SND-20-1173

M32

ENCLOSURE 2
Page 1 of 1

F-46

REFERENCE DRAWING NO. _____

SYSTEM _____

WIRE NO.	DISCONNECTED					RECONNECTED		
	Terminal Location		Ref. Dwg. Rev. No.	VERIFICATION		Ref. Dwg. Rev. No.	VERIFICATION	
	Term. Block	Term. No.		Initials	Date		Initials	Date

OF

PLANT	UNIT	INITIAL	WORK ORDER NO.
SALEM	1	EP	925216

PRIORITY	TO:	INDEX NO. SYST	COMPO.
A	~~MAINT.~~ X PERF. ☐ YARD ____ OTHER	0997	

EQUIPMENT IDENTIFICATION

A & B 4 Trip Breakers

PROBLEM/WORK DESCRIPTION

#12 S.G. to be limit didn't trip the 4 trip Breakers when signal was received. Please investigate and repair

DATE WRITTEN	REQUESTED BY	I.D. TAG NO.	APPROVED	DATE	RECEIVED BY
2-25-83	S. Skinner		C.W. Sowinski	2/25/83	

SAFETY RELATED	QA REQUIRED	REP. REQUIRED	SSS/SS PERMISSION REQUIRED	TIME
YES X NO ☐	YES X NO ☐	NO. ____	SSS/SS PERMISSION: S. Skinner	DATE 2-25-83

SECURITY	FIRE PROTECTION	QA NOTIFICATION/REVIEW	(QA) DATE/TIME
YES ☐ NO X	YES ☐ NO X	(QA) NAME Reynes	2/25/83 0200

SPECIAL INSTRUCTIONS

FOLLOW-UP/RETEST REQUIRED

N/A

REVIEWED BY: E.G. Mekulsa

PLANNER

PLAN START DATE

ACT. START DATE

SUPV. ASSIGNED

DR'S. INITIATED: N/A

AUTH./ACCT.

REPAIR CODE

PERSONNEL REQUIREMENTS

CLASSIFICATION	ESTIMATED PERSONNEL	CLOCK HOURS	ESTIMATED WORK HOURS	ACTUAL WORK HOURS
ELECTRICIAN - TECHNICIAN				
MACHINIST				
BOILER REPAIR MECHANIC				
STATION MECHANIC - TECHNICAL ASSISTANT				
UTILITY MECHANIC - TECHNICAL HELPER				
UMP NO./PROCEDURE NO. PD 14.1.001		TOTALS	EST./UMP	ACTUAL

X TAGS CLEARED & TURNED OVER TO OPERATIONS

SSS/SS R. Flores DATE 2/25/83

DOES THIS MALFUNCTION CONSTITUTE AN INCIDENT ~~YES~~ ☐ NO SSS/SS R. Flores

DESCRIPTION OF WORK PERFORMED

Verified trip signals to SSPS, verified SSPS outputs to uv coil's. "A" & Breaker tripped once out of 3 trys "B" & Breaker didn't trip. A & B Breaker's replaced with Breaker's from unit #2. verified Breaker trips 5 times.

SPARE PARTS USED	P.O./Q.C. NO.
N/A	

J. Nathan 2/25/83
COMPLETED BY DATE

QA SURVEILLANCE DATE

APPROVALS: N/A

SP F-47

FOLLOW-UP/RETEST COMPLETE N/A
SIGNATURE

DATE

E.G. Mekulsa 2/26/83
SUPERVISOR DATE

95-0941 AP 9-1 REV. 5

WORK ORDER RETAIN FOR HISTORY ☐

PLANT	UNIT	INITIAL	WORK ORDER NO.
SALEM	1 &	OD	925217

PRIORITY	TO:	INDEX NO. SYST.	COMPO.
A	☑ MAINT. ☐ PERF. ☐ YARD ____ OTHER	C 47	963

EQUIPMENT IDENTIFICATION

A & B Train Rx trip Bkrs. & BY PASS BKRS

PROBLEM/WORK DESCRIPTION

#1 S/G. Lo Lo Level didn't trip the Rx trip Breakers when signal was removed. Please investigate and repair.

DATE WRITTEN	REQUESTED BY	I.D. TAG NO.	APPROVED	DATE	RECEIVED BY
2-25-83	D. Spence		W. Lawrence Jr	2/25/83	R Gabel

SAFETY RELATED	QA REQUIRED	REP. REQUIRED	SSS/SS PERMISSION REQUIRED	TIME
YES ☒ NO ☐	YES ☒ NO ☐	☐ NO. ____	☒ SSS/SS PERMISSION D. Spence	2154

SECURITY	FIRE PROTECTION	QA NOTIFICATION (REVIEW)	DATE
YES ☐ NO ☒	YES ☐ NO ☒	(QA) NAME Kimmel	DATE 2-25-83

(QA) DATE/TIME	
2/25/83	0230

SPECIAL INSTRUCTIONS

FOLLOW-UP/RETEST REQUIRED

N/A

REVIEWED BY R Gabel

PLANNER

PLAN START DATE

ACT. START DATE

SUPV. ASSIGNED

DR'S. INITIATED MO 83-1424

AUTH./ACCT N530.140

REPAIR CODE

PERSONNEL REQUIREMENTS

CLASSIFICATION	ESTIMATED PERSONNEL	CLOCK HOURS	ESTIMATED WORK HOURS	ACTUAL WORK HOURS
ELECTRICIAN - TECHNICIAN				
MACHINIST				
BOILER REPAIR MECHANIC				
STATION MECHANIC - TECHNICAL ASSISTANT				
UTILITY MECHANIC - TECHNICAL HELPER				
UMP NO./PROCEDURE NO. M3L	TOTALS		EST./UMP	ACTUAL

☒ TAGS CLEARED & TURNED OVER TO OPERATIONS

SSS/SS _____ DATE _____

DOES THIS MALFUNCTION CONSTITUTE AN INCIDENT ☐ YES ☐ NO SSS/SS _____

DESCRIPTION OF WORK PERFORMED

Removed under voltage relays from Rx + Rx Bypass breakers for investigation per I.C.E. D.G.

SPARE PARTS USED	P.O./Q.C. NO.

COMPLETED BY _____ DATE _____

QA SURVEILLANCE _____ DATE _____

APPROVALS: _____ SPD

FOLLOW-UP/RETEST COMPLETE _____ SIGNATURE

DATE _____ SUPERVISOR _____ DATE _____

F-48

98-0941 AP 9-1 REV. 5

WORK ORDER RETAIN FOR HISTORY ☐

DEFICIENCY REPORT

DR NO. mD 83-1424
WO/IO NO. oD 925217
DCR NO. _____

1. **IDENTIFICATION**

COMPONENT/CODE Undervoltage Trip attachment /
UNIT NO. 1 SYSTEM/CODE Rod Control - Rx. Trip Breakers /
SERIAL NO. _____ MODEL NO. DB-50
P.O. NO. _____ VENDOR Westinghouse Electric Co.
TEST CONTINUED: YES ☐ NO ☑ REJECT TAG APPLIED: YES ☐ NO ☑ SUPV. INITIALS

REQUIREMENT:
The undervoltage trip attachments on the reactor trip breakers are equipped with 48 voltage D.C coils. (part # 23A9019G75)

NONCONFORMANCE:
The three (3) new undervoltage trip attachments purchased from Westinghouse Electric Co. are supplied with 125 Volt D.C. coils. (part # 23A9019G61) SUPERVISOR 2/26/83 DATE

2. **DISPOSITION/REVIEW**

PROCEDURE NO.(S) _____
REWORK ☐ RTV ☐ SCRAP ☐ REPAIR ☐ USE AS IS ☐ PS SPONSOR ENGINEER DATE
SAFETY EVALUATION REQUIRED: YES ☐ NO ☐

RETEST REQUIREMENTS:

DEPARTMENT HEAD DATE AUTHORIZED NUCLEAR INSPECTOR DATE QAD DATE

3. **ACTION TAKEN/RETEST**

CAUSE: ☐ VENDOR ☐ OTHER _____
RETEST COMPLETED SATISFACTORILY ☐

SUPERVISOR DATE AUTHORIZED NUCLEAR INSPECTOR DATE QAD DATE

...EM GENERATING STATION

INCIDENT REPORT

1.1 REPORT NO. _____

1 – INITIATION 1.2 DATE 2/25/83 1.3 TIME 0021

1.4 REPORT SUBJECT

UNIT #1 REACTOR TRIP (#12 S/G LOW LOW LEVEL) - ATWAS MANUAL REACTOR TRIP AFTER AUTOMATIC TRIP DID NOT OCCUR

1.5 UNIT 1 1.6 MODE 1 1.7 RX POWER 12% 1.8 UNIT LOAD 70 Mwe

1.9 DESCRIPTION OF EVENTS: ACTION STATEMENT NO. A.S. 3.3.1.1 ENTERED N/A TERMINATED N/A

AT 0021, UNIT #1 RECIEVED A RX. TRIP SIGNAL DUE TO ACTUAL LOW LOW WATER LEVEL ON #12 STEAM GENERATOR. THE OVERHEAD ANNUNCIATOR ALARMED AND THE ACTUAL TRIP CONDITION (#12 S/G LOW-LOW LEVEL) EXISTED, HOWEVER THE REACTOR TRIP BREAKERS DID NOT TRIP OPEN.

REALIZING THE REACTOR WAS STILL CRITICAL AND A TRIP CONDITION DID EXIST, THE CONTROL OPERATOR IMMEDIATELY MANUALLY TRIPPED THE REACTOR AT THE CONTROL CONSOLE.

THE CONTROL OPERATORS RE-COVERED FROM THE MANUAL TRIP AND ARE CURRENTLY MAINTAINING THE UNIT IN HOT STANDBY (MODE 3).

I&C WAS IMMEDIATELY CALLED AND THEY ARE CURRENTLY INVESTIGATING WHY THE REACTOR TRIP BREAKERS DID NOT AUTOMATICALLY TRIP OPEN.

AFTER REVIEWING THE ACCIDENT CLASSIFICATION GUIDE, THE SENIOR SHIFT SUPERVISER ENTERED EPI-2 (ALERT) @ 0130 DUE TO THE FACT THE REACTOR PROTECTION SYSTEM FAILED TO INITIATE THE AUTOMATIC TRIP. THE ALERT WAS TERMINATED AT 0200. ALL CALLS WERE MADE IAW EPI-2.

1.10 RESULTS OR POSSIBLE RESULTS OF INCIDENT:

FAILURE OF REACTOR PROTECTION SYSTEM TO INITIATE AND COMPLETE A TRIP.

1.11 REPORTED TO SR. SHIFT SUPERVISOR BY _____

1.12 NOTIFIED OF THE INCIDENT ☒ OPERATING ENGINEER OR ☐ _____ 0132 TIME 2/25/83 DATE

1.13 REPORT SUBMITTED [signature] SR. SHIFT SUPERVISOR 2/25/83 DATE

F.C.

SECTION 2 – FOLLOW-UP

2.1 SQAE NOTIFIED DATE _____

2.2 MAJOR CAUSE: ☐ EQUIPMENT FAILURE ☐ PROCEDURE INADEQUACY ☐ PERSONNEL ERROR ☐ _____

2.3 INCIDENT CLASSIFICATION: ☒ REPORTABLE LER # _____ ☐ NOT REPORTABLE

2.4 JUSTIFICATION OF CLASSIFICATION:

PROMPT NOTIFICATION WITH WRITTEN FOLLOWUP.

6.9.1.8a

No LER 3/3 YET

2.5 INCIDENT AND PROCEDURE REVIEW COMPLETE _____

2.6

OPERATING ENGR	DATE	SQAE	DATE	CHIEF ENGR.	DATE

F-50

DISTRIBUTION: MANAGER – SGS; SH... ...FOFICE; SQAE; CHIEF ENGR; MANAGER – QA

AP4-1 REV. 6

NSD DATA LETTER 74-2

From : Nuclear Service Division
With : 236-4744
Date : February 19, 1974
Subject: Reactor Trip Breaker Maintenance

NUCLEAR ENERGY SYSTEMS

TO: Distribution

Technical Bulletin NSD-TB-74-1 (issued 1/11/74) described a reactor trip breaker malfunction which occurred at H. B. Robinson station in December of 1973, and recommended certain additional periodic maintenance measures to improve the reliability of these breakers.

The malfunction (failure to trip during a regularly scheduled periodic test) was attributed to excessive friction in the linkage of the Undervoltage Trip Attachment, which is the device that initiates the breaker drop-open action by elevating the trip bar. The problem was corrected by cleaning and lightly lubricating certain portions of the linkage.

To preclude the possibility of reoccurrence of this malfunction, Westinghouse recommends that the reactor trip breakers be given regularly scheduled periodic inspection/maintenance as described in the Instruction Manual and in line with the following guidelines.

1. Scope. These recommendations are intended to apply to Westinghouse DB-50 (or DB-25) breakers in Reactor Trip applications. Some future WNES plants will be supplied with Westinghouse Type DS (stored energy) breakers, which should be maintained in accordance with their instruction manual.

2. Related Operations. It is expected that these inspection and maintenance measures would normally be carried out in conjunction with breaker periodic operational testing or during plant shutdowns. However, these recommendations in no way are intended to supersede breaker operational testing commitments and requirements.

3. Frequency. Intervals between maintenance will be influenced by operating and atmospheric conditions, but we would recommend that initially it be performed on a semi-annual basis. The period might then be extended to 9 or 12 months if experience shows this to be sufficient.

4. Cleaning. Clean the entire unit by blowing with dry instrument air (or a hand bellows), followed by vacuum cleaning. Particular attention should be paid to the cleanness of the undervoltage trip device, which can be inspected without component disassembly.

5. Solvents. In general, the use of a cleaning solvent is not encouraged since some can be damaging to electrical components. If there is a particularly heavy deposit of contaminants, an inert or mild solvent such as Stoddard solvent could be used if applied sparingly.

6. Lubricants. Although the Instruction Manual (page 5) cautions against any re-lubrication in the field, the manufacturers have agreed that the reliability of the breaker is improved by lightly lubricating the linkage of the undervoltage device occasionally. However, the lubricant should be applied only sparingly to the front and back faces of the vertical-traveling latch (interfacing with the flat copper-alloy spring).

   A dry or near-dry molybdenum disulfide lubricant should be used. Technical Bulletin NSD-TB-74-1 indicated Molykote G as a possible choice. That information is incorrect and is hereby rescinded. Molykote G uses a thickened mineral oil as a vehicle, which would tend to collect foreign material. A better choice would be Molykote M-88, or Spray-kote. Both are commercially available Dow Corning products.

7. Inspection. Following the above cleaning and lubrication the entire breaker should be operationally checked and inspected for broken parts, loose bolts or excessive wear.

This Data Letter and the above information supersedes Technical Bulletin NSD-TB-74-1, which is hereby cancelled.

W H Furfari

W. H. Furfari
Electric Technology
TECHNICAL OPERATIONS

S G Caslake

APPROVED: Sydney G. Caslake, Manager
Electric Technology
TECHNICAL OPERATIONS

WHF/nev
Attachment

(See Data Letter 74-2)

Cancelled
2/19/74

NSD TECHNICAL BULLETIN

No.: NSD-TB-74-1
Date: 1/17/74

(An interim advisory notice of a recent significant technical development requiring immediate consideration by Westinghouse nuclear service personnel. Preliminary information only. Supplemental instructions and information, as appropriate, to follow through normal division and department procedures.)

Subject DB-50 Reactor Trip Breakers

System(s) Rod Control Power Supply S.O.(s) 385

Affected Plants All

References TO-E-530

Information:

An incident occurred recently at an operating plant where a reactor trip breaker failed to trip upon initiation of a normal trip signal. The incident occurred during the regularly scheduled periodic testing of the breakers.

Investigations revealed that excessive friction within the linkage of the Undervoltage Trip Device prevented this device from exerting sufficient force to initiate the breaker tripping mechanism.

The malfunctioning device was corrected by cleaning the entire breaker, and lubricating the faces of the vertical-traveling latch in the undervoltage device linkage. A molybdenum disulfide lubricant such as Molykote G is recommended.

The manufacturer is being asked to review the design of the UV devices to see if spring force could be increased to improve reliability.

In the meantime, all plant operators should be made aware of this potential malfunction.

Immediate Action: Parties responsible for plant maintenance should be reminded that these breakers require periodic mechanical maintenance. On a regular basis (perhaps semi-annually) they should receive maintenance as described in the Manual, plus blown-out, vacuumed, and UV device linkage lubricated as described above.

Follow-up instructions or information to be issued by NSD Electrical Technology (Responsible Dept) on or before 3/1/74 (Date)

Originator:

W H Furfari

W. H. Furfari
Electrical Technology
TECHNICAL OPERATIONS

Approval:

Sidney G. Caslake

S. G. Caslake, Manager
Electrical Technology
TECHNICAL OPERATIONS

APPENDIX G

Control Room Information and Technical Specification Staffing Requirements

(Cross Referenced to Section 2 of this Report)

Contents

G.1 Salem Unit 1 Technical Specification Staffing Requirements . . . G-1

G.2 Salem Unit 1 First-Out Annunciator Information G-7

G.3 Licensee Data and Procedures for February 22, 1983 ATWS Event . . G-20

G.4 Licensee Data and Procedures for February 25, 1983 ATWS Event . . G-92

6.0 ADMINISTRATIVE CONTROLS

6.1 RESPONSIBILITY

6.1.1 The Station Manager shall be responsible for overall facility operation and shall delegate in writing the succession to this responsibility during his absence.

6.2 ORGANIZATION

OFFSITE

6.2.1 The offsite organization for facility management and technical support shall be as shown on Figure 6.2-1.

FACILITY STAFF

6.2.2 The Facility organization shall be as shown on Figure 6.2-2 and:

a. Each on duty shift shall be composed of at least the minimum shift crew composition shown in Table 6.2-1.

b. At least one licensed Operator shall be in the control room when fuel is in the reactor.

c. At least two licensed Operators shall be present in the control room during reactor start-up, scheduled reactor shutdown and during recovery from reactor trips.

d. An individual qualified in radiation protection procedures shall be on site when fuel is in the reactor.

e. All CORE ALTERATIONS after the initial fuel loading shall be directly supervised by either a licensed Senior Reactor Operator or Senior Reactor Operator Limited to Fuel Handling who has no other concurrent responsibilities during this operation.

f. A Fire Brigade of at least 5 members shall be maintained onsite at all times. The Fire Brigade shall not include 4 members of the minimum shift crew necessary for safe shutdown of the unit or any personnel required for other essential functions during a fire emergency.

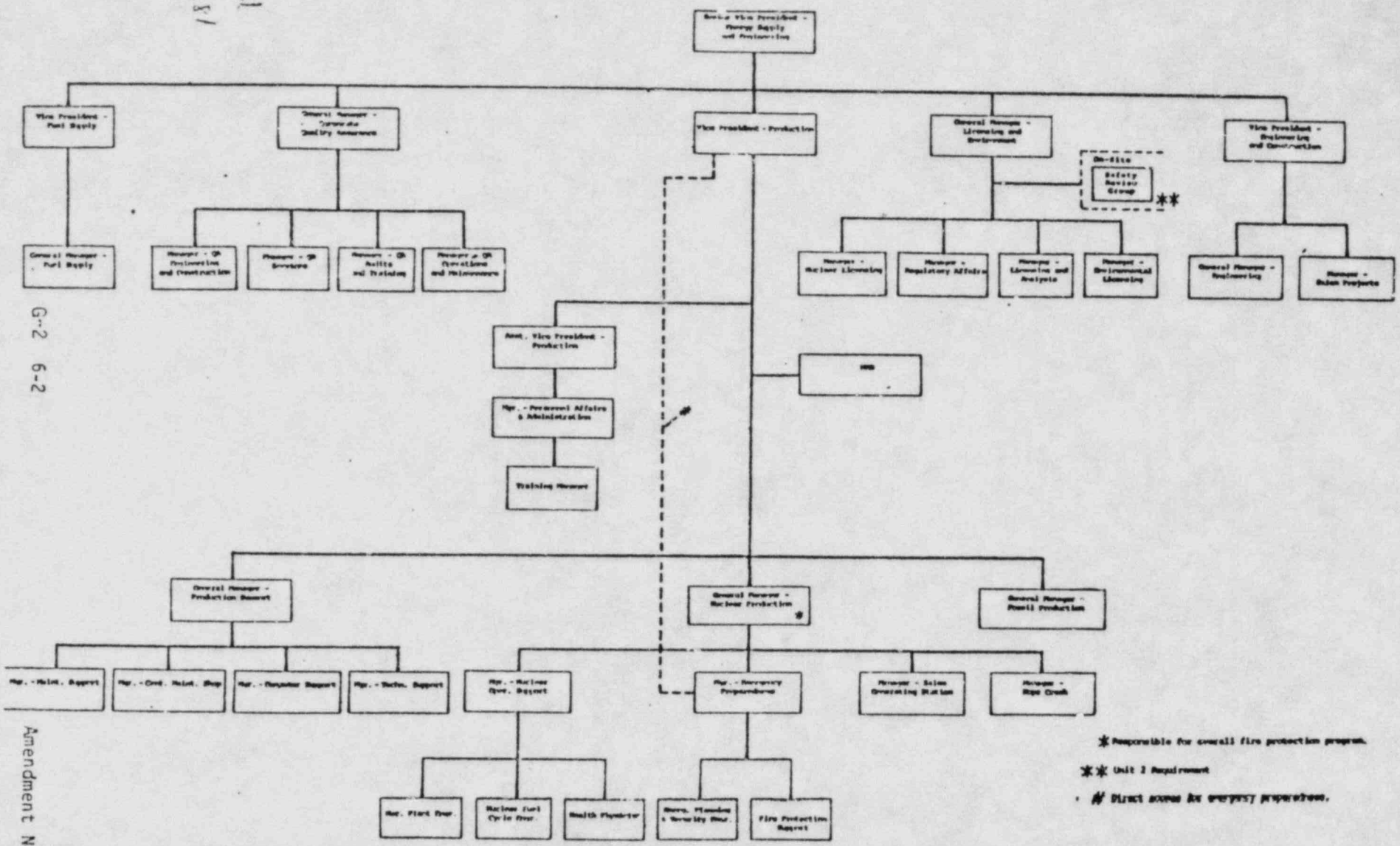


FIGURE 6.2-1 OFFSITE ORGANIZAT[illegible] FOR FACILITY MANAGEMENT AND TECHNICAL SUPPORT

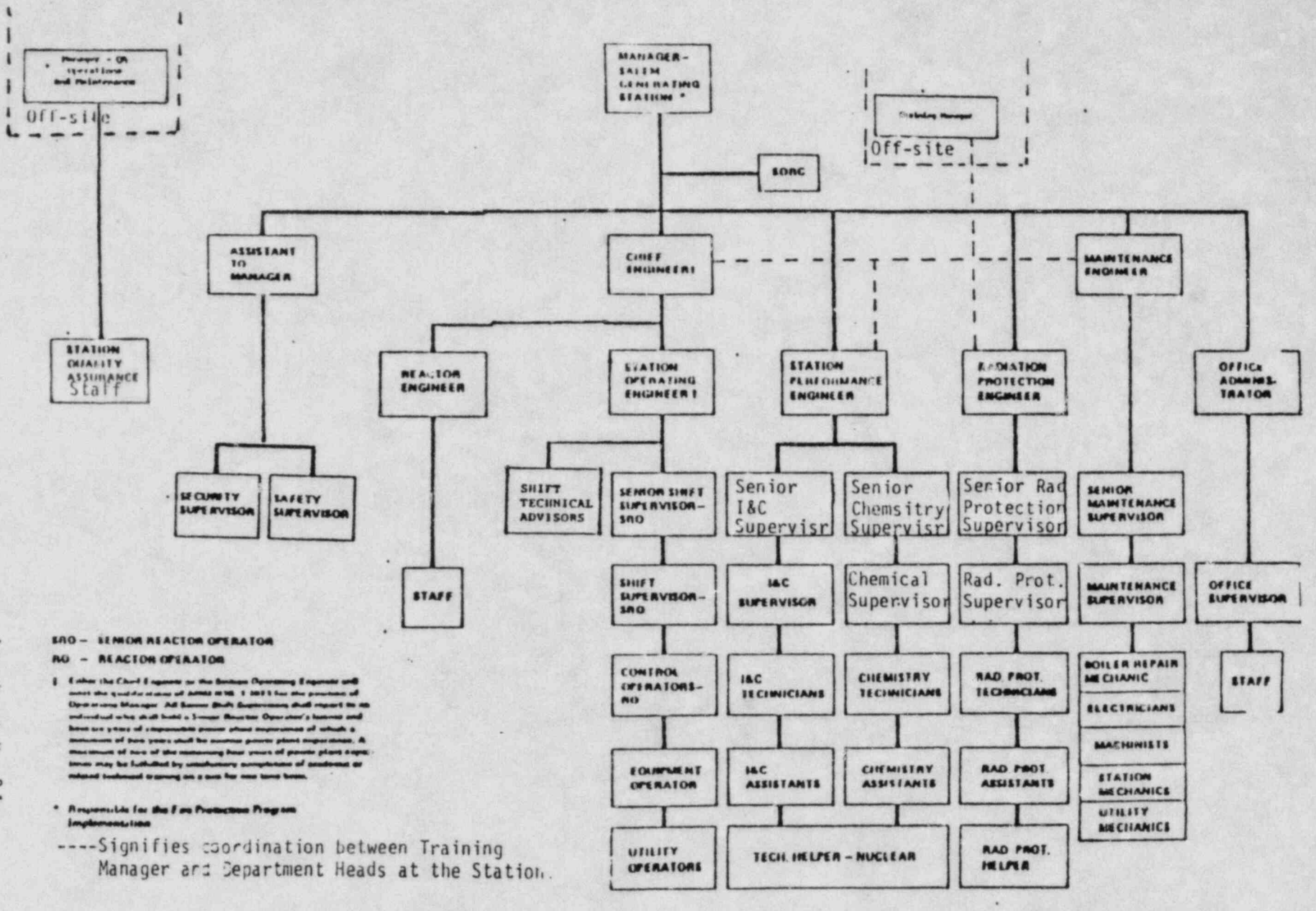


FIGURE 6.2.2 FACILITY ORGANIZATION – SALEM GENERATING STATION

TABLE 6.2-1

MINIMUM SHIFT CREW COMPOSITION

SALEM UNIT 1

WITH UNIT 2 IN MODES 5 OR 6 OR DE-FUELED		
POSITION	NUMBER OF INDIVIDUALS REQUIRED TO FILL POSITION	
	MODES 1, 2, 3 & 4	MODES 5 & 6
SS	1[a]	1[a]
SRO	1[a]	none
RO	2	1
AO	3	2[b]
STA	1	none
Maintenance Electrician	1	none

WITH UNIT 2 IN MODES 1, 2, 3 OR 4		
POSITION	NUMBER OF INDIVIDUALS REQUIRED TO FILL POSITION	
	MODES 1, 2, 3 & 4	MODES 5 & 6
SS	1[a]	1[a]
SRO	1[a]	none
RO	2	1
AO	3[c]	1
STA	1[a]	none
Maintenance Electrician	1[a]	none

a/ Individual may fill the same position on Unit 2

b/ One of the two required individuals may fill the same position on Unit 2, such that there are a total of three AOs for both units.

c/ One of the three required individuals may fill the same position on Unit 2, such that there are a total of five AOs for both units.

TABLE 6.2-1 (Continued)

SS - Shift Supervisor with a Senior Reactor Operators License on Unit 1
SRO - Individual with a Senior Reactor Operators License on Unit 1
RO - Individual with a Reactor Operators License on Unit 1
AO - Auxiliary Operator
STA - Shift Technical Advisor

Except for the Shift Supervisor, the Shift Crew Composition may be one less than the minimum requirements of Table 6.2.1 for a period of time not to exceed 2 hours in order to accommodate unexpected absence of on-duty shift crew members provided immediate action is taken to restore the Shift Crew Composition to within the minimum requirements of Table 6.2-1. This provision does not permit any shift crew position to be unmanned upon shift change due to an oncoming shift crewman being late or absent.

During any absence of the Shift Supervisor from the Control Room while the unit is in MODE 1, 2, 3 or 4, an individual (other than the Shift Technical Advisor) with a valid SRO license shall be designated to assume the Control Room command function. During any absence of the Shift Supervisor from the Control Room while the unit is in MODE 5 or 6, an individual with a valid RO license (other than the Shift Technical Advisor) shall be designated to assume the Control Room command function.

6.2.3 SHIFT TECHNICAL ADVISOR

6.2.3.1 The Shift Technical Advisor shall serve in an advisory capacity to the Shift Supervisor on matters pertaining to the engineering aspects assuring safe operation of the unit.

6.2.3.2 The Shift Technical Advisor shall have a bachelor's degree or equivalent in a scientific or engineering discipline with specific training in plant design and response and analysis of the plant for transients and accidents.

ANNUNCIATOR LOCATION F-5

STM. GEN. 11

FEEDWATER

LO LVL + FLO

REAC TRIP

SETPOINT: 1.4×10^6 LB/HR SF > FF AND STM GEN. LEVEL < 25%.

ORIGIN: STM. GEN. #11 FLOW AND LEVEL BISTABLES.
FT 512 > FT 510 (FC510B) CH I
OR
FT 513 > FT 511 (FC511B) CH I
AND
LT 517 (LC517C) CH IV OR
LT 518 (LC518C) CH III.

CAUSE: STEAM FLOW - FEED FLOW MISMATCH AND LOW STM. GEN. LEVEL.
LOSS OF FEED FLOW ACCIDENT WITH LOW LEVEL.
STEAM DUMP SYSTEM MALFUNCTION AT LOW POWER.

AUTOMATIC ACTION:
1. REACTOR TRIP.
2. TURBINE TRIP.
3. GENERATOR TRIP = 30 SEC. DELAY.
4. GROUP BUSES TRANSFER = 30 SEC. DELAY.
5. STEAM DUMP.
6. FEEDWATER ISOLATION WITH TAVG. < 554°F.

IMMEDIATE ACTION: REFER TO EMERGENCY INSTRUCTION I-4.3, "REACTOR TRIP," AND I-4.12, "LOSS OF FEEDWATER/IMPROPER STEAM GENERATOR LEVEL."

SUPPLEMENTARY ACTION: THE CAUSE FOR THE SF > FF AND LOW LEVEL TRIP SHOULD BE DETERMINED PRIOR TO SUBSEQUENT START-UP.

REFERENCE: P.S. DRAWING 220430, 205207, 220431, 205203, 221056, 222762

MASTER

ANNUNCIATOR LOCATION F-6

STM DIFF P
LOW P1
SI
REAC TRIP

SETPOINT: 100 PSID.
STM. LINE 11 IS < 2/3 CHANNELS ON STM. LINE 12, 13, OR 14.

ORIGIN: STM. LINE PRESS. BISTABLES.
PT 514 < PT 524 (PC514A) CH I
PT 515 < PT 535 (PC515A) CH II
PT 516 < PT 546 (PC516C) CH IV

CAUSE: STM. GEN. 11 IS 100 PSI < 2/3 TRIP SIGNALS FROM 12, 13, OR 14 STM. GEN'S
STM. LINE RUPTURE.
EXCESSIVE FEEDING OF COLD FEEDWATER TO ONE STM. GEN. DURING LOW POWER OPERATION.

AUTOMATIC ACTION:
1. SAFETY INJECTION ACTUATION.
2. REACTOR TRIP.
3. TURBINE TRIP.
4. GENERATOR TRIP ≈ 30 SEC. DELAY.

IMMEDIATE ACTION: REFER TO EMERGENCY INSTRUCTION I-4.0, "SAFETY INJECTION INITIATION," AND I-4.6, "STEAM LINE RUPTURE."

SUPPLEMENTARY ACTION: THE CAUSE FOR THE SAFETY INJECTION SHOULD BE DETERMINED PRIOR TO SUBSEQUENT START-UP.

REFERENCE: P.S. DRAWING 205203, 220430, 31, 32, 34, 37, 221056 221057, 222762

MASTER

ANNUNCIATOR LOCATION F-8

SETPOINT: 90% FLOW DEC. RCP BKR. OPEN.

ORIGIN: 2/4 LOW FLOW OR BKR. OPEN CHANNELS INITIATE RX TRIP.

RC LO FLOW

OR RCP BKR OPEN + P-7

REAC TRIP

ORGIN: 52/STA RCP BKR. CONTACTS
#11 RC LOOP (FT 414, 415, 416)
#12 RC LOOP (FT 424, 425, 426)
#13 RC LOOP (FT 434, 435, 436)
#14 RC LOOP (FT 444, 445, 446)

CAUSE: REACTOR COOLANT PUMP BREAKER OPEN. (2/4 RCP'S) <90% FLOW ON 2/3 CHANNELS ON 2/4 RC LOOPS IF POWER IS >P7 (10%) <P8 (36%) POWER.

AUTOMATIC ACTION:
1. REACTOR TRIP.
2. TURBINE TRIP.
3. GENERATOR TRIP = 30 SEC. DELAY.
4. GROUP BUSES TRANSFER APT TO SPT = 30 SEC. DELAY.
5. STEAM DUMP
6. FEEDWATER ISOLATION WHEN TAVG < 554°F.

IMMEDIATE ACTION: REFER TO EMERGENCY INSTRUCTION I-4.3, "REACTOR TRIP." AND I-4.5, "LOSS OF REACTOR COOLANT PUMP AND/OR FLOW.

SUPPLEMENTARY ACTION: THE CAUSE FOR THE LOSS OF FLOW OR BREAKER OPEN TRIP SHOULD BE DETERMINED PRIOR TO SUBSEQUENT START-UP.

REFERENCE: P.S. DRAWING 205201, 221532, 34, 36, 38, 220412, 220413, 221054, 222762.

MASTER

ANNUNCIATOR LOCATION F-14

4 kV
GRP BUSES
UNDER FREQ
REAC TRIP

SETPOINT: 56.6 HZ DEC.
2/4 BUSES MADE UP OF 1/2 BUS 1E OR 1H, AND 1/2 BUS 1F OR 1G.

ORIGIN: 81X-1E, 1F, 1G, AND 1H ON REACTOR COOLANT PUMP 4KV BUSES.

CAUSE: LOW FREQUENCY ON 4KV BUSES 1E OR 1F, AND 1G OR 1H.

AUTOMATIC ACTION:
1. REACTOR TRIP. IF POWER IS > P7 (10%).
2. REACTOR COOLANT PUMP TRIP.
3. TURBINE TRIP.
4. GENERATOR TRIP = 30 SEC. DELAY.
5. GROUP BUSES TRANSFER APT TO SPT = 30 SEC. DELAY.
6. STEAM DUMP.
7. FEEDWATER ISOLATION.

IMMEDIATE ACTION: REFER TO EMERGENCY INSTRUCTION I-4.3, "REACTOR TRIP", AND I-4.5, "LOSS OF REACTOR COOLANT PUMP AND/OR FLOW."

SUPPLEMENTARY ACTION: THE CAUSE FOR THE BUSES UNDERFREQUENCY REACTOR TRIP SHOULD BE DETERMINE PRIOR SUBSEQUENT START-UP.

REFERENCE: P.S. DRAWING 203050, THRU 203053, 221054, 222762

MASTER

ANNUNCIATOR LOCATION F-15

PRESSURIZER HIGH LEVEL REAC TRIP

SETPOINT: 92% INC.
2/3 PRESSURIZER LEVEL CHANNELS WITH POWER > P-7 (10%).

ORIGIN: PRESSIZER LEVEL BISTABLE
LT 459 (LC459A) CH I
LT 460 (LC460A) CH II
LT 461 (LC461A) CH III

CAUSE: 2 OUT OF 3 PRESSURIZER LEVEL CHANNELS >92%.
PRESSURIZER LEVEL CONTROL SYSTEM MALFUNCTION (MAKE-UP) AND LETDOWN).

AUTOMATIC ACTION:
1. REACTOR TRIP.
2. TURBINE TRIP.
3. GENERATOR TRIP ≈30 SEC. DELAY.
4. GROUP BUSES TRANSFER APT TO SPT ≈30 SEC. DELAY.
5. STEAM DUMP.
6. FEEDWATER ISOLATION WHEN TAVG. <554°F.

IMMEDIATE ACTION: REFER TO EMERGENCY INSTRUCTION I-4.3, "REACTOR TRIP."

SUPPLEMENTARY ACTION: THE CAUSE FOR THE PRESSURIZER HIGH LEVEL TRIP SHOULD BE DETERMINED PRIOR TO SUBSEQUENT START-UP.

REFERENCE: P.S. DRAWING 220441, 221055, 222762

MASTER

ANNUNCIATOR LOCATION F-16

STM. GEN. 13
LOW-LOW
LEVEL
REAC TRIP

SETPOINT: 18% DEC.
2/3 STM. GEN. #13
LEVEL CHANNELS.

ORIGIN: STM. GEN. #13 LEVEL
BISTABLES
LT 537 (LC537B) CH IV
LT 538 (LC538B) CH III
LT 539 (LC539B) CH II

CAUSE: 2 OUT OF 3 STM. GEN. #13 LOW-LOW LEVEL CHANNELS >18%.

AUTOMATIC ACTION:
1. REACTOR TRIP.
2. TURBINE TRIP.
3. GENERATOR TRIP ≈30 SEC. DELAY.
4. GROUP BUSES TRANSFER APT TO SPT ≈30 SEC. DELAY.
5. STEAM DUMP.
6. FEEDWATER ISOLATION WHEN TAVG <554°F.

IMMEDIATE ACTION: REFER TO EMERGENCY INSTRUCTION I-4.3, "REACTOR TRIP AND I-4.12, "LOSS OR FEEDWATER/ IMPROPER STEAM GENERATOR LEVEL."

SUPPLEMENTARY ACTION: THE CAUSE FOR THE LOW-LOW TRIP SHOULD BE DETERMINED PRIOR TO SUBSEQUENT START-UP.

REFERENCE: P.S. DRAWING 205202, 220435, 221056, 222762

MASTER

ANNUNCIATOR LOCATION F-20

4KV GRP BUSES UNDER VOLT REAC TRIP

SETPOINT: ~~75%~~ 70 OF NORMAL VOLTAGE | DEC. 2/4 BUSES MADE-UP OF 1/2 BUS 1E OR 1H, AND 1/2 BUS 1F OR 1G | OSC 12-2 (82)

ORIGIN: 27X-1E, 1F, 1G, AND 1H OR REACTOR COOLANT PUMP 4KV BUSES.

CAUSE: LOW VOLTAGE ON 4KV BUSES 1E OR 1F, AND 1G OR 1H.

AUTOMATIC ACTION: TURB. DRIVEN AUX. F.W. PUMP START IN 3 SEC. TURBINE TRIP. REACTOR TRIP IF POWER IS >P-7 (10%). GENERATOR TRIP - 30 SEC. DELAY. STEAM DUMP. FEEDWATER ISOLATION WHEN TAVG <554°F.

IMMEDIATE ACTION: REFER TO EMERGENCY INSTRUCTION I-4.3, "REACTOR TRIP", AND I-4.5, "LOSS OF REACTOR COOLANT PUMP AND/OR FLOW.

SUPPLEMENTARY ACTION: THE CAUSE FOR THE BUSES UNDER VOLTAGE REACTOR TRIP SHOULD BE DETERMINE PRIOR SUBSEQUENT START-UP.

REFERENCE: PS DRAWING 203050 THRU 203053 - 221054 - 222762.

MASTER

ANNUNCIATOR LOCATION F-21

PZR LO PRESS SI REAC TRIP

SETPOINT: <1765 PSIG. DEC. 2/3 PRESSURIZER PRESSURE CHANNELS <1765 PSIG.

ORIGIN: PRESSURIZER PRESSURE BISTABLES. PT455 (PC455D) CH. I PT456 (PC456D) CH. II - PT457 (PC457D) CH. III.

CAUSE: 2 OUT OF 3 PRESSURIZER PRESSURE CHANNELS <1765 PSIG. PRESSURIZER PRESSURE CONTROL SYSTEM MALFUNCTION. POWER RELIEF OR SAFETY VALVE FAILURE. STEAM LINE RUPTURE. LOSS OF COOLANT ACCIDENT.

AUTOMATIC ACTION: SAFETY INJECTION ACTUATION. REACTOR TRIP. TURBINE TRIP. GENERATOR TRIP ≈30 SEC. DELAY. GROUP BUSES TRANSFER APT TO SPT ≈30 SEC. DELAY. STEAM DUMP. FEEDWATER ISOLATION WHEN TAVG <554°F.

IMMEDIATE ACTION: REFER TO EMERGENCY INSTRUCTION I-4.0, "SAFETY INJECTION INITIATION".

SUPPLEMENTARY ACTION: THE CAUSE FOR THE LOW PRESSURIZER PRESSURE SAFETY INJECTION SHOULD BE DETERMINED PRIOR TO SUBSEQUENT START-UP.

REFERENCE: PS DRAWING 220440 - 221055 - 222762.

MASTER

ANNUNCIATOR LOCATION F-30

TURB TRIP
+ P-7
REAC TRIP

SETPOINT: 45 PSIG DEC.
(AUTO STOP OIL.)
4/4 STOP VALUES CLOSED.

ORIGIN: AUTO STOP OIL
PD-826 (63-1/AST
PD-454 (63-4/AST)
PD-455 (63-5/AST)
STOP VALVES
33-T1 / CVO LIMIT SWITCH
33-T2 / CVO "
33-T3 / CVO "
33-T4 / CVO "

CAUSE: TURBINE TRIP AND POWER > P-7 (10%).

AUTOMATIC ACTION:
1. REACTOR TRIP.
2. TURBINE TRIP.
3. GENERATOR TRIP = 30 SEC. DELAY.
4. GROUP BUSES TRANSFER APT TO SPT = 30 SEC. DELAY.
5. STEAM DUMP.
6. FEEDWATER ISOLATION WHEN TAVG. <554°F.

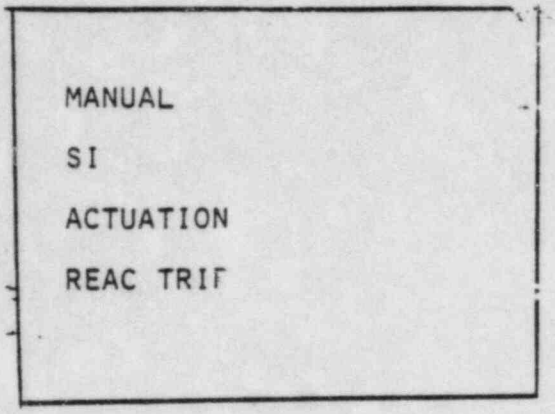
IMMEDIATE ACTION: REFER TO EMERGENCY INSTRUCTION I-4.3, "REACTOR TRIP."

SUPPLEMENTARY ACTION: THE CAUSE FOR THE TURBINE TRIP SHOULD BE DETERMINED PRIOR TO SUBSEQUENT START-UP.

REFERENCE: P.S. DRAWING 221065, 222762, 240108, 244112

MASTER

ANNUNCI. OR LOCATION F-34



SET POINT: TWO MANUAL PUSHBUTTONS (KEYLOCK)

ORIGIN: PUSHBUTTON STATION ON SAFEGUARDS CONTROL CONSOLE.

CAUSE: MANUAL OPERATOR ACTUATION. (EITHER OF TWO PUSHBUTTONS WILL ACTUATE BOTH TRAINS).

AUTOMATIC ACTION:
1. SAFETY INJECTION ACTUATION.
2. REACTOR TRIP.
3. TURBINE TRIP.
4. GENERATOR TRIP = 30 SEC. DELAY.
5. GROUP BUSES TRANSFER APT TO SPT = 30 SEC. DELAY.
6. STEAM DUMP.
7. FEEDWATER ISOLATION WHEN TAVG. <554°F.

IMMEDIATE ACTION: REFER TO EMERGENCY INSTRUCTION I-4.0, "SAFETY INJECTION INITIATION."

SUPPLEMENTARY ACTION: N/A

REFERENCE: P.S. DRAWING 221057, 222762

MASTER

ANNUNCIATOR LOCATION F-3/

SETPOINT: 18-22 VAC DEC.

ORIGIN: PD-188 ON MAIN TURBINE.

CONDENSER VACUUM LOW
TURBINE TRIP

CAUSE: LOSS OF VACUUM PUMP (S). LOSS OF CIRC, WATER PUMP (S). CONDENSER LEAK.

AUTOMATIC ACTION: TURBINE TRIP - REACTOR TRIP IF >P-7 (10%) GENERATOR TRIP = 30 SEC. DELAY. GROUP BUSES TRANSFER APT TO SPT = 30 SEC. DELAY STEAM DUMP. FEED WATER ISOLATION WHEN TAVG <554°F.

IMMEDIATE ACTION: REFER TO EMERGENCY INSTRUCTION I-4.3, REACTOR TRIP. IF STEAM DUMPS ARE LOST DUE TO LOW VACUUM, MAINTAIN TAVG WITH ATMOSPHERIC RELIEVE VALVES.

SUPPLEMENTARY ACTION: RESTORE CONDENSER VACUUM, VACUUM PUMPS AND CIRC. WATER PUMPS.

REFERENCE: PS DRAWING 212863 - 221065 - 222762 - 244026.

MASTER

ANNUNCIATOR LOCATION F-38

STM GEN II HI-HI LEVEL TURB TRIP

SETPOINT: 67% INC. 2/3 LEVEL CHANNELS ON #11 STEAM GEN.

ORIGIN: STM. GEN. LEVEL BISTABLES.
LT517 (LC517A) CH. IV
LT518 (LC518A) CH. III
LT519 (LC519A) CH. II
2 OUT OF 3 HI-HI LEVEL CHANNELS >67%.

CAUSE: MAIN FEEDWATER PUMP OR CONTROL VALVE MALFUNCTION.
PRIMARY TO SECONDARY LEAK.

AUTOMATIC ACTION: TURBINE TRIP. FEEDWATER ISOLATION. REACTOR TRIP IF >P-7 (10%) GENERATOR TRIP = 30 SEC. DELAY. GROUP BUSES TRANSFER APT TO SPT = 30 SEC. DELAY. STEAM DUMP.

IMMEDIATE ACTION: REFER TO EMERGENCY INSTRUCTION I-4.3, "REACTOR TRIP".

SUPPLEMENTARY ACTION: IF EVIDENCE OF A PRIMARY TO SECONDARY LEAK EXISTS, REFER TO EMERGENCY INSTRUCTION I-4.7, "STEAM GENERATOR TUBE LEAK".

REFERENCE: PS DRAWING 205202 - 220431 - 221056 - 221062 - 221065 - 222762.

MASTER

ANNUNCIATOR LOCATION F-46

SETPOINT: BREAKER CONTACTS

REACTOR TRIP
TURB TRIP

ORIGIN: REACTOR TRIP BREAKER CONTACTS.
52H/1RTA AND 52H/1BYA
OR 52H/1RTB AND 52H/1BYB

CAUSE: REACTOR TRIP BREAKERS OPEN.

AUTOMATIC ACTION:
1. TURBINE TRIP.
2. GENERATOR TRIP = 30 SEC. DELAY.
3. GROUP BUSES TRANSFER APT TO SPT = 30 SEC. DELAY.
4. STEAM DUMP.
5. FEEDWATER ISOLATION WHEN TAVG. <554°F.

IMMEDIATE ACTION: REFER TO EMERGENCY INSTRUCTION I-4.3, "REACTOR TRIP".

SUPPLEMENTARY ACTION: THE CAUSE OF THE REACTOR TRIP - TURBINE TRIP SHOULD BE DETERMINED PRIOR TO SUBSEQUENT START-UP.

REFERENCE: P.S. DRAWING 203645, 221065, 222762

MASTER

INTRODUCTION

On February 25, 1983, during a routine startup of the Salem Unit 1 plant following a refueling outage, both reactor trip breakers failed to open automatically on receipt of a valid Low-Low Steam Generator Level reactor trip signal. The trip breakers involved were Westinghouse Model DB-50 Type A breakers. The failures resulted from binding of the undervoltage relay mechanisms apparently associated with inadequate preventive maintenance. The event was within the limits of the accident analyses of the FSAR, and no core or Reactor Coolant System damage was sustained.

DESCRIPTION OF OCCURRENCE

Prior to the trip, on February 24, 1983, final testing of the Salem Unit 1 turbine generator was satisfactorily performed. Following the tests, at 0012 hours, February 25, 1983, the generator was paralleled to the grid. Associated with the change in turbine load, reactor power increased from approximately 10% to 14% and problems were experienced in controlling the steam generator levels. At 0021 hours, due to a No. 12 Steam Generator Low-Low Level signal, a reactor trip occurred.

The Control Room Operator, observing the overhead annunciator for the trip, verified that an actual trip condition existed by observing No. 12 Steam Generator levels were less than the trip setpoint of 18%. The operator also noted that the No. 12 Steam Generator and SSPS bistables on Panel RP-4 indicated a tripped condition.

At the time of the trip, the Senior Shift Supervisor was overseeing the attempt to increase steam generator levels. Upon observing the reactor trip annunciator, he noticed that the turbine had not tripped. Checking the control rod position indication and rod bottom lights, the Control Room Operator observed that the rods had not been inserted. Also noticing that the rods were still withdrawn, the Senior Shift Supervisor ordered the operator to manually trip the reactor. The operator immediately initiated a manual trip utilizing the rotary switch on the control console.

The manual trip successfully opened the trip breakers, resulting in control rod insertion and a turbine trip. Auxiliary feedwater flow automatically initiated and the unit was immediately placed in a stable condition in Mode 3, in accordance with operating procedures.

Due to concern that a failure of the annunciator, steam generator level instrument or SSPS circuitry had possibly caused an erroneous trip indication, the Instrument and Control Department was immediately notified to investigate the occurrence. Tests of the Reactor Protection System confirmed that the reactor trip breakers had malfunctioned, and that an "Anticipated Transient Without SCRAM" (ATWS) had occurred.

A review of operating records revealed that the ATWS condition had existed 24 seconds when the reactor was manually tripped. At 0130

hours, following confirmation of the ATWS, the Senior Shift Supervisor declared an Alert condition, in accordance with Emergency Procedure EP I-2. and appropriate notification was performed. The alert was terminated at 0200 hours.

With both channels of the Reactor Trip Breakers inoperable, Technical Specification Limiting Condition for Operation 3.3.1.1 could not be met, and Limiting Condition for Operation 3.0.3 applied. Immediate notification of the NRC was confirmed by written transmission February 25. 1983 (See LER 83-011/01P).

APPARENT CAUSE OF OCCURRENCE

Investigation of the problem immediately following the incident revealed that the SSPS had functioned properly, and that the failure was in the reactor trip breakers. In four tests of the breaker operation, one for each steam generator, Breaker A failed to open once, and Breaker B failed to open on all tests. The breakers were replaced with ones from Unit 2, and both trip breakers opened on 8 simulated trips.

Further investigation showed that the under voltage relay attachment in the failed breakers were binding, resulting in a failure to engage the trip lever with trip signals from the SSPS. Previous failures of this type had been noted with Salem Unit 2 breakers on August 20, 1982. and January 6, 1983 (See LERs 82-072/03X-1 and 83-001/03L). In each instance, only one trip breaker had malfunctioned.

On the first occasion, the faulty undervoltage relay attachment had been replaced. In the second case, the breaker had been exchanged with the one from Salem Unit 1 Reactor Trip Breaker B position. Following the second occurrence, the manufacturer's authorized representative had been contacted by the Salem Maintenance Department. In the opinion of the representative, the problem involved binding of the undervoltage mechanisms due to insufficient lubrication. At his recommendation, the undervoltage relay mechanisms on all Unit 1 trip and bypass breakers had been cleaned and lubricated with CRC2-26 spray lubricant.

At that time, the Maintenance Department had asked the service representative to supply Salem station with a manufacturer's procedure for inspection, cleaning, lubrication and testing of the breakers. A work order had been written to inspect, clean, and lubricate the Salem Unit 2 Model DB-50 breakers during the then upcoming Unit 2 refueling. Finally, steps had been taken to initiate periodic inspection and maintenance of the breakers during each refueling, to be performed in accordance with the procedure received from the manufacturer. The recommendations had not yet been received at the time of the most recent breaker failures.

Prior to the second occurrence, due to the low frequency of operation of the breakers (actual number of breaker cycles annually is approximately 50), no preventative maintenance had been deemed necessary in accordance with recommendations of the breaker technical

manual. The manual stated that maintenance schedules should be determined by the severity of the duty performed. It further specified that lubrication of the the undervoltage mechanisms was not advisable. In the absence of any required testing or lubrication of the breakers, it was assumed that operation of the breakers every 2 months associated with monthly SSPS surveillance testing would indicate any mechanical or electrical deficiencies.

Following similar problems at the Carolina Power and Light Co. Robinson Unit 2 in December, 1973, the manufacturer had recommended periodic inspection and lubrication of the undervoltage mechanisms of Model DB-50 breakers in Reactor Trip System applications. Sparing application of a dry molybdenum disulfide lubricant to the front and back faces of the vertical traveling latch at six month intervals was specified.

Westinghouse NSD Data Letter 74-2, containing the service recommendations, was sent to company nuclear service representatives. However, no record of the receipt of the letter exists in Salem Generating Station files. Since no knowledge of the information existed, the appropriate preventative maintenance had not been performed on the breakers.

During an apparently unrelated incident involving the Unit 1 Reactor Trip Breaker B cover... on February [illegible], 1983, the breaker was exchanged with the one from the Bypass Breaker B position. The ATWS incident therefore did not involve the breakers which had previously failed in August and January.

Based on the evidence assembled thusfar, the failures all involve binding of the undervoltage relay mechanisms. Due to recurrence of the binding problem, it is now viewed as as being common mode in nature and as potentially affecting all breakers in this application at the station. Further analysis of the failures by the manufacturer has been requested.

ANALYSIS OF OCCURRENCE

The operability of the Reactor Protection System is required to provide the overall reliability, redundance and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of the system is consistent with the assumptions of the accident analyses in the FSAR.

In accordance with the FSAR. a Loss of Normal Feedwater is a Condition II event, classified as a Fault of Moderate Frequency. Due to the minimal power history, the low initial power level, and the slow decrease in steam generator levels involved in this occurrence, the incident is clearly within the FSAR analysis, which is based on maximum power history, 102% thermal power and a more rapid decrease in feedwater flow. FSAR analyses for Condition II events demonstrate that fuel rod failures and Reactor Coolant System overpressurization

are not likely; the events by definition do not propagate to cause more serious faults.

Additional consideration of a limiting ATWS following a Condition II event shows that if a reactor trip is generated within 10 minutes, a turbine trip within 30 seconds, and auxiliary feedwater is actuated within 60 seconds, acceptable consequences result (from the Westinghouse Owner's Group Emergency Response Guidelines (ERG) Seminar). As noted, the manual reactor trip and turbine trip occurred 24 seconds after the trip signal was received.

Based on operational data of the transient, it is clear the occurrence was well within the FSAR and ERG analyses. The occurrence therefore of itself involved no risk to the health and safety of the public for operation up to and including that assumed in the limiting Condition II analyses. The likelihood of no trip following Condition II events, based on random component failures, is extremely low, and the ATWS occurrence supports the assumption of a common mode failure.

Since the ATWS could have apparently been equally possible following less frequent Condition III and Condition IV faults, some undue risk to the public is likely involved. All other safety related equipment and instrumentation performed as analyzed. Prompt and effective action to place the unit in a safe condition in accordance with procedure was illustrated by operations personnel during the transient. Such overall performance would minimize the impact of an ATWS following more serious faults.

Limiting Condition for Operation 3.0.3 requires:

> When a Limiting Condition for Operation is not met except as provided in the associated action statements, within one hour action shall be initiated to place the unit in a mode in which the specification does not apply by placing it, as applicable, in at least hot standby within the next 6 hours, hot shutdown within the following 6 hours, and cold shutdown within the subsequent 24 hours.

CORRECTIVE ACTION

As noted, the unit was immediately placed in a safe condition. Limiting Condition for Operation 3.3.1.1 appies only in Modes 1 and 2, or with the reactor trip breakers closed and the rod control system capable of rod withdrawal. With the manual trip, the breakers opened and the unit entered hot standby, in compliance with the limiting conditions for operation. Under direction of the NRC, a cooldown was commenced and the plant was placed in Mode 5 at 0254 hours, February 26, 1983.

As noted, further analysis of the failures by the manufacturer has been requested. Recommendations for a long-term solution of the problem, including clarification of the required preventative maintenance and consideration of possible replacement of the breakers with a new design, has also been requested. To prevent future

occurences of breaker failure, Inspection Orders have been written for preventative maintenance on the breakers semi-annually. Finally, a review of company processing of technical information from vendors will be conducted, with emphasis on insuring all documents required for station maintenance contain complete and up-to-date manufacturer maintenance recommendations.

FAILURE DATA

Westinghouse Electric Corp.
Circuit Breaker
Model DB-50 Type A

Russ MacWatters
X 4519

REACTOR TRIP FEBRUARY 25,1983

On Februrary 24,1983 Unit 1 was in the startup phase following a refueling outage. At approximately 1200 the turbine was taken off the line in order to complete the overspeed test. Following the successful completion of the test the unit was returned to power. At 0012 on February 25,1983 the generator was synchronized to the grid. Reactor power was approximately 14%. Problems were experienced controlling the level in No.12 Steam Generator and as a result the level decreased to below the Lo-Lo Level Trip Setpoint of 18%. A reactor trip signal was generated by the Reactor Protection System, however, the Reactor Trip Breakers failed to open. The operator, upon surveying the control room indications as directed by EI-I-4.3, Reactor Trip, observed there were no Rod Bottom Lights illuminated, the Individual Rod Position Indications still showed the control rods to be withdrawn and the turbine did not indicate it was tripped. Upon recognition of these facts, the operator concluded that the Reactor Trip had failed to initiate and manually initiated a trip utilizing the trip handle on the console. This ocurred approximately 30 seconds after the Reactor Trip signal was gernerated,(see the attached sequence of events printout attached) and resulted in a successful reactor trip. All automatic functions associated with the reactor trip were then verified to have ocurred. (All control rods were fully inserted and the turbine tripped.)

The operator had concluded that a trip was warranted because the actual level indicated in No.12 Steam Generator was below the trip setpoint of 18% and all of the alarms associated with the Steam Generator levels, both on the console and the Overhead Alarms were illumiated. Also, the Motor Driven Auxiliary Feedwater Pumps had started automatically. These pumps start when the level in any Steam Generator decreases to less than 18%.

As directed by the Emergency Plan Procedure EP-I-0 Part 2 Item 16, an Alert Classification was declared at 0130. All notifications were made in accordance with EP-I-2, Alert. The event was terminated at 0200.

Attached are copies of the recorder charts for all four Steam Generator Levels, both narrow and wide range.

SENIOR SHIFT SUPERVISOR'S LOG

DAY FRIDAY

DATE Feb. 25, 1983 SHIFT 2315-0715 S.S.S. Victor W. Lowenstein, Jr.

UNIT 1 MODE III
STATUS Rx Power 0 %
Load 0 Mwe Gross

Tave 548 °F
RCS Press 2235 psig
Boron Conc. 1281 ppm

COMMENTS UNIT SYNC @ 0012 hrs. - Trip @ 0023 hrs (Mzs/G Lo-Lo Lvl
MANUAL Rx TRIP INITIATED IAW AP-5 SECT. 6.2.1 c

UNIT 2 MODE DE-FUELED
STATUS Rx Power — %
Load — Mwe Gross

Tave 90 °F
RCS Press — psig
Boron Conc. 2121 ppm

COMMENTS

UNIT 3 AVAILABLE ✓ UNAVAILABLE ____ SINCE ____

COMMENTS

TECH SPEC ACTION STATEMENT

UNIT	EQUIPMENT	A/S NUMBER	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
1/2	Fire Barriers	3.7.11a	10/28/81@ 0001		
1	+ MTC	3.1.1.4a	2/16/83 @ 0001		100 MWD/MTU
1	P.O.R.V.	3.4.3a	2/23/83 @ 0628		
2	C.R. Emerg. A/C	3.7.6a	2/23/83 @ 1252		3/2/83 @ 1252
1/2	RAD WASTE	ETS 2.3.1 F	2/24/83 @ 1620		

UNIT 1 SHIFT SUPERVISOR'S LOG

DATE 2/25/83 SHIFT 0000-0800 SHIFT SUPV. OTT/

UNIT STATUS MODE 3 Tave 547 °F

Rx Power 0 % RCS Press 2235 psig

Load 0 Mwe Gross Boron Conc. 1281 ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes 1. 2. 3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP
11 CVCS Mon TK.	2/24/83 2050	0330 (2/25/83)	[illegible]		

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
FIRE DOORS & BARRIERS	3.7.11	10/29/81 0008		
POSITIVE RTC.	3.1.1.4.9	2/6/83 0001		
PORVS	3.4.3	2/23/83 0628		
SIG CONDUCTIVITY	E.T. 4.21 TABLE 4	2/24/83 2200		
RAD WASTE	E.T.S. 3.3.1.F	2/24/83 1630		

COMMENTS FOR TURNOVER

1. Call Dave Williams at Ho Jo's Rm 223 1 hr before rolling turbine.
2. All Safety Related Equipment will be started and run for ≈1 min to verify operability as per NRC.
3. 1-5, 5-6 500 KV BKRS C/T for S²
4. 1B Diesel run for 1 hr surveillance
5. ATTACHED IS INCIDENT REPORT DESCRIBING THE EVENTS CONCERNING THE REACTOR TRIP WHICH OCCURRED AT 0021.
6. ALSO ATTACHED IS THE WORK ORDER CONCERNING THE REACTOR TRIP BREAKERS.

BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: FEB 25 1983

ME	APPARATUS	REMARKS:
2300	W - Shift	
	SSS	V. Lowenstein
	SS	R. Flores and S. Saunders
	NCO's	D. Lowensbury, P. Bowdren and C. Anderson
	EO's	S. Pepper and H. Thompson
	WO's	R. Dunn and J. Schumacher
	Fire Brigade	W. Sweeper, F Priestly, J. Rodriguez, F Becker T. McKee / M Brauchle
2325	RCS	CB = 1291 ppm and Pressurizer 1298 ppm
2355	500 KV	The 5.55 tags LD-892 were released from 500 KV Breakers 1-5 and 5-6 and they were made ready for service
2/2	26 KV	#1 G.T. or was synchronized and the unit was put on the line
0023	Unit #1	Reactor trip, 14% power 552°F Tave Bank D - 121 steps RCS CB: 1291 ppm Pressurizer 1311. Trip caused by 12 Steam Generator Low Low level. The reactor was manually tripped because the automatic trip did not occur.
0113	VC	A containment pressure relief was started
0130	Unit #1	An Alert was declared due to the automatic trip actuation malfunction on #2 Steam Gen Low-Low level.
0200	Unit #1	The Alert was cancelled
0215	VC	Containment pressure relief was completed
45	500 KV	The 1-5 and 5-6 Breakers and Disconnects were

Use apparatus to provide a description of the event being logged.

(1) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

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BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE. FEB 25

TIME	APPARATUS	REMARKS:
		CIT for the SSS LD #895
0352	SSPS	RX TRIP BKRS EXCHANGED AND SEVE.
		TRIP TESTED ALL SAT.
0355	AUX VENT	# 11 AUX SUPPLY FAN O/S #12 AOI FAN
0356	SW	Test ECCS & SEC equip
		#12 SW PMP
0359	SW	# 13 #14 #15 #16 SW pmps checke.
0402	CC	# 11 #12 #13 Comp Cooling pmps
0404	RHR	# 11 #12 RHR Pmps checked
0406	CS	# 11 #12 CS PMPS checked
0410	SI	#11 #12 SI PMPS checked
0455	C.V	#11 CHARG pump CHECKED
0500	DG	#1A #1C DIESELS RUN FOR
		OPERABLE CHECK
0505	DG	COMPLETED 1 HOUR SR ON 1B DIESEL
		David Lowenberg

(a) Use apparatus to provide a descripti[on] the event being logged.

(b) The CO need only sign the remarks pa[ge] as immediately following his last entry at Shift Relief.

BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 2/25/83

TIME	APPARATUS	REMARKS:
0700	Y-Shift	
	S^3	Dimon
	S^2	Massa, Crews
	N.C.O	Banks, Hyman
	E.O.	Schaffer, Fiscbrando / Tilton
	U.O.	Adams / Tilton, Brewer
	STA	Haley
	CWI	Hanford
	RWO	Hobbs
	Fire Patrols	Rivera - Chief, Adams - Asst. Fiscbrando, Jennings, Burgess
0745	L.C.O.	terminated T.S. action for ET-421 Table I S/G conductivity - not applicable
0800	CW	13A CW pump F/S for screen inspection
0830	CFCU	14 CFCU F/S in high speed, 12 CFCU F/S for visit of fire alarm
0900	SA	#3 SAC F/S for maintenance testing - Petrace
0924	FW	11 AW pump F/S for R. Wenclaw
0928	SA	#3 SAC F/S
0944	NI	N31 F/S for P.O. Inspection Testing
0945	Fire Alarm	RCS Flow 1687 gpm - Holly
0957	FW	11 AW pump F/S
0957	CFCU	15 FCU F/S
1015	WL	Liquid release of 11 CVCS MT to circ water - 11L-4c -
1105	NI	Completed functional P.O. Test on N31
1130	CFCU	15 FCU F/S Rev speed for flow (SW) calibration
38	CW	13B circulator F/S

(a) Use apparatus to provide a description of the event being logged.

(b) The CO need only sign the remarks page immediately following his last entry at Shift Relief.

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BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 2/25/[illegible]

TIME	APPARATUS	REMARKS:
1125.	CVCS	Started boron addition to increase boron concentration for mode 3 operation.

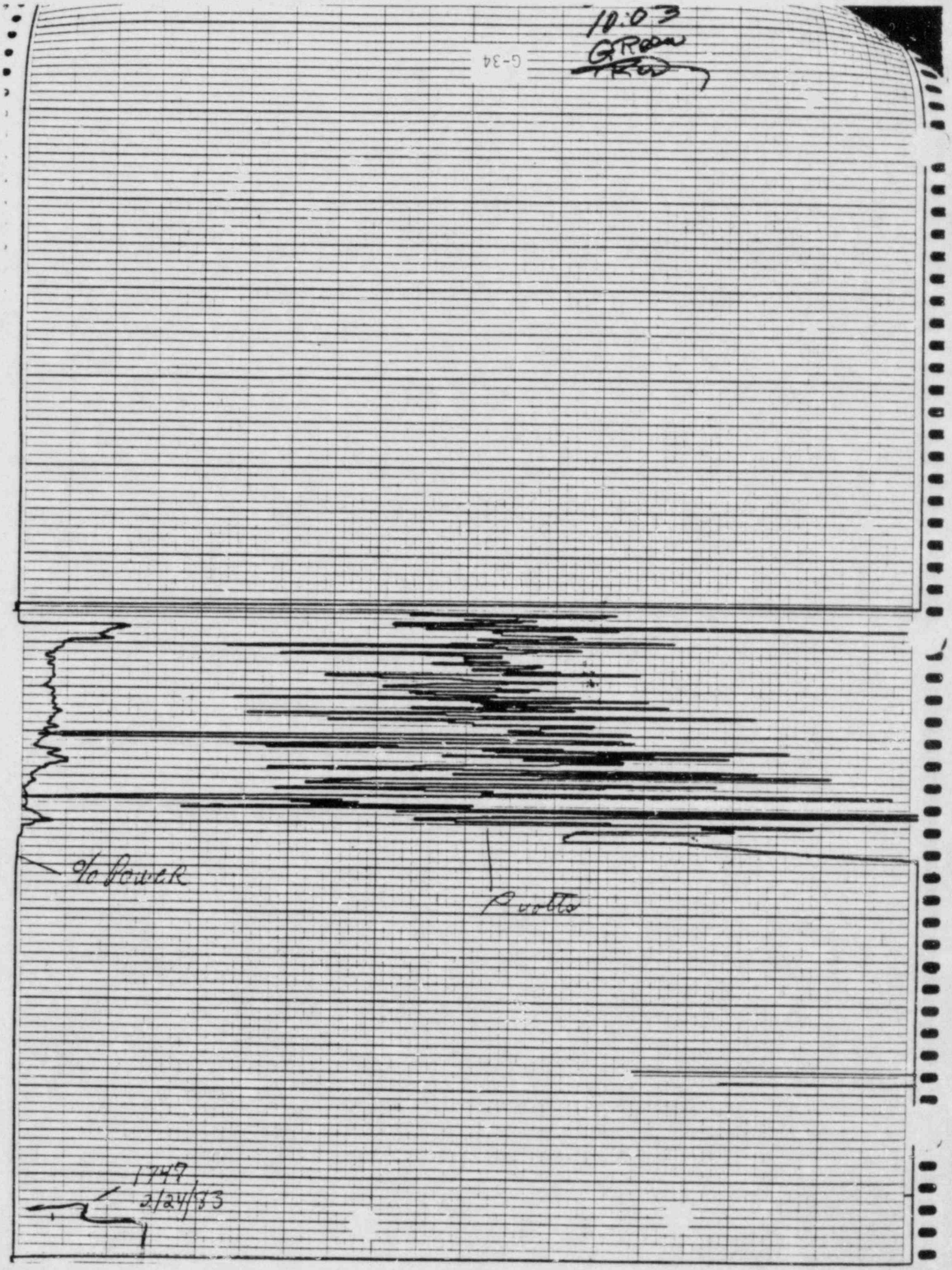
(1) Use apparatus to provide a description of the event being logged.

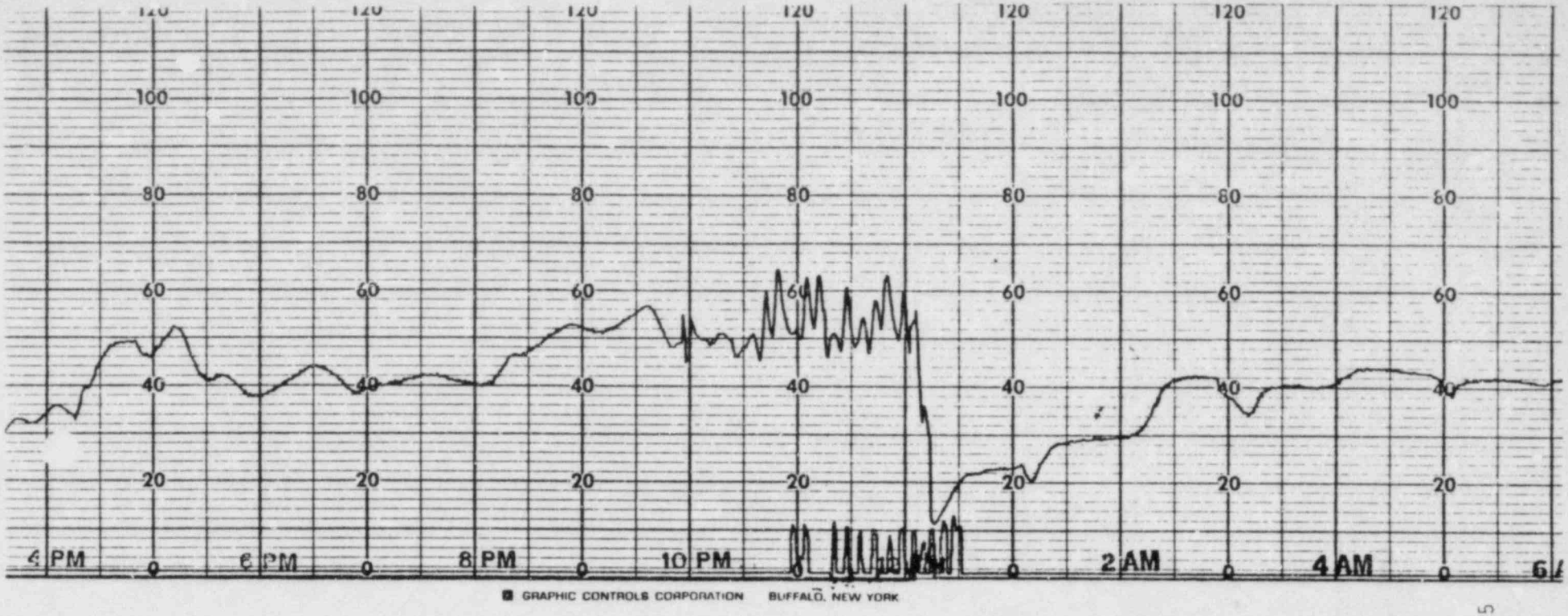
(2) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

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Various Graphs of Pertinent Information

at the Time of the Incident


10:03
GROW
TRD
G-34
To Sewer
Volts
1749
2/24/33



G-35

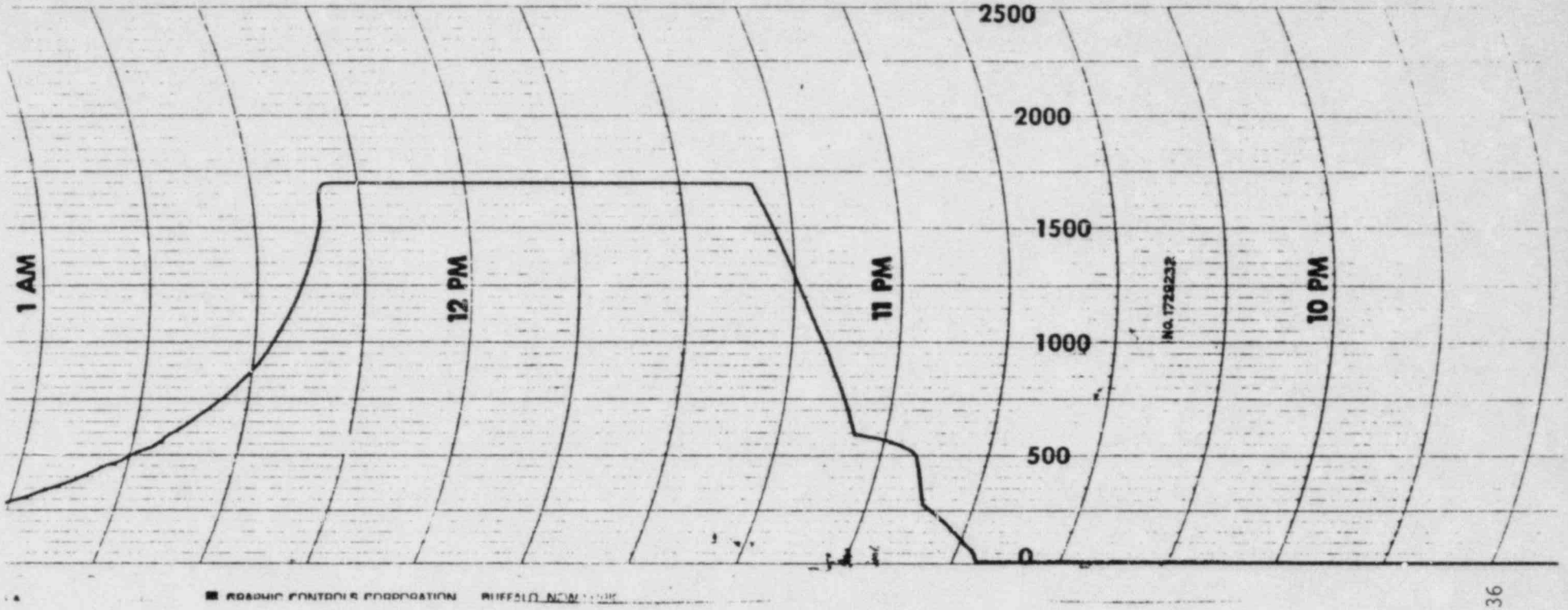
UNIT 1 Console

LA - 5051

14 STM GEN NAR. Range Level

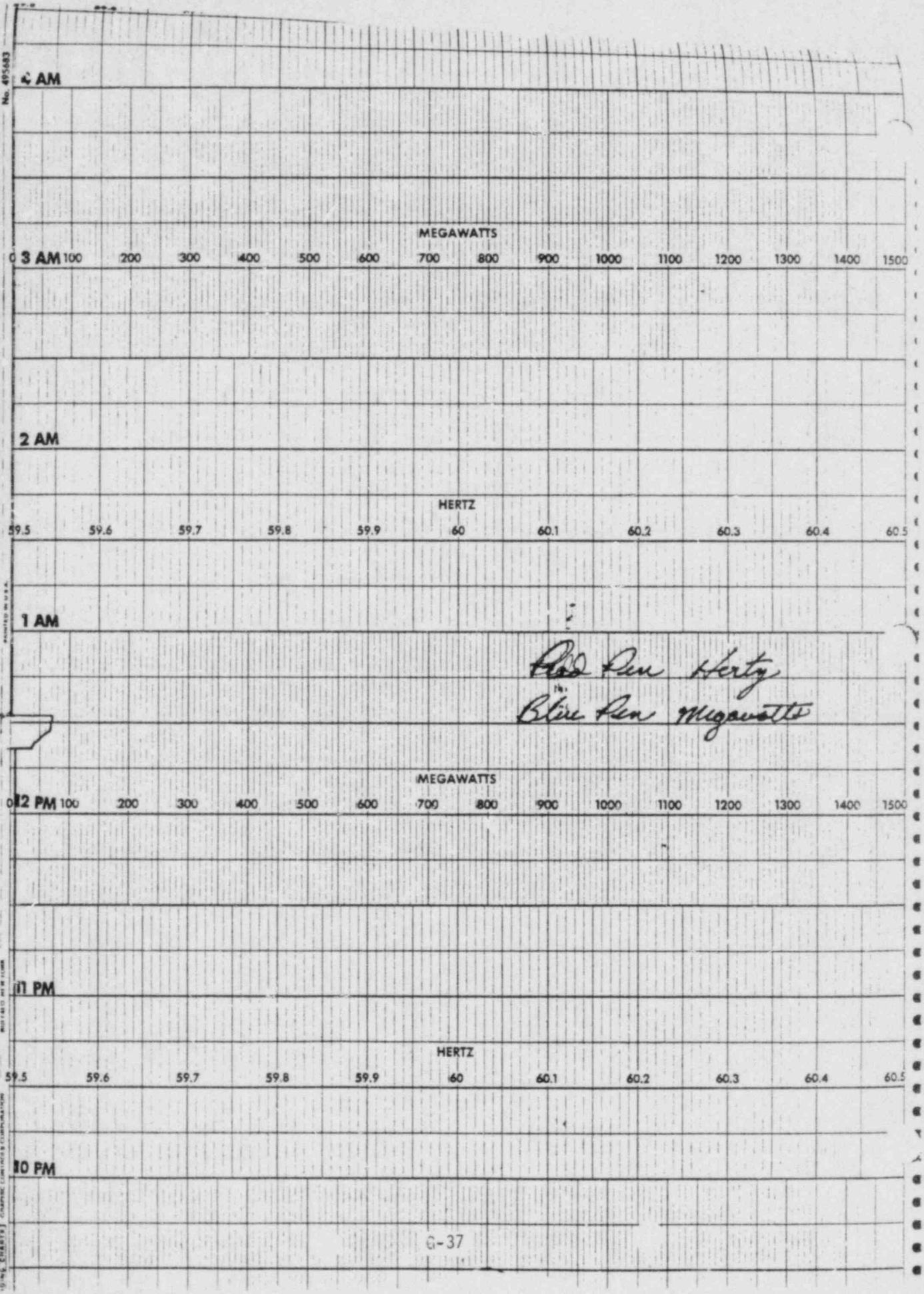
Feed water Flow

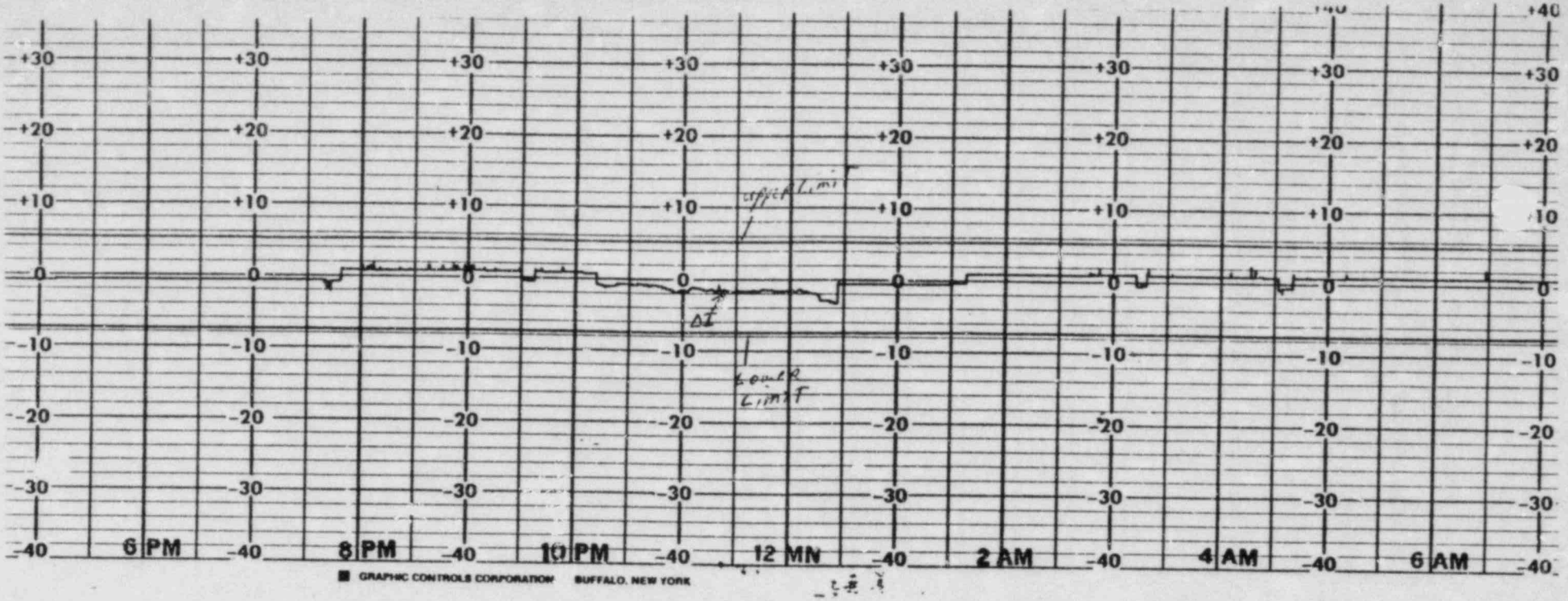
Team Flow



G-36

UNIT 1
Turbine Speed.


4 AM
MEGAWATTS
3 AM
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500
2 AM
HERTZ
59.5 59.6 59.7 59.8 59.9 60 60.1 60.2 60.3 60.4 60.5
1 AM
Red Pen Hertz
Blue Pen Megawatts
MEGAWATTS
12 PM
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500
11 PM
HERTZ
59.5 59.6 59.7 59.8 59.9 60 60.1 60.2 60.3 60.4 60.5
10 PM



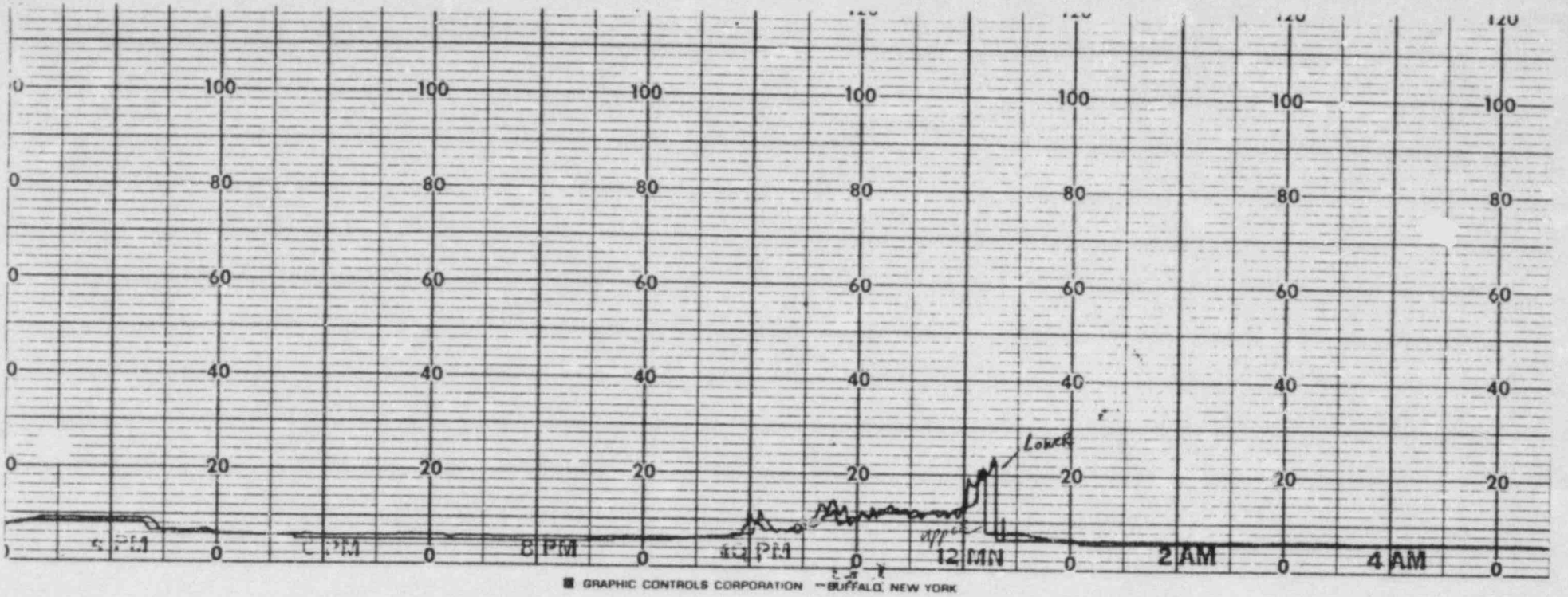
G-38

UNIT 1 Console

XA - 8740

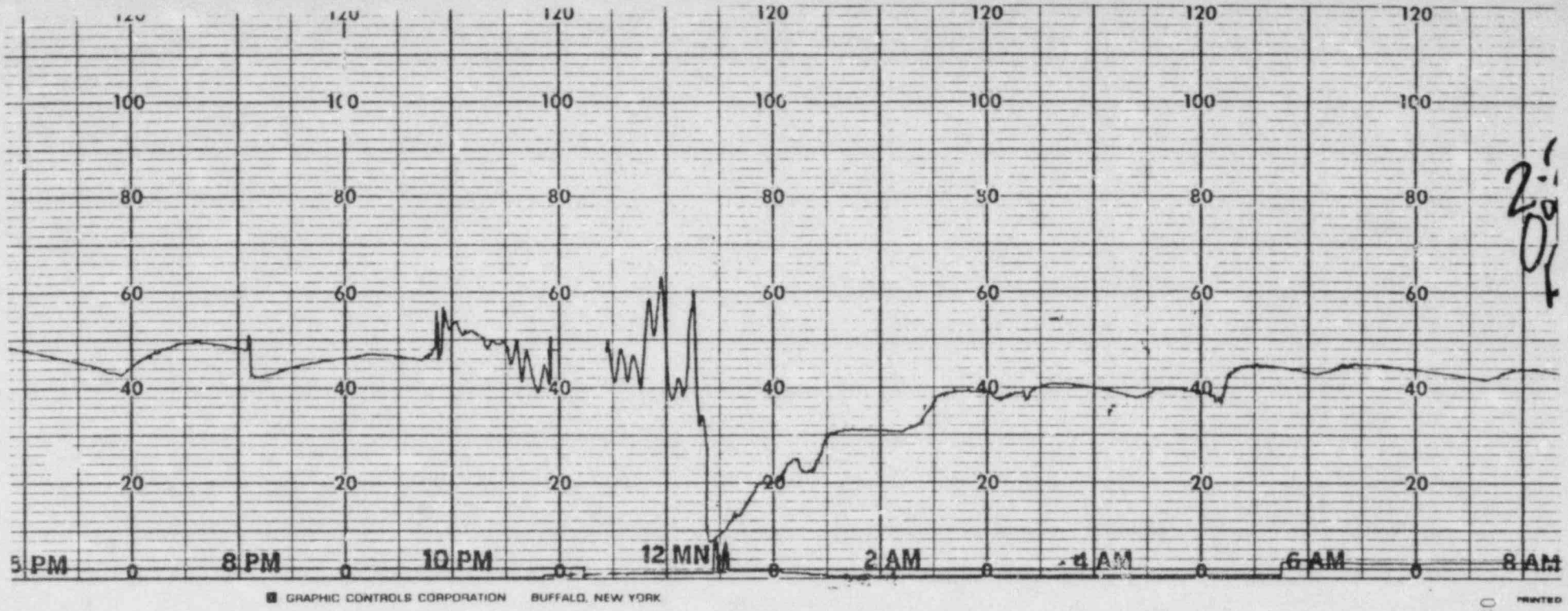
Target Band upper + Lower Limits

Actual ΔI %



G-39

UNIT 1 Console.
XA-5723
NR-43 NEUTRON FLUX
(upper + LOWER)



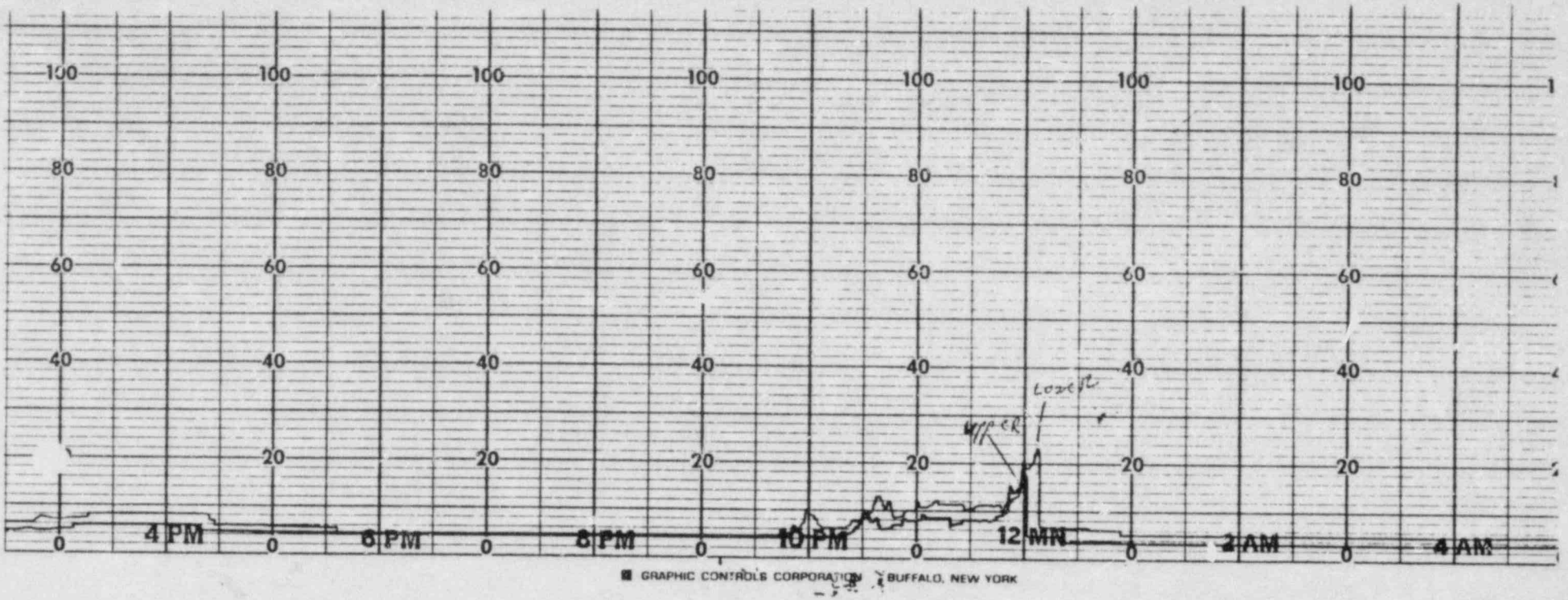
UNIT 1 Console

L.A-5050

13 STM GEN NAR. RANGE Level

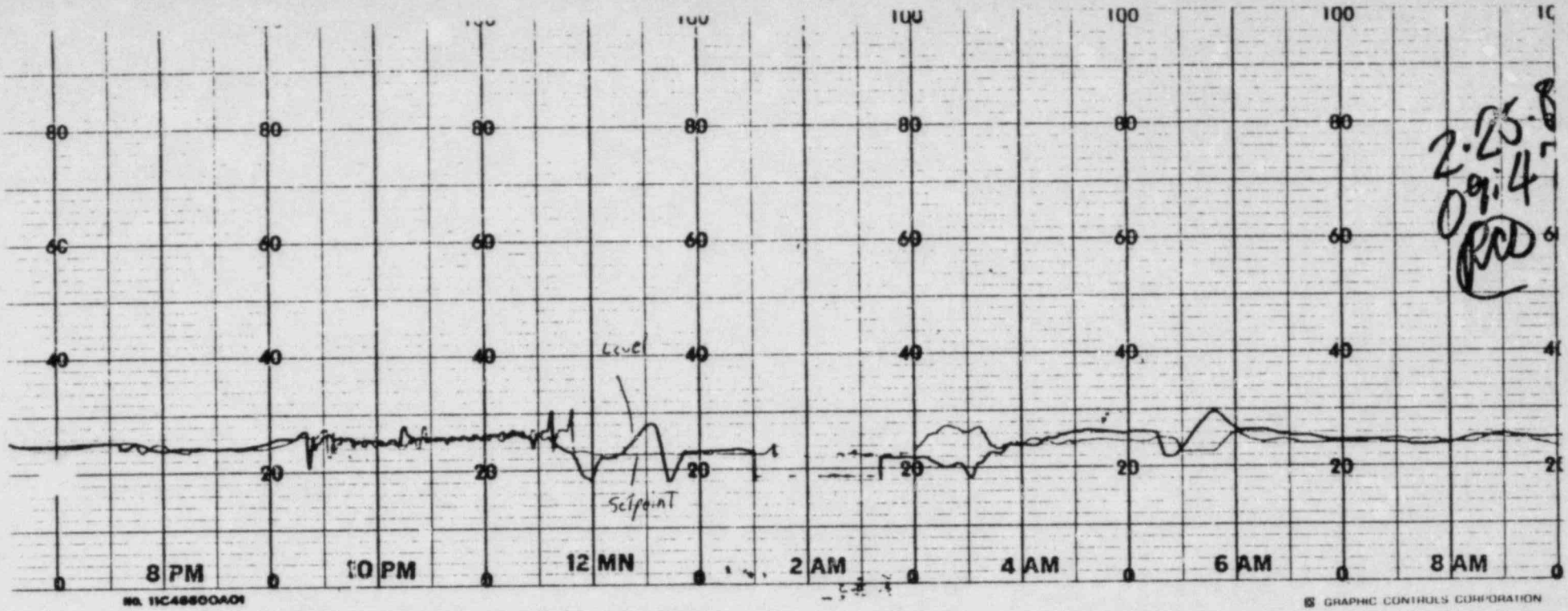
Feed water Flow

Steam Flow

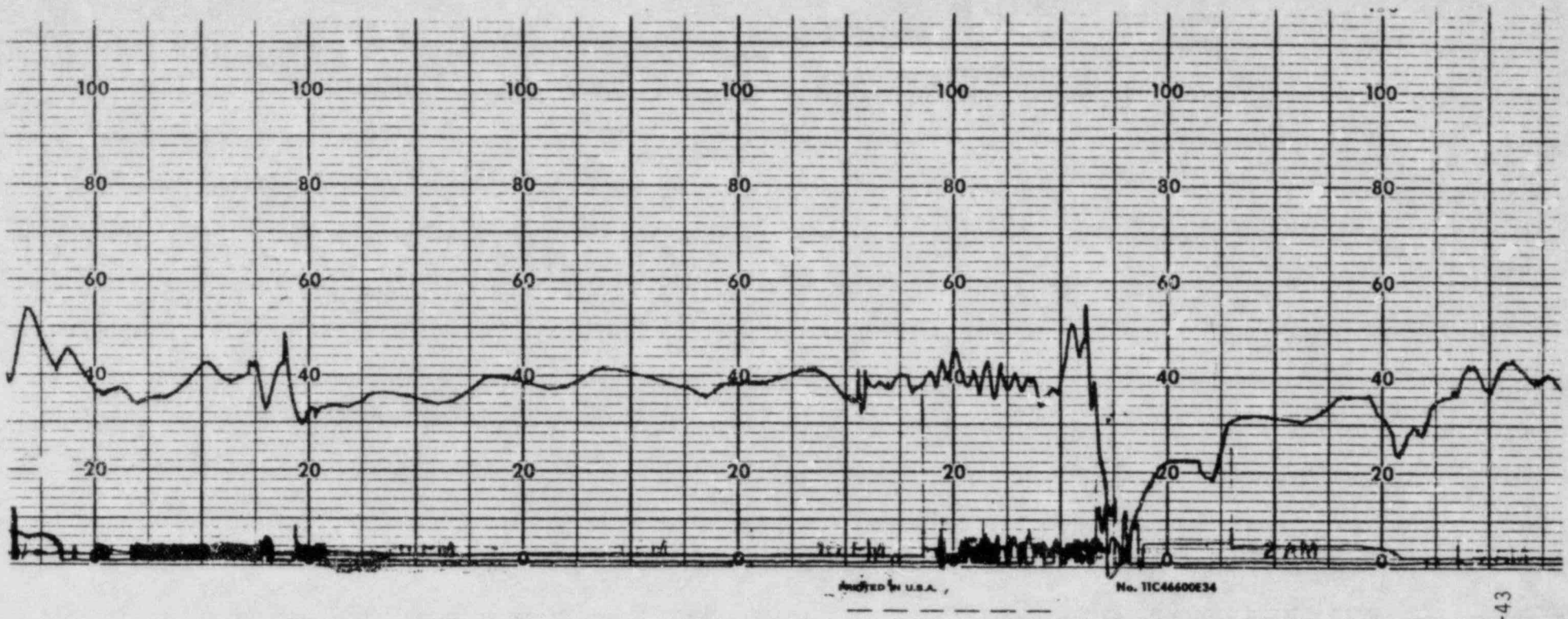


G-41

UNIT 1 Console.
XA - 5721
NR-41 Neutron Flux
(upper + Lower)

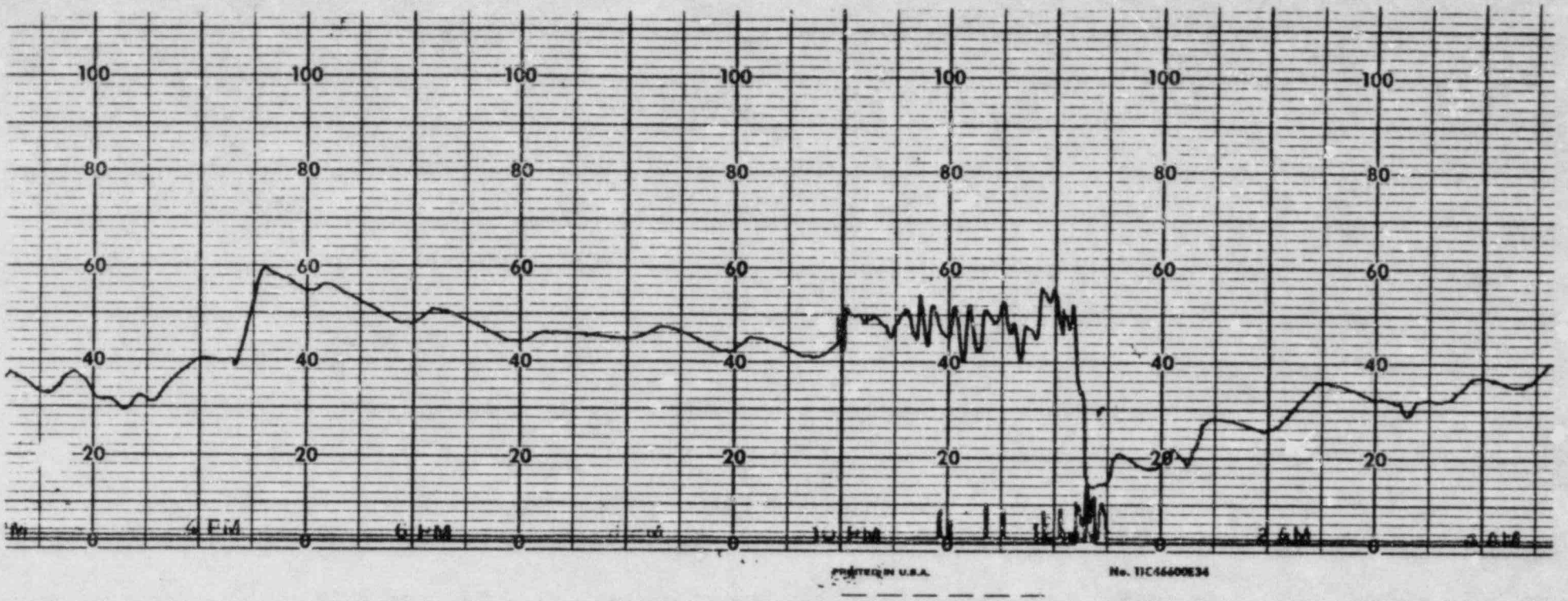


UNIT 1 Console.
LA-5304
Pressurizer Level %
Pressurizer Level Setpoint



G-43

UNIT 1 Console
LA-5049
12 STM GEN. NAR. RANGE Level
Feedwater Flow
Steam Flow



G-44

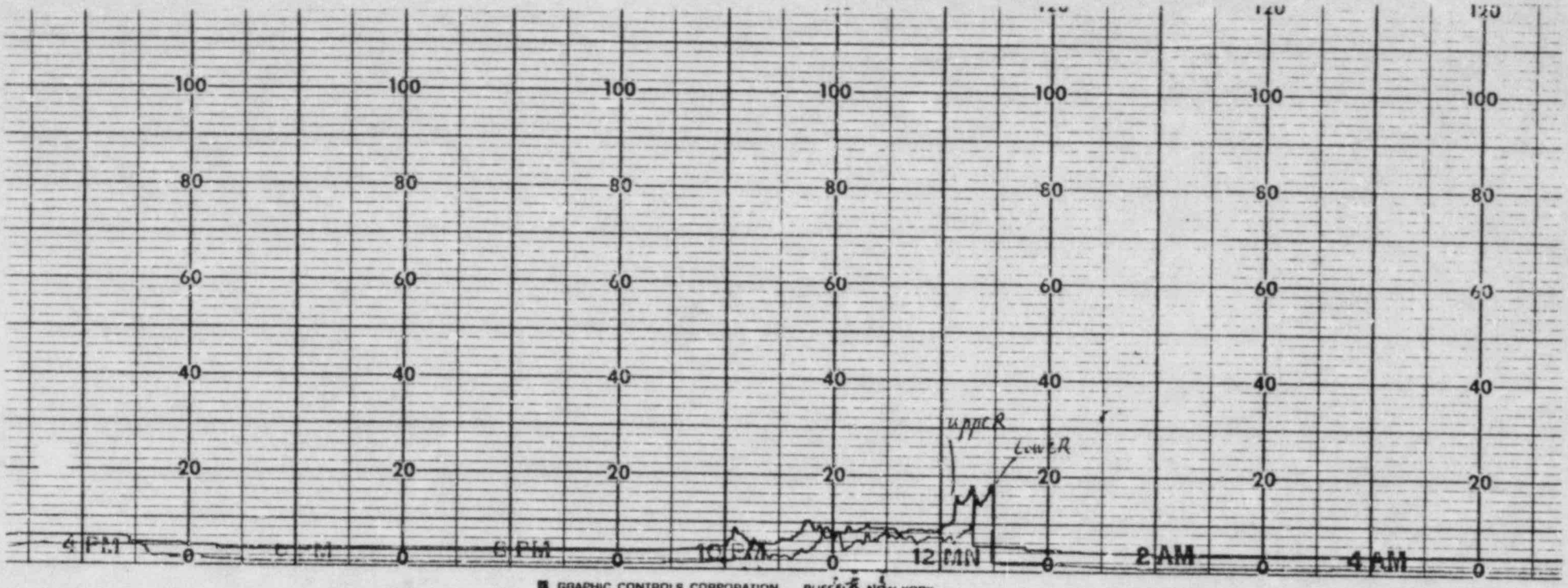
UNIT 1 Console

LA-5048

11 STM. GEN NAR. Range Level

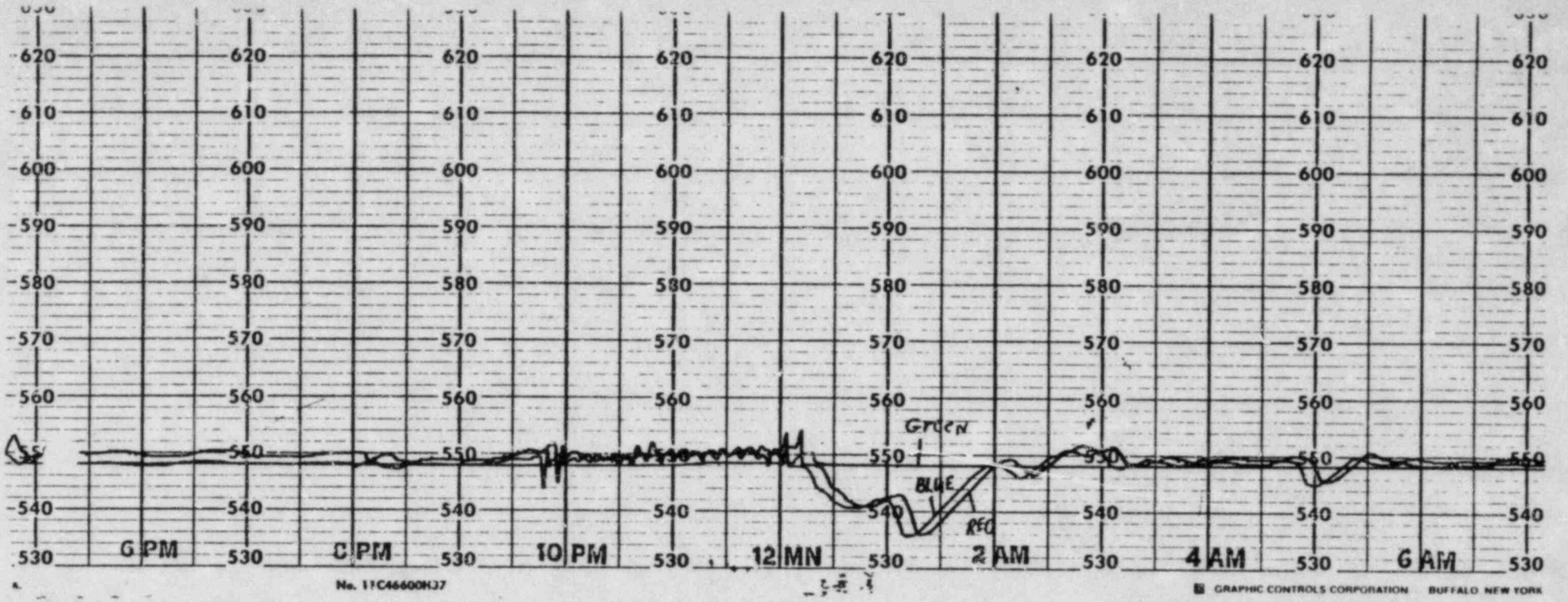
Feedwater Flow

Team Flow



G-45

UNIT 1 Console
XA-5724
NR-44 Neutron Flux
(upper + lower)



G-46

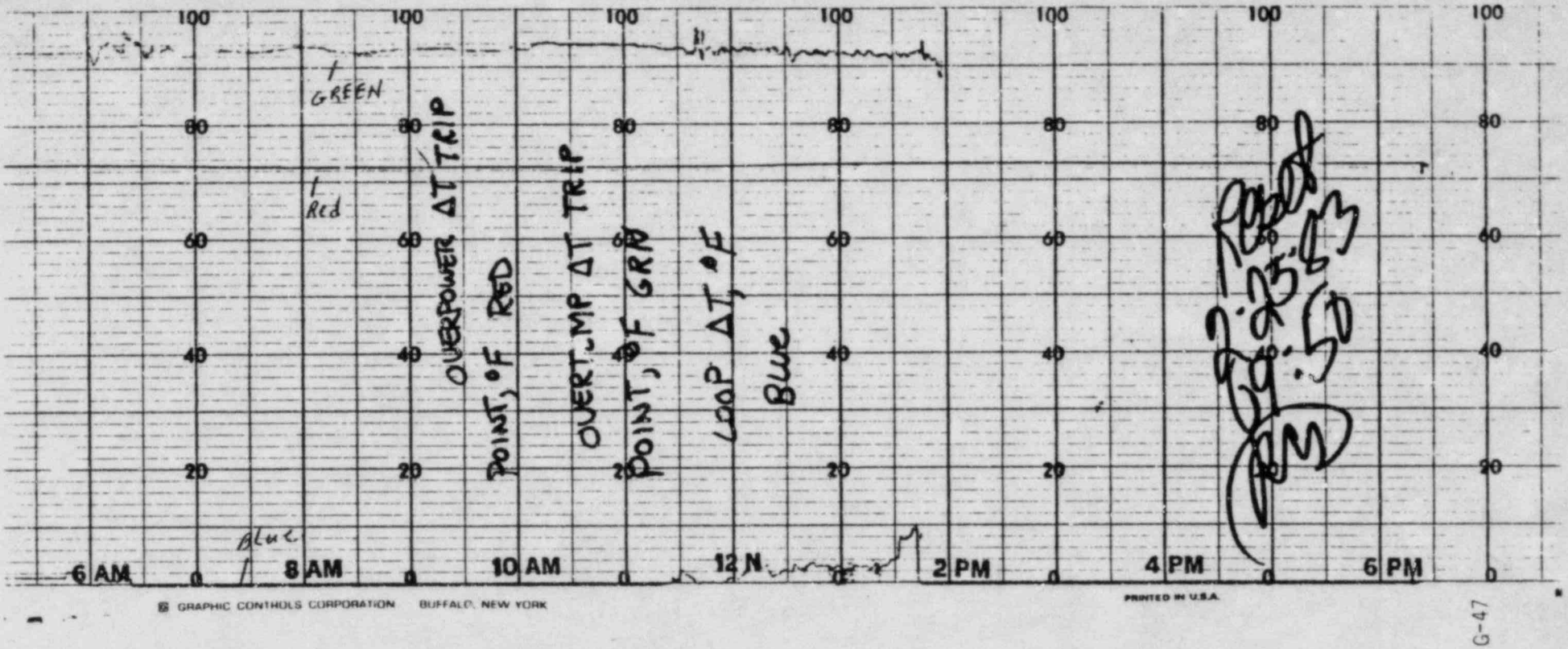
UNIT 1 Console

TA - 5306

AUCT. TAVE, °F (Red)

Ref. TAVE, °F (green)

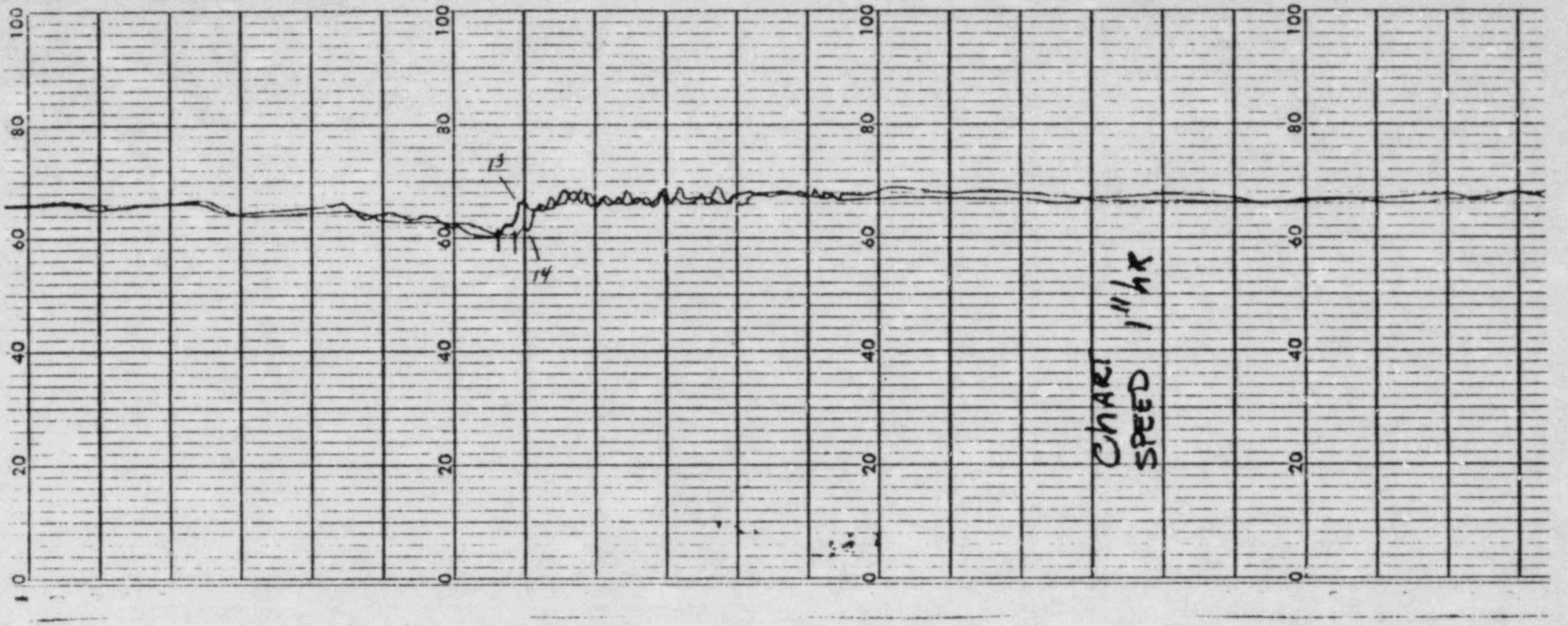
op TAVE °F (Blue)



UNIT 1 Console

TA - 5307

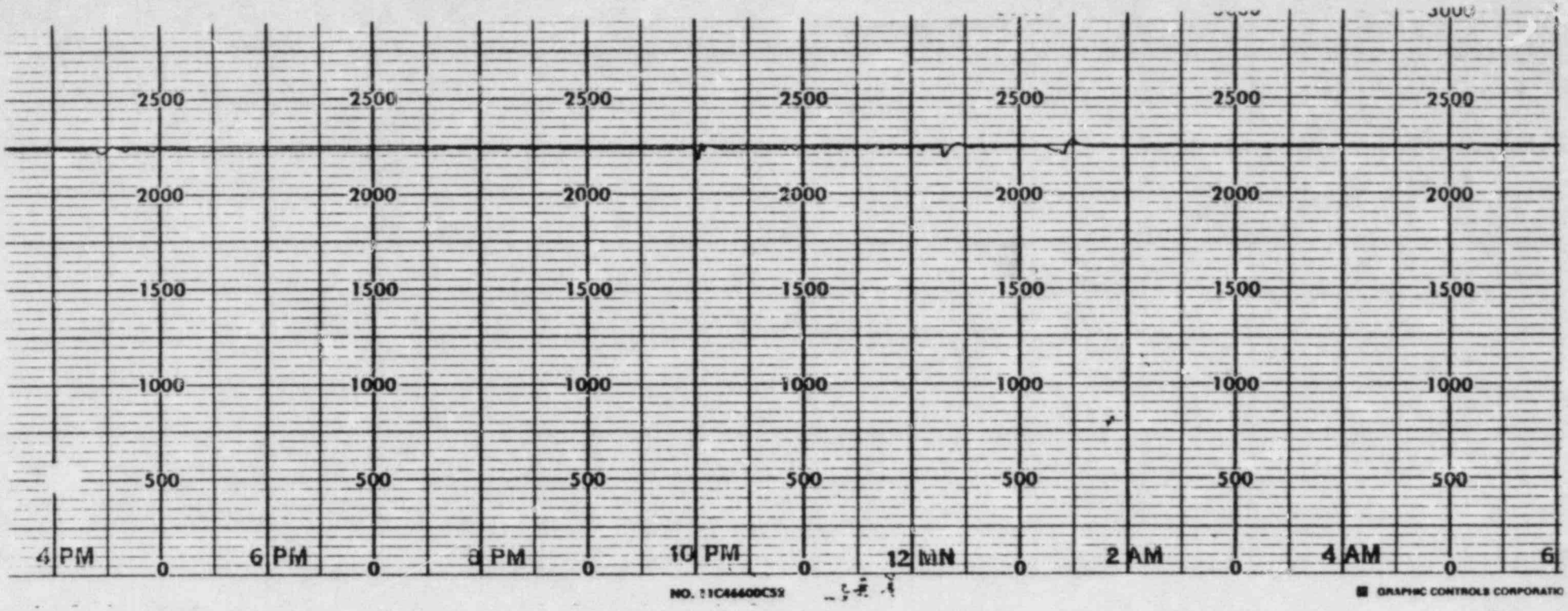
OTΔT, OPΔT



LA 3978

13 + 14 STEAM GEN WIDE RANGE Level

G-48

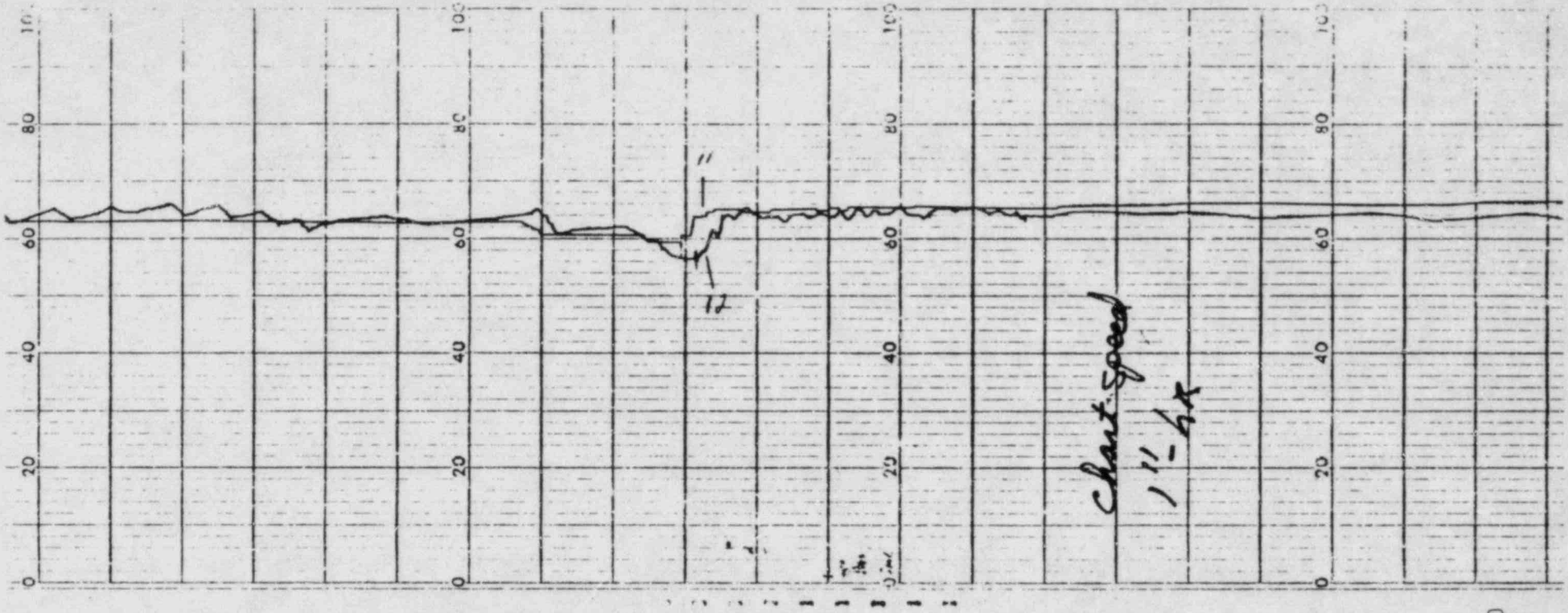


G-49

UNIT 1 Console

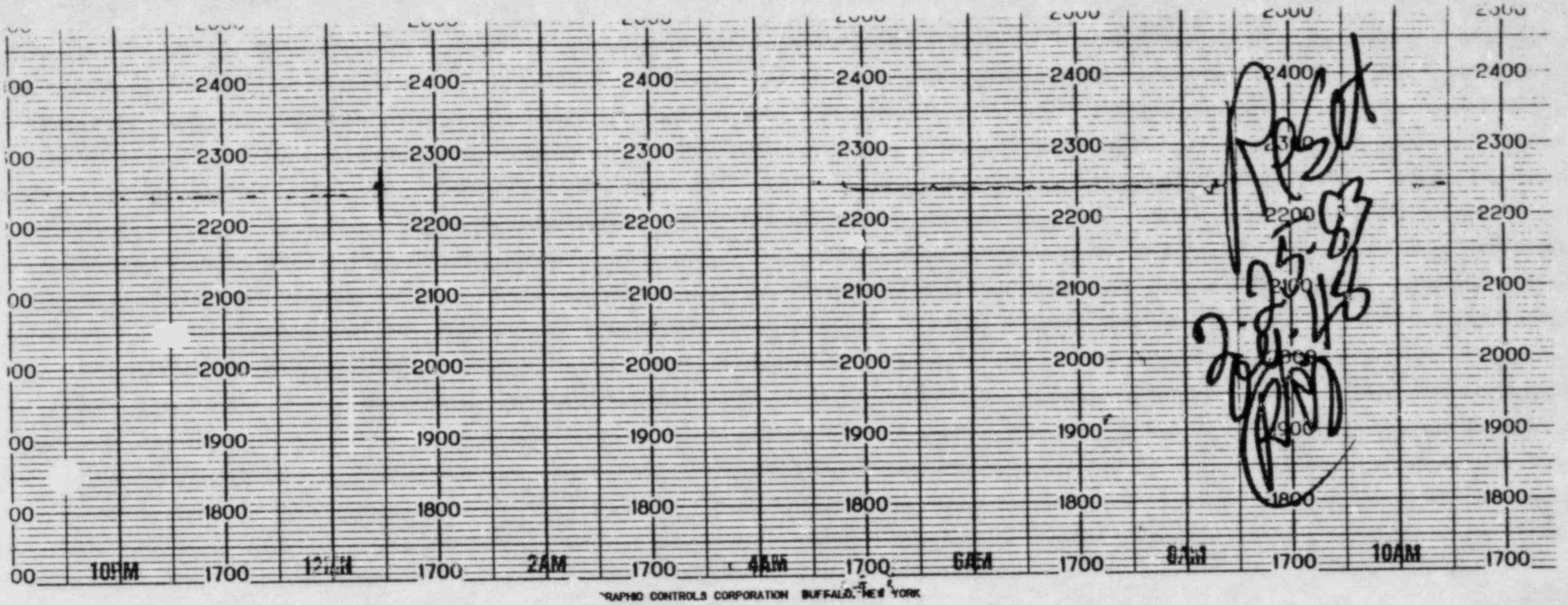
PA - 5308

Hot Leg Pressure



LA-3917

11+12 STEAM GEN Wide Range Level



G-51

UNIT 1 Console

PA - 5305

Pressure (Pressurizer

11 NC Loop T_H & T_C

No. 563804

PRINTED IN U.S.A.

BUFFALO, NEW YORK

12 RC Loop TH
G-53
0
200
300
400
500
600
700
°F
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK

13 Apr Loop 2 H2 Htr

14 RC Loop TH Atc

6 AM
5 AM
4 AM
3 AM
2 AM
1 AM
12 PM
11 PM
10 PM
9 PM
8 PM

°F
0 100 200 300 400 500 600 700

No. 563804

EMERGENCY PROCEDURE
EP I-2
ALERT

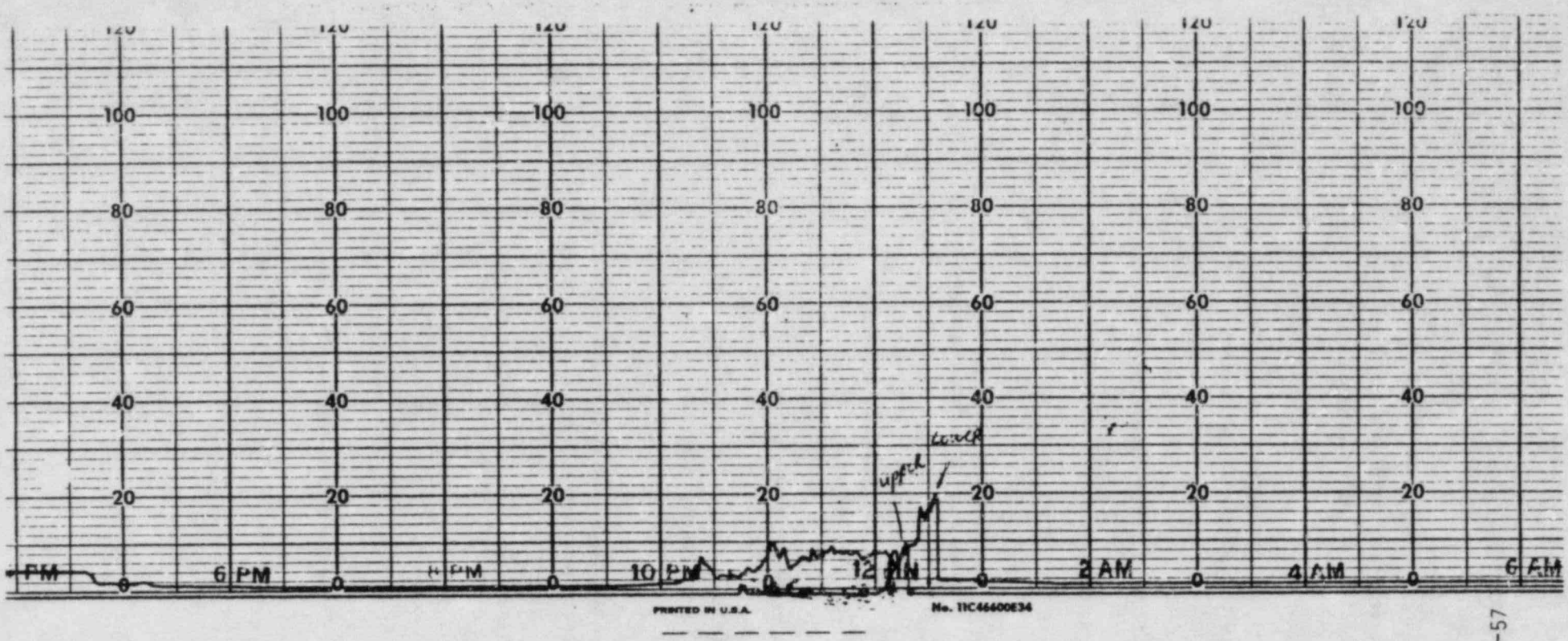
The purpose of an "alert" status is to assure that emergency personnel are readily available to respond if an emergency status degrades, perform confirmatory radiation monitoring and provide off-site authorities with current status information.

NOTE

Refer to EP I-0, "Accident Classification Guide" for possible escalation to a higher level accident classification or for deescalation to a lower level accident classification. Notification of a change in the emergency classification shall be conveyed via the "Initial Contact Message Form" (Attachment No. 1). Termination of the emergency response and initiation of the recovery phase shall be conveyed via the "Termination Call List" (Attachment No. 4).

ACTION STATEMENTS

TIME*	INITIAL		
N/A		1.	If necessary, sound Radiation Alert Alarm, announce if possible, the nature of the alert. Request evacuation of affected area(s) if necessary.
N/A		2.	Announce via the plant Public Address System (P.A.): "Radition Protection personnel report to your emergency duty stations".
N/A		3.	Contact the Shift Radiation Protection Technician (Shift RPT) and direct him to initiate procedure EP IV-101 (Radiation Protection Initial TSC Response).
		4.	Complete the "Initial Contact Message Form" (Attachment No. 1). Protective Action Recommendations are to be based upon EP IV-108 as information becomes available.
		5.	Direct the communicator to transmit the "Initial Contact Message Form" (Attachment No. 1) in accordance with contained instructions.



G-57

UNIT 1 Consol.
XA-5722
NR-42 Neutron Flux
(upper + lower)

ACTION STATEMENTS (CONTINUED)

TIME*	INITIAL		
	N/A	6.	IF:

a) New Jersey/Delaware State Police cannot be contacted, or

b) Local contact is requested by New Jersey/Delaware State authorities.

THEN:

Directly contact Salem and Cumberland Counties in New Jersey, Kent and New Castle Counties in Delaware and/or U.S. Coast Guard.

Instruct the communicator that the information transmitted to the Counties shall be in the form of the "Initial Contact Message Form" (Attachment No. 1). Also instruct the communicator that any additional inquiries shall be referred to the respective state emergency management agencies.

N/A 7. Direct a qualified individual to complete the "Station Status Checklist" (Attachment No. 3). Coordinate Emergency Dose Calculations and completion of Attachment No. 3 with the Shift RPT.

8. Initiate the Alert Call List (Attachment No. 2).

N/A 9. If the EDO/Senior Shift Supervisor decides to activate the EOF:

a) Contact Plant Manager or his designee and advise him to implement EP II-4, Notification of Corporate Response Personnel.

b) If Plant Manager or designee cannot be reached the EDO/Senior Shift Supervisor shall assume responsibility for implementing EP II-4.

c) Dispatch a Security Guard to open the facility as per EP III-2.

ACTION STATEMENTS (CONTINUED)

TIME* INITIAL

10. Upon receipt of a phone call from the New Jersey Bureau of Radiation Protection (BRP) or Delaware Division of Emergency Planning and Operations (DEPO) do the following:

    a) Provide the "Station Status Checklist" at current level of completion.

    b) Exchange contact phone numbers for future updates/information.

N/A 11. Initiate the EDO Checklist (Figure No. 1).

N/A 12. Direct a communicator to proceed to the activated TSC and initiate 15 minute updates to New Jersey BRP and Delaware DEPO. Updates shall be in the form of the "Station Status Checklist" (Attachment No. 3) as information becomes available.

N/A 13. If necessary, account for personnel in accordance with EP I-8.

N/A 14. Direct a technically qualified person to commence data collection in accordance with the Operational and Radiological Status Boards (Figure No. 3 and No. 4, respectively). Transmit this data to the TSC and EOF.

N/A 15. Contact the Assistant to Manager/designee and advise him to appraise the State Board of Public Utilities and Department of Energy of the emergency event.

N/A 16. If the EOF is activated, transfer the responsibility of the 15 minute notifications to the States and the coordination of off-site survey teams to the EOF staff. Update the EOF Manning Chart (Figure No. 2) as appropriate.

TIME* INITIAL

N/A 17. Complete the procedure steps as follows:

a) Radiological Emergencies (18 through 25)

b) Operational Emergencies (26 through 29)

c) Fire/Natural/Security Emergencies (30 through 36)

d) Miscellaneous Emergencies (37 through 40)

NOTE

The previous steps are intended to place personnel on standby in the event of a radiological release. Dispatching survey teams may not be required at this time.

RADIOLOGICAL

_____ 18. Coordinate emergency on and off-site radiation surveys in accordance with Radiation Protection Procedure EP IV-110 with the Shift RPT and/or the Radiation Protection personnel assigned to the TSC.

_____ 19. If a radioactive spill caused the emergency, refer to EP I-6.

_____ 20. Insure the actions required of Emergency Instruction I-4.16 (Radiation Incident) are or have been taken as applicable.

_____ 21. If a fuel handling incident occurred, refer to EI I-4.25 (Fuel Handling Incident).

ACTION STATEMENTS (CONTINUED)

TIME* INITIAL

RADIOLOGICAL (CONTINUED)

_____ 22. If any personnel have been injured or exposed to radiation in excess of 10CFR limits, refer to EP I-5 (Personnel Emergency).

_____ 23. If site evacuation becomes necessary, evacuate in accordance with EP I-12.

_____ 24. Complete an Operational Incident Report in accordance with Administrative Procedure No. 6.

_____ 25. Upon termination of the event complete the "Termination Call List", Attachment No. 4 and initiate recovery operations, EP I-14, as necessary.

OPERATIONAL

MJ 26. If the Reactor Protection System fails to bring the plant to Mode 3 when required refer to EI I-4.3 (Reactor Trip).

N/A 27. On a loss of on or off-site power systems, as noted in the Action Levels, refer to EI I-4.9 (Blackout).

MJ 28. Complete an Operational Incident Report in accordance with Administrative Procedure No. 6.

MJ 29. Upon termination of the event complete the "Termination Call List", Attachment No. 4 and initiate recovery operations, EP I-14, as necessary.

ACTION STATEMENTS (CONTINUED)

TIME* INITIAL

FIRE/NATURAL/SECURITY

_____ 30. If the Delaware River level is greater than 10.0 feet MSL (99 feet PSE&G datum) and is approaching 11.5 feet MSL (100.5 feet PSE&G datum):

_____ a) Implement Emergency Instruction EI I-4.1 (Flooding and/or High Winds).

_____ b) If necessary, evacuate the site in accordance with EP I-12.

_____ 31. If sustained winds are predicted to be 95 mph:

_____ a) Implement Emergency Instruction EI I-4.1 (Flooding and/or High Winds).

_____ b) If necessary, evacuate the site in accordance with EP I-12.

_____ 32. If a seismic event occurs with a force greater than 0.1g but less than 0.2g consider implementing OI-1.3.5 or 1.3.6, as appropriate (Power Operation to Hot Standby, Hot Standby to Cold Shutdown).

_____ 33. Refer to EP I-7, "Station Fire", to conduct fire fighting actions.

_____ 34. If outside assistance is required call the Salem Fire Dispatcher (609-935-4505). Give the location and type of fire and where vehicles will be met by the security personnel. Alert security of incoming emergency vehicles.

_____ 35. Complete an Operational Incident Report in accordance with Administrative Procedure No. 6.

_____ 36. Upon termination of the event complete the "Termination Call List", Attachment No. 4 and initiate recovery operations, EP I-14, as necessary.

ACTION STATEMENTS (CONTINUED)

TIME* INITIAL

MISCELLANEOUS

_____ 37. If toxic gas, e.g., chlorine, acid vapors, etc., present a safety hazard contact Performance Engineer and/or Senior Supervisor-Chemistry for further direction. (Phone numbers may be found in Addendum No. 1).

_____ 38. If the Control Room must be evacuated for any reason refer to EI I-4.10 (Control Room Evacuation).

_____ 39. Complete an Operational Incident Report in accordance with Administrative Procedure No. 6.

_____ 40. Upon termination of the event complete the "Termination Call List", Attachment No. 4 and initiate recovery operations, EP I-14, as necessary.

Completed By: Victor W. Lowenstein Jr. 3/25/83
Senior Shift Supervisor/EDO Date

NOTE

FORWARD ALL COMPLETED FORMS TO THE ASSISTANT TO MANAGER. ATTACH ANY REFERENCED COMPLETED EP'S OR ATTACHMENTS.

Prepared By: _____ Date: _____

Reviewed By: _____ Department Head Date: 3/17/82

Reviewed By: _____ Assistant to Manager Date: 3/17/82

Reviewed By: _____ Station Quality Assurance Engineer Date: 3/17/82

SORC Meeting No.: 82-29 Date: 3/17/82

Approved By: _____ Manager - Salem Generating Station Date: 4/5/82

Approved By: _____ Manager - Emergency Preparedness Date: 4/5/82

ATTACHMENT 1
INITIAL CONTACT MESSAGE FORM

DIRECTIONS: This form will be filled out by the Senior Shift Supervisor/EDO and given to a communicator for transmittal to the States of New Jersey and Delaware.

☐ IS "THIS ☒ IS NOT A DRILL"

☐ IS "THIS ☒ IS NOT A DRILL"

THIS IS Iris Veasey (Name), Shift Clerk (Title)

SALEM NUCLEAR GENERATING STATION, UNIT NO. 1

THIS IS NOTIFICATION OF:

☐ an UNUSUAL EVENT
☐ a SITE AREA EMERGENCY
☒ an ALERT
☐ a GENERAL EMERGENCY

THE EVENT DECLARED AT 0130 (Time-24 hour clock) ON 2/25/83 (Date)

☒ THERE IS NO RELEASE IN PROGRESS.

☐ WE HAVE A CONTROLLED RELEASE IN PROGRESS.

☐ WE HAVE AN UNCONTROLLED RELEASE IN PROGRESS.

☒ NO PROTECTIVE ACTIONS ARE RECOMMENDED AT THIS TIME.

☐ WE RECOMMEND SHELTERING FOR THE FOLLOWING SECTOR(S) _____ / _____ (Distance/Miles)

☐ WE RECOMMEND EVACUATION FOR THE FOLLOWING SECTOR(S) _____ / _____ (Distance/Miles)

Completed By: Donald Lowenstein, Jr.
Senior Shift Supervisor/EDO

Transmitted By: I. VEASEY
Communicator

PROCEDURE AND CALL LIST FOR COMMUNICATOR

TIME	NAME OF PERSON CONTACTED	
0140	Lynch	1. Contact New Jersey State Police Primary: Gray Phone Secondary: 882-2000 Read Initial Contact Message Form.
0145	Carrow	2. Contact Delaware State Police Primary: NAWAS Secondary: 302-736-5851 Read Initial Contact Message Form.
0135	Keen	3. Contact Lower Alloways Creek Township Primary: Direct Line Secondary: (609) 935-7300 ACCIDENT CLASSIFICATION ONLY.
0147	Sileverio	4. Contact General Manager - Information Services Primary: Addendum No. 1 Read Initial Contact Message Form.
_____		5. Inform Senior Shift Supervisor which calls were completed.

ONLY IF DIRECTED BY THE SENIOR SHIFT SUPERVISOR MAKE FOLLOWING CALLS.

NEW JERSEY COUNTIES

_____	_____	Salem County EOC Primary: Direct Line Secondary: 935-4505 Read Initial Contact Message Form.
_____	_____	Cumberland County EOC Primary: Direct Line Secondary: 455-8500 Read Initial Contact Message Form.

DELAWARE COUNTIES

_____	_____	New Castle County EOC Primary: Direct Line Secondary: 302-571-7454/7949 Read Initial Contact Message Form.
_____	_____	Kent County EOC Primary: Direct Line Secondary: 302-678-9111 Read Initial Contact Message Form.

_____	_____	U.S. Coast Guard Primary: 456-1370 Read Initial Contact Message Form.

ATTACHMENT 2
ALERT CALL LIST

DIRECTIONS: The EDO/Senior Shift Supervisor shall complete the below information and insure the following communications are completed. Advise and direct those contacted based upon discussion with the EDO.

PRIMARY INITIATING CONDITION (from Accident Classification Guide, i.e., EP I, Part 2, No. 5)

EP I-0, PART 2, NO. 16 TIME/DATE EVENT DECLAR"D 2/25/93 0130 (2400 Hours)

BRIEF DESCRIPTION OF EVENT: R/ TRIP BREAKERS FAILED TO OPEN UPON RECEIPT OF #12 STM GEN LO-LO LEVEL TRIP SETPOINT.

NOTE

In the event of a test, drill or exercise, preface and complete each message with the phrase "THIS IS A DRILL, THIS IS A DRILL".

		CONTACT	CALLER	TIME
1.	Emergency Duty Officer (EDO)*	J. Fuller	Lowenstein	0132
2.	NRC (ENS Line to Bethesda)	RAY PRIEVE	Pete Att	0151
3.	Station Manager	~~J. Driscoll~~	~~V. Lowenstein~~	0320
4.	~~Chief Engineer~~/Operating Engineer	J. Fuller	V. Lowenstein	0132
5.	Station Security	Terry Bennett	Ralph Flores	0158
6.	Salem Visitors Center	N/A	N/A	N/A
7.	Hope Creek (Union Security)	Stevenson	Ralph Flores	0213
8.	Technical Support - On-site	N/A	N/A	N/A
9.	NRC Resident	No Answer		

NOTE

Refer to Addendum No. 1 for all phone/beeper numbers.

*Advise the Primary EDO to notify the secondary EDO (Technical Support Supervisor).

Completed By: Ralph Flores

Reviewed By: Vincent Lowenstein
Senior Shift Supervisor/Shift Supervisor/EDO

Forward completed copies to the Assistant to Manager.

ATTACHMENT 4
TERMINATION CALL LIST

A. An emergency situation may only be terminated when the following conditions are met:

VWF 1. No action levels for Alert, Site or General Emergency are applicable.

MWF 2. Affected unit returned to normal or long term recovery status.

PJF 3. Concurrence of the state of New Jersey. ETZEL (Contact) 0210 2/25/83 (Time/Date)

PJF 4. Concurrence of the state of Delaware. CARROW (Contact) 0200 2/25/83 (Time/Date)

N/A 5. Concurrence of the Emergency Response Manager. _____ (Emergency Response Manager) _____ (Time/Date)

B. Contact the listed individuals/agencies and report the following message:

> THIS IS _____ (Name), _____ (Title), AT SALEM NUCLEAR GENERATING STATION UNIT NO. 1 (1 or 2). THIS IS TO NOTIFY YOU THAT THE ALERT AT THIS FACILITY HAS BEEN TERMINATED EFFECTIVE 0200 (Time-24 Hour) 2/25/83 (Date). REPEAT, THE ALERT AT SALEM NUCLEAR GENERATING STATION HAS BEEN TERMINATED.

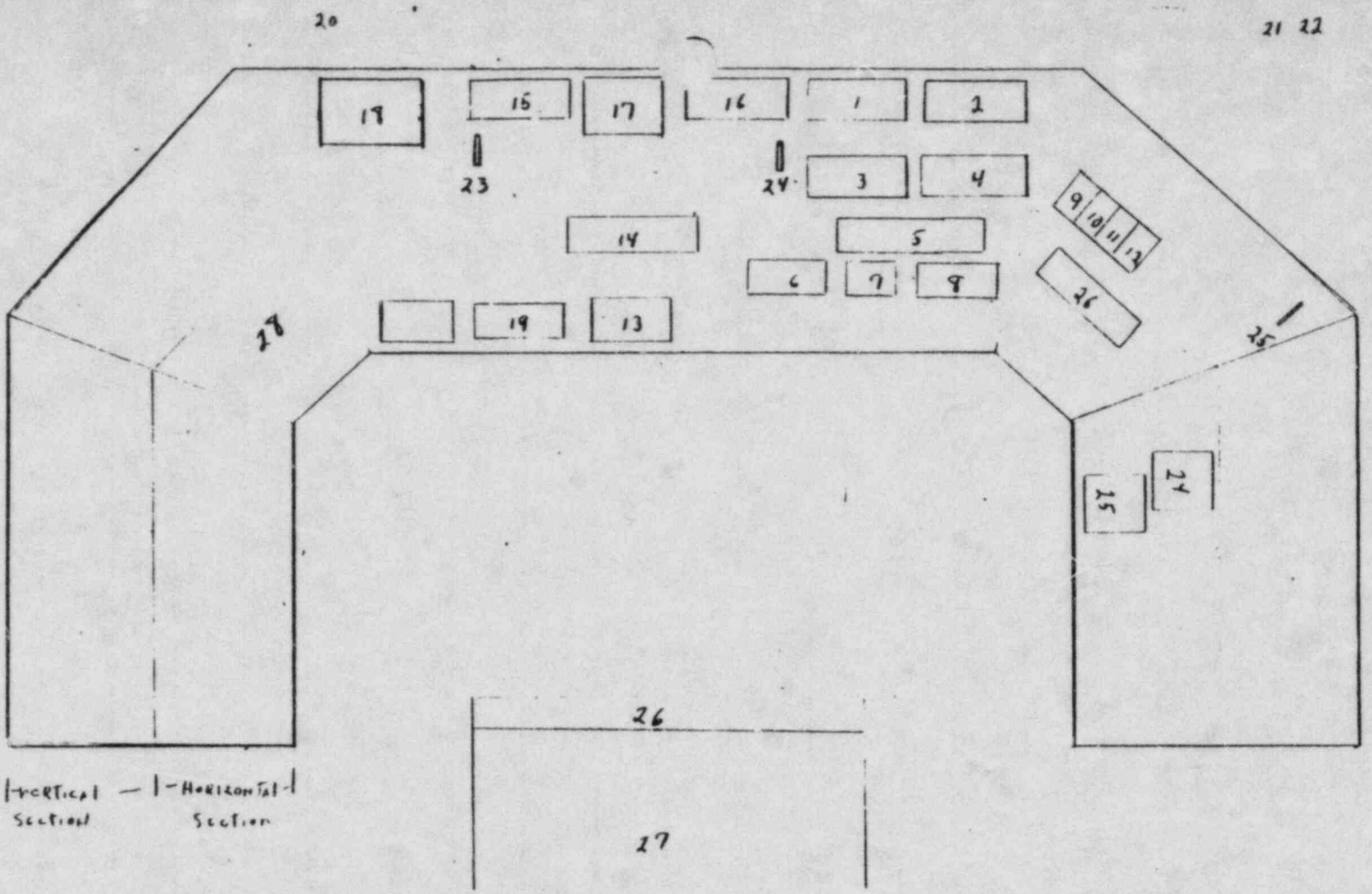
		CONTACT	CALLER	TIME
1.	State of New Jersey (Bureau of Radiation Protection)	Ross	R. Flores	0210
2.	State of Delaware (Division of Emergency Planning and Operations)	Brown	R Flores	0203
3.	NRC (ENS Line)	RAY PRIEVE	PatrOH	0215
*4.	Station Manager	J. Driscoll	Lowenstein	0320
*5.	NRC Resident	No Answer	R. Flores	
*6.	General Manager - Information Services	D. Silverio	R Flores	0200
*7.	BPU	SHEPPA	PatrOH	0315
*8.	EA ← ?			
*9.	DOE (New Jersey)	A. RIZZOLO	R. Flores	0320

NOTE: The EDO is responsible for completing Part A of this Attachment. Part B may be completed by any designated individual.

*See Addendum No. 1 for the required phone numbers.

Reviewed By: _____ (Emergency Duty Officer) _____ (Date)

Forward completed sheets to the Assistant to Manager.



69-5

1. 11 Steam Gen Levels, Press, Stm/Feed Flow, Feed Reg Valves
2. 12 Steam Gen Levels, Press, Stm/Feed Flow, Feed Reg Valves
3. 13 Steam Gen Levels, Press, Stm/Feed Flow, Feed Reg Valves
4. 14 Steam Gen Levels, Press, Stm/Feed Flow, Feed Reg Valves
5. Auxiliary Feed Water Controls.
6, 7 + 8 Main Feed Pump controls.
9, 10, 11 + 12 - 11 through 14 SG Narrow Range Level Recorders
13. Rx Rod Controls + Trip Breaker Controls
14. Nuclear Instrumentation.
15. Shutdown Rods ERPI's
16. Control Rods ERPI's
17. NR-45 Recorder
18. [illegible] ERPI

19. CVCS Makeup controls
20. Rod Bottom Light (Back Panel)
21. - 11 + 12 Stm Gen Wide Range Level Recorders (Back Panel)
22. - 13 + 14 Stm Gen Wide Range Level Recorders (Back Panel)
23. MANUAL Rx TRIP LEVER
24. MANUAL Rx TRIP LEVER
25. MANUAL TURB. TRIP LEVER
26. Procedure Manual.
27. Control Room Desk.
28. RCP's CONTROLS

UNIT 1 PAGE 9

REACTOR TRIPS

LIST ALL REACTOR TRIPS
DESIGN LIMIT 400
NOTIFY OPERATIONS AT 300 *

CONSECUTIVE NUMBER	DATE	TIME	REACTOR POWER PRIOR TO TRIP	SOURCE OF TRIP
126	2-14-83	0600	0%	Lo S/G Level + Flow 14 S/G (Physics Testing)
127	2-20-83	0832	1%	Lo S/G Level 12 S/G
128	2-20-83	2158	4%	Hi S/G Level 14 S/G
~~129~~	~~2-21-83~~	~~0116~~	~~10%~~	~~AT Sync 13 S/G Lo Lo — 13 BFP Malfunction~~ Kim
~~Kim +30~~ 129	2-22-83	0116	10%	AT Sync 13 S/G Lo Lo — 13 BFP Malfunction
130	2-22-83	2204	20%	MANUAL TRIP AFTER Loss of 13 RCP - Loss of 1F Buss
131	2-25-83	0023	14%	Lo Lo S/G #12 - AUTO TRIP FAILED - TRIPPED MANUALLY

G-70

*REFERS TO NRC INSPECTION ITEM 272/80-07-07

EMERGENCY INSTRUCTION
I-4.3
REACTOR TRIP

1.0 PURPOSE

1.1 A REACTOR TRIP IS INITIATED AUTOMATICALLY BY THE REACTOR PROTECTION SYSTEM IF UNSAFE OPERATING CONDITIONS ARE APPROACHED. IT MAY ALSO BE INITIATED MANUALLY FROM THE CONTROL CONSOLE. THIS INSTRUCTION PROVIDES THE ACTIONS REQUIRED TO ENSURE THE REACTOR IS IN A SAFE SHUTDOWN CONDITION.

1.2 IN ADDITION TO DE-ENERGIZING THE SHUTDOWN AND CONTROL ROD DRIVE MECHANISMS, A REACTOR TRIP SIGNAL WILL INITIATE A TURBINE TRIP AND, IN CONJUNCTION WITH A LOW T_{AVG} (554°F) INITIATE A FEEDWATER ISOLATION SIGNAL. THIS INSTRUCTION DELINEATES THE ACTIONS REQUIRE TO ENSURE BOTH OF THESE HAVE OCCURRED.

1.3 IN THE EVENT A REACTOR TRIP IS REQUIRED AND HAS NOT BEEN AUTOMATICALLY INITIATED OR THE REACTOR FAILS TO TRIP WHEN INITIATED, THIS IS IDENTIFIED AS AN "ANTICIPATED TRANSIENT WITHOUT A TRIP" EVENT (ATWT EVENT). THIS INSTRUCTION PROVIDES THE NECESSARY ACTIONS TO ENSURE THE REACTOR IS PLACED IN A SAFE SHUTDOWN CONDITION FOR THIS EVENT.

2.0 INITIAL CONDITIONS

2.1 ANY OF THE FOLLOWING CONDITIONS WILL LEAD TO A REACTOR TRIP AND TO AN AUTOMATIC PLANT SHUTDOWN. THE CONDITION CAUSING THE TRIP WILL BE BACK LIGHTED IN RED ON THE FIRST OUT OVERHEAD ANNUNCIATOR PANEL (SECTION F).

	REACTOR TRIP	SETPOINT	COINCIDENCE	INTERLOCK
1.	MANUAL	NONE	1/2	NONE
2.	PWR. RANGE, HIGH NEUTRON FLUX	LOW SETPOINT - 25% OF RATED THERMAL PWR.	2/4	P-10
		HIGH SETPOINT - 109% OF RATED THERMAL PWR.	2/4	NONE
3.	PWR. RANGE, HIGH FLUX RATE TRIP	± 5% OF RATED THERMAL PWR. IN 2 SEC.	2/4	NONE
4.	INTERMEDIATE RANGE, HIGH NEUTRON FLUX	CURRENT EQUIVALENT TO 25% OF FULL PWR.	1/2	P-10
5.	SOURCE RANGE, HIGH NEUTRON FLUX	10^5 COUNTS PER SEC.	1/2	P-6 INTERLOCK WITH P-10.
6.	OVERTEMPERATURE ΔT	VARIABLE SETPOINT	2/4	NONE
7.	OVERPOWER ΔT	VARIABLE SETPOINT	2/4	NONE

MASTER

	REACTOR TRIP	SETPOINT	COINCIDENCE	INTERLOCK
8.	LOW REACTOR COOLANT PRESSURE	1865 PSIG	2/4	P-7
9.	HIGH REACTOR COOLANT PRESSURE	2385 PSIG	2/4	NONE
10.	HIGH PRESSURIZER	92% LEVEL	2/3	P-7
11.	LOW REACTOR COOLANT FLOW	90% OF NORMAL FLOW	2/3/LOOP	P-7 & P-8
12.	REACTOR COOLANT PUMP UNDER VOLTAGE	75% OF NORMAL VOLTAGE WITH A 0.2 SEC. TIME DELAY	1/2 TAKEN TWICE	P-7
13.	REACTOR COOLANT PUMP UNDER FREQUENCY	56.5 HERTZ WITH A 0.1 SECOND TIME DELAY	1/2 TAKEN TWICE	P-7
14.	REACTOR COOLANT PUMP BREAKER OPEN	10% PWR. 2 BKR. OPEN 36% PWR. 1 BKR. OPEN	1/PUMP	P-7 & P-8
15.	LOW FEEDWATER FLOW	1.4×10^6 STM. FLOW GREATER THAN FEEDWATER FLOW & 25% S/G LEVEL	1/2 FLOW MISMATCH, IN COINCIDENC WITH 1/2 LOW WTR LEVEL, PER LOOP.	NONE
16.	LOW-LOW STEAM GENERATOR WTR. LVL	18% LEVEL PER S/G	2/3 PER S/G	NONE
17.	TURBINE-GENERATOR TRIP	45 PSIG AUTO STOP OIL PRESSURE OR ALL FOUR STOP VALVES CLOSED	2/3 4/4	P-7
18.	SAFETY INJECTION (ACTUATION)	1. MANUAL	1/2	NONE
		2. PRESSURIZER AT 1765 PSIG	2/3	NONE
		3. CONTAINMENT AT ~~4.7~~ 4.0 PSIG	2/3 HIGH CONTAINMENT PRESSURE	NONE / P-3 Fwk
		4. ANY ONE S/G 100 PSIG LOWER THAN ANY OTHER TWO S/G's	1/2 STEAM PRESSURE ON ANY S/G LOWER THAN 1/2 STEAM PRESSURES ON 2/3 OF THE OTHER LOOPS.	NONE

MASTER

REACTOR TRIP	SETPOINT	COINCIDENCE	INTERLOCK
5.	SP VAIRABLE: STEAM LINE FLOW 1.4×10^6 #/HR. 0-20% LOAD INCREASING TO 4.0×10^6 #/HR. AT 100% PWR. IN COINCEDENCE WITH LOW TAVG 543°F OR LOW SP STM. PRESS 500 PSIG.	1/2 HIGH STEAM FLOW 2/4 STEAM GEN IN COINCIDENCE WITH 2/4 LOW TAVG OR 2/4 LOW STEAM LINE PRESSURE.	NONE
19. GENERAL ALARM	LOGIC TRAIN "A" & TRAIN "B" IN TEST SIMULTANEOUSLY. NOTE: THE GENERAL ALARM TRIP IS NOT ALARMED ON THE FIRST OUT ANNUNCIATOR.		NONE
20. TRIP BYPASS BKRS.	RACKING IN, OR ATTEMPTING TO RACK IN, BOTH REACTOR TRIP BYPASS BKRS. AT THE SAME TIME. NOTE: THE BYPASS BREAKER TRIP IS NOT ALARMED ON THE FIRST OUT ANNUNCIATOR.		NONE

3.0 IMMEDIATE ACTIONS

3.1 AUTOMATIC

3.1.1 REACTOR TRIP

3.1.2 TURBINE TRIP

3.1.3 GENERATOR TRIP

3.2 MANUAL

3.2.1 IF AN AUTOMATIC REACTOR TRIP HAS NOT OCCURRED AS INDICATED BY REACTOR POWER REMAINING HIGH AND/OR MULTIPLE CONTROL RODS FAILING TO INSERT, THIS IS IDENTIFIED AS AN "ANTICIPATED TRANSIENT WITHOUT A TRIP" EVENT (ATWT EVENT). PROCEE AS FOLLOWS UNTIL THE REACTOR IS SUCESSFULLY TRIPPED:

1) INITIATE A MANUAL REACTOR TRIP WITH EITHER HANDLE ON THE CONTROL CONSOLE.

2) INITIATE A MANUAL TURBINE TRIP WITH THE HANDLE ON THE CONTROL CONSOLE.

3) OPEN THE REACTOR TRIP BREAKERS MANUALLY FROM THE CONTROL CONSOLE BY DEPRESS OPEN PUSHBUTTONS ON BOTH REACTOR TRIP BREAKER A & B BEZELS.

MASTER

4) MANUALLY INITIATE SAFETY INJECTION BY INSERTING THE SAFEGUARD KEY INTO EITH TRAIN A OR B SAFETY INJECTION OPERATE BEZEL AND TURN THE KEY.

5) MANUALLY TRIP BOTH REACTOR TRIP BREAKERS LOCALLY AT THEIR CUBICLE IN THE 84 FT. ELEVATION SWITCHGEAR ROOM.

6) MANUALLY TRIP BOTH CONTROL ROD MG SETS AT THEIR CONTROL PANELS IN THE 84 FT ELEVATION SWITCHGEAR ROOM.

3.2.2 IF AN AUTOMATIC REACTOR TRIP HAS OCCURRED, PROCEED AS FOLLOWS:

1) CHECK THAT ALL FULL LENGTH RODS ARE FULLY INSERTED BY CHECKING INDIVIDUAL ROD POSITION INDICATORS AND ROD BOTTOM LIGHTS.

2) IF ANY FULL LENGTH CONTROL ROD DOES NOT INDICATE FULLY INSERTED, MANUALLY INITIATE A REACTOR TRIP.

3) IF ALL FULL LENGTH CONTROL RODS ARE NOT THEN FULLY INSERTED, RAPID BORATE BY 150 PPM FOR EACH ROD NOT INSERTED AS FOLLOWS:

   A) SHIFT ONE OR BOTH BORIC ACID TRANSFER PUMPS TO FAST SPEED.

   B) OPEN 1(2)CV175, RAPID BORATION STOP VALVE.

   C) BORATE FOR AT LEAST 8 MINUTES FOR EACH ROD NOT FULLY INSERTED (4 MINUTES WITH BOTH PUMPS IN FAST).

3.2.3 VERIFY TURBINE TRIP BY CHECKING THE FOLLOWING:

1) UNIT TRIP LIGHT ON E/H CONSOLE ILLUMINATED.

2) TURBINE STOP VALVES, GOVERNOR VALVES, INTERCEPTOR VALVES AND REHEAT STOP VALVES CLOSED.

3) TURBINE SPEED DECREASING.

IF THE TURBINE HAS NOT TRIPPED, PROCEED AS FOLLOWS UNTIL STEAM FLOW FROM THE STEAM GENERATORS IS TERMINATED.

MASTER

4) INITIATE A MANUAL TRUBINE TRIP WITH THE HANDLE ON THE CONTROL CONSOLE.

5) MANUALLY OPEN THE GENERATOR OUTPUT BREAKERS, 1-5 & 5-6 (1-9 & 9-10).

6) TRIP CLOSED THE MAIN STEAM ISOLATION VALVES, 11-14(21-24)MS167 FROM EITHER THE SAFEGUARD BEZELS OR MAIN STEAM BEZELS.

IF THE UNCONTROLLED STEAM FLOW HAS CAUSED REACTOR COOLANT SYSTEM PRESSURE TO DECREASE TO <1765#, INSURE SAFETY INJECTION IS ACTUATED. IF SAFETY INJECTION NOT ACTUATED, INITIATE IT MANUALLY BY INSERTING THE SAFEGUARDS KEY INTO EITHER TRAIN A OR B SAFETY INJECTION OPERATE BEZEL AND TURN THE KEY. PROCEED TO EI I-4.0, "SAFTEY INJECTION INITIATION".

3.2.4 VERIFY T_{AVG} IS DECREASING TOWARD OR IS BEING MAINTAINED AT 547°F BY EITHER STEAM DUMP OR ATMOSPHERIC STEAM RELIEF.

3.2.5 VERIFY THAT FEEDWATER ISOLATION TAKES PLACE WHEN T_{AVG} DECREASES TO 554°F.

3.2.6 VERIFY AUXILIARY FEEDWATER FLOW IS ESTABLISHED TO ALL FOUR STEAM GENERATORS IF ANY STEAM GENERATOR LEVEL IS <18%.

3.2.7 ANNOUNCE OVER THE PLANT PA SYSTEM TWICE: UNIT NO. 1(2) REACTOR TRIP.

4.0 SUBSEQUENT ACTIONS

COMMENTS

4.1 IF SAFETY INJECTION WAS MANUALLY INITIATED IN STEP 3.2.1, PROCEED TO EI-1-4.0, "SAFETY INJECTION INITIATION"

UTILIZE REDUNDANT INDICATIONS WHERE POSSIBLE TO CONFIRM EVALUATIONS AND ACTIONS.

4.2 VERIFY ALL IMMEDIATE ACTIONS ARE COMPLETE, ACCOMPLISH ANY WHICH ARE NOT.

4.3 VERIFY THE GENERATOR OUTPUT BREAKERS, 1-5 & 5-6(1-9 & 9-10) ARE OPEN IF THEY DO NOT OPEN, OPEN MANUALLY BY DEPRESSING THE OPEN PUSHBUTTON ON THE BEZEL FOR EACH BREAKER ON THE CONTROL CONSOLE.

4.3 SHOULD OPEN ~30 SECONDS AFTER THE TURBINE TRIP.

4.4 CHECK THAT NUCLEAR POWER IS DECREASING BY OBSERVING THE NUCLEAR INSTRUMENTATION.

4.4.1 CHECK THAT THE SOURCE RANGE HIGH VOLTAGE IS REINSTATED BELOW 5×10^{-11} AMPS ON BOTH INTERMEDIATE RANGE CHANNELS

4.4.1 SHOULD OCCUR IN ~15-18 MINUTES FOLLOWING THE TRIP.

1) IF THE SOURCE RANGE HIGH VOLTAGE DOES NOT ENERGIZE AUTOMATICALLY, MANUALLY DEPRESS THE RESET SOURCE RANGE "A" AND RESET SOURCE RANGE "B" PUSHBUTTONS ON THE CONTROL CONSOLE.

4.4.2 SWITCH THE NUCLEAR POWER RECORDER (NR-45) TO READ ONE INTERMEDIATE RANGE CHANNEL AND ONE SOURCE RANGE CHANNEL.

MASTER

4.4.3 NOTIFY THE PERFORMANCE DEPARTMENT THAT A REACTOR TRIP HAS OCCURRED AND THAT THE COMPENSATING VOLTAGE ON THE INTERMEDIATE RANGE DETECTORS SHOULD BE ADJUSTED.

4.4.3 THIS SHOULD BE ACCOMPLISHED AS SOON AS PRACTICAL TO INSURE PROPER INTERMEDIATE RANGE INDICATION.

4.5 VERIFY THAT THE PRESSURIZER PRESSURE AND LEVEL ARE WITHIN LIMITS, AND UNDER CONTROL.

4.5 TAKE MANUAL CONTROL AS NECESS/

4.6 VERIFY THAT THE 4160V GROUP BUSSES HAVE TRANSFERRED FROM THE No. 1(2) AUXILIARY POWER TRANSFORMER TO No. 11(21) & No. 12(22) STATION POWER TRANSFORMERS.

4.6.1 CHEC: THAT THE FOLLOWING 4160V BREAKERS HAVE OPENED AND ACKNOWLEDGE THEM ON THE APPROPRIATE CONTROL CONSOLE BEZEL:
1(2)BGGD
1(2)BFGD
1(2)AEGD
1(2)AHGD

4.6.1 OPEN MANUALLY AS NECESSARY.

4.6.2 CHECK THAT THE FOLLOWING 4160V BREAKERS HAVE CLOSED AND ACKNOWLEDGE THEM ON THE APPROPRIATE CONTROL CONSOLE BEZEL:
12(22)GSD
12(22)FSD
11(21)ESD
11(21)HSD

4.6.2 CLOSE MANUALLY AS NECESSARY.

4.7 VERIFY THAT T_{AVG} IS BEING MAINTAINED AT 547°F DUE TO STEAM DUMP OPERATION.

4.7 CHECK STEAM DUMP VALVE POSITI INDICATING LIGHTS AND THE STE DUMP DEMAND INDICATOR.

4.7.1 ENSURE THE MAIN STEAM PRESSURE SETPOINT IS SET TO MAINTAIN STEAM GENERATOR PRESSURE AT ~1005 PSIG, THEN TRANSFER THE STEAM DUMP CONTROL TO MAIN STEAM PRESSURE CONTROL.

4.7.1 CHECK THE SETTING FIRST TO PREVENT ANY UNWANTED STEAM DUMP OPERATION.

4.7.2 IF CONDENSER STEAM DUMP IS NOT VAILABLE, UTILIZE THE ATMOSPHERIC STEAM RELIEF VALVES, 11-14(21-24)MS10 TO MAINTAIN STEAM GENERATOR PRESSURE AT ~1005 PSIG.

4.8 VERIFY THAT FEEDWATER ISOLATION HAS TAKEN PLACE DUE TO THE REACTOR TRIP IN COINCIDENCE WITH LOW T_{AVG} (554°F).

4.8.1 CHECK THAT THE FOLLOWING VALVES HAVE CLOSED BY OBSERVING THEIR APPROPRIATE BEZEL INDICATION:

11(21)BF19 FEEDWATER CONTROL VALVE
12(22)BF19 FEEDWATER CONTROL VALVE

MASTER

13(23)BF19 Feedwater Control Valve
14(24)BF19 Feedwater Control Valve
11(21)BF40 Feedwater Bypass Valve
12(22)BF40 Feedwater Bypass Valve
13(23)BF40 Feedwater Bypass Valve
14(24)BF40 Feedwater Bypass Valve

4.9 Terminate any RCS dilution which is in progress.

4.9 Prevent any inadvertent reduction in Shutdown Margin.

4.9.1 Depress the STOP pushbutton on the Makeup Mode Selector Bezel and align the Blender for AUTO makeup IAW OI II-3.3.6, "Boron Concentration Control".

4.9.2 Bypass the deborating demineralizers by aligning 1(2)CV27 to the VCT.

4.10 Return the levels in the Steam Generators to normal (~33%) as follows:

4.10 The feed ring drains slowly through the loose fit connection to the feed inlet piping.

CAUTION: If the Level in any Steam Generator has been <10% on the narrow range for more than 5 minutes and all feedwater flow has been isolated for more than 5 minutes, flow must be limited to < 10×10^4 lbm/hr. to that Steam Generator until the level is returned to >10% in the narrow range.

If conditions require maximu flow for decay heat removal considerations, this takes precedence over the water hammer considerations.

CAUTION: Do Not stop 11 or 12(21 or 22) Aux. Feed Pump while any steam Genrator is <18%.

If either Motor Driven Pump is stopped while a Steam Generator level is <18%, the pu must be started locally from th: Hot Shutdown Panel, or t 125 VDC Control Power must b cycled to start the pumps fr the Control Room. If the level increases to >18% the pumps may be restarted normal

4.10.1 Control flow to the Steam Genrators as required by controlling the following valves:

1) 11-14(21-24)AF11 if No. 13(23) Aux. Feedwater Pump is in operation.

MASTER

2) 11-14(21-24)AF21 IF No. 11 & 12 (21 & 22) AUX. FEEDWATER PUMPS ARE IN OPERATION.

1 P-4 7-15-PES

4.11 ESTABLISH AND MAINTAIN THE HOT STANDBY CONDITION IAW OI I-3.5, "MINIMUM LOAD TO HOT STANDBY", AND OI I-3.8, "MAINTAINING HOT STANDBY".

4.12 IF Rx TRIP WAS FROM >15% Rx POWER, HAVE THE CHEM DEPT. PERFORM AN I^{131}, I^{133}, I^{135} ISOTOPIC ANALYSIS BETWEEN 2 AND 6 HOURS FOLLOWING THE Rx TRIP.

4.12 TECH SPEC 3.4.8 TABLE 4.4

4.13 OBTAIN A SAMPLE OF THE REACTOR COOLANT SYSTEM AND DETERMINE BORON CONCENTRATION. ADJUST BORON CONCENTRATION AS REQUIRED IAW OI II-3.3.6, "BORON CONCENTRATION CONTROL".

4.14 AS PER ADMINISTRATIVE PROCEDURE No. 5: & 7

1 P-2 6-4-81 WS

4.14.1 NOTIFY THE STATION OPERATING ENGINEER OR CHIEF ENGINEER OF THE REACTOR TRIP AND; and the NRC

4.14.2 INITIATE AN OPERATIONAL INCIDENT REPORT IAW AP-6 AND FORWARD IT TO THE STATION OPERATING ENGINEER.

4.14.3 Refer to Emergency Plan Procedure EP-2 & Part I for the appropriate accident classification

1 P-1 5-22-81 WS

4.15 IF, AT THIS TIME, IT BECOMES NECESSARY, TAKE THE PLANT TO THE COLD SHUTDOWN CONDITION IAW OI I-3.6, "HOT STANDBY TO COLD SHUTDOWN".

4.15 IF ANY OF THE AUTOMATIC FUNC REQUIRED (I.E. REACTOR TRIP, TURBINE TRIP, AUXILIARY FEED-WATER INITIATION) HAVE FAILE TO ACTUATE, IT WILL BE NECES. TO PROCEED TO COLD SHUTDOWN IAW TECH SPEC 3.0.3.

4.16 AS AUTHORIZED BY AP-5, WITHDRAW THE SHUTDOWN BANKS AS FOLLOWS:

4.16.1 RESET THE FLUX RATE TRIP BY MOMENTARILY TAKING THE RATE MODE SWITCHES, ON EACH NIS POWER RANGE A DRAWER, TO THE RESET POSITION.

4.16.1 ANY REACTOR TRIP FROM POWE WILL GENERATE A NEGATIVE RATE TRIP SIGNAL WHICH SEA IN AND MUST BE MANUALLY RESET.

4.16.2 DEPRESS THE CLOSE PUSHBUTTON, ON THE CONTROL CONSOLE, FOR REACTOR TRIP BKR A, VERIFYING THE BREAKER DOES CLOSE.

MASTER

4.16.3 Depress the CLOSE pushbutton, on the control console, for REACTOR TRIP BKR B, verifying the breaker does close.

4.16.4 Depress the STARTUP pushbutton, on the control console, and verify each Shutdown and Control Rod Step Counter resets to zero.

4.16.4 If the STARTUP pushbutton has been pushed prior to closing the Reactor Trip Breakers, a Rod Urgent Alarm condition will be present. This can be cleared by pushing either the STARTUP pushbutton or the ALARM RESET pushbutton.

4.16.5 Commence withdrawing Shutdown Bank A, B, C and D, in that order, to their fully withdrawn position.

4.17 When the cause of the trip has been determined and corrected, obtain the permission of the Station Operating Engineer or the Chief Engineer, IAW AP-5, to take the reactor critical.

4.18 With Steam Generator levels within their normal operating bands and just prior to commencing the recovery, startup, perform the following:

4.18.1 Place the Steam Generator Feedwater Controls in MANUAL and run the valve demand to zero.

4.18.2 Reset the Feedwater Isolation signal by depressing the Train "A" and Train "B" FEEDWATER ISOLATION RESET pushbuttons on the control console.

4.18.3 Maintain Steam Generator levels within their normal operating bands by manually controlling Feedwater Bypass Valves 11, 12, 13 and 14(21, 22, 23 and 14)BF40.

4.18.4 Return the Auxiliary Feedwater System to its normal at power lineup IAW OI III-10.3.1, "Auxiliary Feedwater System Operation".

4.18.4 AFW Storage Tank level may low.

MASTER

4.19 RETURN TO POWER OPERATION IAW OI I-3.3, "HOT STANDBY TO MINIMUM LOAD", AND OI I-3.4, "POWER OPERATION".

PREPARED BY J. BAILEY

REVIEWED BY G. CONNOR

SORC MEETING No. 74-80

S. J. Eckhardt
MANAGER - SALEM GENERATING STATION

DATE 9/19/80

Background Information on ATWS

Supplied to Station by Westinghouse

I. INTRODUCTION

The guideline ECA-1, "Anticipated Transient Without SCRAM (ATWS)," specifies the mitigating actions required following ATWS events - a family of Condition II accidents requiring a reactor trip but, through some failure in the protection system, the trip is not obtained. The reactor coolant system conditions at the time the operator identifies an ATWS event can be very different depending on the initiating event. Loss of main feedwater, control bank withdrawal at power, and a spurious opening of a pressurizer PORV are examples of the differing nature of ATWS events. The required operator actions following identification of an ATWS event are the same but the reactor coolant system conditions may be very different; pressurizer pressure can exceed 2800 psia following a loss of main feedwater ATWS but will never exceed the nominal operating pressure following the spurious opening of a pressurizer PORV. Operators must be aware of such system responses and not rely on any signals or indications other than those for reactor trip.

Transient response is also highly dependent on the time in fuel cycle at which an ATWS occurs. Response is much more severe very early in cycle lifetime than later in the cycle. For example, primary pressure may exceed 3000 psia for a turbine trip ATWS at beginning of cycle life but not exceed 2575 psia (the pressurizer safety valve setpoint + accumulation) near the end of cycle life.

This guideline only addresses the short-term operator actions. The operator must attempt alternate means of reactor trip and maintain a secondary-side heat sink via turbine trip (for a total loss of main feedwater) and auxiliary feedwater actuation. [redacted] a turbine trip within 30 seconds (for a loss of main feedwater), and auxiliary feedwater actuated within 60 seconds, [redacted] These times are for the limiting ATWS transients. Turbine trip and actuation of auxiliary feedwater would normally be generated by the reactor protection system but it is assumed that the same fault that prevents a reactor trip also prevents these functions. Therefore, the guideline provides

NS-TMA-2182
12/30/79

11.0 SUMMARY AND CONCLUSIONS

Westinghouse has shown, in WCAP-8330 (August, 1974) and in subsequent submittals to the NRC, that Westinghouse plant designs essentially meet the requirements that have since been assembled and designated as "Alternative 3 and 4" in NUREG-0460, Volume 3.

The analytical results contained in this report confirm the conclusions of WCAP-8330. Westinghouse plants which fall into Alternative 3 and 4, as defined by the NRC, are capable of experiencing an ATWS without produc- ing unacceptable consequences.

The analyses, documented in WCAP-8330, are based upon a 95% moderator temperature coefficient with no equipment failures other than the scram system. These are the conditions proposed for the analyses of plants falling into the Alternative 3 category. Given these conditions, and using the current computer models, the transient results come well within the proposed Alternative 3 criteria. The peak RCS pressures attained do not jeopardize RCS integrity, nor do they impede operability of valves needed to reach a safe shutdown condition.

The loss of offsite power ATWS, which produces the greatest reduction in thermal margin, has been analyzed and the results indicate with a very high confidence level that fuel failures are not likely to occur.

Radiological consequences due to ATWS releases outside containment are acceptable, and the releases inside containment do not pose a containment pressure buildup problem.

The greatest mass and energy release into containment occur during the spurious opening of a pressurizer safety valve (RCS depressurization ATWS). The rise in containment pressure due to these releases is insignificant compared to LOCA, and is certainly within containment design limits.

The only mitigation functions required to operate during an ATWS in a Westinghouse plant are the auxiliary feedwater and the trip of the main turbine. The balance of plant designs of many Westinghouse plants already provide for the automatic actuation of these functions, without resort to the scram system. Only minor modifications are needed in the remainder of the Westinghouse plants to provide these diverse mitigation functions.

In addition, numerous Westinghouse analyses since 1974 have shown that proposed Alternative 4 requirements are attainable for Westinghouse plants. These will be documented in subsequent submittals.

9.3.20 INFORMATION READ-OUT

AMSAC bypass at low power operation (see 9.3.12) shall be indicated in the control room. Additionally, AMSAC initiation (see 9.3.16 and 9.3.19) shall also be indicated in the control room.

9.3.21 SYSTEM REPAIR

AMSAC shall be capable of timely repair upon detection of a failure during the periodic test program. Depending on redundancy and the capability to bypass the inoperable element, continued operation may be permitted.

9.3.22 IDENTIFICATION

AMSAC equipment and cables shall be distinctively identified to preclude routing of such cables or location of such equipment with RPS channels or cabinets to maintain physical separation between RPS and AMSAC.

9.4 PLANT SHUTDOWN

There are several mechanisms by which a plant may be shutdown following an ATWS event. These include initiation of the safety injection process, an emergency boration process, a normal boration process, or a manual reactor trip.

If the postulated CMF is in the protection system, i.e., electrical, and not in the control rods, i.e., mechanical, the operator can simply open the control rod power supply motor-generator set supply breakers, or the main scram breakers, to trip the reactor. When the control rods are tripped, all control rods drop into the core in less than 3 seconds, inserting more than 4 percent $\Delta k/k$ negative reactivity.

If the postulated CMF is mechanical and not electrical, the operator can proceed with various boration procedures to shut the plant down. These

include initiation of safety injection, normal boration, or emergency boration. For any of these procedures, sufficient borated water can be delivered to the plant for shutdown.

A review of the transients analyzed in Section 5 and the stress limits shown in Section 6 indicates that the plant can proceed to a normal shutdown once the operator has taken action to add negative reactivity. The stress analysis has shown that pressure boundary valve can operate following a limiting ATWS event and that the instrumentation will not be affected. The containment analysis presented in Section 7 has shown that the conditions following an ATWS event are much less severe than the conditions generated by design basis accident.

TRAINING AND LICENSE HISTORY OF OPERATORS

Victor Lowensten
RO License: Number- OP-4426
Date- May 15,1977
SRO License: Number- SOP-3268-4
Date- July 14,1982 (license renewal)
Initial SRO License- May 1978
Most recent requal- August 31,1981 through October 23,1981
Most recent simulator requal- November 6,1982 through November 10,1982
At SNUPPS simulator in Pittsburgh

Ralph Flores
RO License: Number- OP-6203
Date- December 24,1982 (initial license)
STA Qualification- March 1980 through December 1980

Patrick Bowdren
RO License. Number- OP-5379
Date- December 12,1980 (initial license; renewal submitted. correspondence from NRC on 2/16/83 indicated license was in for typing)
Most recent requal- April 26,1982 through April 30,1982 (interrupted by strike)
August 30,1982 through October 15,1982 (completion of strike interrupted session)
Failed written exam. Remedial training scheduled to be started March 28,1983.
Most recent simulator requal- October 25,1982 through October 29,1982
At SNUPPS simulator in Pittsburgh

Charles Anderson
RO License: Number- OP-4617-2
Date- November 3,1979 (renewal submitted, correspondence from NRC on 2/16/83 indicated license was in for typing)
Initial License- May 15,1977
Most recent requal- October 26,1981 through December 18,1981
Failed written exam. Remedial training was originally scheduled for March 1,1982 through April 8,1982 but not completed due to illness. Remedial training was rescheduled for August 30,1982 through October 15,1982
Failed one section of the remedial training, additional training requirements being evaluated.
Most recent simulator requal- December 18,1982 through December 22,1982
At SNUPPS simulator in Pittsburgh
NOTE: Was not fulfilling a licensed operator function in the Control Room at the time of the transient. Was an extra operator available for assistance at the time.

David Lounsbury
RO License: Number- OP-6200
Date- December 24,1982 (initial license)

PUBLIC SERVICE ELECTRIC & GAS COMPANY SALEM UNIT # 1 PD-3.8.023

Chemistry Anal. is Daily Report

Page 4 of 10

Date: 2-25-83 Rx Power - 2X Trip

Let Down Flow 0023 GPM

Primary Chemistry 3/7/83 Bob Dolan - Chemistry Engineer

Analysis / Units / RCS & PZR Ranges	pH @25°C 4.2-10.5	Li ppm 0.7-2.2	B ppm 0-4000	Sp. Cond. umho/cm <40	O_2 ppb <5	Cl ppm <0.15	F ppm <0.15	SiO_2 ppm <0.2	Al ppm <0.05	Ca ppm <0.05	Mg ppm <0.05	H_2 cc/Kg 25-35	S.S. (Crud) ppm <1.0	CrO_4 ppm
RCS	5.97		1281	14.0	<5	<0.05	<0.014							
PZR			1443											
R.C.D.M. Out ✓														
RWST ✓														
PWST ✓														
Comn. Cooling						0.05								

C-88

Systems ✓	BAST 11	BAST 12	BIT 1	Accum 11	Accum 12	Accum 13	Accum 14	
Boron in ppm								

Primary Radiochemistry

RCS GAS uCi/ml	Kr-85	Kr-88	I-131	Ar-41	Xe-133	Xe-133m	Xe-135	Liquid Radwaste Releases
RCS Sp. Act. uCi/ml	H-3	Na-24	Co-58	Co-60	I-131	I-133	Gross Act.	Ci/Qtr.
	Dose Eq. Iodine	DM Out Gross	R-16 Reading cpm					Ci/Year to date

Plant Vent	H-3	Charcoal Cartridge				Particulate Filter				Johnson Bomb			

...C SERVICE ELECTRIC AND GAS COMPANY
...GENERATING STATION
UNIT #1

RADIOCHEMICAL ANALYSES

FRIDAY 2/25/83

SYSTEM	ANALYSES												
RCS or ~~RHR~~	GROSS BETA uci/ml	MCA I.D. #	I-131 uci/ml	I-133 uci/ml	Co-58 uci/ml	Co-60 uci/ml	Na-24 uci/ml		-			POWER %	PURIF FLOW GPM
	9.187 E-3	1RCS 72-83	4.868 E-5	3.504 E-4	7.342 E-4	5.642 E-4	1.365 E-4					0	80
RCDM OUT	GROSS BETA	MCA I.D. #	I-131	I-133	Co-58	Co-60	Na-24						
	3.024 E-3	1RCDMO-45-83	—	—	1.02 E-4	—	—						
S.G. BLOWDOWN #11	GROSS BETA												
	LLD=1.1733 E-6												
#12	LLD=1.1733 E-6												
#13	LLD=1.1733 E-6												
#14	LLD=1.1733 E-6												
R-16 DATA	24 HR. AVERAGE READING		24 HR. AVERAGE FLOWRATE										
	250 CPM		79,000 CFM										

G-89

REMARKS (MODE CHANGE, EQUIP. PROBLEMS, ETC.)

Activity released to date

Qtr. = 1.259

Yr. = 3.856

PUBLIC SERVICE ELECTRIC & GAS COMPANY SALEM UNIT # 1 PD-3.8.023 Page 4 of 10

Chemistry Analysis Daily Report

Date: 2-26-88 Rx Power - 5/0 % Let Down Flow GPM

Primary Chemistry

Analysis / Units / RCS & PZR Ranges	pH @25°C	Li ppm	B ppm	Sp. Cond. umho/cm	O_2 ppb	Cl ppm	F ppm	SiO_2 ppm	Al ppm	Ca ppm	Mg ppm	H_2 cc/Kg	S.S. (Crud) ppm	CrO_4 ppm
	4.2-10.5	0.7-2.2	0-4000	<40	<5	<0.15	<0.15	<0.2	<0.05	<0.05	<0.05	25-35	<1.0	
RCS	5.91	1.12	1713	12.8		<0.05	<0.014							
PZR														
R.C.D.M. Out														
RWST														
PWST														
Comp. Cooling														

G-90

Systems	BAST 11	BAST 12	BIT 1	Accum 11	Accum 12	Accum 13	Accum 14	
Boron in ppm								

Primary Radiochemistry

RCS GAS uCi/ml	Kr-85	Kr-88	I-131	Ar-41	Xe-133	Xe-133m	Xe-135	Liquid Radwaste Releases	
RCS Sp. Act. uCi/ml	H-3	Na-24	Co-58	Co-60	I-131	I-133	Gross Act.	Ci/Qtr.	
	Dose Eq. Iodine	DM Cut Gross	R-16 Reading cpm					Ci/Year to date	

	H-3	Charcoal Cartridge				Particulate Filter				Johnson Bomb			
Plant Vent													

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
SALEM GENERATING STATION
UNIT #1

RADIOCHEMICAL ANALYSES

MONDAY 2/28/83

SYSTEM	ANALYSES												
~~RCS~~ or RHR	GROSS BETA uci/ml	MCA I.D. #	D.E. I-131 uci/ml	I-131 uci/ml	I-133 uci/ml	Co-58 uci/ml	Co-60 uci/ml	Na-24 uci/ml				POWER %	PURIF.FLOW -GPM
	6.7413 E-3	1 RHR 41-83	—	—	—	1.48 E-3	1.10 E-3	—				0	80
RCDM OUT	GRGSS BETA	MCA I.D. #	D.E. I-131	I-131	I-133	Co-58	Co-60	Na-24					
	2.3983 E-3	1RCDMO-48-83	—	—	—	9.31 E-5	5.29 E-5	—					

S. G. BLOWDOWN	GROSS BETA	MCA I.D. #	D.E. I-131	COMPOSITE (1)
#11	LLD 1.434 E-6	SG-11-08-83	—	
#12	↓	SG-12-07-83	—	
#13		SG-13-07-83	—	
#14	↓	SG-14-07-83	—	

	GROSS BETA			
COMPONENT COOLING	LLD 1.434 E-6			
SEWAGE PLANT EFFLUENT	GROSS BETA LLD 1.434 E-6			

WEEKLY COMP. LIQUID RELEASES	I-131	Ba-La-140	MCA I.D. #	Vol (Gal)
	LLD 1.890 E-6	LLD < 5.5YE-6 LLD < 1.2YE-6	1Tal/2-09-33	74900

IR-16 DATA	24 HR. AVERAGE READING		24 HR AVERAGE FLOWRATE	
	300	CPM	80,000	CFM

(1) ANALYST INITIAL UPON SAT. COMPLETION

REMARKS (MODE CHANGES, EQUIP. PROBLEMS, ETC.)

1.259 ci Qtr

3.856 ci yr

G-91

OPERATIONS DEPARTMENT

REPORT ON REACTOR TRIP/SAFETY INJECTION

February 22, 1983

At 2036 hours, February 22, 1983, Salem Unit 1 was synchronized and the turbine loading was increasing in accordance with established Operations Department procedures. At 20 % reactor power, approximately 200 Mwe electrical load, procdure step 5.34 of IOP-3, Hot Standby to Minimum Load, required that the 4Kv Group Bus power supplies be transferred from the Station Power Transformers to the Auxiliary Power Transformer.

The 1G 4Kv Group Bus was successfully transfered and at 2155 hours the operators attempted to transfer the 1F 4kv Group Bus to the Auxiliary Power Transformer. Upon depressing the close push button for the Auxiliary Power Transformer infeed breaker, the Station Power Transformer infeed breaker opened, however, the infeed breaker from the Auxiliary Power Transformer failed to close. The failure of the Auxiliary Power Transformer to close caused the 1F 4Kv Group Bus to deenergize. The opening of the Station Power Transformer Breaker prior to the closure of the Auxiliary Power Transformer Breaker is in accordance with the power transfer design scheme.

Upon the loss of power to the 1F 4Kv Group Bus all equipment powered from the bus was deenergized. The most important equipment deenergized was 13 Reactor Coolant Pump and 14 MAC 115 volt distribution panel. The control room lighting was also lost. However, this did not present a problem as the emergency lighting provided sufficent light.

There was no immediate Turbine/Reactor trip on loss of reactor coolant flow to the 13 reactor coolant loop because the Reactor Protection System allows single loop loss of flow below 36 % power. The loss of 14 MAC panel, however, caused 12 Steam Generator Feed Pump to trip due to the loss of feed pump control power. The loss of the feed pump interrupted the feedwater flow to all steam generators and steam generator levels started to immediately decrease. The operators noted that 13 Steam Generator level was decreasing rapidly due to the combined effects of the loss of feedwater flow and the shrink in the steam generator due to loss of reactor coolant flow. In addition to the loss of the feed pump, a significant amount of instrumentation lost power when 14 MAC panel was de-energized. This caused the instruments to fail to the mid-scale position.

The supervisor in the control room at the time of incident realized that with the rate of decrease in 13 Steam Generator level it would not be possible to bring the reactor to less than 10 % power in a controlled manner so he ordered the Unit to be manually tripped. At 2157 hours, simultaneously, with the

issuance of the order, the reactor was automaticly tripped by the Reactor Protection System on 13 Steam Generator LO-LO level.

All equipment functioned as designed when called upon by the Reactor Trip. The Reactor Trip/Turbine Trip set up the automatic transfer circuit for the group buses to be transfered from the Auxiliary Power Transformer to the Station Power Transformer. The 1H and 1E 4Kv Group were already supplied power from the Station Power Transformers as they were never swapped over to the Auxiliary Transformer. The 1G 4Kv Group Bus swapped over as per design. The transfer scheme also provided a close signal to the Station Power infeed breaker to the 1F 4Kv Group Bus, causing the breaker to close an the bus to become re-energized.

The simultaneous starting of all the connected loads on the 1F 4Kv Group Bus caused the 11 Station Power Transformer voltage to decrease. The decrease in the transformer voltage was sensed by the second level of undervoltage protection on the 1B 4Kv Vital Bus and the bus was automatically swapped over to 12 Station Power Transformer. The locked rotor relay protection for 13 Reactor Coolant Pump operated shortly after the bus was reenergized due to the inability of the pump to start without the aid of the lift pump and the low voltage condition on the bus.

At 2204 hours, an automatic Safety Injection occured because the steam pressure in 13 Steam Generator was 100 psi less then the steam pressure in any other 2 steam generators. The cause of the steam pressure decreasing 100 psi was due to the combined effects of the addition of cold feedwater by the Auxiliary Feedwater Pumps which started automatically on response to the LO-LO level in 13 Steam Generator, the cooling effect cause by the draw off of steam from the 11 and 13 Steam Generator by the turbine driven auxiliary feedwater pump, the reduced circulation in the Reactor Coolant System due to the loss of 13 Reactor Coolant Pump and the fact that the MSIV's had been closed to control the decrease in Tave. The closure of the MSIV's to limit the cooldown following a reactor trip is standard practice early in core life when there is little or no decay heat available to maintain RCS temperature.

All required Safeguards Equipment functioned as designed, causing the pressurizer level to increase during the Safety Injection. As pressurizer level increased the bubble was compressed and pressurizer pressure increased causing the Power Operated Relief Valves to relieve to the Pressurizer Relief Tank. The increase in pressurizer pressure would normally be held below the set point of the Power Operated Reliefs by the pressurizer spray valves. However, in this case no spray flow was available since 11 and 13 Reactor Coolant Pumps were out of service. No.11 Reactor Coolant Pump had tripped at 2206 for no apparent reason.

The operators responded to the Safety Injection in accordance with the Emergency Instructions for Safety Injection. The duration of the Safety Injection was 7 minutes. Upon establishment of the Safety Injection reset criteria by the operators, the Safety Injection was terminated at 2211 hours in accordance with procedures and the Unit was returned to a stable shutdown condition.

An investigation was conducted by maintenance and relay department personnel into the incident. The investigation revealed a faulty 52 I/S limit switch in the 1F 4Kv Group Bus - Auxiliary Power Transformer infeed breaker. This switch is normally closed when the breaker is fully racked up and is wired in series with the closing coil of the breaker. The faulty limit switch therefore prevented the closing coil from energizing when the transfer control scheme called for the breaker to close.

The investigation did not reveal any apparent problem with the relay protection for the 11 Reactor Coolant Pump nor did it reveal any other reason for the tripping of the pump.

The Engineering Department has been requested through a Design Change Request to provide undervoltage lockout relay protection for all Reactor Coolant Pump Motors. This will provide a breaker trip/lockout of the coolant pumps in the event of a total loss of voltage on the supplying bus. This will prevent the uncontrolled starting of the Reactor Coolant pumps upon bus re-energization.

SENIOR SHIFT SUPERVISOR'S LOG Orig. NMR

DAY TUESDAY

DATE FEB. 22, 1983 SHIFT 1515-2315 S.S.S. Victor W. Lowensten, Jr.

UNIT 1 STATUS
MODE III
Rx Power 0 %
Load 0 Mwe Gross
Tave 510 °F
RCS Press 2300 psig
Boron Conc. ppm

COMMENTS R/ CRITICAL @ 1516 hrs. - UNIT SYNC @ 2036 hrs.
UNIT TRIP @ 2157 hrs. - (LOSS OF #13 RCP ON APT X-FER.)
SAFETY INJECTION @ 2201 hrs - STM LINE ΔP

UNIT 2 STATUS
MODE VI
Rx Power 0 %
Load 0 Mwe Gross
Tave 90 °F
RCS Press psig
Boron Conc. 2110 ppm

COMMENTS 128 FUEL ELEMENTS REMOVED FROM CORE.

UNIT 3 AVAILABLE ✓ UNAVAILABLE SINCE

COMMENTS

TECH SPEC ACTION STATEMENT

UNIT	EQUIPMENT	A/S NUMBER	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
1/2	Fire Barriers	3.7.11a	10/28/81@ 0001		
1	FIRE DETECTION	3.3.3.6	2/9/83 @ 0955		
1	+ MTC	3.1.1.4.a	2/16/83 @ 0001		500 MWD/MTU

UNIT 1 SHIFT SUPERVISOR'S LOG

DATE 2-22-83 SHIFT 1515-2315 SHIFT SUPV Robert Gallaher

UNIT STATUS MODE 3 Tave 540 °F

Rx Power 0 % RCS Press 2250 psig

Load 0 Mwe Gross Boron Conc. 1402 ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP
11 CVCS MT	2/20/83 1637				

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
Fire Doors & Barriers	3.7.11	10/29/81 2001		
Charcoal Filter Fire Det	3.3.3.6	2/9/83 0955		
Rubire MTC	3.1.1.3.9	2/16/83 0001		
~~Shutdown~~ Rod Position	3.1.3.2a	2/22/83 1540	2/22/83 1707	
BIT	3.5.4.1 A	2/22/83 2211		
EAST	3.1.2.8 A	2/22/83 2320		

Salem Unit 1/2 OD-18-B-1 MASTER Rev. 1

COMMENTS FOR TURNOVER

1) Filled #3 SAC per maintainence request = 205 gal.
2) 1516 Rx Critical
3) 1805 LATCHED TURB, AT 1812 TURB. Trip due to High level in 13 stm. Gen.
4) Relatched Turbine AT 1922
5) Mode 1 AT 2036
6) AT 2155 IF bus did not transfer over to Aux power transformer causing 13 RCP to trip.
7) AT 2157 Shift Supervisor Bill O'Brien told NCO's to trip Reactor.
8) AT 2204 We Had a S.I. on Steam DP on 13 Stm Gen.
9) AT 2206 11 RCP Trip for no apparent reason. Had operator check for flags. He found none on 11 RCP but found two on 13 RCP
10) AT 2211 Terminated S.I.

Salem Unit 1/2 OD-18-B-3 MASTER Rev. 1

BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE FEB 22 1983

TIME	APPARATUS	REMARKS:
2315	X Shift	
	SSS	W Rahl
	SS	B Ciantroni
	NCO	A Foehner, M. Gwirtz
	EO	B. Crawford, H. Kawecki
	VO	M. Maleny / B. Phillips, J. Willoughby / J. Simpkins
	Fire Brigade	W Maleny (chief), M. Anderson (asst), M. Maleny / Phillips, J Willoughby / J. Simpkins
2353	Turb	Latched Turbine
0029	CN	11 Cond pump I/S
0100	BF	Feeding S/G's on 12 SG FP
0103	Gen	Synchronized the Gen 1-5 breaker closed
0105	500 KV	Closed 500 KV breaker 5-6
0116	Rx	Reactor trip on 13 S/G low-low level
		carried out immediate and subsequent actions
		of ØEI-I-4.3
0117	"	NRC notified of Rx trip
Late Entry 0105	RCS	RCS boron concentration 1372 ppm
0245	turb.	Main turbine is on the turning gear
0437	CS	11 CS pump I/S for 405 P
0446	CS	11 CS pump O/S
0455	CS	12 CS pump I/S for 405 P
0510	CS	12 CS pump O/S
~~05~~ NLS		
		M D Quinty

a) Use apparatus to provide a description of the event being logged.

b) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

Page 4 of 4 Rev. 6

BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: Feb 22, 1983

TIME	APPARATUS	REMARKS:
	Y SHIFT	
	S^3	Pierson
	S^2	Massa
	STA	Slaby
	NCO's	Console: Guiette / Peterson Desk: Brooks
	EO's	Pri: Fiordimondo Sec: Thomson
	UO's	Pri: Simpkins Sec: Shindel
	Fire Brigade	Simpkins, Halter, Shindel, Schaffer, Greaver / Adams.
0800	CN	Started 11 cond Pump for maint. would not shutoff remotely, locally Trip Bkr.
0845	BF	#12 Feed pump on Turning Gear. Turning Gear Tied in.
0950	CN	#11B Circ in/s.
1000	Press Relief	Commenced Press relief of out.
0920	Chem	RCS Boron 1462 ppm; Pzr 1385 ppm; RWST 2067.
1127	Chem	#11 BAST Boron conc: 21,156; #12 BAST Boron conc: 21190
1150	RWST	RWST recirc. through SFP Demin.
1200	Chem	Batch Tank Boron conc: 7000 ppm.
1252	Rx Trip Bkr	Rx Trip Bkr's X.
1357	Rx Trip Bkr.	Rx Trip Bkr's O.
1438	Chem	Bit Boron conc. 21202 ppm, Batch Tank Boron conc 22,839 ppm.
1425	Rx Trip Bkr's.	Rx Trip Bkr's X.
1424	Rx S/U	Commence unit I Rx S/U Tave 545.1 °F.
1450	Chem	Batch Tank 22,952 ppm

a) Use apparatus to provide a description of the event being logged.

b) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

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SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: Feb 22, 1983

IMF	APPARATUS	REMARKS:
1515	V SHIFT	
	S3	V. LOWESTEN
	S2	B. GALLAHOD
	NCO	K. PETERSON, F. WILTSEE
	EO	M. ROMAN, P. PRICE
	IIO	J. WILLOUGHBY, B. STEWART
	FIRE BRIGADE	MILLER, WILLIAMS, WILKINSON, STANLEY, RODAN
1516	Rx	REACTOR CRITICAL
1540	T.S.	3.1.3.2 A 2SA1 Shutdown Rod Position 18 Steps Low
1622	CB	RCS 1380 PZR 1350
1707	T.S	Come out of 3.1.3.2A.
1736	AF	11+12 A.F.P.'s O/S
1805	MT	LATCHED MAIN TURBINE
1812	S/G	13 S/G Hi-Hi level Turb Trip 12 Feed pp trip F.W. ISOLATION
1813	AF	11+12 AF Pump O/S
1822	CFCU	15 F.C. Unit O/S
1824	AF	11+12 AF pumps O/S
1825	CFCU	15 FCU O/S
1833	AF	11+12 AF Pump O/S
1847	AF	11+12 AF PUMPS O/S
1922	MT	TURBINE LATCHED
2036	GEN	SYNCHRONIZED UNIT 1 1-5 Breaker closed
2039	500 KV	Closed 5-6 - Breaker
2125	CN	12 Cond. Pump O/S
		and B. Gallahan / Relief a Comm

, Use apparatus to provide a description of the event being logged.

,8) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

Page 4 of 4 Rev. 6

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SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 2-22-83

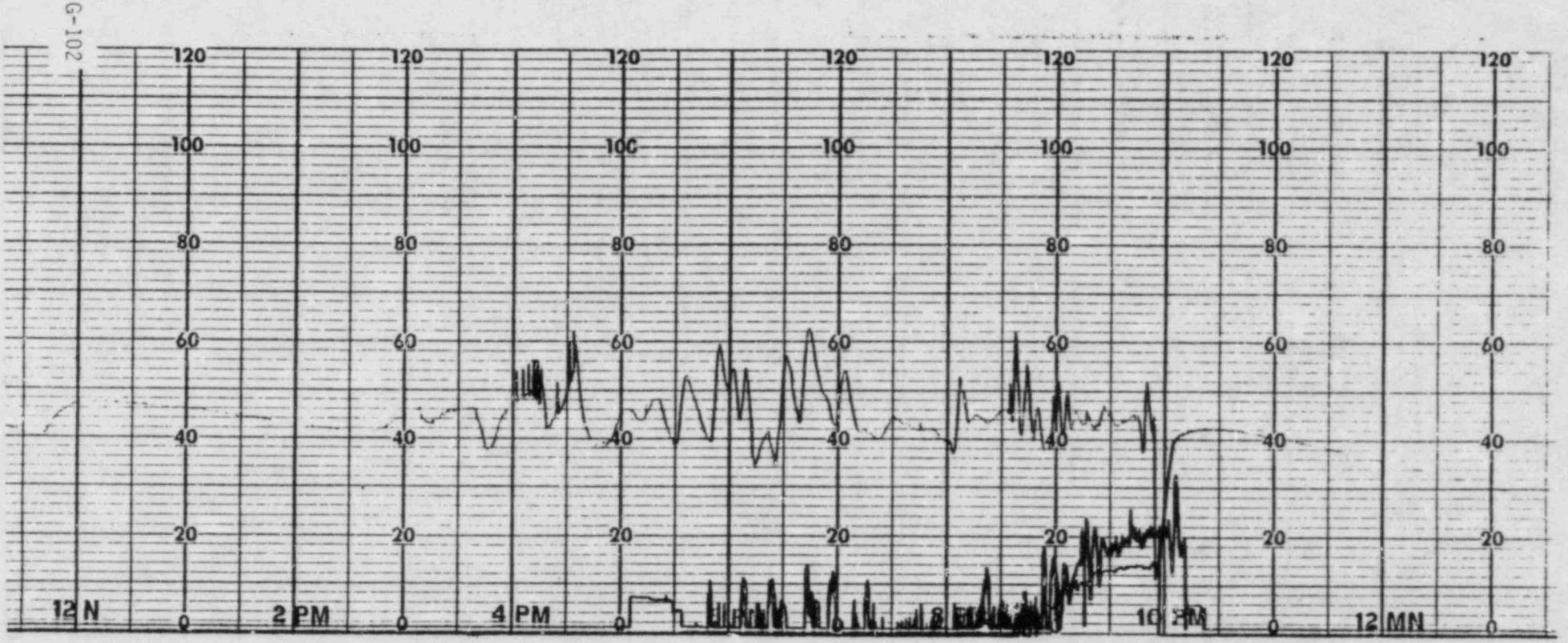
TIME	APPARATUS	REMARKS:
2145	CFCU	#14 CFCU o/s
		P.D. working on Flow Transmitters
2155	Rx	MANUAL Rx TRIP
		1F 4kv Group Did NOT Swap from 12SPT #13 RCP Loss of Voltage.
2204	S.I.	SAFTY INJECTION
		11 & 13 S/G Lo STEAM LINE Diff Press Due to #11 RCP & 13 RCP Trips & #13 AUX FEED Pump start
2211	S.I.	TERMINATED S.I.
		RCS Press 2300#
		PZR Lvl 36%
		RCS Tavg 510°F
		S/G levels
		#11 - 46% NR 12 - 51% NR
		#13 - 50% NR 14 - 52% NR
2211	(A.S)	ENTERED T.S.A.S 3.5.4.1a
		#1 Bit Low Boron Conc.
2320	(A.S.)	ENTERED T.S.A.S. 3.1.2.8a
		#11 B.A.S.T Low Level 68%
		#12 B.A.S.T ISOLATED for Batch TK Transfers
		Robert A Carman

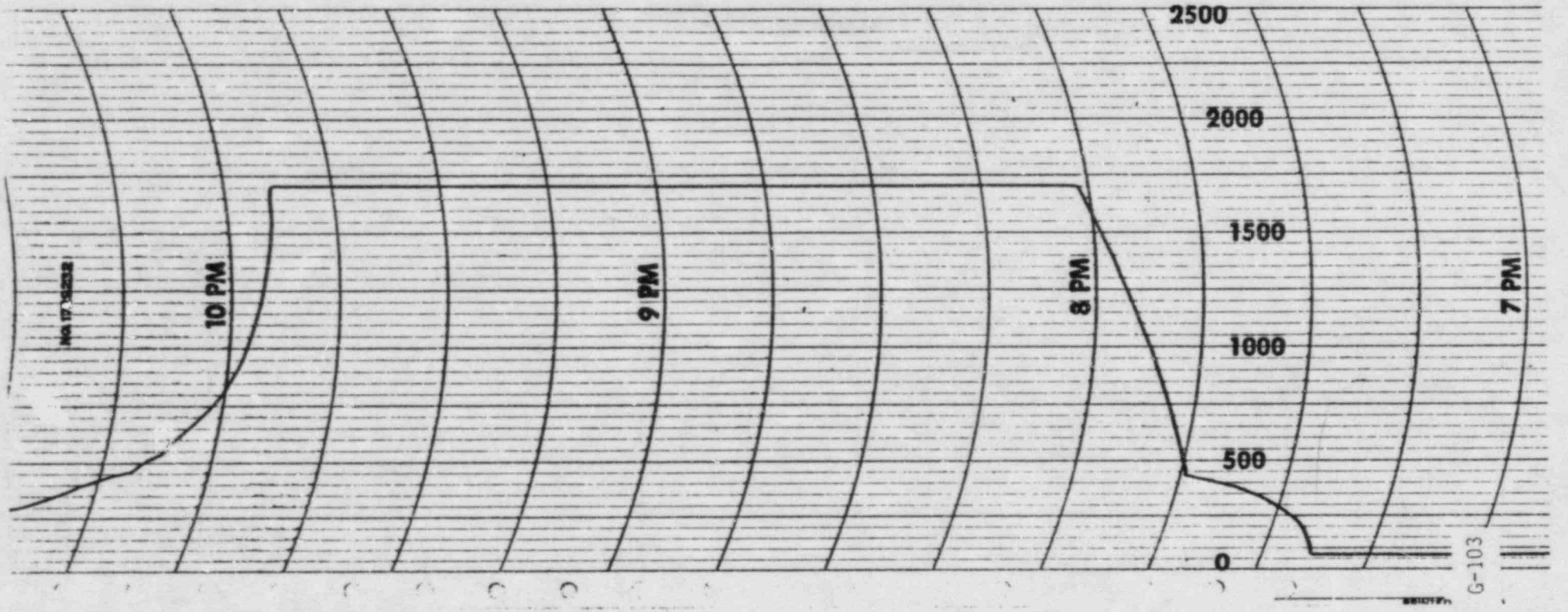
a) Use apparatus to provide a description of the event being logged.

b) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

Page 4 of 4 Rev. 6

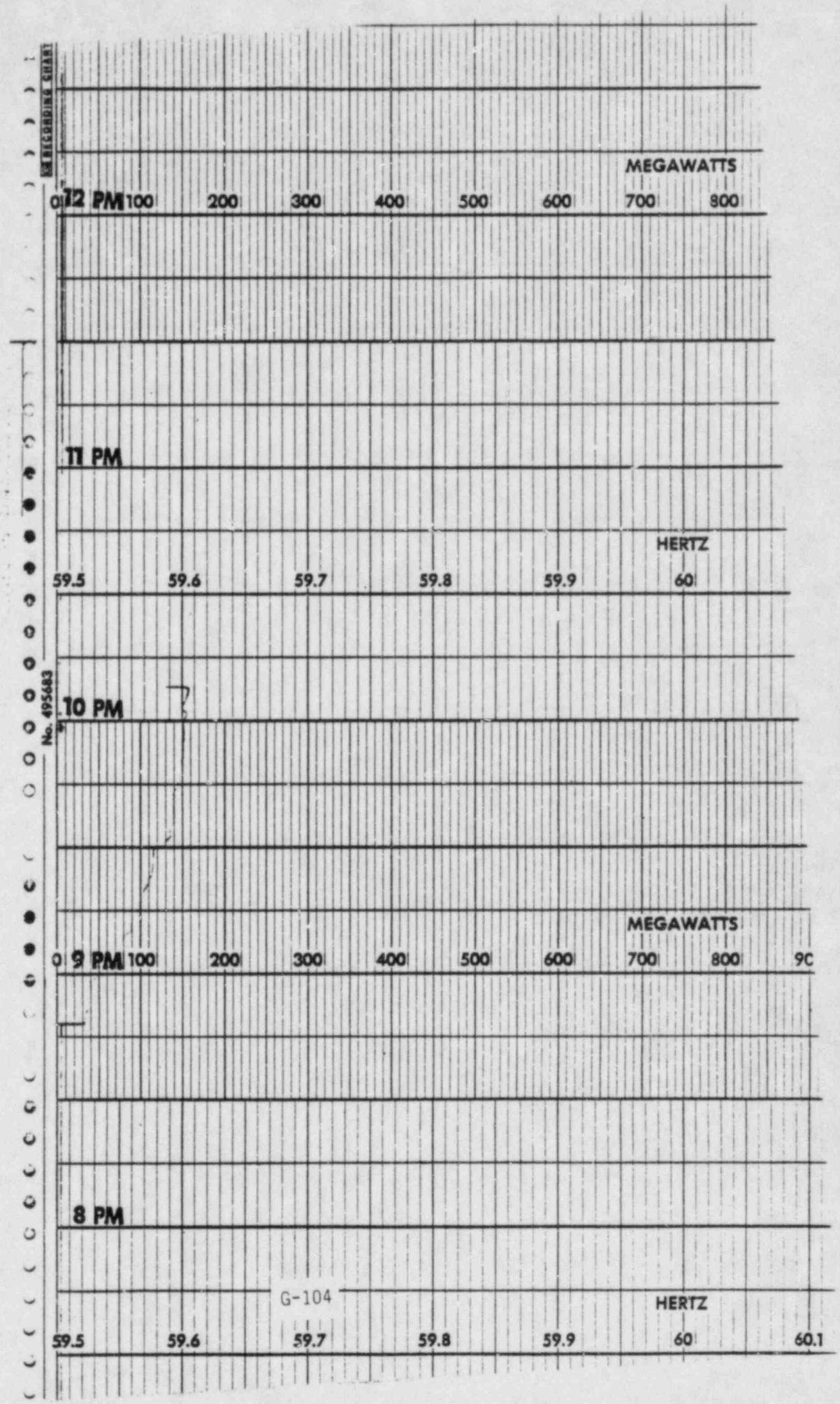
UNIT 1 CONSOLE
LA-5051
14 STM. GEN. NAR. RANGE LEVEL
FEED FLOW
STM FLOW



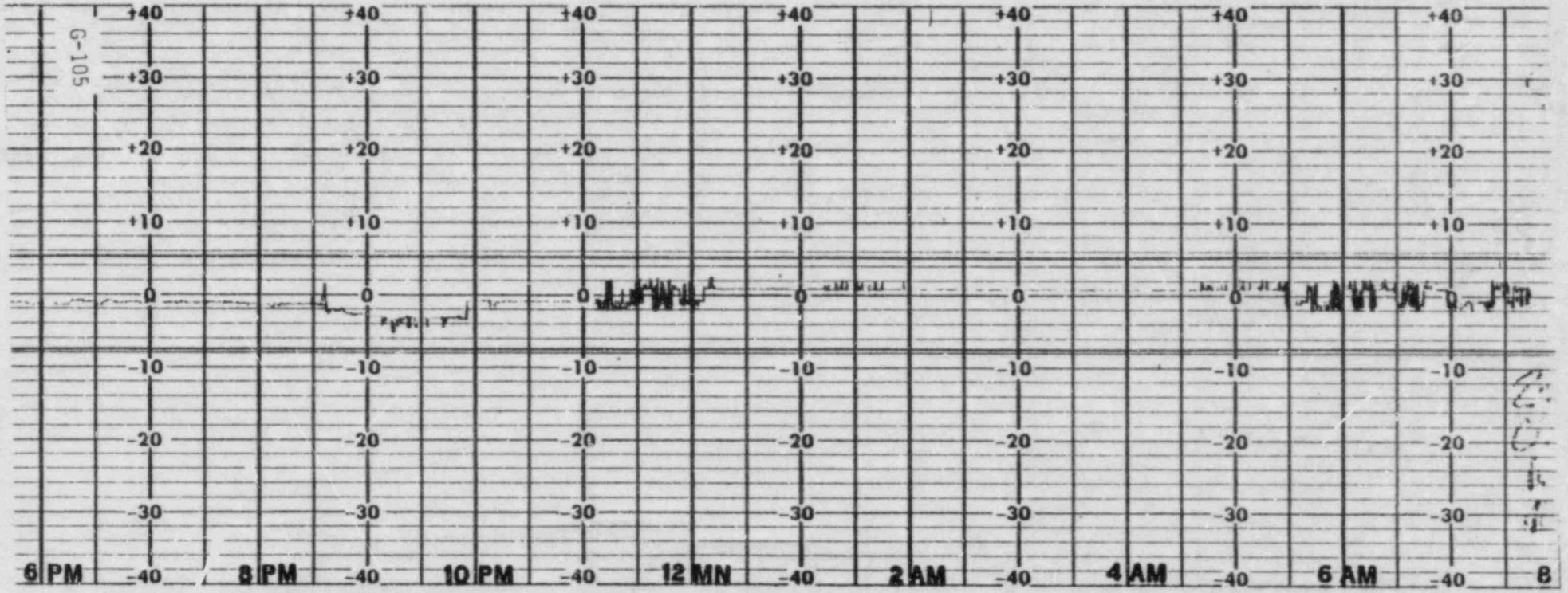


UNIT 1

TURBINE SPEED

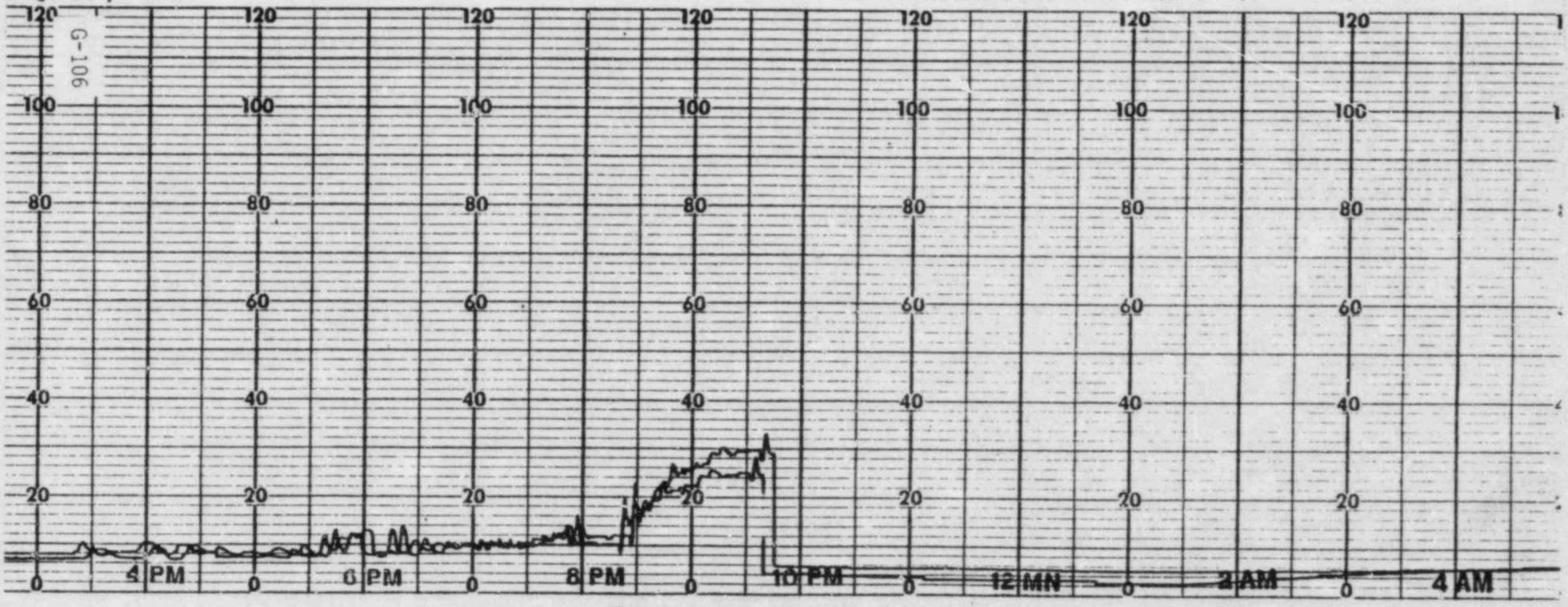

RECORDING CHART
No. 495683
MEGAWATTS
0
12 PM
100
200
300
400
500
600
700
800
11 PM
HERTZ
59.5
59.6
59.7
59.8
59.9
60
10 PM
MEGAWATTS
0
9 PM
100
200
300
400
500
600
700
800
8 PM
HERTZ
59.5
59.6
59.7
59.8
59.9
60
60.1

UNIT 1 CONSOLE
KA-8740
TALLET BAND UPPER & LOWER LIMITS
ACTUAL DI %



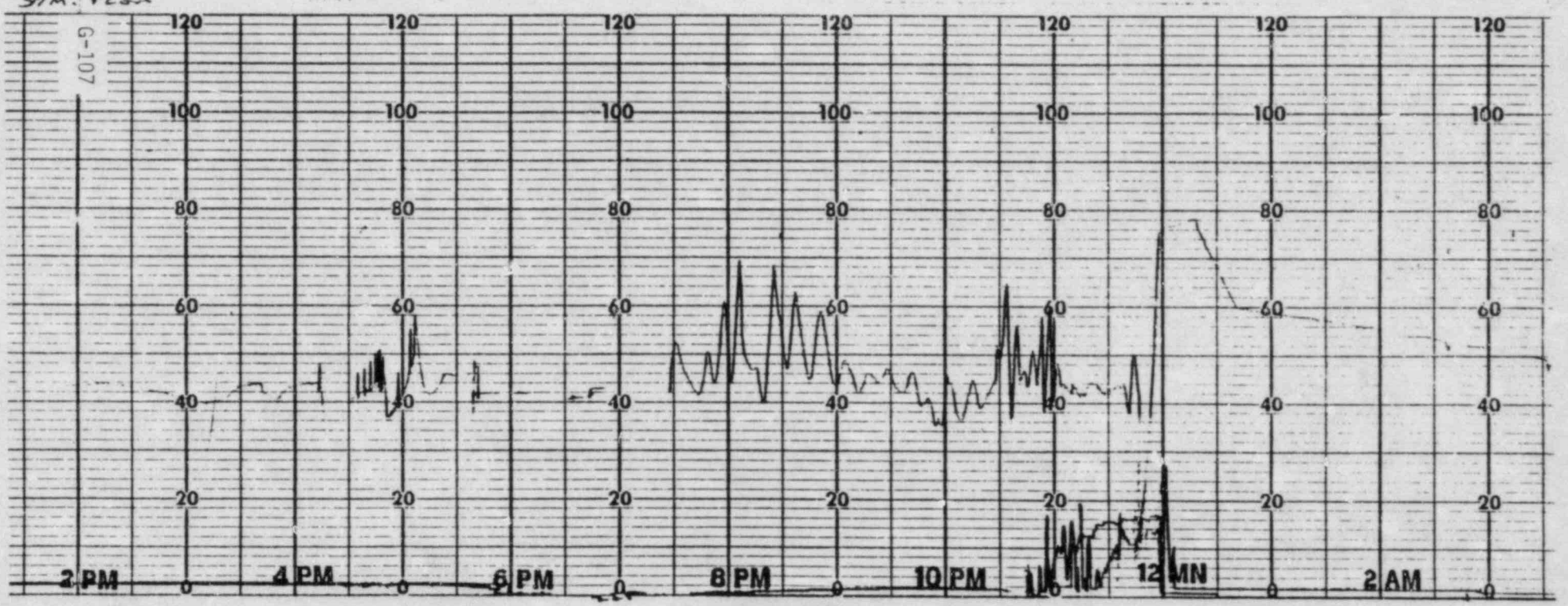
GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK

UNIT 1 CONSOLE
KA-5723
NK-43 NEUTRON FLUX
CHOP CH 1 LOG A

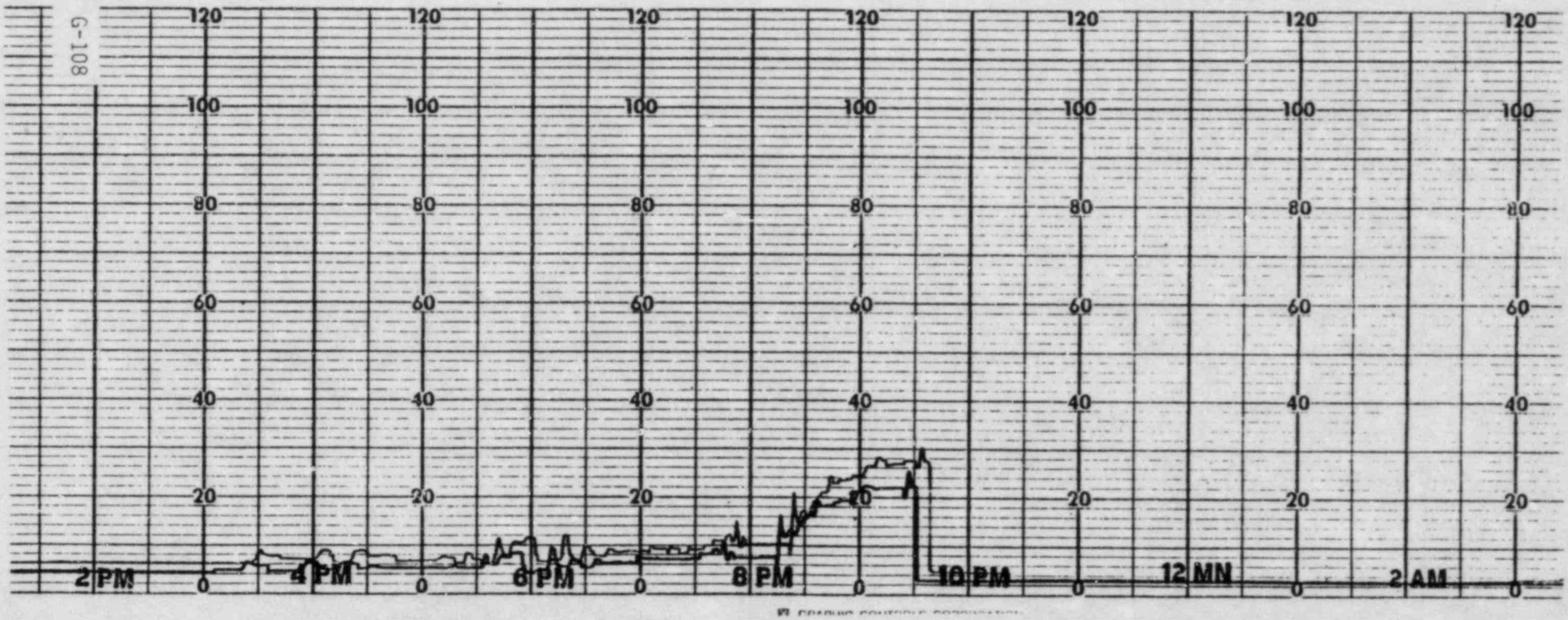


GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK

UNIT 1 CONSOLE
LA-5050
13 STM GEN NAR. RANGE LEVEL
FEED FLOW
STM. FLOW



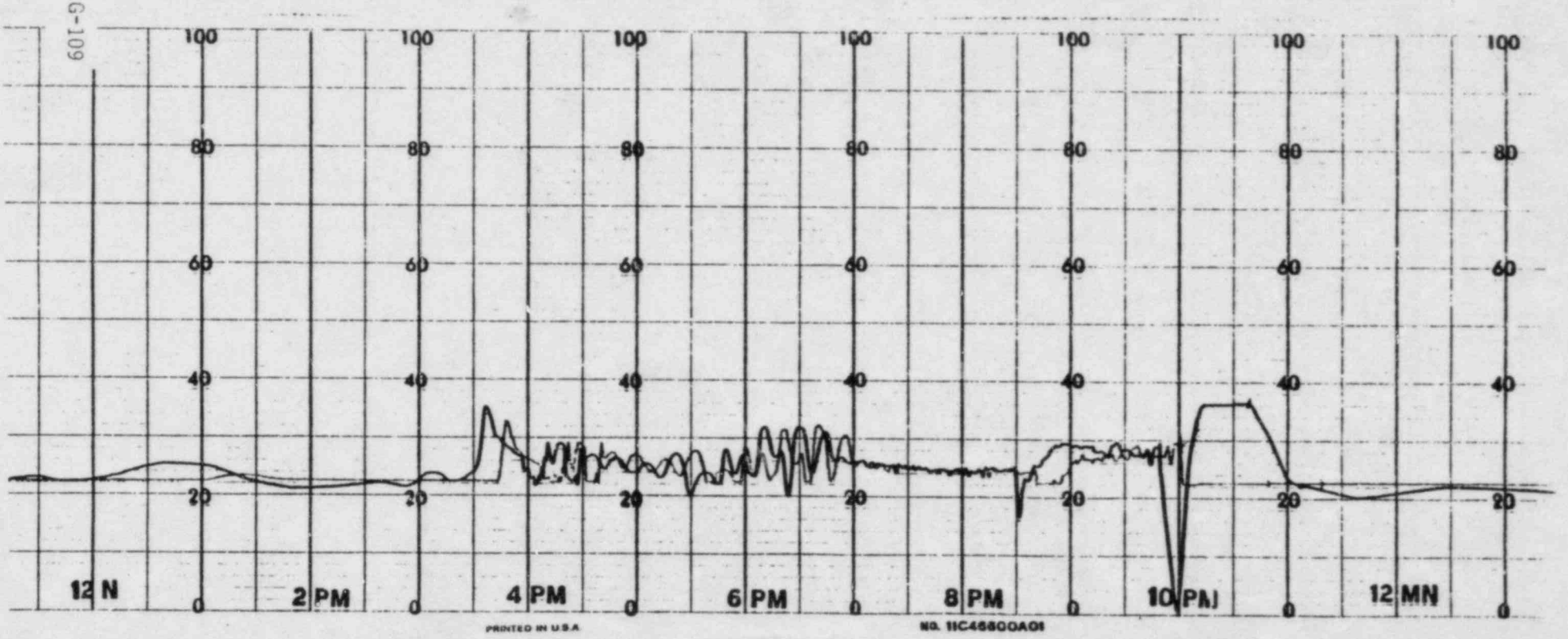
Unit 1 Console
XA-5721
NR-41 Neutron Flux
(Upton & London)



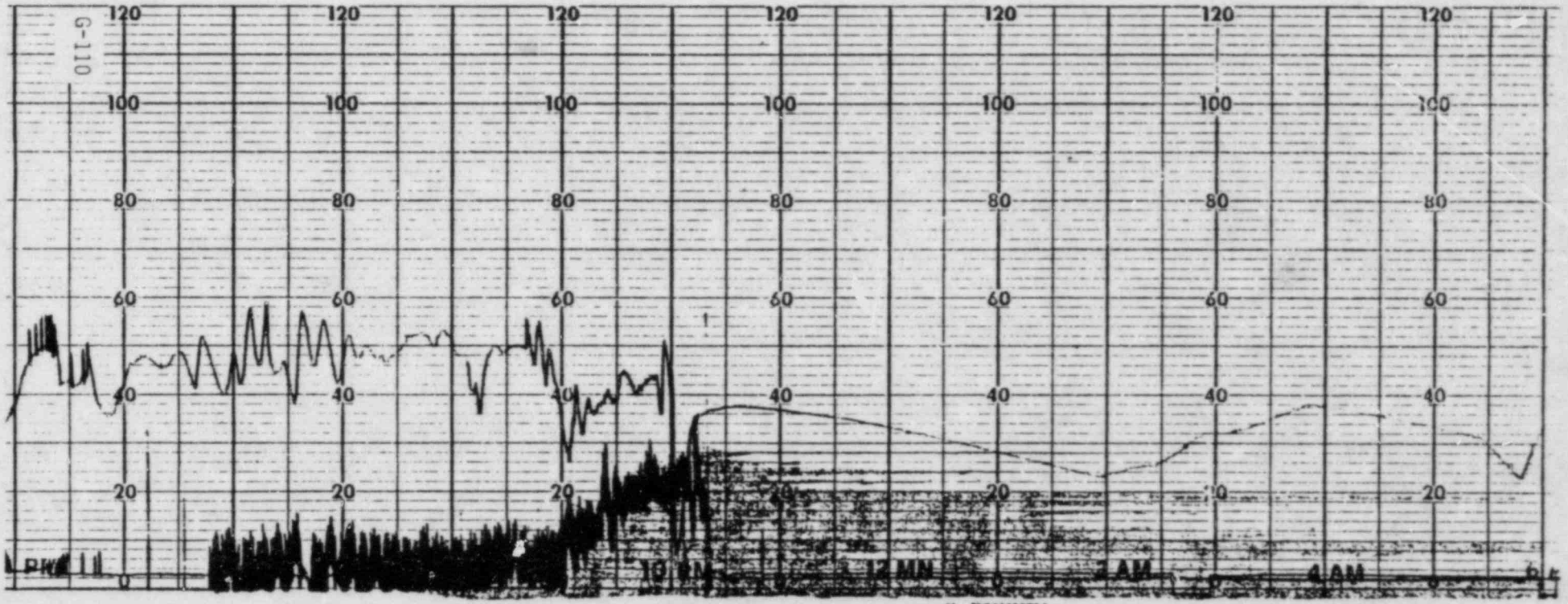
UNIT 1 Loop 3
LA-5304

PRESSURIZER LEVEL %

PRESSURIZER LEVEL SETPOINT



UNIT 1 CONSOLE
LA-5049
1# STM GEN NAR. RANGE LEVEL
FEED FLOW
STM FLOW



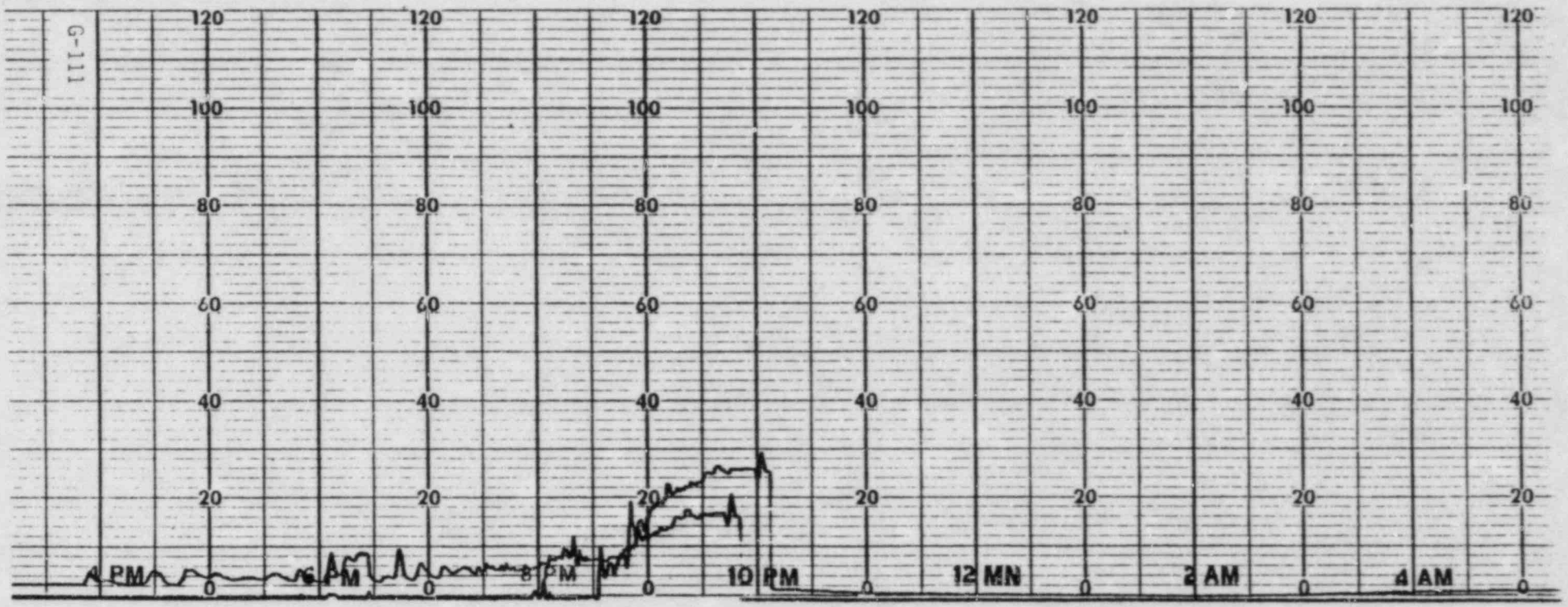
PRINTED IN U.S.A.
No. 11C46600E34

UNIT 1 CONSOLE

~~XA~~-5712

AR-4L NEUTRON FLUX

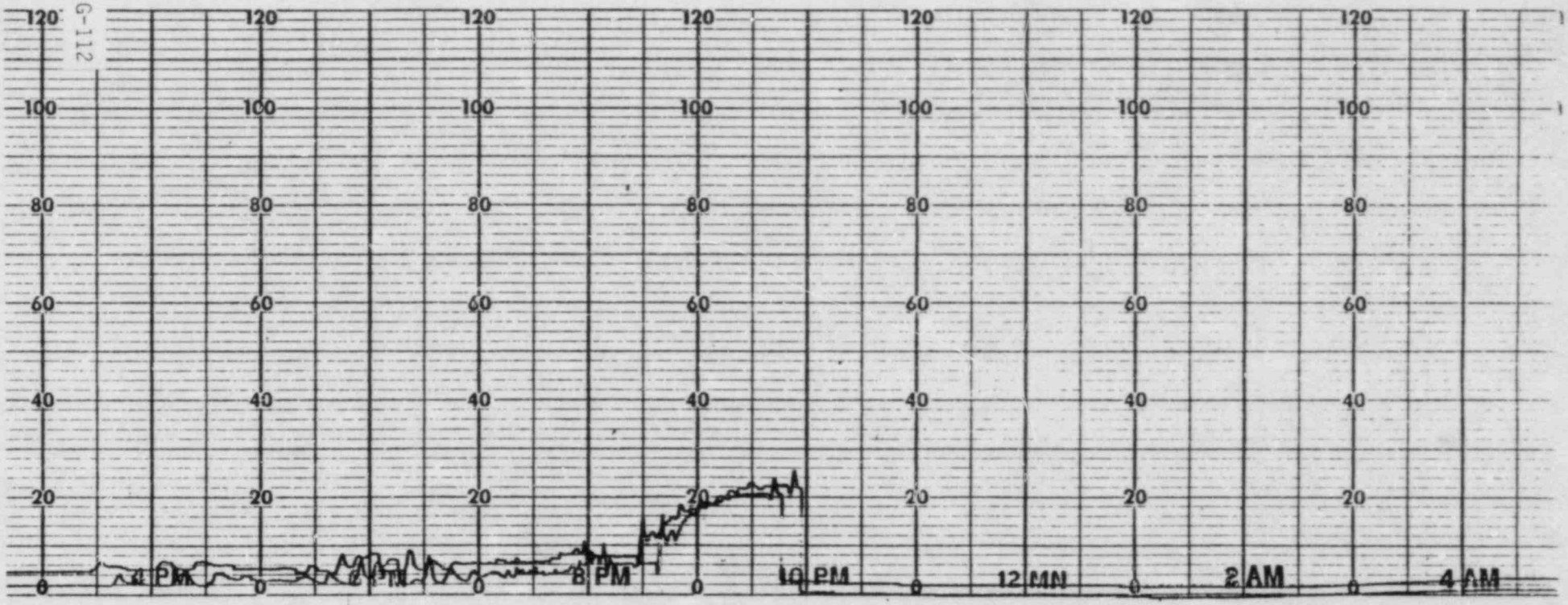
(UPPER & LOWER)



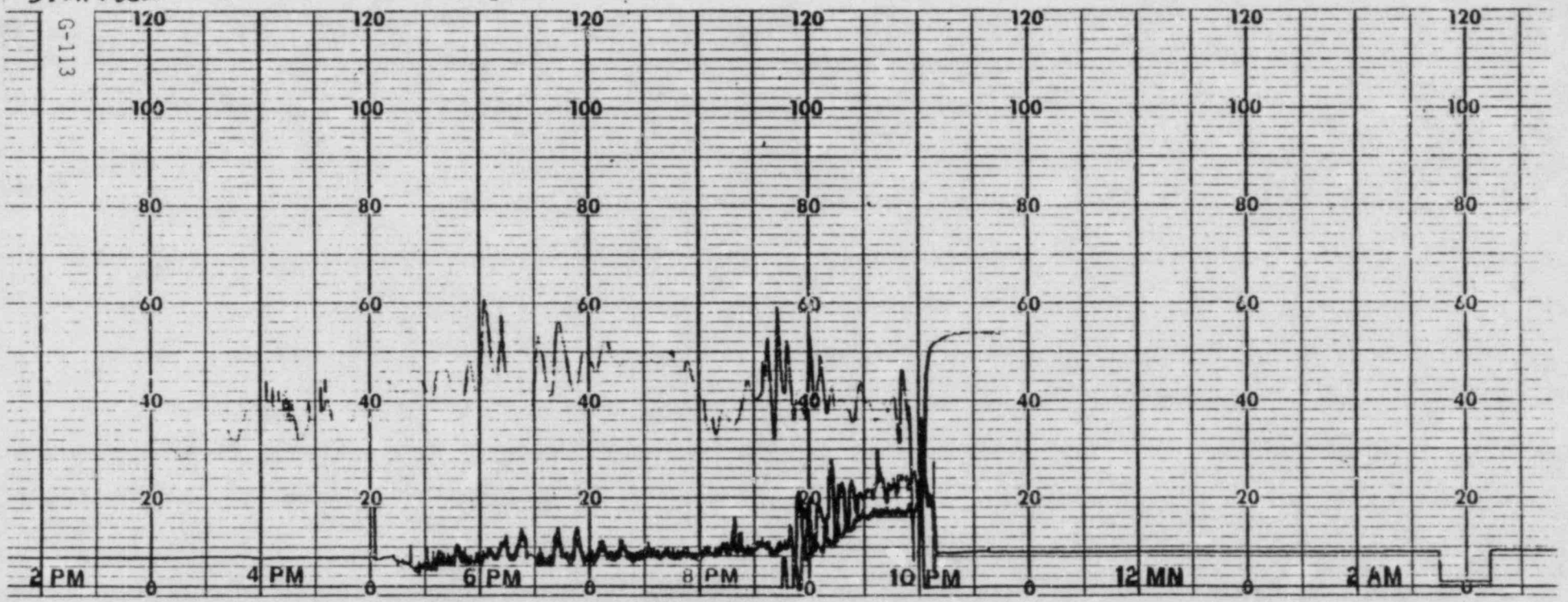
PRINTED IN U.S.A.

No. 11C46600E34

UNIT 1 CONSOLE
XA-5724
NR-4/4 NEUTRON FLUX
(UPPER & LOWER)

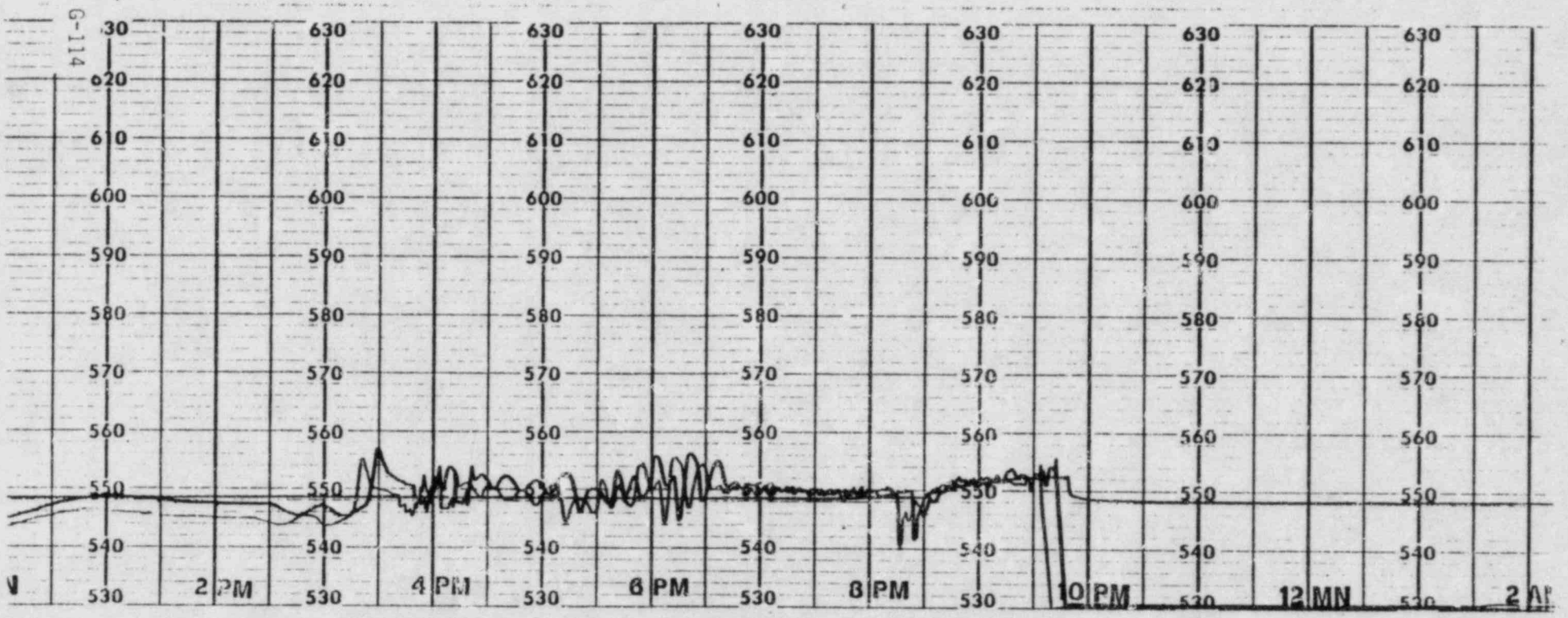


UNIT 1 CONSOLE
LA-5 of 8
11 STM. GEN. NAR. RANGE LEVEL
FEED FLOW
STM. FLOW



DFIK

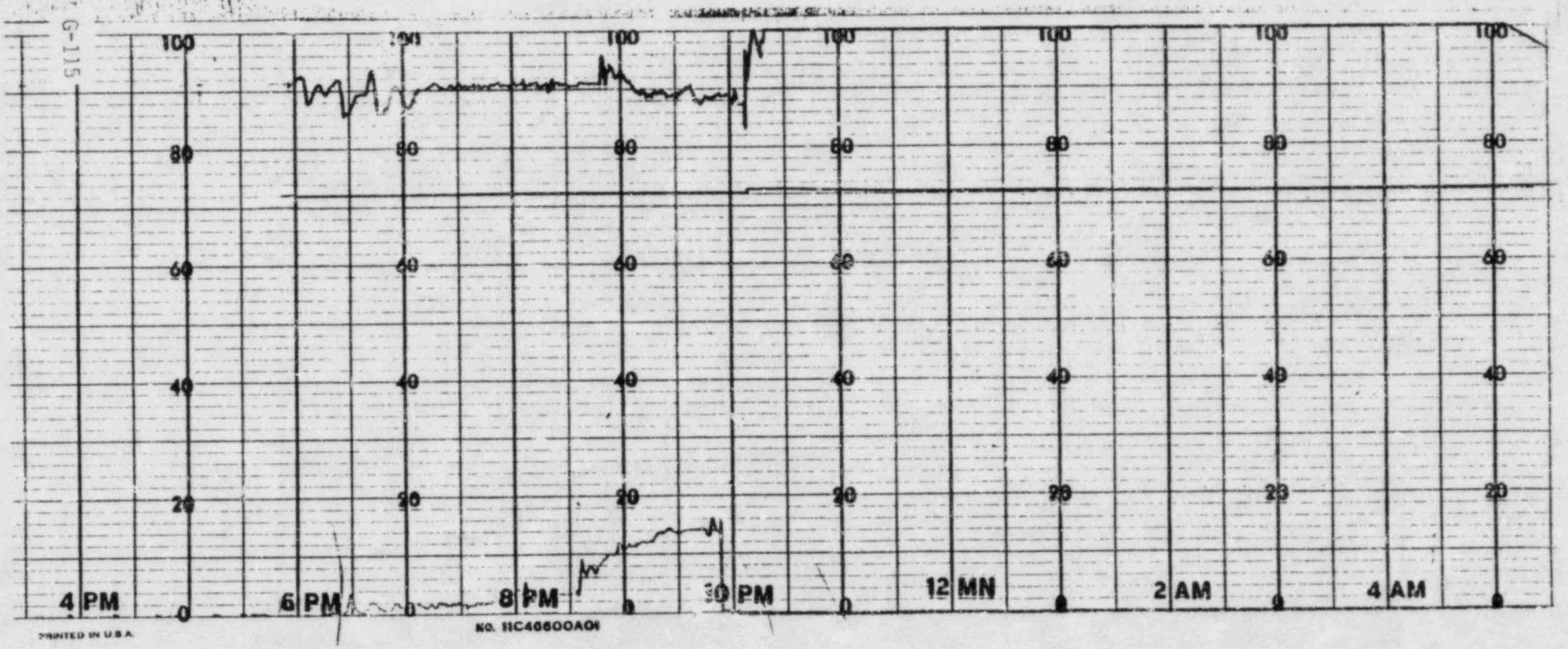
UNIT 1 CONSOLE
TA-5304
REACT. TAVE, °F (RED)
°F TAVG, °F (GREEN)
LOOP TAVE, °F (BLUE



PRINTED IN U.S.A.

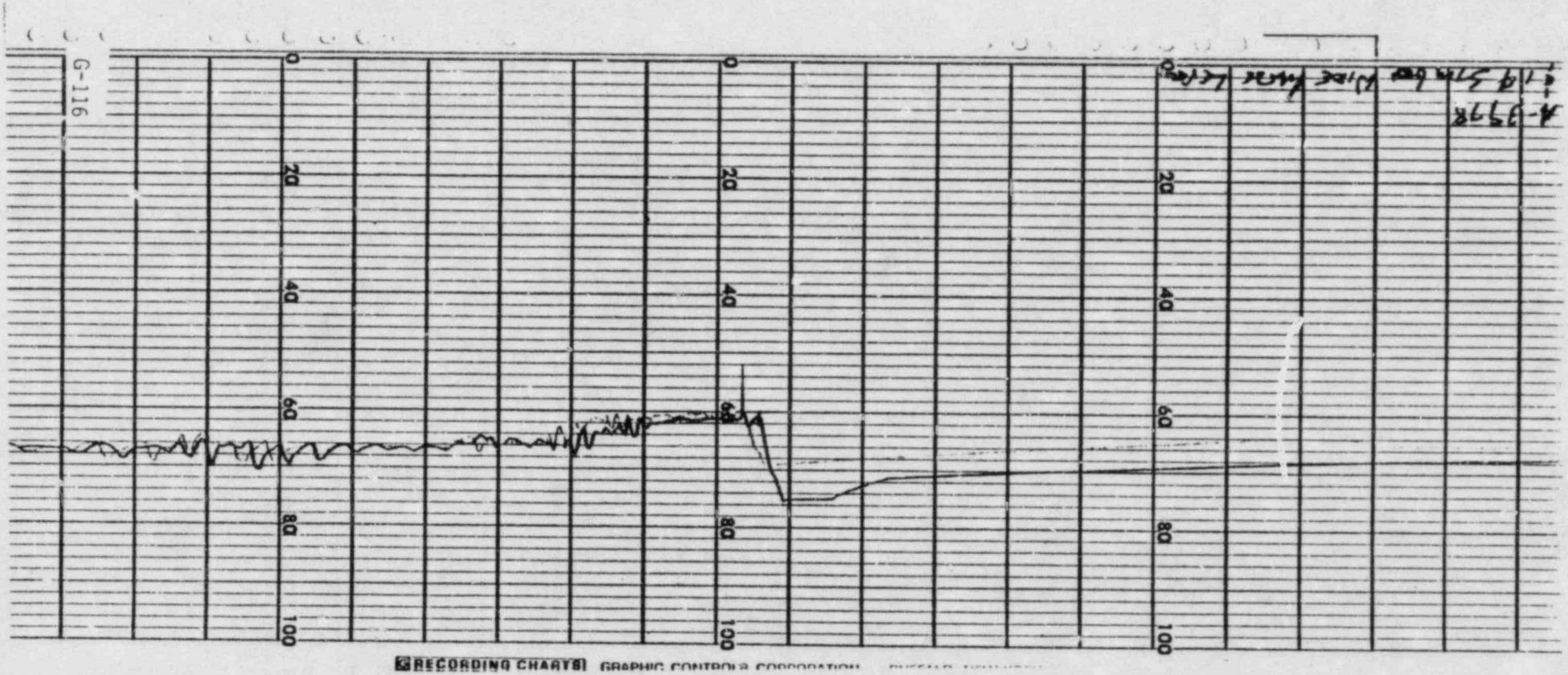
UNIT 1 KENSOLE
T-1-5307

OTAT, OTAT



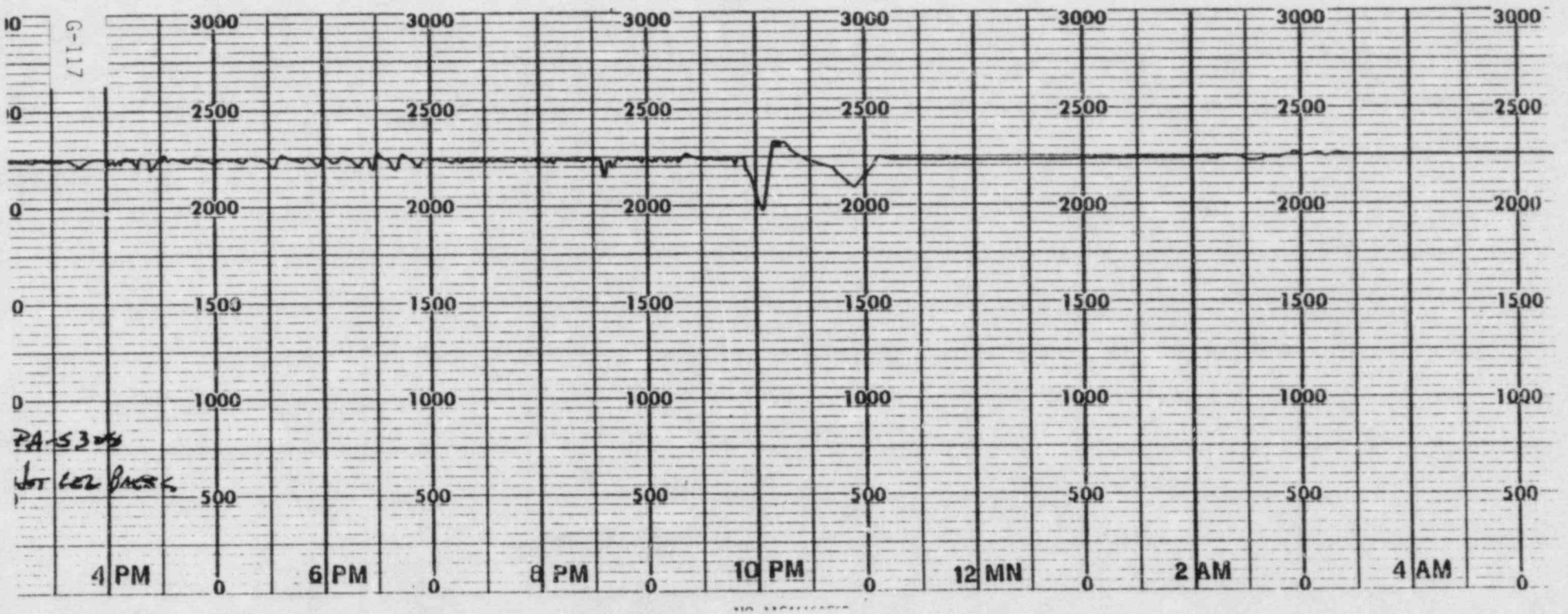
LA-3978

13 & 14 STH GEN WIDE RANGE LEVEL



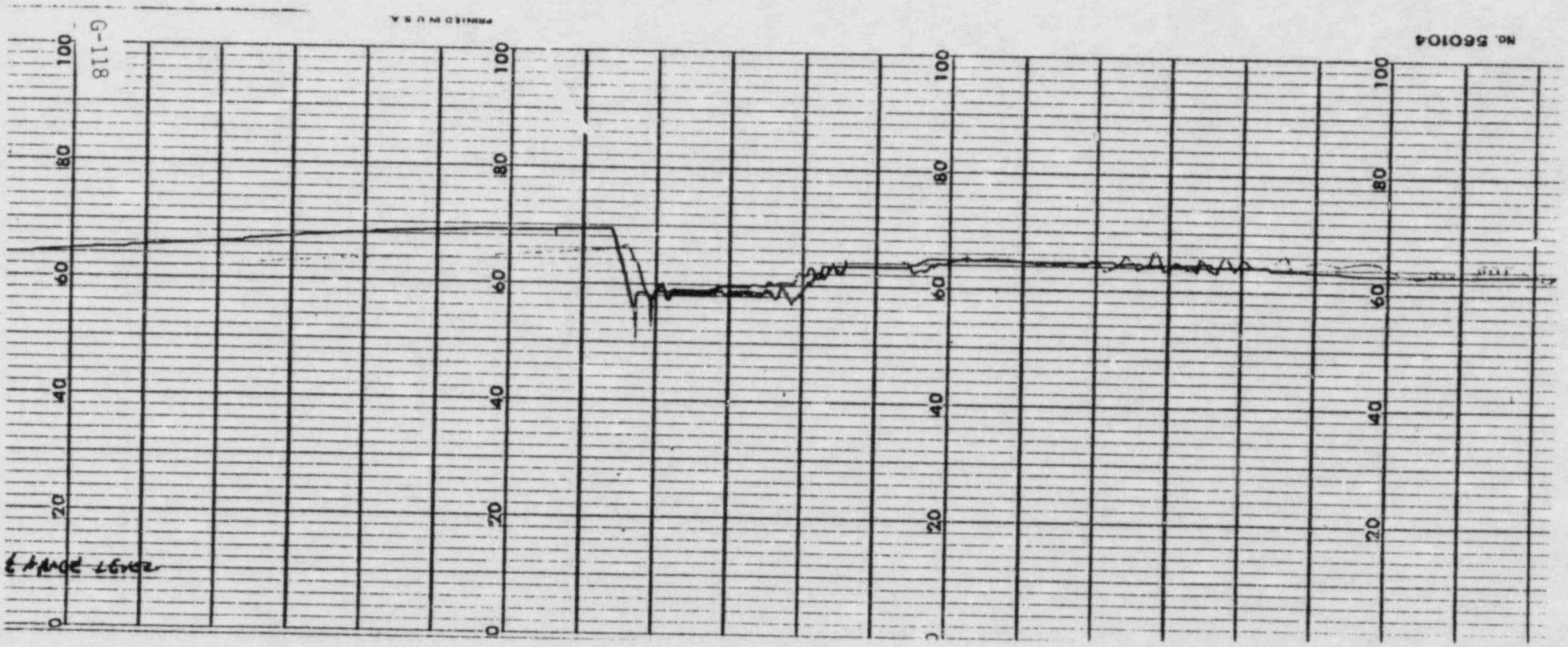
UNIT 1 CONSOLE
PA-5308

HOT LEG PRESSURE



LA3977

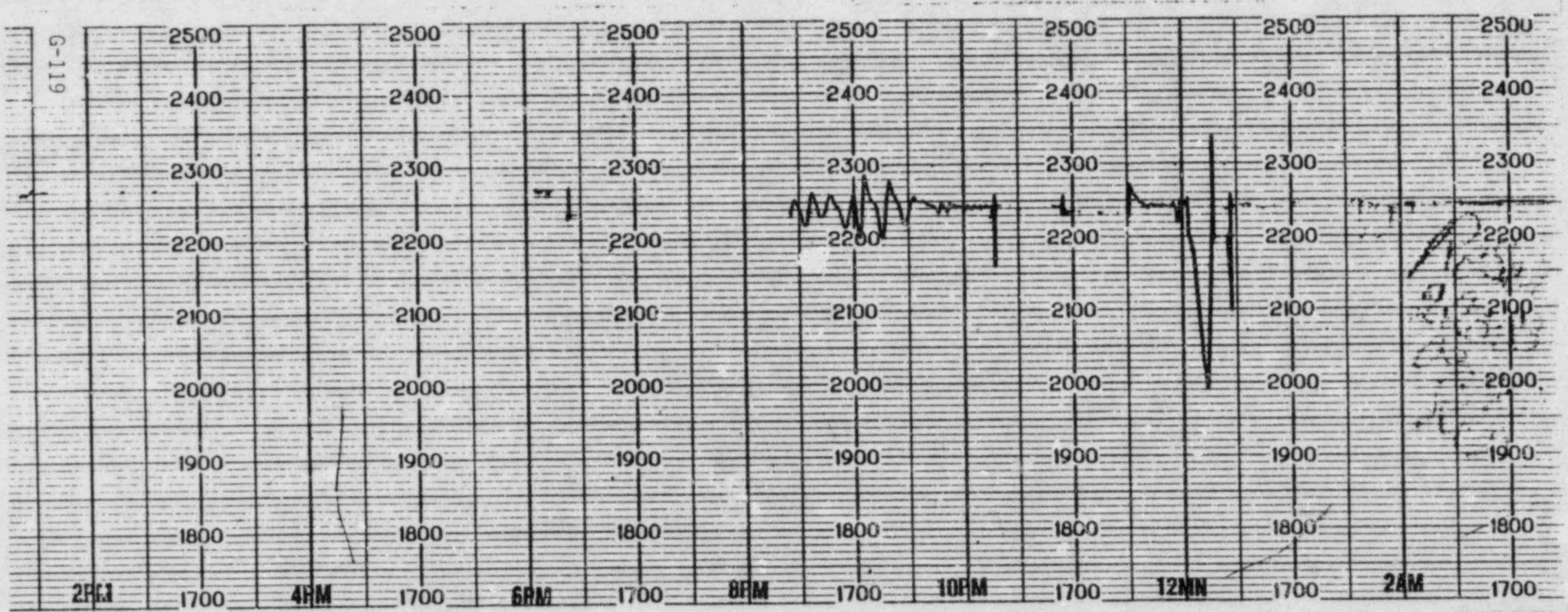
11 & 1L STM GEN WIDE RANGE LEVEL

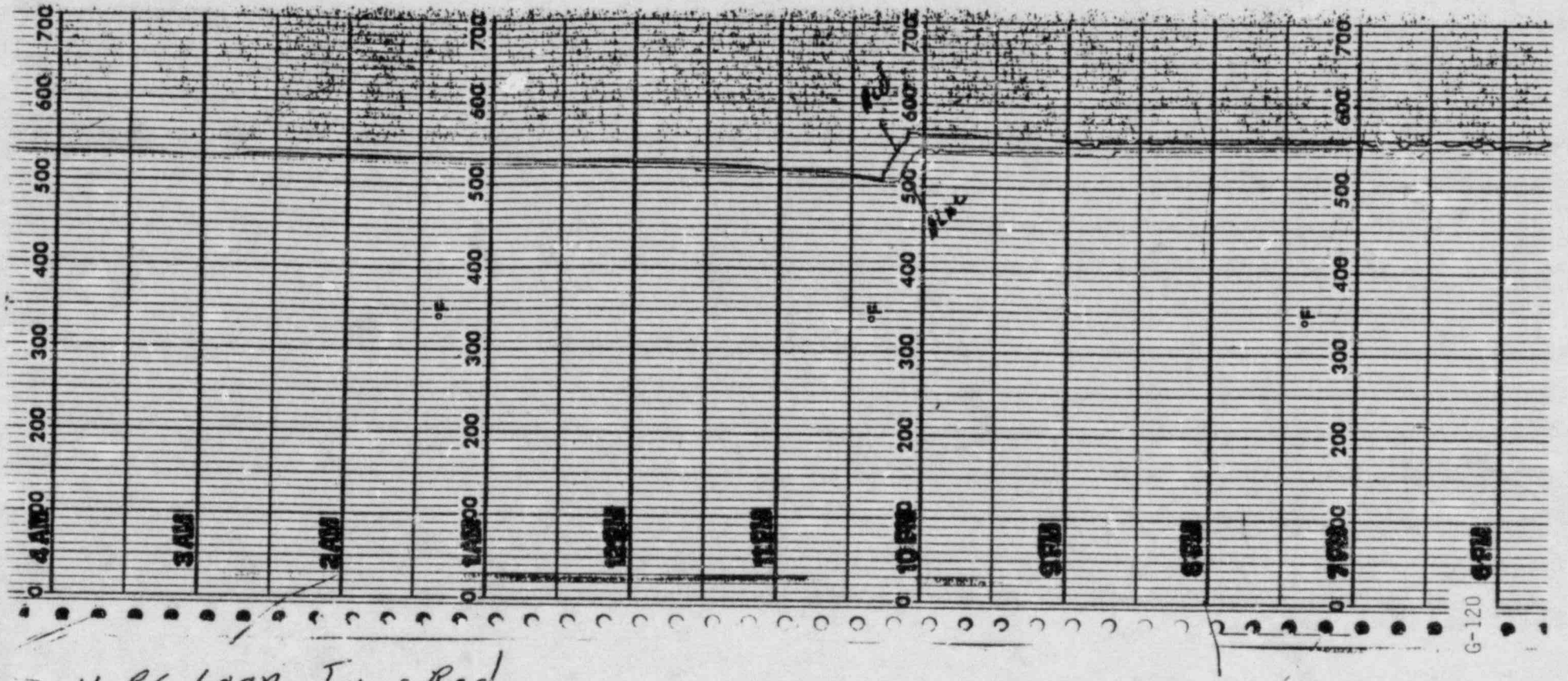


UNIT 1 Console

PA-5305

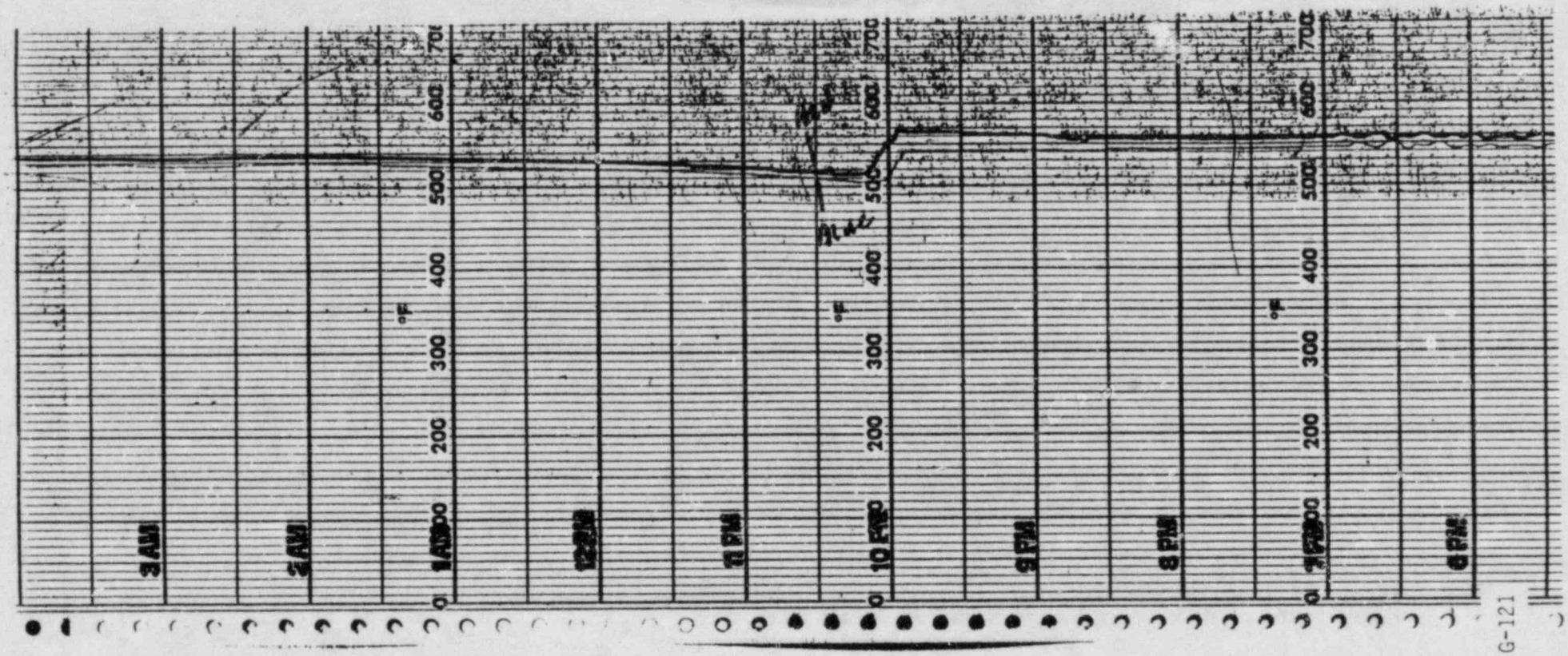
PRESSURIZER PRESSURE





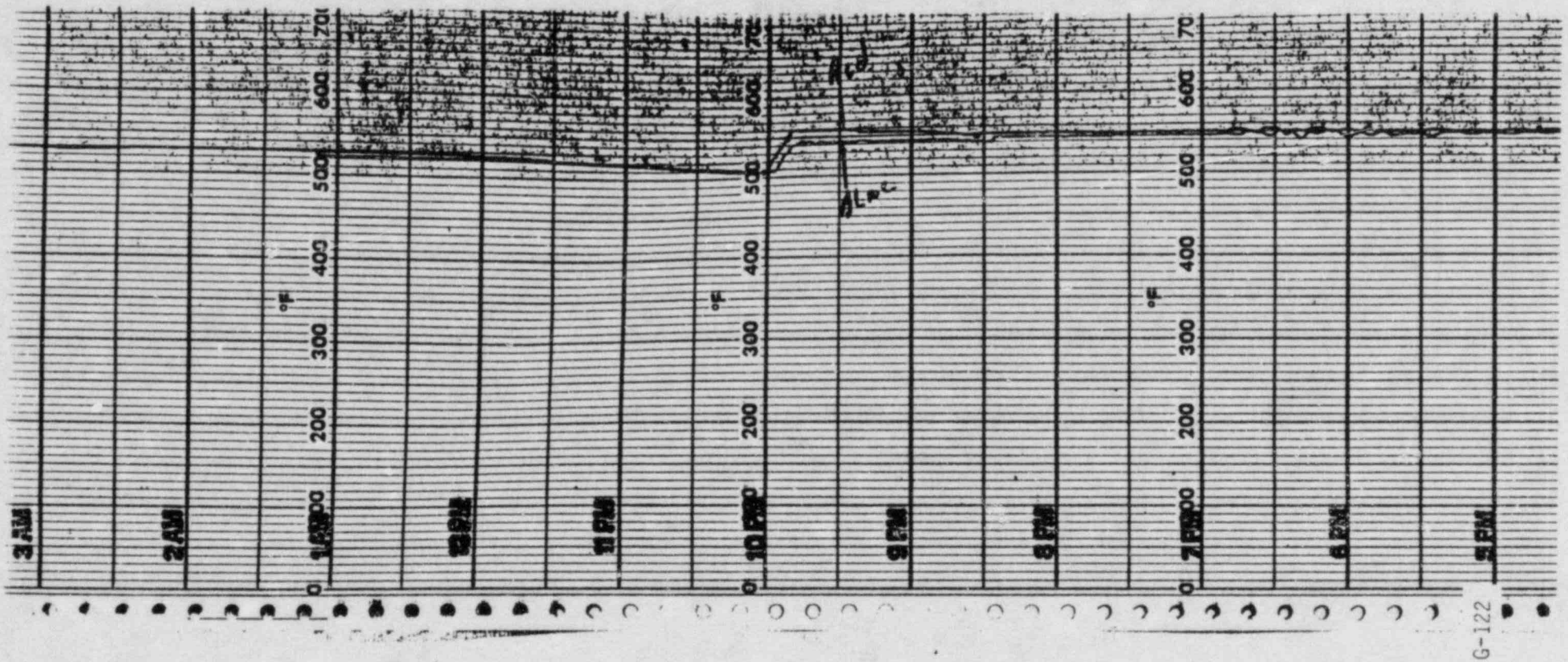
11 RC Loop T_H - Red

11 RC Loop T_C - Blue



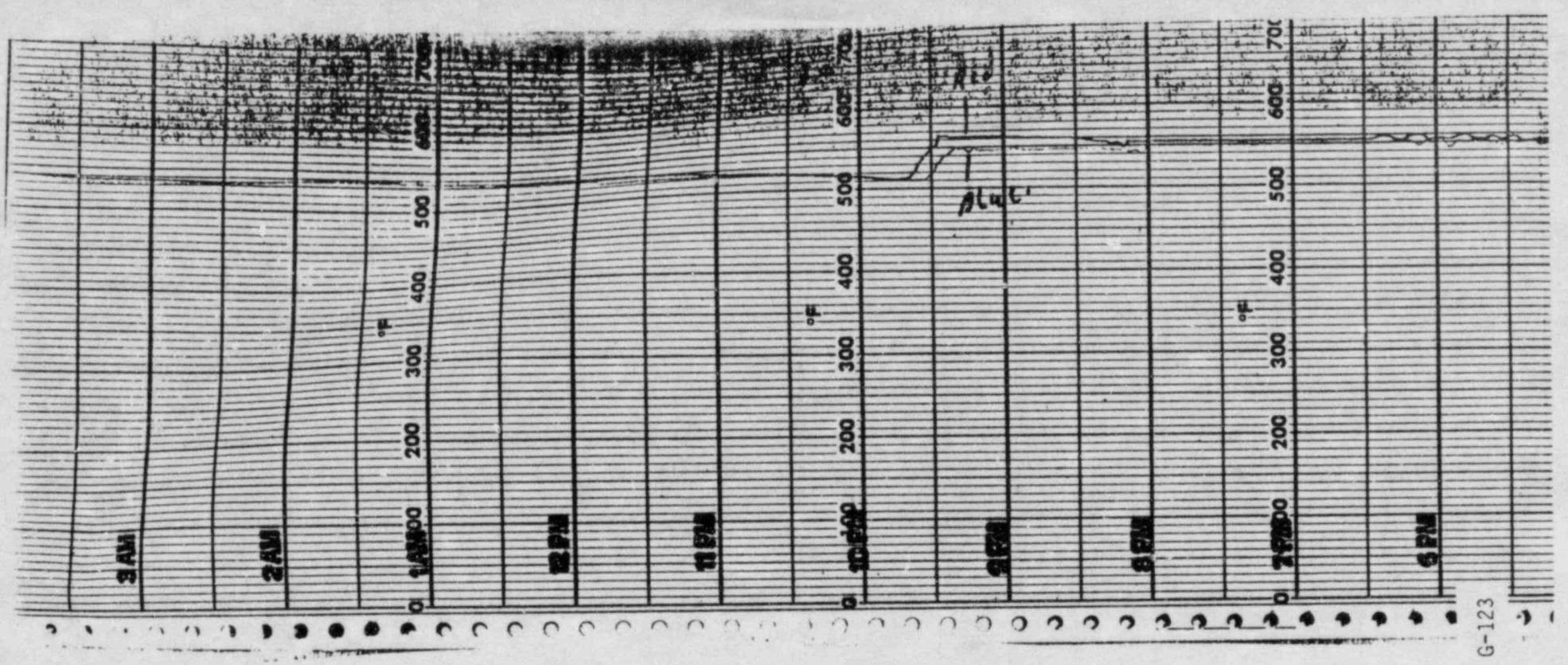
12 RC Loop T_H - Red

12 RC Loop T_C - Blue



13RC Loop T_H - Red

13RC Loop T_C - Blue



14 RC Loop T_H - Red

14 RC Loop T_C - Blue

No. 2
Operations Manager
Unit #1 Control Room
Salem Generating Station
M-116

EMERGENCY PROCEDURE
EP I-1
NOTIFICATION OF UNUSUAL EVENT/SIGNIFICANT EVENT

ACTION STATEMENTS - SECTION I - EMERGENCY COORDINATOR

Initials

The Senior Shift Supervisor shall:

VMJ 1. Determine classification of the event to be an Unusual Event as defined by EP I-0; or a Significant Event as defined by Attachment 4 of this procedure.

EP I-0 Part 2, No. 1
and/or Significant Event No. _____

VMJ 2. Assume the responsibilities of the Emergency Coordinator. (see page 4 for responsibilities)

VMJ 3. Fill in data on the Initial Contact Message Form (Figure 8) - Attachment 2 to this procedure.

N/A 4. Direct that the Station Status Check List (Figure 9) - Attachment 3 to this procedure be completed (to the extent possible at this time) and given to the Designated Communicator.

VMJ 5. Direct the Designated Communicator to make notifications of Attachment 1 to this procedure within the time limits listed and maintain communications with the NRC Operations Center when directed to do so by the NRC ~~duty officer~~.

6. Direct the communicator to respond to calls from State or local officials by providing the information on the Station Status Check List or Press Release received from the Public Affairs Manager - Nuclear and have the name and affiliation of the person calling recorded on the Station Status Checklist.

ACTION STATEMENTS

7. Direct the Communicator to refer requests for information from other agencies to the Public Affairs Manager - Nuclear.

8. Refer to EP I-7, "Station Fire," to conduct fire fighting actions. If outside assistance is required, have the Salem Fire Dispatcher called. Give the location, type of fire, and where vehicles will be met by Security personnel to communicator.

9. If this is a security event, coordinate with the Security Lieutenant to implement the Contingency Plan and Procedures.

10. Transfer the Emergency Coordinator responsibilities to the Emergency Duty Officer, when available.

11. Forward all completed forms to the Senior Operating Supervisor. Attach any other completed EP's or attachments used.

ACTION STATEMENTS - SECTION II - COMMUNICATOR

The Designated Communicator shall:

1. When directed by the Senior Shift Supervisor/EDO use the data provided on the Initial Contact Message Form to notify persons listed on the Communications Log within the time limits specified on Attachment 1.

2. Upon receipt of a phone call from the New Jersey Bureau of Radiation Protection (BRP) or Delaware Division of Emergency Planning and Operations (DEPO) do the following:

   a) Provide the Station Status Checklist (Figure 9) - Attachment 2 to this procedure - at current level of completion.

3. When directed by the Senior Shift Supervisor/EDO contact the Salem Fire Dispatcher and provide the following message:

   a) This is the Communicator at Salem Generating Station. This is a notification of a fire.
   b) We request fire company support.
   c) The type of fire is _____.
   d) The location of the fire is _____.
   e) The fire truck(s) will be met at _____ and directed to the location of the fire by our security force.

Notify security (ext. 4625) of location where fire truck(s) should be met and type of fire.

ACTION LEVEL

Whenever an action level listed in EP I-0 as an Unusual Event has been reached, notification of an Unusual Event will be made to offsite authorities and designated personnel within the time limits listed in Attachment 1.

Whenever an action level described as a Significant Event (Attachment 4) is reached, notification of a Significant Event will be made to offsite authorities and designated personnel within the time limits listed in Attachment 1.

NOTE

Notification shall be reperformed for additional events, as defined in EP I-0 or Attachment 4 to this procedure.

An Event which satisfies both the definition of an Unusual Event and a Significant Event shall be classified as an Unusual Event.

LIMITS ON AUTHORITY

The person acting as the Emergency Coordinator (Senior Shift Supervisor, Emergency Duty Officer, or Emergency Response Manager) has the authority and responsibility to immediately and unilaterally initiate any emergency action including the decision to notify and provide protective action recommendations to authorities responsible for implementing off site emergency measures.

ATTACHMENTS

Attachment 1 - Communications Log (Figure 7)
Attachment 2 - Initial Contact Message Form (Figure 8)
Attachment 3 - Station Status Checklist (Figure 9)
Attachment 4 - Significant Event Classification

Prepared By: C. Burge

Reviewed By: _____ 12/6/82
Department Head — Date

Reviewed By: _____ 12/16/82
Nuclear Emergency Planning Engineer — Date

Reviewed By: for _____ 1/6/83
Station Quality Assurance Review — Date
(if required see EP VI-2)

SORC Meeting Number: 83-03 1/13/83
Date

Approved By: _____ 1/17/83
General Manager - Salem Operations — Date

Approved By: _____ 1/17/83
Manager - Nuclear Site Protection — Date

TIME LIMIT IN (MINUTES)	REQUIRED FOR EVENT CLASS				PERSON TO BE CONTACTED	PERSON CONTACTED	DATE/ TIME	CONTACTED BY
	UE/SE	A	SAE	GE				
15	YES	YES	YES	YES	Primary: EDO (Contact One) L. Fry Office: 4523; Car: 342-5103; Beeper: 342-0880; Home: 678-7634 J. Gueller Office: 4522; Car: NA; Beeper: 342-0554; Home: 455-8052	L. FRY J. GUELLER	2210 2-22-83 2-22-83 2200	V. LOWENSTEN V. LOWENSTEN
15	YES	YES	YES	YES	Secondary: TSS (Contact One) L. Miller Office: 4455; Car: 342-5077; Beeper: 342-0551; Home: 769-1727 L. Catalfomo Office: 4506; Car: NA; Beeper: 342-0557; Home: 678-3176		2-22-83 2315	W. C. Brien
15	YES	YES	YES	YES	NEW JERSEY Primary: (Direct Line) Secondary: 882-2000	Trooper Horner	2304 2-22-83	R. Gallahe.
15	YES	YES	YES	YES	DELAWARE Primary: (NAWAS) Secondary: 302-736-5851	Trooper McClemson	2307 2/22/83	R. Gallaher
15	NO	NO	NO	YES	Salem County Primary: (Direct Line) Secondary: 935-4505			
15	NO	NO	NO	YES	Cumberland County Primary: (Direct Line) Secondary: 455-8500			
15	NO	NO	NO	YES	New Castle County Primary: (Direct Line) Secondary: 302-738-3131			
15	NO	NO	NO	YES	Kent County Primary: (Direct Line) Secondary: 302-678-9111			
15	NO	NO	NO	YES	U. S. Coast Guard Primary: 456-1370			

ATTACHMENT 1
COMMUNICATIONS LOG

TIME LIMIT IN (MINUTES)	REQUIRED FOR EVENT CLASS UE/SE	A	SAE	GE	PERSON TO BE CONTACTED	PERSON CONTACTED	DATE/ TIME	CONTACTED BY
30	YES	YES	YES	YES	General Manager - Salem Operations (Contact One) H. Midura Office: 4500; Car: 342-5106; Beeper: 342-0556; Home: 883-6069 J. Driscoll (Asst. GM) Office: 4497; Car: 342-5092; Beeper: 342-0555; Home: 302-366-8476 R. A. Uderitz (VP - Nuclear) Office: 4542; Car: Beeper: N/A Home: 769-4175	H. MIDURA R. UDERITZ	2-22-83 2-22-83	W. O'Brien
30	YES	YES	YES	YES	Public Affairs Manager-Nuclear (Contact One) R. Silverio Office: 935-6033; Car: NA; Beeper: 772-7163; Home: 829-1546 W. Denman Office: 935-2260; Car: NA; Beeper: NA: Home: 935-6349	R. SILVERIO	2341 2-22-83	W. O'Brien
30	NO	YES	YES	YES	Security-Site (Shift Lieutenant) Primary: 4625 Secondary: 935-2392			
60	YES	YES	YES	YES	Security-Hope Creek (Union Security) 7-450-3270 or 7-450-3271	DAVID EVERSOL	2336 2-22-83	W. O'Brien
60	NO	YES	YES	YES	Second Sun Visitor's Center Primary: 4480 Secondary: 935-2660			
60	YES	YES	YES	YES	LAC Township Primary: (Direct Line) Secondary: 935-7300	PLUMMER	2334 2-22-83	W. O'Brien
60	YES	YES	YES	YES	NRC Primary: (ENS) Secondary: 202-951-0550 or 301-427-4056	RAY PRIEVE	2334 2-22-83	W. O'Brien R. GALLAHER
60	YES	YES	YES	YES	NRC Resident (Contact One) L. Norrholm - Office: 4479; Home: 228-0421 B. Summer - Office: 4479; Home: 848-6741	R. SUMMERS	2328 2-22-83	W. O'Brien

ATTACHMENT 1
COMMUNICATIONS LOG

TIME LIMIT IN (MINUTES)	REQUIRED FOR EVENT CLASS				PERSON TO BE CONTACTED	PERSON CONTACTED	DATE/ TIME	CONTACTED BY
	UE/SE	A	SAE	GE				
90	YES	YES	YES	YES	New Jersey DOE Primary: (201) 648-6290 Secondary: See Addendum 1	R 1220/0	0035 2/23/83	R Gallaher
90	YES	YES	YES	YES	New Jersey BPU Primary: (201) 648-2066 Secondary: (201) 583-4091	Hartung	0028 2/23/83	R GALLAHER
90	NO	YES	YES	YES	American Nuclear Insurers Primary: (208) 677-7305			

(Figure 7)

ATTACHMENT 2
INITIAL CONTACT MESSAGE FORM

DIRECTIONS FOR COMMUNICATOR

Upon completion of the below prepared message the Emergency Coordinator or the Designated Communicator shall make the required notifications using Attachment 1 to this procedure.

NOTE: In the event of a test, drill or exercise, preface and complete each message with the phrase "THIS IS A DRILL, THIS IS A DRILL".

SECTION I (Provide to all)

THIS IS W. OBRIEN (NAME), SHIFT SUPV. (TITLE)

SALEM NUCLEAR GENERATING STATION, UNIT NO. 1

THIS IS A NOTIFICATION OF:

- ☐ a SIGNIFICANT EVENT
- ☒ an UNUSUAL EVENT
- ☐ a SITE AREA EMERGENCY
- ☐ an ALERT
- ☐ a GENERAL EMERGENCY

THIS EVENT OCCURRED AT 2157 (TIME - 24 HOUR CLOCK) ON 2-22-83 (DATE)

- ☒ THERE IS NO RELEASE IN PROGRESS.
- ☐ WE HAVE A NORMAL RELEASE IN PROGRESS.
- ☐ WE HAVE AN UNCONTROLLED RELEASE IN PROGRESS.

SECTION II (Provide to New Jersey and Delaware Only)

- ☒ NO PROTECTIVE ACTIONS ARE RECOMMENDED AT THIS TIME
- ☐ WE RECOMMEND SHELTERING FOR THE FOLLOWING SECTOR(S) _____ / _____ (Distance-Miles)
- ☐ WE RECOMMEND EVACUATION FOR THE FOLLOWING SECTOR(S) _____ / _____ (Distance-Miles)

SECTION III (Provide to PSE&G personnel only)

DESCRIPTION OF EVENT _____

_____

_____

Use back of sheet if necessary.

SALEM GENERATING STATION

OPERATIONS DEPARTMENT DOCUMENT APPROVAL COVER SHEET

Title: Hot Standby to Minimum Load

No.: IOP-3 Unit: 1 Rev.: 0

Remarks: 16 pages of text, 1 figure, 2 Check Off Sheets

IOP-3 Rev. 0 replaces Rev. 6 of Overall Procedure I-3.3

Last OTSC P-4

Safety Related Review (Ref. AD-13): S/R yes X no

Howard Onorato — Reviewer — Date 7-2-82

Author Howard Onorato — Date 7-2-82

SRO* V. J. Paluzzi — Date 7/14/82

Ops. Eng. James Muller — Date 7/28/82

Ops. Mgr. [signature] — Date 7/29/82

QA** [signature] — Date 8/11/82

SORC** [signature] 82-77 — Date 8/18/82

General Manager** H. J. Midura — Date 8/19/82

* required for SPM documents only

** required for safety related documents only

MASTER

INTEGRATED OPERATING PROCEDURE
IOP-3
HOT STANDBY TO MINIMUM LOAD

START TIME_____ DATE_____ BY_____

TERMINATION TIME_____ DATE_____ BY_____

COMPLETION TIME_____ DATE_____ BY_____

1.0 PURPOSE

1.1 This instruction outlines the sequence in which systems are placed in service for a plant startup from Hot Standby (Mode 3) to Power Operation (Mode 1). Specific operating details and valve lineups are found in referenced instructions.

2.0 PRECAUTIONS

2.1 ADMINISTRATIVE

2.1.1 In the event plant conditions require a delay during some part of this procedure, the Senior Shift Supervisor/Shift Supervisor shall retain this instruction until the procedure is continued or terminated.

2.1.2 If this instruction is terminated prior to completion, the Senior Shift Supervisor/Shift Supervisor shall note the reason, time and date of termination on this instruction. The last completed IOP will be maintained in the Control Room file.

2.1.3 Criticality must be anticipated any time the Control Rods are being withdrawn or boron dilution operations are in progress.

2.1.4 An Inverse Count Rate Ratio (ICRR) Plot shall be maintained during Control Rod withdrawal on a reactor startup when the estimated critical configuration differs from a known critical configuration by more than 650 PCM differential due to rods or a 1000 PCM differential due to Xenon.

2.1.5 Do not exceed a stable start up rate of one decade per minute.

MASTER

2.1.6 The critical position shall be no less than described in Technical Specification 3.1.3.5 and Figure 14 of the Reactor Engineering Manual.

2.1.7 In Modes 1 and 2, the Group Step Counters and Rod Position Indicators for that bank must be within ±12 steps as specified by Technical Specification 3.1.3.2.

2.1.8 Refer to Emergency Plan Procedure, EP-I-0 Part 4 for the appropriate event classification and reporting requirements.

2.2 EQUIPMENT

2.2.1 When changing the RCS boron concentration, pressurizer sprays should be utilized to minimize the differential between pressurizer and loop boron concentration to less than 50 ppm by placing heaters in MANUAL-ON and leaving spray control in AUTO.

2.2.2 The pressurizer spray must not be used if the temperature between the pressurizer and the spray fluid is greater than 320F.

2.2.3 Reactor Coolant Pumps

a. With less than 4 RCP's in service, be in Hot Standby within 1 hour.

b. Power operation above P-7 is not permitted with less than 4 RCP's in service.

c. The reactor should not be brought critical with less than 4 RCP's in service.

2.2.4 Steam Generator pH must be maintained between 8.5 and 9.2. Steam Generator Blowdown after the ion exchange conductivity must be less than .8 micromhos. If unable to achieve chemistry specifications, refer to EI-I-4.21, "Condenser Tube Leak," Table 1.

3.0 ATTACHMENTS LIST

3.1 Figures

3.1.1 Figure 1 - Feedwater Differential Pressure vs. Total Feedwater Flow

MASTER

3.2 Tables

None

3.3 Check Off Sheets

3.3.1 Check Off Sheet 1 - Requirements to Enter Mode 2

3.3.2 Check Off Sheet 2 - Requirements to Enter Mode 1

4.0 PREREQUISITES

NOTE

Initial each step after completion

___ 4.1 The plant is in the Hot Standby Mode IAW IOP-2 "Cold Shutdown to Hot Standby."

___ 4.2 The Full Length Control Rods are inserted; the Shutdown Banks are fully withdrawn.

___ 4.3 Final inspection and closure of the containment has been made and signed off IAW SP(O)4.5.2(c), ECCS Subsystems and SP(O)4.6.1.3(a), Containment Systems - Air Locks.

___ 4.4 Containment integrity is established.

___ 4.5 Permission has been granted to take the Reactor Critical IAW AP-5, Operating Practices.

___ 4.6 The estimated critical boron concentration for the desired critical control rod bank position has been determined, IAW Reactor Engineering Manual, Part I.

MASTER

___ 4.7 Check Off Sheet 1, Requirements to Enter Mode 2 has been reviewed and signed by the Senior Shift Supervisor.

~~Only items 1,5,6, 10,21 of Tech Spec Surv 4.3.1.1.1 (Table 4.3.1) on COS 1-2 need be completed, if not performed within 7 days of startup, and~~ IF startup is being made to recover from a reactor trip and:

1. Control Rod withdrawal is started within 24 hours of the trip

   AND

2. RCS temperature has not decreased below 500°F since the trip occurred

   AND

3. The cause of the trip is known and corrected.

P-5 K

___ 4.7.1 PERFORM SPO 4.3.1.1.1 INSTRUMENTATION - REACTOR TRIP BREAKERS IF NOT DONE IN LAST 7 DAYS (SATISFIES ITEM 1 OF STS TABLE 4.3-1) P-2 KEM

___ 4.7.2 VERIFY IC DEPARTMENT WEEKLY SURVEILLANCES ARE CURRENT TO SATISFY ITEM 5, 6, 18 AND 21 OF TECH SPEC SURV 4.3.1.1.1 TABLE 4.3-1 (COS 1-2 IC SIGN-OFF) P-5 KEM

THEN CHECK OFF SHEET 1 IS NOT REQUIRED. P-5 K

___ 4.8 All RCP's are in service. Tech Spec 3.4.1.1

___ 4.9 Both Source Range Channels are operable. Tech Spec 3.3.1

MASTER

___ 4.10 Prior to starting the Main Feedwater System, permission must be obtained from the Chemistry Department to feed the Steam Generator from the Condenser hotwells.

If the plant is being restarted within 24 hours after last shutdown, due to either a reactor trip or a controlled shutdown, and the plant chemistry was within specifications at the time of the shutdown, Chemistry Department permission is not required.

5.0 PROCEDURE

NOTE

Initial the indicated steps after completion.

___ 5.1 ADJUST the RCS boron concentration to the Estimated Critical Boron Concentration IAW OI II-3.3.6 Boron Concentration Control.

___ 5.2 DEFEAT the Source Range HIGH FLUX AT SHUTDOWN ALARM and verify the SR HIGH FLUX AT SHUTDOWN BLOCKED annunciator alarm energizes.

Block switches are on NIS rack.

___ 5.3 With 15 minutes prior to withdrawal of any Control Rod Bank, DETERMINE that each Shutdown Rod is fully withdrawn.

Tech Spec 4.1.3.4(a)

___ 5.4 MAKE the following announcement twice on the plant PA-System. "ATTENTION ALL PERSONNEL", Commencing Unit #1 Reactor Startup.

MASTER

___ 5.5 Within 15 minutes prior to Criticality, VERIFY RCS Tavg to be greater than or equal to 541°F.

Tech Spec 4.1.1.5(a)

___ 5.6 SELECT both Source Range Channels on the recorder for the Nuclear Instrumentation System until the Intermediate Range is approached. At this time one pen must be switched to an Intermediate Range Channel.

The licensed operator making the startup may, at his discretion, use the NR-45 recorder differently, as required by the situation.

___ 5.7 OBTAIN APPROVAL of the Senior Shift Supervisor and withdraw the Control Rod Banks in Manual and begin the approach to Criticality.

5.7.1 MONITOR Nuclear Instrumentation and expect Criticality at any time.

___ 5.8 STOP Rod Withdrawal at every 50 steps and check for proper Rod Alignment (individual rod position indicators versus step counters) and overlap.

5.8.1 If an ICRR is required, PLOT the Count Rate versus rod position at every 50 step stop point.

MASTER

5.9 If any of the following conditions occur while trying to achieve criticality, PROCEED as specified.

A detailed description should be entered in Operations Log #1 and all copies of the ECP shall be retained. The Operations Manager or Operating Engineer should be notified and an Incident Report should be initiated.

5.9.1 The Control Bank height at Criticality is below the Rod Insertion Limit for zero power.

___ a. NOTIFY the Senior Shift Supervisor/Shift Supervisor.

___ b. INSERT all control rod banks.

___ c. CALCULATE a Shutdown margin

Tech Spec 3.1.1.1

___ d. RECALCULATE the ECP

___ e. DETERMINE AND CORRECT the error

5.9.2 The Control Bank height at Criticality is 500 PCM below the ECP but above the Rod Insertion limit.

___ a. NOTIFY the Senior Shift Supervisor/Shift Supervisor.

___ b. INSERT all Control Rod Banks.

MASTER

c. RECALCULATE the ECP

d. DETERMINE AND CORRECT the error

5.9.3 Criticality has not been achieved with the rods withdrawn to an equivalent of 500 PCM past the ECP.

___ a. NOTIFY the Senior Shift Supervisor/Shift Supervisor.

___ b. INSERT control banks to the position for 500 PCM below criticality

___ c. RECALCULATE the ECP

___ d. DETERMINE AND CORRECT the error. If no error was found,

Mark N/A the steps not required.

___ 1. REQUEST confirming boron sample

___ 2. NOTIFY Reactor Engineering

___ 3. FULLY INSERT all control rod banks

___ 4. PULL rods for criticality using an ICCR plot

___ 5.10 When the P-6 (Source Range Permissive) light is energized, BLOCK the Source Range High Flux Trip by depressing both the BLOCK SOURCE RANGE "A" and BLOCK SOURCE RANGE "B" pushbuttons on the console.

___ 5.10.1 VERIFY the Source Range Trains A&B TRIP BLOCKED light on RP4 and the SR Detector Voltage Trouble Overhead Annunciator alarm are energized.

MASTER

___ 5.10.2 When P-6 is exceeded and the Source Range Channels are blocked, the Second Pen should be switched to the other Intermediate Range Channel.

___ 5.11 LEVEL off the Reactor Neutron level at 1X10-8 amps in the Intermediate Range.

___ 5.11.1 VERIFY Critical Rod Position is not less than the limits of Tech Spec 3.1.3.5 and Figure 14 of the Reactor Engineering Manual within 4 hours of achieving criticality.

___ 5.12 COMPLETE the ECP FORM.

___ 5.13 INCREASE Reactor Power to 1% to 2% and complete the following:

___ 5.13.1 COMPLETE warmup of the Main Steam System by performing the following:

___ a. Check Off Sheet 4.1 OI III-2.3.1 Main Steam

___ b. Check Off Sheet 4.2 OI III-2.3.1 Reheat Steam

___ c. Check Off Sheet 4.3 OI III-2.3.1 Reheat Drains

___ d. OPEN OR CYCLE the Warm Up Valves, 11-14MS18, to maintain RCS temperature constant.

___ 1. During warmup of Steam System, FEED the steam generators as necessary to maintain their normal no load level.

MASTER

___ e. OPEN the following:

1. Drain valves 11-14MS7

2. Drain valves 11&12MS26

___ f. When less than 50 PSID between steam generator and lines downstream of stop valves, OPEN steam generator stop valves, 11-14MS167.

___ g. VERIFY 11-14MS18's are open, then VERIFY 11-14MS167's valve closure times are less than 5 seconds. ~~ENTER results on SP(O)4.0.5-V-MD Sheet 4.6.~~ PERFORM SP(O) 4.7.1.5 IF NOT PERFORMED P-4 Rem IN LAST 92 DAYS. Tech Spec 4.7.1.5

___ h. CLOSE the following:

1. Warmup Valves 11-14MS18

2. Drain Valves 11-14MS7

3. Drain Valves 11&12MS26

___ i. PERFORM SP(O)4.0.5-V-MISC Check Off Sheet 4.1 Page 3 of 3 if not performed in the previous 92 days.

___ j. SECURE Condensate System Recirc Flow IAW OI III-9.3.4 Placing Condensate System in Recirc for Cleanup.

MASTER

___	k.	OBTAIN PERMISSION from Chemistry Department to feed Steam Generators from the Condenser hotwells.	If the plant is being restarted within 24 hours of the last shutdown, due to either a reactor trip or a controlled shutdown and the plant chemistry was within specifications at the time of shutdown, Chemistry Department permission is not required.
___	l.	BEGIN Feed Pump Turbine Warmup IAW OI III-9.3.2 Feed Pump Operation.	
___	m.	CHANGE Sealing Steam over to #1 or #2 Unit Main Steam IAW OI III-4.3.1. Turbine Gland Sealing Steam Normal Operation.	
___	n.	ESTABLISH S/G Blowdown IAW OI III-13.3.2 Steam Generator Blowdown Normal Operation.	Chemistry Department shall specify the amount of blowdown.
___	o.	OPEN 11-14 MS167	
___	5.14	Prior to exceeding 5% Power, ENSURE Check Off Sheet 2 Requirements to Enter Mode 1 has been completed and signed off by the Senior Shift Supervisor.	Check Off Sheet 2 is not required when the Startup is being made to recover from a reactor trip and:

MASTER

1. Control Rod Withdrawal is started within 24 hours of the trip

AND

2. RCS temperature has not dropped below 500°F, since the trip

AND

3. The cause of the trip is known and corrected.

___ 5.15 INCREASE Reactor power to 8%

Remain below P-10 for turbine roll.

___ 5.16 MAINTAIN Steam Generator water level with the Auxiliary Feed System.

At this point Steam Generator Level Control becomes very critical sudden increases or decreases in feedwater or steam flow are to be avoided.

5.16.1 COORDINATE all changes in feed water or steam flow with the reactor while rod control is in manual.

___ 5.17 PLACE Main Feed System in service IAW OT III-9.3.2 Feed Pump Operation.

MASTER

5.18 Once Steam Generator Feedwater Control Valves are in automatic and controlling S/G level adequately, ALIGN the AFWS for power operation as follows:

___ 5.18.1 OPEN OR CHECK OPEN 11-14AF11 SG AF level control valves
Update TRIS

___ 5.18.2 VERIFY that the Auxiliary Feed System Controls are adjusted to conform to the standby conditions IAW OI III-10.3.1, Auxiliary Feedwater System Operation.

___ 5.19 PLACE the Turbine Generator on the line IAW OI III-1.3.1 Turbine Generator Operation.

___ 5.20 INCREASE Turbine load until the steam dump valves have fully closed.

___ 5.21 NOTIFY the Load Dispatcher that the unit has been synchronized.

___ 5.22 CONTINUE INCREASING Turbine Load while maintaining TAVE at the programmed value.

___ 5.23 VERIFY that permissive P-10 signals have actuated (P-10 light energized) then perform the following:

2/4 Power Range greater than 10.%

___ 5.23.1 MANUALLY BLOCK Intermediate Range A&B low power trips by depressing both BLOCK IR "A" and BLOCK IR "B" pushbuttons on the console.

___ 5.23.2 MANUALLY BLOCK Power Range "A" and Power Range "B" Low Power trips by depressing both BLOCK PWR RANGE "A" and BLOCK PWR RANGE "B" pushbuttons on the console.

MASTER

___ 5.24 VERIFY that Permissive Signal P-7 has actuated (below P-7 light de-energized).

This makes the following reactor trips operable.

A. Pressurizer Low Pressure

B. Pressurizer High Water Level

C. Loss of Flow-Two Loop Logic

D. Turbine Trip

P-7 Setpoint greater than 10% Power Reactor Power (2/4) or TURB PWR (1/2)

___ 5.25 If manual MSR control is to be used, BEGIN WARMUP of the MSR's IAW OI III-2.3.3, Moisture Separator Reheaters Manual Operation.

___ 5.26 When the P-2 Interlock has been actuated, ADJUST TAVE to within ± 1°F of TREF and PLACE Rod Control System in AUTO.

Turbine Power greater than 15%

5.27 ALIGN Steam Dump Valves for Power Operations as follows:

___ 5.27.1 ENSURE the Loss of Load Interlock is reset by pushing the Reset Load Rejection pushbutton and observing the Turbine Impulse Chamber Pressure Permissive light on the Status Panel is out.

___ 5.27.2 PLACE the Steam Dump Valve Controller in Average Temp. Cont. Mode.

MASTER

___ 5.27.3 VERIFY that the Block Cooldown and the Block Non-Cooldown lights are ~~OFF~~ ON

5.28 PERFORM the following to place the Steam Generator Feed Pump Speed Controls to Automatic.

___ 5.28.1 MANUALLY ADJUST the Master Controller Speed Demand to match the speed of the pump

0-100% of the Master Controller is equal to 1100-5550 RPM on the individual pump controller.

___ 5.28.2 PLACE the Feed Pump Individual Controller in AUTO.

___ 5.28.3 ADJUST the Speed Demand of the Master Controller to maintain proper dp shown on Figure No. 1.

___ 5.28.4 PLACE the Master Controller in AUTO.

___ 5.29 At approximately 20% power, VERIFY the steam generator pH between 8.5-9.2 and steam generator blowdown after the ion exchanger conductivity is less than .8 micromhos.

a. If recorders indicate an out of specification condition, NOTIFY the Chemistry Department to verify by analysis.

b. If an out of specification condition is verified, REFER to EI-I-4.21 Condenser Tube Leak.

c. If analysis indicates faulty control room indication, ENSURE analysis is performed every 4 hours.

MASTER

___ 5.30 SELECT IMP in Mode on the E/H Control Panel.

___ 5.31 RESET Auxiliary Power Transformer Isolation Trip. Reset pushbutton on console.

5.32 TRANSFER the Group Buses from the Station Power Transformer to the Auxiliary Power Transformer by selecting on the Mimic Panel and closing the following breakers:

___ 5.32.1 1AHGD CLOSED

___ 5.32.2 1AEGD CLOSED

___ 5.32.3 1BFGD CLOSED

___ 5.32.4 1BGGD CLOSED

___ 5.33 VERIFY the Station Power Breaker open. UPDATE TRIS for steps 5.32 and 5.33

___ 5.34 NOTIFY the Load Dispatcher that the unit is ready for additional load.

6.0 FINAL CONDITIONS

6.1 The 4KV Group Buses are being supplied by the Auxiliary Power Transformer.

6.2 The generator is synchronized and is supplying the grid.

END OF PROCEDURE

FINAL PAGE

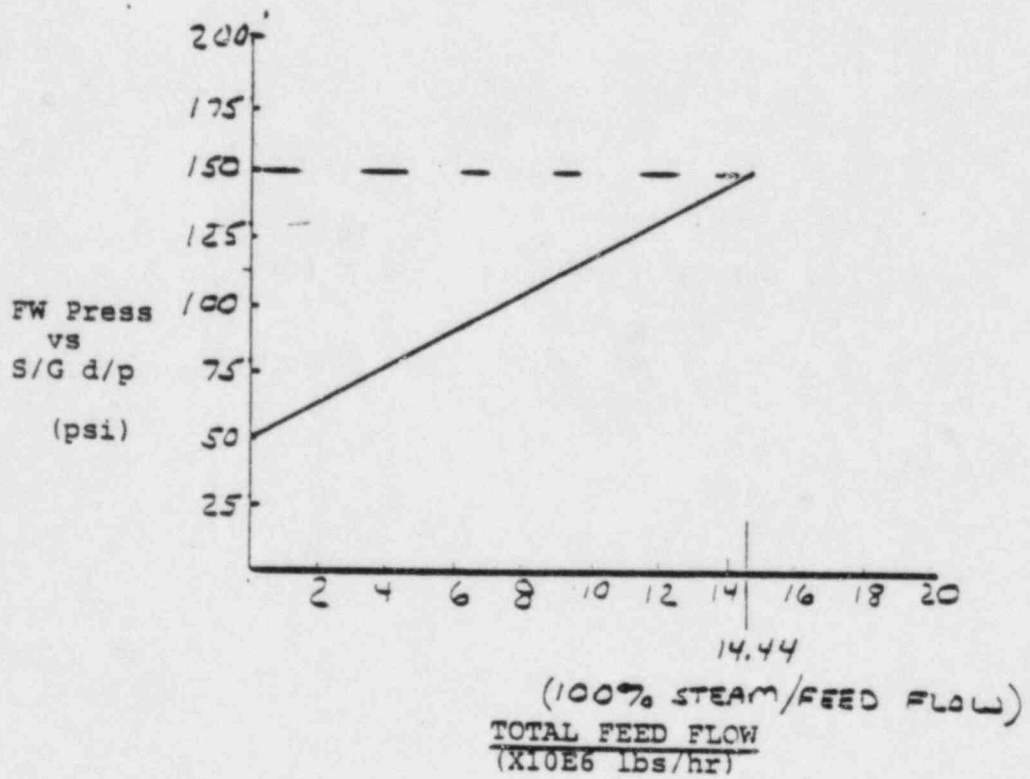
MASTER

FIGURE 1

FEEDWATER DIFFERENTIAL PRESSURE

VS

TOTAL FEEDWATER FLOW



MASTER

CHECK OFF SHEET 1
REQUIREMENTS TO ENTER MODE 2

1.0 TECHNICAL SPECIFICATIONS

REFERENCE TECHNICAL SPECIFICATION	DEPT	OPS PROCEDURE	FREQ	COMPLETION DATE	SIGNATURE
3.1.3.1 Rod Control Assemblies	OD	SP(O)4.1.3.1.2	M		
	OD	SP(o) 4.3.1.1.1	W		
3.3.1.1 Reactor Trip Instrumentation	OD	SP(O)4.3.2.1.1A	R		
Verify Control Console Readings taken for Modes 1-4	OD	Complete Ops Log #3	Prior to Mode 2		
3.3.1.1 Reactor Trip Instrumentation Channel Calibration	RE				
3.3.1.1 Reactor Trip Instrumentation Channel Calibration	MD				
Channel Functional Test	MD				
3.6.4.2 Hydrogen Recombiners	MD				

F-2 Nem

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MASTER

1.0 TECHNICAL SPECIFICATIONS

REFERENCE TECHNICAL SPECIFICATION	DEPT	OPS PROCEDURE	FREQ	COMPLETION DATE	SIGNATURE
3.3.1.1 Reactor Trip Instrumentation Channel Calibration	IC				
Channel Functional Test	IC*				
3.6.4.1 Hydrogen Analyzers	CH				

* Items X,5,6,18 and 21 of Tech. Spec. Surveillance Requirement 4.3.1.1 (Table 4.3.1) must have been completed within seven days of the Reactor Startup.

P-2 Rem

G-152

Reviewed By _____ DATE _____
Senior Shift Supervisor

1A. All design changes required to be completed prior to entry into Mode 2 have been completed.

P-3 Add

_____ DATE _____
Station Planning Engineer

MASTER

2.0 Prior to changing modes:

2.1 Change TRIS Operating Mode to the next intended mode (Menu 2-F2)

2.2 Generate a Components In Off-Normal Position Report (Menu 3-F2)

NOTE

This report will indicate all components not in the required position for the intended mode.

2.3 Position all components as required for the mode change.

2.4 Update TRIS using Change/Query Component Current Position (Menu 2-F1)

2.5 I have complied with steps 2.1-2.4, and all equipment required for changing modes is available.

_____ DATE_____

Shift Supervisor/Senior Shift Supervisor

3.0 I have reviewed the Jumper Log in the Senior Shift Supervisor's office and all equipment and instrumentation required for changing modes is available.

_____ DATE_____

Shift Supervisor/Senior Shift Supervisor

_____ DATE_____

Maintenance Department

_____ DATE_____

I&C Department

4.0 Generate "Equipment Unavailable List" from TRIS
I have reviewed the Equipment Unavailable list from TRIS .
All equipment required for changing modes is available

_____ DATE_____

Shift Supervisor/Senior Shift Supervisor

MASTER

CHECK OFF SHEET 2
REQUIREMENTS TO ENTER MODE 1

1.0 TECHNICAL SPECIFICATIONS

REFERENCE TECHNICAL SPECIFICATION	DEPT	OPS PROCEDURE	FREQ	COMPLETION DATE	SIGNATURE
3.7.1.5 MN. STM STOP VALVES ~~4.0.5-V-MD SHEET 4.6~~	OD	SP(O) 4.7.1.5 ~~SP(O)4.0.5-V-MD~~	S/U		JP-4
4.0.5-V-MISC SHEET 4.1 PAGE 3	OD	SP(O)4.0.5-V-MISC	Q		
3.1.3.1 Rod Control Assemblies	OD	SP(O)4.1.3.1.2	M		
3.3.2.1 Engineer Safety	OD	SP(O)4.3.2.1.1D	R		
Features	OD	SP(O)4.3.2.1.3	R		
Verify Control Console Readings taken for Modes 1-4	OD	Complete Ops Log #3	Prior to Mode 1		
3.2.2 Hot Channel Factor Heat Flux STS 4.2.2.2	RE				
STS 4.2.2.3	RE				
3.2.3 Hot Channel Enthalpy STS 4.2.3.1	RE				
STS 4.2.3.2	RE				
3.2.5 D N B Parameters STS 4.2.5.2	RE				

MASTER

1.0 TECHNICAL SPECIFICATIONS

REFERENCE TECHNICAL SPECIFICATION	DEPT	OPS PROCEDURE	FREQ	COMPLETION DATE	SIGNATURE
3.3.1.1 Reactor Trip Instrumentation Channel Calibration	MD				
Channel Functional Test	MD				
3.3.1.1 Reactor Trip Instrumentation Channel Calbiration	IC				
Channel Functional Test	IC				

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Reviewed By _____ DATE _____
Senior Shift Supervisor

P3
AD

1A All design changes required to be completed prior to entry into Mode 1 ~~2~~, have been completed.

_____ DATE _____
Station Planning Engineer

MASTER

2.0 Prior to changing modes:

2.1 Change TRIS Operating Mode to the next intended mode (Menu 2-F2)

2.2 Generate a Components In Off-Normal Position Report (Menu 3-F2)

NOTE

This report will indicate all components not in the required position for the intended mode.

2.3 Position all components as required for the mode change.

2.4 Update TRIS using Change/Query Component Current Position (Menu 2-F1)

2.5 I have complied with steps 2.1-2.4, and all equipment required for changing modes is available.

_____ DATE_____
Shift Supervisor/Senior Shift Supervisor

3.0 I have reviewed the Jumper Log in the Senior Shift Supervisor's office and all equipment and instrumentation required for changing modes is available.

_____ DATE_____
Shift Supervisor/Senior Shift Supervisor

_____ DATE_____
Maintenance Department

_____ DATE_____
I&C Department

4.0 Generate "Equipment Unavailable List" from TRIS
I have reviewed the Equipment Unavailable List from TRIS
All equipment required for changing modes is available

_____ DATE_____
Shift Supervisor/Senior Shift Supervisor

MASTER

SALEM GENERATING STATION

OPERATIONS DEPARTMENT DOCUMENT APPROVAL COVER SHEET

Title: Power Operation

No.: IOP-4 Unit: 1 Rev.: 0

Remarks: Two year review. Last OTSC P-4

6 pages, 1 Figure, 2 Tables

Operations Directive 36 incorporated

IOP-4 Rev. 0 replaces Rev. 5 of Overall Procedure I-3.4

Safety Related Review (Ref. AD-13): S/R yes X no

Howard Onorato — Reviewer — Date 7-6-82

Author Howard Onorato — Date 7-6-82

SRO* V J Polizzi — Date 7/6/82

Ops. Eng. James Gueller — Date 8/4/82

Ops. Mgr. [signature] — Date 8/6/82

QA** [signature] — Date 8/11/82

SORC** [signature] 82-77 — Date 8/18/82

General Manager** HJ Midura [signature] — Date 8/19/82

* required for SPM documents only

** required for safety related documents only

MASTER

INTEGRATED OPERATING PROCEDURE
IOP-4
POWER OPERATION

START TIME _____ DATE _____ BY _____

TERMINATION TIME _____ DATE _____ BY _____

COMPLETION TIME _____ DATE _____ BY _____

1.0 PURPOSE

1.1 This instruction outlines the steps necessary to operate the plant during load variations within the Power Range (Mode 1).

2.0 PRECAUTIONS

2.1 Administrative

2.1.1 Both units shall not be intentionally shutdown concurrently during the period of November through April. This specification is not applicable, if shutdown is required to protect the health and safety of the public or compliance with the Technical Specifications. (ETS 2.1.3)

2.1.2 Thermal Power changes exceeding 15% of the Rated Thermal Power within a one hour period require an isotopic analysis for Iodine between 2 and 6 hours following the change. Notification of Performance Department is necessary.

2.1.3 For any unit trip refer to Emergency Plan Procedure EP I-O, Part 4 for the appropriate classification and notify the NRC as required.

2.1.4 The control rods should remain fully withdrawn for high power steady state operation.

2.1.5 Power level increases shall be made at ~~3% per hour or less~~ less than 10% per hour P-1 74

2.2 Equipment

2.2.1 Generator power factor and reactive load are to be maintained at values specified by the Load Dispatcher and within generator operating curves.

2.2.2 Turbine-Generator loading and unloading rates should be made to comply with the ~~3% per~~ 10% Note restriction, and to maintain the Axial Flux Difference within the Target Band. P-1 74

ERSTER

2.2.3 During power operation greater than 90% Auto Rod Control should be used only when Bank 'D' Control Rods are greater than 215 steps withdrawn.

2.2.4 Condenser Thermal Limits:

a. The discharge temperature shall not exceed 115°F.

b. The condenser differential temperature shall not exceed 27.5°F.

c. The pH shall not be less than 6.0 nor greater than 9.0.

d. During power reductions of greater than 25% of Rated Thermal Power, per hour, condenser Delta T must be monitored every 15 minutes. Use Operations Log No 10 (ETS 2.1.3).

e. The rate of change of discharge temperature shall not exceed 8°F per hour during normal plant operations (ETS 2.1.3).

3.0 ATTACHMENTS LIST

3.1 Figures

3.1.1 Figure 1 - Dampening Xenon Oscillations

3.2 Tables

3.2.1 Table 1 -Power Increases (2 pages)

3.2.1 Table 2 -Power Decreases (1 page)

3.3 Check Off Sheets

None

4.0 PREREQUISITES

4.1 4kv Group Busses are being supplied by the Auxiliary Power Transformer.

4.2 The AFD Monitoring System is operable.

5.0 PROCEDURE

5.1 Load Increases

MASTER

5.1.1 The Reactor Engineering Department will calculate daily, the maximum steady state power level permitted and the maximum rate of change of power. The normal values shall be 100% and 3%/Hour respectively unless otherwise specified by the Reactor Engineering Department

5.1.2 Refer to Table 1 for power levels at which specific actions are normally taken during power level increases.

5.2 Constant Load Operations

5.2.1 Maintain the AFD within the target band for all reactor power levels

Refer to SP(O) 4.2.1.1 if the AFD exceeds the target band.

5.2.2 Minimum rod motion is desired when operating at constant high power conditions to minimize flux oscillations.

a. The control rods should be used for the following purposes:

1) To force the AFD to the target value during power level changes.

2) To keep the AFD at the target value during reduced power operation.

3) To dampen axial xenon oscillations.

a. This is accomplished by inserting rods as AFD is passing through its target value on the increasing swing. Refer to Figure 1.

MASTER

5.3 Power Reduction - Rapid

5.3.1 Reduce Turbine-Generator Load with the Turbine E/H Controls.

a. If the intended rate of power reduction exceeds 25% per hour, perform the following:

1) Monitor Steam Generator Feed Pump suction pressure to prevent suction pressure from decreasing to less than 300 psig.

2) Monitor the Condenser discharge temperature every 15 minutes during the power reduction. (ETS 2.1.3).

3) Record the condenser differential temperatures on Operations Log No. 10 every 15 minutes.

5.3.2 When the desired power level is reached, adjust boron concentration to return the Axial Flux Difference to within the target band IAW OI II-3.3.6, Boron Concentration Control.

Refer to SP(O) 4.2.1.1 if the AFD exceeds the target band.

5.3.3 Refer to Table 2 for power levels at which specific actions at the direction of the Shift Supervisor are normally taken during a power reduction.

MASTER

5.4 Power Reduction - Normal

5.4.1 Reduce power using the Turbine E/H Controller at a rate specified by the Senior Shift Supervisor/Shift Supervisor.

a. Maintain rod control in AUTO if possible.

5.4.2 As power is reduced, adjust RCS boron concentration to maintain the AFD within the Target Band.

5.4.3 Refer to Table 2 for power levels at which specific actions should normally be taken during a power reduction.

5.5 Abnormal Frequency Operation

5.5.1 In the event of Low System Frequency the following actions shall be taken at the specific frequencies:

a. 59.75 HZ and without instructions from Load Dispatcher, increase unit generation, if not already at full load or otherwise limited, until frequency reaches 59.9 HZ.

b. 59.3 through 58.5 HZ automatic shedding will occur to reduce system load.

c. 58 HZ, notify Load Dispatcher of requirement to trip unit at 57.55 HZ.

Due to RCP breaker low HZ trip.

d. 57.55 HZ, manually trip the reactor.

MASTER

5.5.2 In the event of High System Frequency the following actions shall be taken at the specific frequencies.

a. 60.25 HZ, without instructions from Load Dispatcher, decrease load on unit IAW Section 5.4 until frequency reaches 60.1 HZ.

5.6 Chemistry Spec. Limits

5.6.1 Ensure secondary plant chemistry remains in specification. If it does not, then refer to Table 1 of EI I-4.21 for guidance.

5.6.2 Ensure primary plant chemistry remains in specification IAW Technical Specification 3/4.4.8.

6.0 FINAL CONDITIONS

6.1 Operational Mode 1

6.2 Stable plant operation.

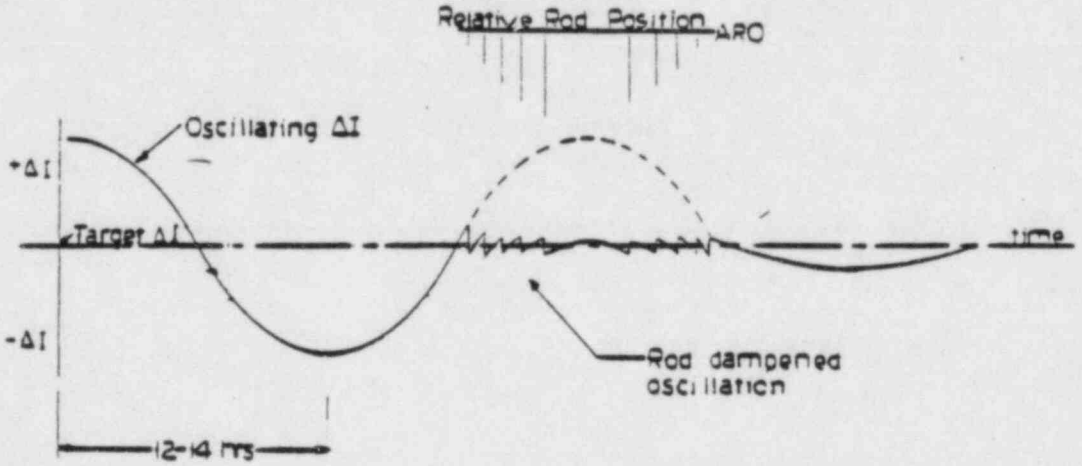
END OF PROCEDURE

FINAL PAGE

MASTER

FIGURE 1

DAMPENING XENON OSCILLATORS



Xenon oscillations should be dampened out, especially before they drive delta I out of the target band. Dampening a xenon oscillation is done by simply holding delta I at the target value (or non oscillating value) using control rods when delta I is on the up swing (positive peak). Rod insertion can be compensated for with boron concentration dilution. Experience has shown that by applying rods to hold delta I at its target (or equilibrium) value during one positive peak the oscillation is almost stopped.

MASTER

TABLE 1
POWER INCREASES

POWER LEVEL	OPERATIONAL EVENT
greater than 5%	Enter Mode 1, Power Operation
10%	P-7 Permissive Automatically unblocks Reactor trips resulting from Loss of Flow - Two Loop Logic Pressurizer Low Pressure Pressurizer High Water Level Turbine Trip P-10 Permissive Allows Manual block of Low Power Trips: Intermediate Range Rod Stop Intermediate Range Hi Level Trip Power Range Lo Range Hi Level Trip
approximately 10%	Steam Dump to AVERAGE TEMP CONT mode
15%	P-2 Permissive Allows use of Automatic Rod Control Start Second Condensate Pump
approximately 15%	Feedwater Control to Automatic Transfer Group Busses to Auxiliary Power Transformer Select IMP IN on EHC Console
greater than 15%	Perform SP(O)4.2.1.1, Power Distribution - Axial Flux Difference (Tech Spec 3.2.1)
20%	Close all Turbine Drains Place Bleed Steam Coil Drain Pumps In Service Intermediate Range Rod Stop (Normally Blocked above P-10)
25%	Power Range Low Range Hi Level Trip (Normally Blocked above P-10) Intermediate Range Hi Level Trip (Normally Blocked above P-10)
36%	P-8 Permissive (4 Loop Operation) Automatically unblocks 1/4 Loop Loss of Flow Trip

MASTER

40%	Start the Second Main Feed Pump and Third Condensate Pump
50%	Place Heater Drain Pumps In Service
Prior to going greater than 50%	Perform SP(O)-4.2.4(A),"Power Distribution-Quadrant Power Tilt Ratio" Tech Spec 3.2.4
greater than 90%	Auto Rod Control may be used only if Bank 'D' rods are greater than 215 steps withdrawn.

MASTER

TABLE 2
POWER DECREASES

POWER LEVEL	OPERATIONAL EVENT
40%	Secure Heater Drain Pumps
36%	P-8 Permissive Automatically blocks 1/4 Loss of Flow Trips
35%	Secure 1 Main Feed Pump and 1 Condensate Pump
20%	Open Turbine Drains, secure Bleed Steam Coil Drain Tank Pumps
15%	Transfer Group Busses to the Station Power Transformers P-2 blocks Automatic Rod Withdrawal - switch to Manual Rod control Secure 1 Condensate Pump
approximately 10%	Switch Steam Dump to MAIN STEAM PRESS CONT mode Start Auxiliary Feedwater Pumps
approximately 5%	Shutdown Turbine

MASTER

APPENDIX H

Shift Log, Incident Reports and Station Operations Review Committee Minutes

(Cross Referenced to Section 3 of this Report)

Contents

H.1 Shift Logs Unit 2 August 20, 1982 . . . . . H-1

H.2 Shift Logs Unit 1 January 6, 1983 . . . . . H-15

H.3 Shift Logs Unit 1 February 20, 1983 . . . . . H-40

H.4 PSE&G Report of Unit 2 Reactor Trip of August 20, 1982 . . . . . H-52

H.5 Incident Report February 20, 1983 . . . . . H-58

H.6 Station Operations Review Committee Minutes of September 8, 1982 . . . . . H-59

H.7 Station Operations Review Committee Minutes of October 20, 1982 . . . . . H-61

H.8 NRC Daily Report January 7, 1983 . . . . . H-64

H.9 PSE&G Report of Unit 2 Reactor Trip on January 6, 1983 . . . . . H-68

8811255

SALEM GENERATING STATION UNIT 2

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 9-20-88

TIME	APPARATUS	REMARKS
1650	SA	"2 Station air compressor ⅓
1658	FP	Verified E.P. valves in spec 2L station
1702	"	Terminated making up to RWST. Called for boron sample
1320	STS APO	Entered action statement 3.3.3.1 table 3.3-6 for AOV unit. Ref to guard, pump
1326	ST	RWST sample: 2,141 ppm.
1341	SD APO	Terminated action statement 3.3.3.1 for the A.F.W.
1846	Solid State	Started solid state testing on "B" train
1945	ST	"2 safety injection pump ⅓ to fill accumulators
2010	ST	"2 safety injection pump ⅓ Called for samples on all accumulators
2000	LATE ENTRY STS	Entered action statement 3.3-1 "2 vital for 2A reactor trip breaker Removed from
2048	"	Started power reduction at ~5%/hr Low Tech Specs
2112	"	Increased power decrease to 1%/hr
2127		Accumulator samples 21 22 23 24 ppm 2121 2164 2163 2125
2151	"	Stopped power decrease. Rods in boron "B" equalized. Maintain 23% ASI
2206	" STS	Terminated action statement 3.3-1 for Solid State protection. Started power increase at 2%/hr to 82% (816 mw)
2330	ST.	"21 ST pump ⅓ to fill accumulators

a) Use apparatus to provide a description of the event being logged.

b) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

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SALEM GENERATING STATION UNIT 2

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 8-22-12

TIME	OPERATOR	REMARKS
1650	SA	"2 Station air compressor V_S
1658	FP	Verified FP valves in proper position
1722	"	Eliminated entries to exit cubicle for lunch complete.
1820	STS AP2	Entered action statement 3.3.1 table 3.3-1 for one train Ref to guard keys
1826	ST	Pellet sample: 2.141 Ci/cm
1841	SD AP2	Terminated action statement 3.3.1 for the AFD
1846	Solid State	Started solid state testing on "B" train
1947	ST	"21 safety injection pump V_S to fill accumulator
2016	ST	"21 safety injection pump V_S Called for samples on all accumulators
2000	LATE ENTRY STS	Entered action statement 3.3-1 "22 actuation for 2B reactor trip breaker Manual Entry
2048	"	Started power reduction at ~5%/hr for Low Tech Specs.
2112	R	Incorrect power decrease to 1%/hr
2127	ST	Accumulator samples 21 22 23 24 psig 2121 2114 2103 2123
2151	R	Stopped power decrease, Reactor operator unavailable. Holding for Maintain 73% pwr
2206	R STS	Terminated action statement 3.3-1 for Solid State protection. Started power increase at 32/hr to 82% (Limit)
2320	ST	"21 SI pump V_S to fill accumulator

[a] Use appropriate to provide a description of the event being logged.

[b] The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

Page 4 of 4

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SALEM GENERATING STATION UNIT 2

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 9-20-82

TIME	INITIALS	REMARKS
2240	CW	21 A Circulate. 9's fail to take bat
2248	ST	21 SI pump 9's failed for surveillance on all accumulators
2350	ST	23:24 Accumulator levels: 23: 54 1/3". 24: 54"

RO Log

(a) Use appropriate to provide a description of the event being logged.

(b) The CO need only sign the remarks page once immediately following his last entry

Page 4 of

SALEM GENERATING STATION UNIT 2

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE:

TIME	APPARATUS	REMARKS:
0715	V Shift	
	SS/S	V Lowenstein
	S/S	W. O'BRIEN
	SSC	A Siebert
	NCO	R. Myers, E Hignett/P Bondren, Trainee - E Butler
	EO's	W. Swope, S. Duty
	I/O's	R. Rinaldi/D. Hamilton, B. Birney
	Circ Wtr	J. LORE
	Fire Brigade	R. Walker, S. Duty, B. Birney, B. Geary (Chief), S Mower (Asst.)
0737	ECCS	started 22 SI pump to fill 21, 22, 23 accumulators
0806	WL	Terminated CVBS on 22CVCS MTR - 2LL16782
0810	CW	22A CIRCULATOR Y/S
0814	ECCS	STOPPED 22 SI Pump - Called for accumulator
0833	SW	26 SW Pump Y/S
0854	BS	22 BS Coil DRAIN TANK Pump Y/S
0920	FP	FIRE PROTECTION VALVES IN ZONE 21 VISUALLY VERIFIED
		BY OPERATOR - SAT
0948	RCS	Chem Reports RCS Cl 274 for 0800
0948	ECCS	Chem reports Accum Boron as 21-2169 ppm, 22-2164 ppm,
		23-2174 ppm
1004	SW	26 SW Pump Y/S, 21 SW Pump Y/S
1031	TSAS	TSAS 3.7.10.3.a entered CO_2 switch put in the manual
		position for running of 2A Diesel for testing
1102	DG	2A Diesel Gen. started
1104	DG	2A Diesel Gen. on line
1106	DG	2A Diesel Gen. stopped

(a) Use apparatus to provide a description of the event being logged.

(b) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

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5511257

SALEM OPERATING STATION UNIT 2

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 9-20-82

TIME	APPARATUS	REMARKS:
1110	(I: AS)	Terminated TSAS 3.7.10.3a CO_2 on Diesel Gen
1131	HHB	#1 HHB Y5 Now Cycle
1315	CN	Chem reported that #1 A & B Manwell is <0.005 ppm Sodium
1450	* Accumulators	Levels 23 - Local 55" CB 77½/57½
		24 Local 55" CB 72½/58½
1450	FF	Flow Calculation sheets in book at Viewing Panel by panel - SAT
		Engineering Unit
1504	J Kelly SM	Lowered Shift
	SM	Lower Y Gas
	N.	Compare Readings
	SS	Stanfield & Jones
	SS	Willoughby, Hayden
	SM	Yates / Caggia / Stinchcomb
	Fire Brigade	Fire Marshal, Stanfield & Jones Inspection
1505	SE	#21 Safety injection pump to fill accumulators
1524	SE	#21 Safety injection pump ΔP Call 1 for sample on 21 & 22 accumulators
LATE ENTRY 1420	STS (ST)	Extend action statement 3.5.1 for accumulator Levels (23-24) Due to Levels not being verified within 12 hrs.
STS. 1430	(ST) STS	Terminate action statement 3.5.1 for 23 & 24 accumulator Levels
1505	ST	Accumulator samples 21-2169 psi 22-2162 psi
1615	SE	Started motor up to PWST

(A) Use apparatus to provide a description of the event being logged.

(B) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

Page 4 of 4 Rev. 6

SALEM GENERATING STATION UNIT 2 — SS11:51

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: AUG 20 1982

TIME	APPARATUS	REMARKS
0001	X-Shift	
	S31	Pinsa
	S2	Standard
	NCO	Hijmans, Russell
	E.O	CF Comra, Crawford
	V.O	Lu Melnick, Stewart
	Cask watch	M Mahony, Kawecki
	Fire Brigade	Security-Chief, M Mahony-Deputy, Williams, Crawford, Glynn
2345 T1/T2	CW	21A circulator 3/4 for screen inspection & cleaning
0030	Chemistry	secured chemistry samples on concentrate holdup tank 22,375 gpm, ok to transfer to BA tanks - Ok
0130	VC	Started pressure relief
0137	ECCS	Started 21 SI pump to fill 21, 22, 23, 24 accumulators
0152	ECCS	21 SI pump 3/4 - called for samples
0220		Entered containment to verify 23 and 24 accumulator levels to comply with SPO. 4.5.1
		23 accumulator level 82/82 on level
		24 accumulator level 81, 82 on level
0225	CW	21A circulator 3/4
0230	CW	23B circulator 3/4
0235	VC	Terminated pressure relief
0245	CW	22A circulator 3/4 to clean and inspect screen
0254	CS	Started 21 CS pump for 40SP
0306	CS	21 CS pump 3/4

(A) Use apparatus to provide a description of the event being logged.

(B) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

Page 4 of 4 Rev. 6

SALEM GENERATING STATION UNIT 2 SSTCSS

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 8/20/82

TIME	APPARATUS	REMARKS:
0312	CS	Started 22 CS pump for 405-1
0321	CS	22 CS pump 0/s
0321	Chem Tech	RCS tech 274 ppm
0321	Chemistry	Rcvd accident samples 21-2162 ppm, 22-2152 ppm, 23-2153 ppm, 24-2114 ppm
0440	WL	Started rcvd shift 211-107-82, 22 CSS remote test to CWI
0544	Chemistry	Rcvd BAT tank sample 21-22410 ppm, 22-22321 ppm - RAY

(a) Use apparatus to provide a description of the event being logged.

(b) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

Page 4 of 4 Rev. 6

8760882

COMMENTS ON A/S ITEMS_____

FIRE PROTECTION SYSTEM IMPAIRMENTS/PROBLEMS

Time Identified_____ Expected Duration_____

Location & Description of Impairment_____

Probable Cause_____

Corrective Action Taken_____

WO Number if Issued_____

Tech Spec LCO YES_____ NO_____ LCO A/S_____

Time Identified_____ Expected Duration_____

Location & Description of Impairment_____

Probable Cause_____

Corrective Action Taken_____

WO Number is Issued_____

Tech Spec LCO YES_____ NO_____ LCO A/S_____

Salem Unit 1/2 OD-B-2 Rev. 1

8706883

COMMENTS FOR TURNOVER

① LATE ENTRY: ENTERED T.S. A/S 3.5.1b @ N20 DUE TO 2 HOURS LOADING WITHOUT OBTAINING ACCUMULATOR SAMPLES ON 23 & 24 ACCUMULATORS. TERMINATED T.S. A/S 3.5.1b @ N50 WHEN SATISFACTORY SAMPLES WERE OBTAINED

② MD REPAIRED BAD CONNECTION ON ZPPIE WHICH CAUSED GATE VALVE OPEN INDICATION OF ZAPS.

③ ORDERED HP NITROGEN FROM KAIN COMPRESSED GAS FOR DELIVERY SATURDAY MORNING.

④ ORDERED OXYGEN FROM AIR PRODUCTS FOR DELIVERY ON SUNDAY.

⑤ ENTERED T.S. A/S 3.3.3.1 TABLE 3.3-6 DUE TO CLOSING APD UNIT, HAD TO TAKE APD OUT OF SERVICE

⑥ TERMINATED T.S. A/S 3.3.3.1 AT 1841

⑦ ENTERED T.S. A/S 3.3.1 TABLE 3.3-1, #22, ACTION #1 DUE TO "B" RX TRIP BKR NOT OPENING ON SIGNAL FROM SSPS TRAIN B DURING FUNCTIONAL CHECK. APPEARS TO BE A PROBLEM WITH TRIP COIL. MD & PD INVESTIGATING, STARTED LOAD REDUCTION @ 5%/HR, TO COMPLY WITH ACTION STATEMENT.

⑧ INCREASED LOAD REDUCTION TO 10%/HR @ 2110

⑨ REPLACED "B" TRIP BKR WITH "A" BYPASS BKR. BKR APPEARS TO BE FUNCTIONING PROPERLY, PD TO CONTINUE FUNCTIONAL TESTING ON "B" TRIP BKR. REDUCED LOAD REDUCTION RATE TO 3%/HR

⑩ FUNCTIONAL TEST SAT ON "B" RX TRIP BKR. TERMINATED T.S. A/S 3.3.3.1

⑪ LEAK IN 21A CONDENSER, 21A CONDENSER COMING O/S OD-16-B-3

Salem Unit 1/2 Rev. 1

876:880

COMMENTS FOR TURNOVER

R-31 went into alarm I-131 channel requested sampler as per FI I-4.16.

Nipple leak #1 SAC 1ST stage intercooler outlet. W.O issued.

14SW pump still has high strainer diff. W.O issued

Iodine sample on RCS shows no change over past week.

Had service water leak on cooling coil 13 Charging pump room sump. Level in 12WHUT & 40% Transferring contents to 1WMHUT for release.

Ordered H_2 - Sunday
Air press N_2 - Saturday

Rug cleaners will return on A.M.

8706881

UNIT 2 SHIFT SUPERVISOR'S LOG

DATE 8-20-82 SHIFT 1600-2400 SHIFT SUPV. W. GLAU

UNIT STATUS MODE I Tave 563 °F

Rx Power 75 % RCS Press 2240 psig

Load 820 Mwe Gross Boron Conc. 274 ppm

COMMENTS

UNIT LOAD CHANGES

	INITIAL CONDITIONS				FINAL CONDITIONS			
	Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.	82	900	2000	8-20-82	73	810	2152	8-20-82
2.	73	810	2206	8-20-82	75	820	2251	8-20-82
3.								

Reason for Load Changes
1. INSTALLED "B" Rx TRIP BKR
2. CALIBRATED T'AVG WITH "B" Rx TRIP BKR
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/BOILUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
PORV's	3.4.5	10-6-81 1134		
Fire Doors & Barrier	3.7.11	10-29-81 0001		
23 MSIS	3.7.1.1	7-7-82 0001		
75 CFCU	3.6.2.3a	7-7-82 2300		
Accumulator Levels	3.5.1b	8-20-82 2100	8-20-82 2400	
Fire Unit 1/2	3.7.6	08-18-81	8-20-82	

REV. 1

8760576

SENIOR SHIFT SUPERVISOR'S LOG

DAY FRIDAY

DATE Aug 20, 1982 SHIFT 0830-1600 S.S.S. V. Ladoucer / B. Stitt

UNIT 1 MODE I Tave 569 °F
STATUS Rx Power 100 % RCS Press 2240 psig
Load 1072 Mwe Gross Boron Conc. 458 ppm

COMMENTS 1B Circ Oil

UNIT 2 MODE I Tave 563 °F
STATUS Rx Power 77 % RCS Press 2240 psig
Load 830 Mwe Gross Boron Conc. 734 ppm

COMMENTS 2A Circ Oil suspect cond. Tube leak
increasing power at 2%/hr to F2%

UNIT 3 AVAILABLE ✓ UNAVAILABLE ____ SINCE ____

COMMENTS

TECH SPEC ACTION STATEMENT

UNIT	EQUIPMENT	A/S NUMBER	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
2	P.O.R.V.	3.4.5a	[illegible]		
1	Fire Barrier	3.7.11a	[illegible]		
2	23A SVS	3.7.1.1a	[illegible]		
1	Rem Inst. Cabt	3.3.1.1	[illegible]		2/28/12
2	2E Circ	3.6.2.3a	[illegible]		2/26/12 @ 2330
2	[illegible]	3.2.1 act 1	[illegible]	[illegible]	[illegible]

Salem Unit 1/2 GO-18-A-1 Rev. 1

8760577

COMMENTS ON A/S ITEMS T.S. 4.4.2.1 Act. Started load decrease at 2048 @ 5% + then 10% per hour.

SIGNIFICANT STATION PROBLEMS/EVENTS

A. OPERATIONAL

① During P.D. testing of B trip Bkr. "B" Bkr would not open - Determined to be a mechanical failure of the Bkr. Declared Unusual Event + made all notifications IAW EPI-1. B trip Bypass Bkr A was exchanged for the faulty "B" Trip Bkr + tested "SAT." Stopped load decrease at 73% power + 810 MWe

② 21A Cond O2 increased d/t Tube leak

③ 13B Cond - indicates tube leak during precision

Salem Unit 1/2 OD-18-A-2 Rev. 1

5511255

SALEM GENERATING STATION UNIT 2

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 8-20-82

TIME	OPERATOR	REMARKS
1650	SA	"B" Station air compressor $\frac{1}{2}$
1658	EP	Verified EP valves in good all status
1702	"	Terminated waiting to exit Cold for Incore sample
1320	STS RPV	Entered action statement 3.3.3.1 table 3.3-6 for RVLIS with Ref to guard tag
1326	ST	RWST sample = 2.141 gms.
1341	SD RPV	Terminated action statement 3.3.3.1 for the RVLIS
1346	Solid State	Started solid state testing on "B" train
1945	ST	"2 right injection pump $\frac{1}{2}$ to fill accumulator
2010	ST	"2 right injection pump $\frac{1}{2}$ called for samples on all accumulators
2000	LATE ENTRY STS	Entered action statement 3.3-1 "B" actuation for 2B vacuum breaker Manual Event
2048	"	Started power reduction at ~5%/hr from Tech Spec.
2112	R	Incorrect power decrease to 1%/hr
2127	"	Accumulator samples 21 22 23 24 for 2121 2122 2123 2124
2151	R	Stopped power decrease. Rate is now "B" equivalent. Holding at 77% maintain 23% psig
2206	R STS	Terminated action statement 3.3-1 for Solid State protection. Started power increase at 3%/hr to 82%. (81% net)
2330	ST	"21 ST pump $\frac{1}{2}$ to fill accumulator

[1] The operator is to provide a description of the event being logged.

[2] The CO need only sign the remarks page once immediately following his last entry as Shift Relief.

Page 4 of 4

9470' 10 BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: JAN 6 1983

TIME	APPARATUS	REMARKS:
0000	W SHIFT	
	S^3	JANSEN
	S^2	Behring
	NCO's	Anderson / Kirwin
	FO's	Priestly / Geary
	UO's	Moylan / Jenkins
	Fire Brigade	Rodriquez, Priestly, Moylan, Jenkins, Lore
0130	CHEM	2108 ppm
0156	RCP	Started 14 RCP
0200	SFP	Spent fuel Pit temp 91°
0508	S.A.	Started # 1 S.A. COMP
0510	SFP	Spent fuel Pit temp 93°
0514	12 SPT	CLEARED & TAGGED 12 SPT FOR
0514	Tech Spec	LeMieux.
	T/S	3.7.10. 1.C no automatic initiation of diesel fire Pump man stationed at pumps.
		Thomas Kirwin

(a) Use apparatus to provide a description of the event being logged.

(b) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

Page 4 of 4 Rev. 6

947 S11 BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: JAN 6 1983

IME	APPARATUS	REMARKS:
0715	2 Shift	
	SSS	V. Lowenstein
	SS	J. Varga, J. Morrisen
	NCO's	W. Cornman, M. Gwirtz
	EO's	J. Sabla, B. Sharp
	VO's	D. Myers, J. May
	Fire Brigade	T. Wilbraham (chief), C. Hughes (asst), R. Werline R. Perez, J. May
0730	RCS	Closed RV vessel head vents, commenced increasing RCS pressure to > 320#
0741	Tech Spec	Entered action statement 3.7.10.3(a) diesel cardox
0840	Chem	RCS boron 2108 ppm
1001	RCS	Placed 11 RCP oil lift pump I/S
1030	SF	Spent fuel pit temp. 97°
1240	EH	Shut EH supply values to all 4 turbine stop values and east Intercepts and reheat stop values for EH system flush.
		MD May

(A) Use apparatus to provide a description of the event being logged.

(B) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

ADO

9470 :42 BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 1-6-83

IME	APPARATUS	REMARKS:
1315	V Shift	
	53	Vic Lawenstein / D. Jansen
	5^2	W. OBRIEN
	NCO	R. CORNMAN E. Bubier
	E.O.	S. MILLER P. Williams
	U.O.	J. SHARP R Hunton
	Fire Brigade	F. Bubier P. Dennery R. Walker
		J. SHARP S. Mower
1430	SF	TEMP SF Pit 100°F
1516	13KV	L.D. Permission to close 13KV BER Sect. 4-5 12 SPT returned to Service
1537	RCP	Bumped #11 RCP for Venting of the RCS (30 sec run)
1800	SF	TEMP S.F. Pit 103°F
1952	4KV	OPENED 11ESD & 11HSD in Preparation To tag # 11 SPT
1956	4KV	Closed 11ESD & 11HSD returned to normal Unit #2 Rx tripped
2027	S.W.	#11 S.W. Pp i/s Performance of Operability Test of #12 C.F.C.U
2105	SF	SF Pit TEMP 104°F
2148	S.W.	#11 S.W. Pp o/s SP(o) 4.6.3.2.A ON #12C.F.C.U Completed Results Sat.
2222	13KV	LD PERMISSION TO OPEN BREAKERS 1-2 & 1-3, 11A3D, 11B3D, 11C3D, 11E3D, 11H3D - OPEN
2240	SF	SF PIT TEMP 105°F
		[signature]

a) Use apparatus to provide a description of the event being logged.

b) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

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401

9500811

SALEM GENERATING STATION UNIT 2

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: JAN 6 1983

TIME	APPARATUS	REMARKS:
2305	WSHIFT S^3	Jansen
	S^2	Herrell
	NCO	Bowden, Myers
	E.O.	Pompper, Mallett
	U.O.	Rodriguez, Lore
	Fire Bde	Rodriguez, Prevatsky, McLean, Jenkins, Lore
	SSS	Ravelli
	STA.	OTT.
2307	SI	#21 SI Pump I/S. Fill Accms
2340	SI	#21 SI Pump O/S Filled 21, 22, 23 Accms, Called For Samples
2341	RWST	Started makeup To RWST.
0040	RWST	Terminated makeup To RWST, 607564 gals, Called For sample
0058	Turbine	Turbine mile Reading 750.
0059	WL	Terminated Liquid Release 22 tanks MT
0137	RCS	RCS CB 65 PPM.
0138	ECCS	Accm Boron #21-2134, #22-2137, #23-2134 PPM
0139	RWST	RWST Sample - 2136 PPM Boron
0140	CVCS	Both TK Sample, 22425 PPM Boron of To
0145	Sec Chem	Transfer (Robinson)
0145	Sec Chem	Sb CH, #21-8.87, #22-8.83, #23-8.85, #24-8.83
		Sb Potcin, #21-0.37, #22-0.45, #23-0.47, #24-0.37
0157	VC	Started Containment Pressure Relief
0253	VC	Terminated Containment Pressure Relief
0400	RCS	Completed SP(O) 4.4.7.2.D RCS Leak Rate - 0.781
0417	ECCS	Accm Local Level #23 - 57 inches, 69%, 62%

(A) Use apparatus to provide a description of the event being logged.

(B) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

Page 4 of 4 Rev. 6

9500842

SALEM GENERATING STATION UNIT 2

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 1-6-83

TIME	APPARATUS	REMARKS:
0417	ECCS	ACCM Local Level #24 - 56 inches 65% 66%
0440	CVCS	#1 Boric Acid TK 73% Level in preparation To Transfer Batch To 22 Boric Acid TK.
0505	CVCS	Transferred Batch To 22 Boric Acid TK, TK Isolated For 3 hr Recirc As per procedure
0506	SI	#21 SI Pump T/S To Fill Accms
0513	SA	#2 SAC O/S As per OD #44-AH
0530	SI	#21 SI Pump O/S, Filled 21, 22, 23 Accms, Called For Samples
0624	ECCS	ACCM Boron Samples, #21-2126, #22-2128, #23-2126 PPM Richard J Hyer

(A) Use apparatus to provide a description of the event being logged.

(B) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

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463

SALEM GENERATING STATION UNIT 2

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 1/6/83

TIME	APPARATUS	REMARKS:
	Z Shift	
	S^{3}	Lowenstein
	S^{2}	Holkyer
	NCO	Rowden / Giggetts, Dunaugh
	FO	Hunthrop, Wolk
	AO	Bryloski, McKee
	Fire brigade	Wilbur, Hughes, Weber, Berg, Mey
	Pwr	420 MW, 45% Pwr, Tave 555°F, Fork D-116.
0839	RCS	64 ppm Boron.
0839	CW	#21B Circulator O/S
0934	BA	#22 BAST Sample 21720 ppm
1045	S.I.	#22 S.I. Pump T/S (Fill accum.)
1047	BA	#22 BAST unisolated & Returned to normal C. Rowden
1103	SI	#1 SI pump O/S
1139	Accum. (CB)	#21 = 2121 ppm #22 = 2129 ppm
1215	Accum levels	#23 (66/59½) = 56" #24 = (64/64) = 56"
1240	#2 Turbine	Turbine Casing Expansion 739 mils, W. Giggetts
1300	V - Shift	
	S^{3}	V. Lowenstein
	S^{2}	P.O Donnell
	S/S/S	C. Warren
	S/T/A	G. Reggio
	NCO	F. Wiltsee, B. Giggetts
	EO	B. Geary, E. Parks
	AO	B. Walker, B. Birney
	Fire Brigade	Bubier, Dennery, Walker, Sharp, Mower

(A) Use apparatus to provide a description of the event being logged.

(B) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

Page 4 of 4 Rev. 6

9500844

SALEM GENERATING STATION UNIT 2

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 1-6-83

TIME	APPARATUS	REMARKS:
1430	WL	start release of #21 CVC MT on release #2-44-7-83
1500	RCS-Cb	RCS boron = 58 ppm
1531	S.I.	Terminated A/S 3.3.1 Act. 7, after Channel Sensor Calib. on 23 RC loop ch III complete. S.I. and channel restored to normal
1525	Accum	22 SI Pump T/S to m/u to Accum (all)
1558	Accum	22 SI Pump O/S
1720	Accum Cb.	#21 = 2126 ppm
		#22 = 2131 ppm
		#23 = 2127 ppm
		#24 = 2131 ppm
1734	WL	completed release of #21 CVC MT.
1735	DM	#22 DB. DM T/S.
1800	DM (Cb)	22 DB boron conc. 48 ppm (in) <45 ppm (out)
1805	B.A.	Transfered Batch Tk (21,616 ppm) to 22 BAT.
1855	Accum levels	#23 = 55" (70/62) #24 = 55 (70/70)
1954	RX	Rx TRIP = 21 S/G LO-LO LEVEL
2017	WG	GAS RELEASE # 21 GD 0283
2036	PRI CHEM	RCS BORON 42 PPM PZR 460 PPM
2125	TURB	TURB ON TURNING GEAR
2215	WG	TERMINATED RELEASE GD 0283
2221	WG	GAS RELEASE #21 GATANIS GD 0383
2221	SI	STARTED #22 SI PUMP TO FILL ACCUM
2234	SI	#22 SI O/S
		W. Guyette

(A) Use apparatus to provide a description of the event being logged.

(B) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

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9132111

SENIOR SHIFT SUPERVISOR'S LOG

DAY Tuesday

DATE 1-6-83 SHIFT 2300-0700 S.S.S. D Trump

UNIT 1 MODE I Time 1556 Hr
STATUS RX Power 6 % RCS Press 56 PSIG
Load 6 MWe Gross Boron Conc. 2106 PPM

COMMENTS

UNIT 2 MODE 1 Time 0555 Hr
STATUS RX Power 96 % RCS Press 2246 PSIG
Load 326 MWe Gross Boron Conc. 655 PPM

COMMENTS

UNIT 3 AVAILABLE ✓ UNAVAILABLE ____ STATE ____

COMMENTS

TECH SPEC ACTION STATEMENTS

UNIT	EQUIPMENT	A S NUMBER	DATE TIME ENTERED	DATE TIME TERMINATED	DATE TIME OF EXPIRATION
2	PCRV	3459	[illegible]		
1/2	FIRE [illegible]	3460	[illegible]		
2	[illegible]	3461	[illegible]		
2	[illegible]	3462	[illegible]		
1	[illegible]	3463	[illegible]		
1/2	[illegible]	3464	[illegible]		

Salem Unit 1 2 SD-18-A-1 Rev. 1

ITEMS IN A-E ITEMS

9432115

SIGNIFICANT STATION PROBLEMS EXIST:

OPERATIONAL

14 RCIC pump test tests since the 5 min. test line - lower on normal test since MO has also shall we make this test

Burned 14 HCV [illegible] since face was the second test of the

I Homeland Ü.N. System heard at E A. upon-Severed.

SI 125 DT C/I 4.1 x 5-6 1240 bus ... 1A-B, 125D

125D 125-B & 10(-5D ... bus ... II C/I

UNIT ____ SHIFT SUPERVISOR'S LOG 8701302116

DATE 1-6-83 SHIFT 12 x 8 SHIFT SUP. K Beck

UNIT STATUS MODE √ Time 1:52

Ex Power — RCS Press 84 psig

Load — MWe Gross Boron Conc. 2106 ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
MW (Net)	MWe	Time	Date	MW (Net)	MWe	Time	Date
1.							
2.							
3.							

Reason for Load Changes 1. 2. 3.

RAD WASTE STATUS

TANK IDENT.	RELEASE STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	RELEASE STOP
HCLMT	0300				

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A.S. NO.	DATE TIME ENTERED	DATE TIME TERMINATED	DATE TIME OF SURVEILLANCE
FIRE DOORS & BARR	3.7.11	10-29-81-0001		
12 RHR LOOP	3.4.1.4	1-4-83-1340		
D/G Cc 2	3.7.10 3a	1-5-83-0906	2057	1-5-83
Fire Pump	3.7.10.1a	1-5-83-0514		

Salem Unit 1 2 CD-18-3-1 Rev. 1

9132117

COMMENTS ON A S ITEMS_____

FIRE PROTECTION SYSTEM IMPAIRMENTS PROBLEMS

Time Identified_____ Expected Duration_____

Location & Description of Impairment_____

Probable Cause_____

Corrective Action Taken_____

WO Number is Issued_____

Tech Spec LCO YES_____ NO_____ LCO A S_____

Time Identified_____ Expected Duration_____

Location & Description of Impairment_____

Probable Cause_____

Corrective Action Taken _____

WO Number is Issued_____

Tech Spec LCO YES_____ NO _____ LCO A S_____

Safety Unit 1 2 12-8-1 Page 1

DOCUMENTS FOR TURNOVER 913118

(1) E C S 4&C4 Bucket tied together in prep for CAT of 12 SFT.

(2) #1 & C2 - 30 cu yds completed

(3) - C.S. 4- 12 SFT C/S - CAT for CT checks by lab.

9132119

UNIT 1&2 SHIFT SUPERVISOR'S LOG

DATE 1/2/83 SHIFT 2315-0715 SHIFT SUPV. HERRELL

UNIT STATUS MODE 1 Tave 556 °F

Rx Power 41 % RCS Press 2200 psig

Load 410 Mwe Gross Boron Conc. 60 ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP
21CWSMT				2145	0059
21CWSMT	0315				

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
EDG 1&2	3.8.1	1/2/83 1137		
Fire Doors & Barriers	3.7.11	1/2/83 1137		
23 MSIV	3.7.1.1	1/2/83 0001		
23 2nd Th Flow	3.3.1 F2	12/29/82 1647		
Fire Alm Units	3.7.10.1a	1/2/83 0001		

Salem Unit 1/2 OD-18-B-1 Rev. 1

9432121

COMMENTS FOR TURNOVER

1. TURBINE MIC. READING .750"
2. BORIC ACID FLOW METER KEEPS CYCLING WHEN THERE IS NO FLOW NOT
3. AUX. BOARD TYPEWRITER STILL DOES NOT WORK PROPERLY MAIN - IS SUPPOSED TO BE IN IN THE MORNING TO WORK ON MEMORY DRUM.
4. 2Q4C FAILED - WOE
5. TAGGED OUT #12 SPT LOST PWR TO DIESEL FIRE PUMPS ENTERED TSAF 80-1 STATIONED MAN AT FIRE PUMP

Salem Unit 1/2 OD-18-B-3 Rev. 1

9132120

COMMENTS ON A/S ITEMS_____

_____

_____

_____

FIRE PROTECTION SYSTEM IMPAIRMENTS/PROBLEMS

_____

Time Identified_____ Expected Duration_____

Location & Description of Impairment_____

_____

_____

Probable Cause_____

Corrective Action Taken_____

_____

WO Number if Issued_____

Tech Spec LCO YES_____ NO_____ LCO A/S_____

_____

Time Identified_____ Expected Duration_____

Location & Description of Impairment_____

_____

_____

Probable Cause_____

Corrective Action Taken _____

_____

WO Number is Issued_____

Tech Spec LCO YES_____ NO_____ LCO A/S_____

Salem Unit 1/2 CD-B-2 Rev. 1

9103210122

SENIOR SHIFT SUPERVISOR'S LOG

DAY Thursday

DATE Jan 6, 1983 SHIFT 0715-1515 S.S. Victor M. Lowenstein, Jr.

UNIT 1 MODE V Tave 156 °F
STATUS Rx Power 0 % RCS Press 320 psig
Load 0 Mwe Gross Boron Conc. 2.0K ppm

COMMENTS ① RCS Fill & Vent Procedure In Progress

② 12 SPT outage for 1B Vital Bus Investigation.

UNIT 2 MODE I Tave 554 °F
STATUS Rx Power 45 % RCS Press 2240 psig
Load 400 Mwe Gross Boron Conc. 65 ppm

COMMENTS Holding <50% For AFD Penalty

UNIT 3 AVAILABLE ✓ UNAVAILABLE _____ SINCE _____

COMMENTS _____

TECH SPEC ACTION STATEMENT

UNIT	EQUIPMENT	A.S NUMBER	DATE TIME ENTERED	DATE TIME TERMINATED	DATE TIME OF EXPIRATION
2	P.O.R.V.	3.4.5a	10/6/81 @1131		
1/2	Fire Barriers	3.7.11a	10/28/81 @0001		
2	CRIDS Battery	3.7.1.2a	12/7/82 @ 0001		
2	#3 RCP Flow Trans.	3.3.1-#7	12/14/82 @ 1600		
1	SHR Loop	3.4.1.a	1/1/83 @ 1400		
1/2	Fire Pumps	3.7.8.1A/C	1/6/83 @ 0515		

Relief Unit 1 2 [illegible] To [illegible]

UNIT 1 SHIFT SUPERVISOR'S LOG 9402123 ll-A

DATE 1/4/83 SHIFT 0715-1515 SHIFT SUPV. VARLA/MORRISON

UNIT STATUS MODE 5 Tave — °F

Rx Power — % RCS Press 350 psig

Load — Mwe Gross Boron Conc. 2108 ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr %	Mwe	Time	Date	Rx Pwr %	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes 1. 2. 3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	RELEASE STOP

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A.S NO.	DATE TIME ENTERED	DATE TIME TERMINATED	DATE TIME OF EXPIRATION
Fire pump diesel	3.7.11	1645/1/4		
12 AHF Lo-F	3.4.1.4	1/4/83/1640		
D/G CO2	3.7.10.3a	1/6/83/0741		
Fire Barrels	3.7.10.1a	1/5/83/2214		

Salem Unit 1/2 OD-13-B-1 Rev. 1

9432121

COMMENTS FOR TURNOVER

(1) 1B diesel c/t for trouble.
(2) need to add oil to 11 LCO tank above mountain lab
(3) need to add oil to 14 RCP motor oil reservoir - a little above line in sight glass
(4) CO_2 system statused in test
12 station pwr transformer c/t for relay department
(5) testing Did not let stub switch fail on test
(6) #3 GT vibration meter reported high will not start trouble
(7) SPO 43211A being performed by Flory, Kerr, Melton
(8) 13 CVCS holding tank lyle level about 1 foot below top of ladder - will be from #2 reset
(9) closed EH supply to turbine stop valves + reset side intercept + valves for CH flush - Grafton
(10) 1 WMH-T was supplied for C_6 low level found but in spec
(11) 11 CVCS pump the being serviced for actuator trouble
(12) 12 CVCS pump the high actuator training
(13) 11 SPT will be c/t later today

9103120125

UNIT 2 SHIFT SUPERVISOR'S LOG

DATE 1/6/93 SHIFT 0715-1515 SHIFT SUPV. [illegible]

UNIT STATUS MODE T Tave 556 °F

Rx Power 45 % RCS Press 2240 psig

Load 410 Mwe Gross Boron Conc. 65 ppm

COMMENTS

UNIT LOAD CHANGES

	INITIAL CONDITIONS				FINAL CONDITIONS			
	Rx Pwr %	Mwe	Time	Date	Rx Pwr %	Mwe	Time	Date
1.								
2.								
3.								

Reason for Load Changes 1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/RELEASE STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	RELEASE STOP
RECVRS MT	0315	0315	1130		

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
2CH1C2	3.4.5	[illegible]		
[illegible]	3.7.11	[illegible]		
2SI-315	3.7.1.1	[illegible]		
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	

Salem Unit 1/2 OD-18-3-1 Rev. 1

9132136

COMMENTS FOR TURNOVER

1) [illegible] part of [illegible]
2) [illegible] after [illegible]
3) [illegible] Typ [illegible]
4) [illegible]
5) [illegible]
6) [illegible]
7) [illegible]

SENIOR SHIFT SUPERVISOR'S LOG

DATE

SHIFT

UNIT 1 STATUS

UNIT 2 STATUS

COMMENTS

UNIT 3

COMMENTS

UNIT 1

COMMENTS

UNIT	EQUIPMENT	A S NUMBER	DATE TIME ENTERED	DATE TIME TERMINATED	DATE TYPE OF DISPOSITION
2	HORV	2-MS-4	10/6 @ 1131		
1/2	Fire Control	2-FC-4	10/6/93 @ 1331		
2	23 MSIS	2-FC-4	10/6/93 @ 1331		
2	Steam Flow	2-FC-4	10/6/93 @ 1331	10/6/93 @ 1532	
1	RHR Loop	2-FC-4	10/6/93 @ 1334		
1/2	Fire Pump	2-FC-4	10/6/93 @ 1334		

Safe Unit 1 2

DD-13-A-1

9432128

UNIT 1 SHIFT SUPERVISOR'S LOG

DATE 1-6-83 SHIFT 1315-2315 SHIFT SUP. [illegible]

UNIT STATUS MODE 5 Tave 161 °F

Rx Power — RCS Press 36 psig

Load — Mwe Gross Boron Conc. 2148 PPM

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr %	Mwe	Time	Date	Rx Pwr %	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RELEASE/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	RELEASE STOP

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A S NO.	DATE TIME ENTERED	DATE TIME TERMINATED	DATE TIME OF EXPIRATION
[illegible]	3.7.1.1	[illegible]		
4 Rx Coolant Loops	3.4.1.4	1-4-83 1845		
D/G #3	3.7.1.2.3A	1-6-83 0741		
Fire Pumps	3.7.12.A	1-5-83 0514		

Salem Unit 1/2 OD-19-B-1 Rev. 1

9432129

COMMENTS FOR TURNOVER

1) MADE 11 SPT READY (RELAY DEPT RELEASED THIS)
2) BURPED 11 RCP
3) DEPRESSURIZED RCS + VENTED
4) MET MAIN LEAK RATE TEST ON 1/21/97
5) FILLED 14 RCP TO 1/16" ABOVE SITE GLASS MARK
6) IN PROCESS OF TURNING OVER 11 S.P.T.

Salem Unit 1/2 CC-18-B-1 Rev. 1

9132130

2

6 JAN 83 1300 - 2315 ODONNELL

III 547

2 2270

— 46

4Kc 410 B53 6 JAN 83 FX TRY

21 CVCS MT	0315	0615	1100	1430	1734
22 IVSS MT	1745	2230			
21 SDT	1500	1620	1930	2017	2215
22 SDT	1530	1600	2030	2221	

2 PR1 + PR2	3.4.5	12/4/81 1131		
Fire Door + Hardware	3.7.11	12/23/M 0004		
23 PS15	3.7.1.1	7/7/82 0001		
23 EDG Day Tank Fill	3.8.1.1	12/23/82 1610	11/6/83	1531
Fire Pump	3.7.1.1	12/23/83 0514		

9432134

1. Turbine Spindle Reading
2. Will need to run surveillance on 2A & 2C Diesels to prep station for Service water topping out of 2B Diesel
3. According to L. Anderson, SPIST will be shelved down to zero, giving plenty of room to use demins. Done
4. Nitrogen truck came in at 1530 hours with HP Mr Putnam "in tow".
5. Released tags on 2A SW Pump
6. Pallet on unit #2 near Nitrogen Truck. Thomas could not move it tonight, will move tomorrow and then set Full Nitrogen Truck in Position. Pallet belongs to Bowles.
7. Waste Evap is being fed from 22 Mixed. Will be swapped to 21 Mixed after 21 mixed reaches 10%
8. Sample on 22 Deborating Demin @ 1700 hours. 28 ppm Tr, 5 ppm Cl
9. Reactor Trip at 1953 hours. #1 Station Air Compressor tripped out. #2 Station Air Compressor didn't start. 21 SG Low-Low Level caused reactor trip when BF is started to 21 SG. Only Reactor Trip Bkr tripped. PD is Retesting SSPS
10. PD testing Turbine Stop Valves.

SENIOR SHIFT SUPERVISOR'S LOG

DAY Sunday

DATE 2-20-83 SHIFT 1500-2300 S.S.S. D. Jensen / W.R. Park

UNIT 1 MODE 3 Tave 547 °F
STATUS Rx Power — % RCS Press 2235 psig
Load — Mwe Gross Boron Conc. 1419 ppm

COMMENTS 2154. Rx Trip - Spike on N1 & N6. Panels 14 14 8 R
Seal Trouble Trip & P7 NRC notified
Overexcitation alarm & generator field breaker trip at 304 volts
Relay Dept. notified.

UNIT 2 MODE 6 Tave 96° °F
STATUS Rx Power — % RCS Press — psig
Load — Mwe Gross Boron Conc. 2110 ppm

COMMENTS 17 elements removed from core

UNIT 3 AVAILABLE ✓ UNAVAILABLE ____ SINCE ____

COMMENTS

TECH SPEC ACTION STATEMENT

UNIT	EQUIPMENT	A/S NUMBER	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
1/2	FIRE BARRIERS	3.7.11.A	10-28-81 0001		
1/2	Units	ETS 2.1.3	1-21-83 2282		
1	FIRE DETECTION	3.3.3.6	2-9-83 0953		
1	+ MTC	3.1.1.4 A	2-16-83 0001		

UNIT 1 SHIFT SUPERVISOR'S LOG

DATE 2/20/83 SHIFT 2315-2315 SHIFT SUP Robert Hallstrom/w chapter

UNIT STATUS MODE 3 Tave 546 °F

Rx Power 0 % RCS Press 2240 psig

Load 0 Mwe Gross Boron Conc. 1434 ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP
RCVG MT	2/20/83 1610	2/20/83 2130			

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
Fire Doors & Barriers	3.7.11	10/29/81 0001		
BOTH UNITS SHUTDOWN	ENV. 3.1.3(2)	1/21/83 2028		
CHARCOAL FILTER FREON	3.3.3.6	2/9/83 0255		
POSITIVE MTC	3.1.1.4a	2/16/83 0001		

Salem Unit 1/2 OD-18-B-1 MASTER Rev. 1

COMMENTS FOR TURNOVER

1) 12 CFCU Low Flow in High Speed (600) - Pd working on problem
2) 15 CFCU Low Flow - Pd investigating
3) Released S.S Tags on 1-5, 5-6 disconnects, 10 poles and spoke
4) Pd adjusted speed controller on 12 SBFP to prevent alot of oscillating at low Power.
5) Md Replaced 14 main steam stop valve unloader.
6) Latched turbine
7) 13 LP intercept valve has a E-H Leak md to work on valve on Sun mon.
8) Performed Turbine Auto Trip Mechanism Opertional Tests
   a) overspeed trip - 12 psi
   b) vacuum trip - 19 inches
   c) Thrust bearing trip - 80 psi
   d) low bearing oil trip - 6 psi
9) Pd repair Link on 14 BF 210
10) Rx trip at 2158 on 14 stm Gen Hi Hi lvl.
11) Before trip got overexcitation alarm - Relay department notified.
12) Hydrogen truck came in filled active and active reserve supply.

SENIOR SHIFT SUPERVISOR'S LOG 00f.

DAY Sunday

DATE 2-20-83 SHIFT 0700-1500 S.S.S. D. Jansen

UNIT 1 STATUS MODE 2 Rx Power 1% Load 0 Mwe Gross
Tave 548 °F RCS Press 2240 psig Boron Conc. 1428 ppm

COMMENTS 0832 Rx Trip from <1% power 12SG Lo Lo Level.
0943 Rx critical warm up Steam lines
0730 #1 Generator taps released - purging with CO_2, 1105 filling #1 Generator with H_2.

UNIT 2 STATUS MODE VI Rx Power 0 Load 0 Mwe Gross
Tave 90 °F RCS Press Head off psig Boron Conc. 2110. ppm

COMMENTS

UNIT 3 AVAILABLE ✓ UNAVAILABLE SINCE

COMMENTS

TECH SPEC ACTION STATEMENT

UNIT	EQUIPMENT	A/S NUMBER	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
1/2	FIRE BARRIERS	3.7.11.A	10-28-81 0001		
1/2	UNITS	ETS 2.1.3	1-31-83 2322		
1	FIRE DETECTION	3.3.3.6	2-9-83 0955		
1	+ MTC	3.1.1.4 A	2-16-83 0001		

UNIT 1 SHIFT SUPERVISOR'S LOG

DATE 2/20/83 SHIFT 0800-1600 SHIFT SUPV. OTT/

UNIT STATUS MODE 2 Tave 548 °F

Rx Power 2 % RCS Press 2240 psig

Load 0 Mwe Gross Boron Conc. 1428 ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP
11 CVCS MON TK.	2005 2/19/83	0220 2/20/83	0720 2/20/83	0830	1140

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
FIRE HOSE & BARRIERS	3.7.11	10/27/82 0001		
BOTH UNITS (SHUTDOWN)	T.S. 2.1.3 (2)	1/21/83 2028		
CHARCOAL FILTER FIRE DET.	3.3.3.6	2/9/83 0955		
POSITIVE MTC	3.1.1.4a	2/16/83 0001		

Salem Unit 1/2 OD-18-B-1 MASTER Rev. 1

COMMENTS FOR TURNOVER

1.) MAINT. HAS RELEASED THEIR TAGS OFF GENERATOR, HAVE STARTED TO PURGE THE GENERATOR WITH CO_2 → THEN WILL FILL WITH HYDROGEN AND CHECK FOR LEAKS

2.) #1 UNIT RX. TRIP ON #12 STEAM GENERATOR LOW-LOW LEVEL (I.R. WRITTEN)

3.) 0920 – COMMENCED UNIT #1 START UP

4.) 0943 - UNIT #1 REACTOR CRITICAL (BANK D @ 87)

5.) THE GENERATOR IS PURGED AND HAS BEEN FILLED WITH HYDROGEN, MAINT. (S. STEVENS) IS SNOOPING FOR LEAKS.

6.) #12 STEAM GENERATOR FEED PUMP SPEED IS OSILLATING IN MANUAL, PERFORMANCE IS WORKING.

7.) HYDROGEN HAS BEEN ORDERED, AIR PRODUCTS WILL BE COMING IN TODAY. ACTIVE SUPPLY AND ACTIVE RESERVE SUPPLY NEED TO BE FILLED.

UNIT 1 SHIFT SUPERVISOR'S LOG

DATE 2-20-83 SHIFT 2315-0715 SHIFT SUPV. W. CRANFRANT

UNIT STATUS MODE 2 Tave 547.4 °F

Rx Power 10^{-8} Amps % RCS Press 2240 psig

Load 0 Mwe Gross Boron Conc. 1104 ppm

COMMENTS

UNIT LOAD CHANGES

INITIAL CONDITIONS				FINAL CONDITIONS			
Rx Pwr%	Mwe	Time	Date	Rx Pwr%	Mwe	Time	Date
1.							
2.							
3.							

Reason for Load Changes
1.
2.
3.

RAD WASTE STATUS

TANK IDENT.	RECIRC/HOLDUP STARTED	ANALYSIS REQUESTED	ANALYSIS RETURNED	RELEASE START	TIME STOP
11 EVCST	RECIRC. 2/19/83 2005	2/20/83 0220			

TECH SPEC ACTION STATEMENTS

EQUIPMENT	A/S NO.	DATE/TIME ENTERED	DATE/TIME TERMINATED	DATE/TIME OF EXPIRATION
FIRE DOORS & DAMPERS	3.7.11	12/29/81 2221		
SITE AREA SHUTDOWN	ENC. 2.1.2(2)	1/21/83 2021		
CHARCOAL FILTER FIRE DET.	3.3.3.6	2/9/83 0955		
POSTERS MTG	3.1.1.4	2/1/83 2021		

MASTER

COMMENTS FOR TURNOVER

- 12 CHILLED WTR. PUMP DISCHARGE GAGE PIGTAIL - COMPLETE.
- WORK ON 1ESCB COMPLETED & TAGS REMOVED
  11A, 12A, 13B - SCREENS F/L, CONDENSER WATERBOXES REMOVED & CIRCULATORS F/S
  GLAND SEALING STEAM ON TURBINE SCALE, VAC BKR. CLOSED & VAC. PP. F/S & PULLING VACUUM ON STM. SPACE
- 14 GA JET WTR - CLOSE AND MORE THAN 1/4 OPEN - NO SEWG - P.O. WORKING
- P.T. ACCIDENT MONITORING INSTRUMENTATION SURV. (IO #100104) - DONE
- 4.0.5 V-SW - WORKING
- VEA. READINGS FOR 4.0.5 P-CH (12 CHILLED WTR PUMP) - DONE - SAT.
- 4.0.5 P-CH (11 CHILLED WTR PUMP) - DONE - SAT

BLUE

SALEM GENERATING STATION UNIT 1 — FEB 20

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE:

TIME	APPARATUS	REMARKS:
	X-Shift	
	SSS	Rabl
	SS	Cianfrani
	NCO	Foehner, Bedah
	EO	Kowecki, M. Malany
	UO	P. Price / Mellott, Willenby / Dunn
	Fire Brigade	W. Malany, Crawford, Kowecki, Miller / Pompeer, Willaughby / Mellott
0107	CW	11A, 12B, 13B circulators I/S
0115	AR	12, 13, 14 vacuum pumps in service
0200	RCS	RCS boron 1429 ppm
0400	VC	Commenced cont. press. relief
632	VC	Secured cont. press. relief
		H. Rabl
0715	W-SHIFT	S^3 JANSEN
		S^2 HERRELL / OTT
		NCO LOUNSBURY — WOLK
		EO O'GRADY RODRIQUEZ
		FB SWOPE - BRAUCHLE - MELLOTT - McKEE - POMPER
0830	WL	LIQUID RELEASE LL-41-83
0832	Rx TRIP	Rx TRIP #2 S/G LOW LEVEL
0840	PRI CHEM	0700 SAMPLE CB 1414 ppm RCS
0917	Rx	Rx START-UP
		RCS TEMP 547°F
0920		START PULLING CONTROLE BANKS.
0923	RCS	1418 RCS 1410 PZR BORON.

(A) Use apparatus to provide a description of the event being logged.

(B) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: FEB 20 1983

TIME	APPARATUS	REMARKS:
0931		RCS TEMP. 547°F
0942		RCS TEMP 548°F
0943		Rx CRITICAL.
0948		Rx 10^{-4} AMPS. BANK C-215 BANK D 87
		RCS TEMP 548.2°F BORON P2R 1409 RCS 1428
1140	W.L.	LIQUID RELEASE ILL-41-83 TERMINATED
1205	SG.	START WARMING #12 SGFP
1220	LD 500KV	WORK ORDER 820 + 817 (500KW 1-5 + 5-6)
		WAS RELEASED
1255	VC	START PRESS RELIEF OF CONT.
1310	BF	START #12 SGFP
1334	AF	#11 + 12 AUX FEED PUMP O/S
1343	VC	TERMINATE CONT PRESS RELIEF
		Wayne E Palmer

Use apparatus to provide a description of the event being logged.

(s) The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

Page 4 of 4 Rev. 6

BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE:

IME	APPARATUS	REMARKS:
1500	Shift V	
	S^3	D. JANSEN / W. RAHL
	S^2	R. Gallaher W. ORRIEN (SRO)
	NCO	R. CORNMAN / F. Wiltsee
	E.O.	S. Duty E. PARKER
	U.O.	W. STEWART F. BECKER / M. MALONEY
	SSS	C. WARREN
	RWO	P. Williams
1619	RCS	Requested Chemistry to sample RCS for BORON
1659	RCS	RCS BORON 1434ppm
1815	TURB	#1 TURB LATCHED
1829	CFCU	FIRE ALARM #11 & #12 CFCU removed from service Fire Brigade Responding
1850	CFCU	#11 & #12 CFCU i/s Fire Brigade Reports NO Fire in Containment
1910	TURB	TURB reached 1800 cpm
1938	OI	OI III 1.3.7 Completed
		Overspeed TEST OIL Press = 12psig
		VACUUM Trip 19" VACUUM
		Low Brg Press Trip 6psig
		Thrust Brg Trip 80psig
1941	TURB	TURB relatched
1958	TURB	1800 cpm on TURB
2010	CN	#12 CN Pp ik

1 Use apparatus to provide a description of the event being logged.

1 The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

BLUE

SALEM GENERATING STATION UNIT 1

OPERATIONS LOG 1 | CONTROL ROOM DAILY LOG | DATE: 2-20-83

TIME	APPARATUS	REMARKS:
2028	TURB	MANUALLY TRIPPED TURB
		P.D. WORKING ON #14 STOP VALVE
2029	TURB	TURB relatched
2030	TURB	TURB TRIP # 11 S/G Hi Hi lvl
2140	TURB	relatched Turb
2150	TURB	TURB @ 1800 rpm
2158	Rx	Rx trip - UNDER INVESTIGATION
2217	CN	#12 CN Pp o/s
		Robert A Carr

- Use apparatus to provide a description of the event being logged.
- The CO need only sign the remarks page once immediately following his last entry at Shift Relief.

Page 4 of 4 Rev. 6

A95

PSEG

Public Service Electric and Gas Company P.O. Box E Hancocks Bridge, New Jersey 08038

Salem Generating Station

September 8, 1982

Entered 9/15/82 K.

Mr. R. C. Haynes
Regional Administrator
USNRC
Region 1
631 Park Avenue
King of Prussia, Pennsylvania 19406

Dear Mr. Haynes:

LICENSE NO. DPR-75
DOCKET NO. 50-311
REPORTABLE OCCURRENCE 82-072/03L

Pursuant to the requirements of Salem Generating Station Unit No. 2, Technical Specifications, Section 6.9.1.9.b, we are submitting Licensee Event Report for Reportable Occurrence 82-072/03L. This report is required within thirty (30) days of the occurrence.

Sincerely yours,

H. J. Midura

H. J. Midura
General Manager -
Salem Operations

RH:ks 952

CC: Distribution

The Energy People

95-2189 (20M) 11-81

Report Number: 82-072/03L

Report Date: 09-08-82

Occurrence Date: 08-20-82

Facility: Salem Generating Station, Unit 2
Public Service Electric & Gas Company
Hancocks Bridge, New Jersey 08038

IDENTIFICATION OF OCCURRENCE:

Reactor Trip System - Reactor Trip Breaker "B" - Inoperable.

This report was initiated by Incident Report 82-246.

CONDITIONS PRIOR TO OCCURRENCE:

Mode 1 - Rx Power 82% - Unit Load 890 MWe.

DESCRIPTION OF OCCURRENCE:

At 2000 hours, August 20, 1982, during surveillance testing of Solid State Protection System (SSPS), Train "B", it was discovered that Reactor Trip Breaker "B" would not trip as required. The channel was declared inoperable and Limiting Condition for Operation Action Statement 3.3.1 Action 1 was entered at 2000 hours. At 2040 hours, a power reduction was commenced in compliance with the limiting condition for operation. An unusual event was entered due to a shutdown required by a limiting condition for operation. Only the automatic trip function was inoperable. The manual trip function was unaffected.

DESIGNATION OF APPARENT CAUSE OF OCCURRENCE:

The cause of the Reactor Trip Breaker malfunction was determined to be failure of the Undervoltage (UV) coil. The UV coil is electrically in line for the trip function of the breaker. Malfunction of the coil prevented the breaker from tripping on a signal from the Solid State Protection System.

ANALYSIS OF OCCURRENCE:

The operability of the protective and Engineered Safety Feature (ESF) Instrumentation Systems and interlocks ensure that; 1) the associated ESF action and or reactor trip will be initiated when the parameter monitored by each channel or combination thereof reaches its setpoint, 2) the specified coincidence logic is maintained, 3) sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance, and 4) sufficient system functional capability is available for protective and ESF purposes from diverse parameters.

ANALYSIS OF OCCURRENCE: (continued)

The operability of these systems is required to provide the overall reliability, redundancy and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the accident analysis. Redundant reactor trip capability is provided by another independent channel. Therefore, this occurrence involved no risk to the health and safety of the general public.

Action Statement 3.3.1 Action 1 requires:

> With the number of operable channels one less than required by the minimum channels operable requirement, be in hot standby within 6 hours; however, one channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.1.1 provided the other channel is operable.

Inoperability of one reactor trip channel, therefore, constitutes operation in a degraded mode permitted by a limiting condition for operation, and is reportable in accordance with Technical Specification 6.9.1.9.b.

CORRECTIVE ACTION:

The Reactor Trip Breaker was replaced with an "A" Train Bypass Breaker. The surveillance test was satisfactorily completed, and Limiting Condition for Operation Action Statement 3.3.1 Action 1 was terminated at 2206 hours, August 20, 1982. The undervoltage coil was replaced and the SSPS Train "B" Reactor Trip Breaker was reinstalled and tested satisfactorily.

FAILURE DATA:

Westinghouse Electric Corporation
Type "A" Breaker
Model DB-50

Prepared By R. Heller

W. J. Sheehan
General Manager -
Salem Operations

SORC Meeting No. 82-82

LICENSEE EVENT REPORT

CONTROL BLOCK: (1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

N J S G S 2 (2) 0 0 - 0 0 0 0 0 - 0 0 (3) 4 1 1 1 1 (4) (5)

LICENSEE CODE (14–15) LICENSE NUMBER (25–26) LICENSE TYPE (30) CAT (57–58)

REPORT SOURCE: L (6) 0 5 0 0 0 3 1 1 (7) 0 8 2 0 8 2 (8) 0 9 0 8 8 2 (9)

(60–61) DOCKET NUMBER (62–68) (69–74) EVENT DATE (75–80) REPORT DATE

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

At 2000 hours, August 20, 1982, during surveillance testing, it was discovered that Reactor Trip Breaker "B" would not trip as required. The channel was declared inoperable and Action Statement 3.3.1 Action 1 was entered at 2000 hours, August 20, 1982. At 2040 hours, a power reduction was commenced in compliance with the Action Statement.

SYSTEM CODE (11)	CAUSE CODE (12)	CAUSE SUBCODE (13)	COMPONENT CODE (14)	COMP. SUBCODE (15)	VALVE SUBCODE (16)
I A (9–10)	E (11)	A (12)	C K T B R K (13–18)	A (19)	Z (20)

LER/RO REPORT NUMBER (17)	EVENT YEAR		SEQUENTIAL REPORT NO.		OCCURRENCE CODE	REPORT TYPE		REVISION NO.
	8	2	— (23)	0 7 2 (24–26)	/ (27)	0 3 (28–29)	L (30)	— (31)	0 (32)

ACTION TAKEN	FUTURE ACTION	EFFECT ON PLANT	SHUTDOWN METHOD	HOURS (22)	ATTACHMENT SUBMITTED	NPRD-4 FORM SUB.	PRIME COMP. SUPPLIER	COMPONENT MANUFACTURER
B (18)	Z (19)	B (20)	Z (21)	0 0 0 0 (33–40)	Y (23)	N (24)	N (25)	W 1 2 0 (26) (41–47)

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

The cause was failure of the undervoltage (UV) coil. The Reactor Trip Breaker was replaced with an "A" Train Bypass Breaker and the surveillance was satisfactorily performed. Action Statement 3.3.1 Action 1 was terminated at 2206 hours, August 20, 1982. The UV coil was replaced and Reactor Trip Breaker "B" was reinstalled and satisfactorily tested.

FACILITY STATUS: E (28) — % POWER: 0 8 2 (29) — OTHER STATUS (30): NA — METHOD OF DISCOVERY: B (31) — DISCOVERY DESCRIPTION (32): Routine Surveillance

ACTIVITY RELEASED: Z (33) — CONTENT OF RELEASE: Z (34) — AMOUNT OF ACTIVITY (35): NA — LOCATION OF RELEASE (36): NA

PERSONNEL EXPOSURES — NUMBER: 0 0 0 (37) — TYPE: Z (38) — DESCRIPTION (39): NA

PERSONNEL INJURIES — NUMBER: 0 0 0 (40) — DESCRIPTION (41): NA

LOSS OF OR DAMAGE TO FACILITY — TYPE: Z (42) — DESCRIPTION: NA

PUBLICITY — ISSUED: N (44) — DESCRIPTION (45): NA

NRC USE ONLY

NAME OF PREPARER: R. Heller — PHONE: 609/935-6000 Ext. 3078

PSE&G

Public Service Electric and Gas Company P.O. Box E Hancocks Bridge, New Jersey 08038

Salem Generating Station

October 20, 1982

Mr. R. C. Haynes
Regional Administrator
USNRC
Region 1
631 Park Avenue
King of Prussia, Pennsylvania 19406

Dear Mr. Haynes:

LICENSE NO. DPR-75
DOCKET NO. 50-311
REPORTABLE OCCURRENCE 82-072/03X-1
SUPPLEMENTAL REPORT

Pursuant to the requirements of Salem Generating Station Unit No. 2 Technical Specifications, Section 6.9.1.9.b, we are submitting supplemental Licensee Event Report for Reportable Occurrence 82-072/03X-1.

Sincerely yours,

H. J. Midura

H. J. Midura
General Manager -
Salem Operations

RH:ks

CC: Distribution

The Energy People

95-2189 (20M) 12-80

Report Number: 82-072/03X-1

Report Date: 10-20-82

Occurrence Date: 08-20-82

Facility: Salem Generating Station, Unit 2
Public Service Electric & Gas Company
Hancocks Bridge, New Jersey 08038

IDENTIFICATION OF OCCURRENCE:

Reactor Trip System - Reactor Trip Breaker "B" - Inoperable.

This report was initiated by Incident Report 82-246.

CONDITIONS PRIOR TO OCCURRENCE:

Mode 1 - Rx Power 82% - Unit Load 890 MWe.

DESCRIPTION OF OCCURRENCE:

At 2000 hours, August 20, 1982, during surveillance testing of Solid State Protection System (SSPS), Train "B", it was discovered that Reactor Trip Breaker "B" would not trip as required. The channel was declared inoperable and Limiting Condition for Operation Action Statement 3.3.1 Action 1 was entered at 2000 hours. At 2040 hours, a power reduction was commenced in compliance with the limiting condition for operation. An unusual event was entered due to a shutdown required by a limiting condition for operation. Only the automatic trip function was inoperable. The manual trip function was unaffected.

DESIGNATION OF APPARENT CAUSE OF OCCURRENCE:

The cause of the Reactor Trip Breaker malfunction was determined to be binding of the Undervoltage (UV) coil solenoid. When the UV coil was deenergized the solenoid would not drop fully. This prevented the coil from tripping the breaker on a signal from the Solid State Protection System.

ANALYSIS OF OCCURRENCE:

The operability of the protective and Engineered Safety Feature (ESF) Instrumentation Systems and interlocks ensure that; 1) the associated ESF action and or reactor trip will be initiated when the parameter monitored by each channel or combination thereof reaches its setpoint, 2) the specified coincidence logic is maintained, 3) sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance, and 4) sufficient system functional capability is available for protective and ESF purposes from diverse parameters.

PSE&G

SALEM GENERATING STATION

INCIDENT REPORT

1.1 REPORT NO. 83-047

SECTION 1 – INITIATION 1.2 DATE 2/20/83 1.3 TIME 0830

1.4 REPORT SUBJECT

UNIT #1 – REACTOR TRIP – LOW LOW WATER LEVEL IN #12 S/G

1.5 UNIT 1 1.6 MODE 2 1.7 RX POWER 1% 1.8 UNIT LOAD 0MWe

1.9 DESCRIPTION OF EVENTS: ACTION STATEMENT NO N/A ENTERED N/A TERMINATED N/A

AT 0832, UNIT #1 EXPERIENCED A REACTOR TRIP DUE TO LOW LOW WATER LEVEL IN #12 STEAM GENERATOR. TRIP OCCURED AS OPERATORS WERE INCREASING POWER TO A FEW PERCENT IN PREPARATION FOR WARMING UP STEAM LINE.

TRIP OCCURED DUE TO UNDER-FEEDING OF STEAM GENERATORS BY OPERATOR.

THE NRC (MOURNING/LEO) WAS CALLED AT 0840 AND NOTIFIED OF TRIP, HOWEVER AN UNUSUAL EVENT WAS NOT DECLARED DUE TO RX. POWER < 20%.

1.10 RESULTS OR POSSIBLE RESULTS OF INCIDENT:

1.11 REPORTED TO SR. SHIFT SUPERVISOR BY

1.12 NOTIFIED OF THE INCIDENT: ☒ OPERATING ENGINEER OR ☐ 53 Days 0833 TIME 2-20-83 DATE

1.13 REPORT SUBMITTED David O. Jenn SR. SHIFT SUPERVISOR 2-20-83 DATE

SECTION 2 – FOLLOW-UP

2.1 SQAE NOTIFIED DATE 3-6-83

2.2 MAJOR CAUSE: ☐ EQUIPMENT FAILURE ☐ PROCEDURE INADEQUACY ☑ PERSONNEL ERROR ☐

2.3 INCIDENT CLASSIFICATION: ☐ REPORTABLE LER # ☑ NOT REPORTABLE

2.4 JUSTIFICATION OF CLASSIFICATION:

NO WRITTEN REPORT REQUIRED

REQUIRED NOTIFICATIONS MADE.

2.5 INCIDENT AND PROCEDURE REVIEW COMPLETE

2.6

OPERATING ENGR.	DATE	SQAE	DATE	CHIEF ENGR.	DATE
R					

DISTRIBUTION: MANAGER – SGS SHIFT SUPERVISOR SQAE CHIEF ENGR. MANAGER – QA

H-58

AP-6-1 REV. 6

SALEM GENERATING STATION
STATION OPERATIONS REVIEW COMMITTEE

9251175

NOTES OF MEETING

TIME: 1400 Hours **DATE:** September 8, 1982

PLACE: Conference Room **MEETING NO.:** 82-82

MATERIAL REVIEWED:

SEE ATTACHED

PRESENT:

L. Fry, Chairman
L. Catalfomo
J. Gueller
J. O'Connor
D. Ward
R. Dolan
F. Dickey
R. Heller, Secy.

UNREVIEWED SAFETY QUESTIONS (10CFR50.59(C)

YES _____ NO X

ITEMS:

DEFECTS AND NONCOMPLIANCES (10CFR21)

YES _____ NO X

ITEMS:

SEE ATTACHED SHEET(S) FOR NOTES OF MEETING

DISTRIBUTION:

Vice President - Nuclear
Chairman - NRB
Manager - Nuclear Training
Station Quality Assurance Engineer
On-Site Safety Review Group
SORC Secretary

L. Fry

CHAIRMAN/VICE CHAIRMAN,
OPERATIONS REVIEW COMMITTEE

H-59

DATE: September 8, 1982

MEETING NO.: 82-82

NOTES OF MEETING:

A. Licensee Event Reports

1. 82-064/03L - Unit 1 - This report documents notification from Westinghouse of a possible undetectable failure in the Solid State Protection System. An engineering evaluation is being performed.

2. 82-065/03L - Unit 1 - This report documents an occurrence of the Containment Radiation Monitoring System being inoperable. The cause was determined to be a torn filter paper which jammed the APD unit.

3. 82-072/03L - Unit 2 - This report documents an inoperable Reactor Trip Breaker. The cause was determined to be binding of the undervoltage coil solenoid. *

4. 82-091/01T - Unit 2 - This report documents a service water leak on No. 23 Containment Fan Coil Unit. The cause was erosion of the cooling coils by silt laden service water.

Upon evaluation, the Committee concludes the above items do not result in any unreviewed safety questions.

B. Response to NRC Items of Violation noted in the NRC Combined Inspection Evaluation 50-272/82-17, and 50-311/82-17

1. The following responses to NRC items of violations were reviewed by the Committee.

a. Violation A.1 - Failure to maintain and distribute as-built technical drawing information. Also, failure to update tagging information and operating procedures to incorporate changes to system configurations.

Response - The affected drawings and procedures were identified and are being updated. An evaluation of the Administrative Procedures concerning the above is being performed.

SA M GENERATING STATION
STATION OPERATIONS REVIEW COMMITTEE

9622386

NOTES OF MEETING

TIME: 1400 DATE: October 20, 1982

PLACE: Operations Conference Room MEETING NO.: 82-94B

MATERIAL REVIEWED:

See Attached

PRESENT:
L. Miller, Chairman
J. Jackson
J. O'Connor
G. Czuchnicki
R. MacWatters
J. Harrick
V. Gadzinski
B. Sennestrom*
R. VanderDecker*
R. Heller*
R. Frahm, Secy.

*Denotes Partial Attendance

UNREVIEWED SAFETY QUESTIONS (10CFR50.59(C)

YES ____ NO X

ITEMS:

DEFECTS AND NONCOMPLIANCES (10CFR21)

YES ____ NO X

ITEMS:

SEE ATTACHED SHEET(S) FOR NOTES OF MEETING

DISTRIBUTION:

Vice President - Nuclear
Chairman - NRB
Manager - Nuclear Training
Station Quality Assurance Engineer
On-Site Safety Review Group
SORC Secretary

L Miller

CHAIRMAN/VICE CHAIRMAN,
S H-61 OPERATIONS REVIEW COMMITTEE

9622387

DATE: October 20, 1982

MEETING NO.: 82-94B

NOTES OF MEETING:

A. Licensee Event Reports

1. 82-02/03X-1 - Unit 2 - This report documents inoperability of No. 2A1 Battery Charger with no apparent cause determined.

2. 82-04/03X-1 - Unit 1 - This report documents a positive reactivity addition without boration capability due to low boron concentration water draining out of the steam generators.

3. 82-042/03X-1 - Unit 1 - This report documents an occurrence in which operation of locked open Valves 12AF10 and 12AF86 was not properly restrained as required by the Technical Specifications.

4. 82-077/03L - Unit 1 - This report documents the inoperability of No. 15 Containment Fan Coil Unit due to silt plugging the service water flow transmitter sensing lines.

5. 82-027/03X-1 - Unit 2 - This report documents an occurrence in which the RCS water inventory was not performed within the interval required by the Technical Specifications due to routine xenon transient.

6. 82-072/03X-1 - Unit 2 - This report documents the inoperability of No. B Reactor Trip Breaker due to binding of the UV coil solenoid. *

7. 82-107/03L - Unit 2 - This report documents an occurrence in which the axial flux distribution went out of specification due to Valve 2ST1 drifting closed.

8. 82-110/03L - Unit 2 - This report documents the inoperability of the 100' Elevation Containment Air Lock due to problems with the seals and latch linkage.

9. 82-114/03L - Unit 2 - This report documents the inoperability of Radiation Monitors 2R11A, 2R12A and 2R12B due to a failure of the filter drive solenoid.

NOTES OF MEETING:

10. 82-115/03L - Unit 2 - This report documents the inoperability of No. 2A Diesel Generator due to a service water leak on a pipe cap on the oil cooler.

11. 82-116/03L - Unit 2 - This report documents the inoperability of the RCS subcooling monitor on two separate occasions due to malfunctions of the P-250 computer.

12. 82-117/03L - Unit 2 - This report documents the inoperability of No. 23 Containment Fan Coil Unit due to American oysters plugging Valve 23SW57.

13. 82-118/03L - Unit 2 - This report documents the inoperability of the Engineered Safety Feature Actuation System due to a low setpoint on No. 2C Vital Bus UV Relay.

14. 82-119/01T - Unit 2 - This report documents a containment service water leak on No. 21 Containment Fan Coil Unit due to erosion of the cooling coils by silt in the service water.

15. 82-120/01T - Unit 2 - This report documents a containment service water leak on No. 21 Containment Fan Coil Unit due to erosion of the cooling coils by silt in the service water.

16. 82-09/03X-1 - Unit 1 - This report documents planned inoperability of the Cardox Fire Suppression System for maintenance in the Diesel Generator areas.

Upon evaluation, the Committee concludes the above items do not result in any unreviewed safety questions.

B. Procedures and Revisions

1. Radiation Protection

a. RP4.018 Laundry Surveys - Revision 0 - This is a new procedure.

b. RP8.023 Use of the Radeco H-809 Air Samplers - Revision 2 - This revision updates the procedure to reflect current practices.

TO: L. TRIPP
FROM: [redacted] R. Summers

DAILY REPORT 1/7

Salem Unit ~~1, 3 and~~ 2
(DN ~~50-272 and~~ 50-311)

SRI FAX 1/7
ENS Call 1/6
1/7

Per MC 2515

AT 7:53 p.m. ON 1/6, THE UNIT TRIPPED FROM 46% POWER ON LOW LOW LEVEL IN STEAM GENERATOR 21. AT THE TIME, PREPARATIONS FOR TAKING 11 STATION POWER TRANSFORMER [redacted] OUT OF SERVICE WERE IN PROGRESS. AS PART OF THIS, 1H GROUP BUS WAS OPENED RESULTING IN THE LOSS OF THE OPERATING 1 AIR COMPRESSOR. IN ADDITION, 2 AIR COMPRESSOR FAILED TO START AUTOMATICALLY RESULTING IN A LOW CONTROL AIR PRESSURE AND THE CLOSING OF THE AIR OPERATED FEED REGULATING VALUES WHICH [redacted] RESULTED IN THE LOW LEVEL TRIP.

ALL SYSTEMS FUNCTIONED NORMALLY ON THE TRIP EXCEPT THAT 'A' REACTOR TRIP BREAKER FAILED TO TRIP OPEN. [redacted] THE OPERATORS NOTICED THE CLOSED INDICATION AND INVESTIGATED. THE 'A' TRIP BREAKER WAS FAILED CLOSED; HOWEVER APPROXIMATELY 25 MINUTES AFTER THE TRIP, THE BREAKER TRIPPED. FURTHER INVESTIGATION HAS DATERMINED THE PROBLEM TO BE A MECHANICAL/ELECTRICAL FAILURE IN THE BREAKER AND NOT IN THE C[illegible]

H-64

TO: L. TRIPP
FROM: L. NORRHOLM

Salem Unit[redacted] 2
(DN[redacted]
50-311)

DAILY REPORT 1/7
(CONTINUED)

Per MC 2515

THE 'A' REACTOR TRIP BREAKER FROM UNIT

1. AFTER CORRECTING THE TRIP BREAKER PROBLEM, UNIT START UP COMMENCED. THE REACTOR WAS CRITICAL AT 5:58 A.M. AND THE UNIT ON LINE AT 9:17 A.M. ON 1/7.

H-65

LICENSEE EVENT REPORT

CONTROL BLOCK: (1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

| | | |

ANALYSIS OF OCCURRENCE: (continued)

The operability of these systems is required to provide the overall reliability, redundancy and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the accident analysis. Redundant reactor trip capability is provided by another independent channel. Therefore, this occurrence involved no risk to the health and safety of the general public.

Action Statement 3.3.1 Action 1 requires:

> With the number of operable channels one less than required by the minimum channels operable requirement, be in hot standby within 6 hours; however, one channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.1.1 provided the other channel is operable.

Inoperability of one reactor trip channel, therefore, constitutes operation in a degraded mode permitted by a limiting condition for operation, and is reportable in accordance with Technical Specification 6.9.1.9.b.

CORRECTIVE ACTION:

The Reactor Trip Breaker was replaced with an "A" Train Bypass Breaker. The surveillance test was satisfactorily completed, and Limiting Condition for Operation Action Statement 3.3.1 Action 1 was terminated at 2206 hours, August 20, 1982. The undervoltage coil was replaced and the SSPS Train "B" Reactor Trip Breaker was reinstalled and tested satisfactorily.

FAILURE DATA:

Westinghouse Electric Corporation
Type "A" Breaker
Model DB-50

Prepared By R. Heller

General Manager -
Salem Operations

SORC Meeting No. 82-94B

PSE&G

Public Service Electric and Gas Company P.O. Box E Hancocks Bridge, New Jersey 08038

Salem Generating Station

January 27, 1983

Mr. R. C. Haynes
Regional Administrator
USNRC
Region 1
631 Park Avenue
King of Prussia, Pennsylvania 19406

Dear Mr. Haynes:

LICENSE NO. DPR-75
DOCKET NO. 50-311
REPORTABLE OCCURRENCE 83-001/03L

Pursuant to the requirements of Salem Generating Station Unit No. 2, Technical Specifications, Section 6.9.1.9.b, we are submitting Licensee Event Report for Reportable Occurrence 83-001/03L. This report is required within thirty (30) days of the occurrence.

Sincerely yours,

H. J. Midura
General Manager -
Salem Operations

RF:ks 757

CC: Distribution

The Energy People

Report Number: 83-001/03L

Report Date: 01-27-83

Occurrence Date: 01-06-83

Facility: Salem Generating Station Unit 2
Public Service Electric & Gas Company
Hancock's Bridge, New Jersey 08038

IDENTIFICATION OF OCCURRENCE:

Reactor Trip System - Reactor Trip Breaker A - Inoperable.

This report was initiated by Incident Report 83-009.

CONDITIONS PRIOR TO OCCURRENCE:

Mode 1 - RX Power 46 % - Unit Load 410 MWe.

DESCRIPTION OF OCCURRENCE:

At 1953 hours, January 6, 1983, during routine operation, a reactor trip occurred due to a low level in No. 21 Steam Generator. Following the trip, the Control Room Operator noticed that Reactor Trip Breaker A had failed to open on the trip signal. Breaker B had opened and de-energized the rod drive mechanisms resulting in the shutdown. Since Breaker A was inoperable, Limiting Condition for Operation 3.3.1 Action 1 applied.

With the reactor in a safe condition, the breaker was left in the closed position pending investigation of the problem. At 2018 hours, the operator observed that Breaker A had tripped with no operator action.

APPARENT CAUSE OF OCCURRENCE:

Investigation of the problem revealed that the trip breaker under voltage relay had malfunctioned. The problem apparently involved dirt or corrosion interfering with proper relay operation. Since the breaker is not frequently operated, insufficient self-cleaning of the relay mechanism occurred. Materials evidently accumulated and caused mechanical binding of the mechanism. A similar problem had been noted on August 20, 1982, and was documented in LER 82-072/03X-1.

ANALYSIS OF OCCURRENCE:

The operability of the Reactor Trip and Engineered Safety Feature Actuation Systems is required to provide the overall reliability, redundance, and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of these systems is consistent with the assumptions of the accident analyses.

ANALYSIS OF OCCURRENCE: (cont'd)

Limiting Condition for Operation 3.3.1 Action 1 requires:

> With the number of channels operable one less than required by the minimum channels operable requirement, be in hot standby within 6 hours; however, one channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.1.1 provided the other channel is operable.

Since the redundant trip breaker opened and the trip actually occurred, the incident did not involve any risk to the health and safety of the public. Due to the loss of redundancy, the event constituted operation in a degraded mode permitted by a limiting condition for operation. It is therefore reportable in accordance with Technical Specification 6.9.1.9b.

CORRECTIVE ACTION:

As a result of the trip, the unit entered Mode 3, and the limiting condition for operation no longer applied. The malfunctioning breaker was replaced with a spare from Salem Unit 1, and the new breaker was satisfactorily tested. The Reactor Trip System was returned to an operable status and a reactor startup completed at 0531 hours, January 7, 1983.

The breaker vendor was contacted concerning the problem; upon his recommendation the failed relay was cleaned, lubricated and readjusted. The breaker tested satisfactorily and was installed in Salem Unit 1 Reactor Trip System. To prevent future occurrences of this type, the breakers will be inspected during each refueling outage. The other Unit 1 breakers have been completed; Unit 2 breakers are scheduled for inspection during the present refueling.

FAILURE DATA:

Westinghouse Electric Corp.
Circuit Breaker
Model DB-50 Type A

Prepared By R. Frahm

General Manager -
Salem Operations

SORC Meeting No. 83-09

LICENSEE EVENT R[illegible]

CONTROL BLOCK: (1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

| | | |

APPENDIX I

Administrative Procedures

(Cross Referenced to Section 4 of Report)

Contents

I.1 Administrative Procedure AP-5 Operating Practice Program, Revision 13, September 22, 1982 . . . . . I-1

ADMINISTRATIVE PROCEDURES

REVISION STATUS

Administrative Procedure Number 5 Copy Number 35

Revision Number	Date of Revision	Entered by (Signature)	Date Entered
8	ISSUE		2/5/79
9	4/23/79		4/25/79
10	5/21/80		5/23/80
11	8/17/81	K. Venuto	8/31/81
12	3/23/82	K. Venuto	3/29/82
13	9/22/82	K Venuto	10/5/82

PSE&G

Public Service Electric and Gas Company P.O. Box E Hancocks Bridge, New Jersey 08038

Salem Generating Station

September 1, 1982

To: Distribution

Subject: NUREG-0737 SECTION I.A.1.3 - OVERTIME LIMITS FOR NUCLEAR POWER PLANT STAFF WHO PERFORM SAFETY-RELATED FUNCTIONS.

In order to incorporate the requirements of NUREG-0737 into the Salem Generating Station Administrative Procedures, the following minor changes are being made to AP-5, Operating Practices Program:

A. Auxiliary operators, health physicists, and key maintenance personnel have been included in the guidelines for overtime limitations.

B. A statement requiring overtime to be considered on an individual basis, except during extended shutdown periods, has been added.

The attached AP-5, Revision 13 shall be placed in the set in your possession and the AP Form 1-3 completed and returned to the Technical Manager. QAD approval has been coordinated on these changes.

H. J. Midura
General Manager -
Salem Operations

KW:ks
attachment

TABLE OF CONTENTS

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Attachment 1 Minimum Shift Composition

ADMINISTRATIVE PROCEDURES
SALEM GENERATING STATION
ADMINISTRATIVE PROCEDURE NO. 5
OPERATING PRACTICES PROGRAM

1.0 PURPOSE

This procedure describes the program governing the operation of the nuclear units (No. 1 and 2), the gas turbine (Unit No. 3) and the associated auxiliary equipment, to ensure conformance with applicable regulatory requirements.

2.0 SCOPE

This procedure is applicable to reactor operation during all modes, and to all phases of work performed by the various station departments as they interface with the Operations Department.

3.0 POLICY STATEMENT

The Vice President - Production has issued a Policy Statement concerning nuclear plant operations. This Policy Statement shall be reissued on an annual basis and states that:

> "The safety of the reactor core and the necessity to ensure that adequate cooling is provided under all circumstances shall transcend any other operating considerations with which operating personnel would normally deal. Because breaching of the reactor coolant boundary carries the potential for the release of radioactivity which could endanger the health and safety of the general public, the protection of the reactor core is dominant over all other considerations including, but not limited to, the reliability of the supply of electric energy and the protection of equipment in the generation and transmission systems".

4.0 DEFINITIONS

4.1 SRO - Senior Reactor Operator - An individual licensed by the NRC to direct the licensed activities of licensed operators.

4.2 RO - Reactor Operator - An individual licensed by the NRC to manipulate the controls of a reactor.

4.3 Licensed Operator - An individual possessing either an SRO or an RO license.

4.4 Control Room Area - Control Room area for SRO shall include: the total area of both Unit Control Rooms and associated Process and Protection Equipment Rack Rooms, both Computer Rooms, Senior Shift Supervisor's Office, Shift Supervisor's Office, Shift Clerk's Office and Control Room hallway.

4.5 Control Room - The Control Room for each unit shall include the following areas: the Unit Control Room, the Process and Protection Equipment Rack Room and the Computer Room.

4.6 Control Board Area - The area in which the Nuclear Control Operator has an unobstructed view of the control console, including instrumentation displays and alarms.

5.0 GENERAL REQUIREMENTS

5.1 Administrative functions that detract from or are subordinate to the management responsibility for ensuring the safe operation of the plant shall be delegated to station personnel not on duty in the Control Room.

5.2 All system valves shall be operated by Operations Department personnel only, except for those valves under the jurisdiction of the Technical Department such as instrument valves, control air valves and valves associated with the Condensate Polishing System, Demineralized Water System, Sampling System, etc. and the Radiation Protection Department such as the airlock doors and remote containment air sampling system.

5.3 The reactor shall not be taken critical following a reactor trip until a determination of the cause of the trip has been made and subsequently corrected. If a definite cause has not been clearly identified, the authorization for a reactor startup shall be obtained from the General Manager - Salem Operations, Assistant General Manager or the Operations Manager if the General Manager is unavailable.

5.4 Shift personnel shall:

5.4.1 Not manipulate instrument, control, or alarm setpoints other than in accordance with approved Operating Instructions or to assist in the completion of appropriate Technical Department (formerly Performance Department) or Maintenance Department procedures.

5.4.2 Respond conservatively to readings and control indications. All indications shall be treated as accurate readings until proven otherwise.

5.4.3 Review log readings to ensure proper and safe unit operation.

5.4.4 Notify the Senior Shift Supervisor or Shift Supervisor of any "out-of-spec" readings and/or abnormal or unusual conditions which indicate equipment degradation or improper system/equipment operation.

5.5 Assignment of Personnel

5.5.1 The assignment of shift personnel shall be determined by the Operations Manager, Operations Supervisor and the Senior Shift Supervisor. The number and classification of personnel assigned to each shift will be determined by station operating conditions and shall meet the minimum shift crew composition as required by Technical Specifications, Section 6.2.2. In addition to the considerations of available personnel, individual levels of skill, and operating requirements, the shift compliment shall be in compliance with the requirements of Title 10, Code of Federal Regulations, Part 50.54, Conditions of Licenses, Subsections (i), (j), (k), (l) and (m).

NOTE

Whenever either Unit is operating in Mode 1, 2, 3 or 4, a Senior Reactor Operator (SRO) shall be in the defined Control Room area at all times.

5.5.2 A site fire brigade of at least five (5) members shall be maintained on-site at all times. The fire brigade shall not include five (5) members of the minimum shift crew necessary for safe shutdown of the unit or any personnel required for other essential functions during a fire emergency. Fire brigade composition may be less than the minimum requirements for a period of time not to exceed two (2) hours in order to accomodate unexpected absence of fire brigade members, provided, immediate action is taken to restore the fire brigade to within the minimum requirements.

5.5.3 All CORE ALTERATIONS shall be directly supervised by an individual holding a Senior Reactor Operator License for the specific unit. This individual shall have no other responsibilities during this assignment and shall functionally report to the Duty Senior Shift Supervisor.

5.5.4 At least one licensed Operator shall be in the Control Board area when fuel is in the reactor.

5.5.5 During an emergency, oncoming shift personnel shall report to the on-site Operational Support Center (OSC) or any other locations, as directed by the Senior Shift Supervisor, Shift Supervisor or EDO. Upon reporting to the OSC, Operating personnel will notify the Senior Shift Supervisor or Shift Supervisor of their presence and await further instructions.

5.5.6 Shift crew composition, except for the Shift Supervisor position, may be one less than the minimum requirements of the Technical Specifications for a period of time not to exceed two (2) hours in order to accommodate unexpected absence of on-duty shift crew members provided immediate action is taken to restore the shift crew composition to within the minimum requirements of the Technical Specifications. This provision does not permit any shift crew position to be unmanned upon shift change due to an on-coming shift crewman being late or absent.

5.5.7 The position of Shift Supervisor must be filled at all times. In Modes 1, 2, 3 or 4 the individual filling the Shift Supervisor's position shall possess a valid SRO license; in Mode 5 or 6, the individual shall possess a valid RO or SRO license.

5.5.8 Limits shall be applied to the overtime for Licensed Operators, Auxiliary Operators, Health Physicists and key maintenance personnel (those maintenance personnel actually engaged in safety-related work). Enough plant personnel should be employed to maintain adequate shift coverage without routine heavy use of overtime. The objective is to have operating personnel work a normal 8 hour day, 40 hour week while the plant is operating. However, in the event that unforeseen problems require substantial amounts of overtime to be used, or during extended periods of shutdown for refueling, major maintenance or major plant modifications, on a temporary basis, the following guidelines shall be followed:

a) An individual should not be permitted to work more than 16 hours straight (excluding shift turnover time).

b) An individual should not be permitted to work more than 16 hours in any 24 hour period, nor more than 24 hours in any 48 hour period, nor more than 72 hours in any seven day period (all excluding shift turnover time).

c) A break of at least eight hours should be allowed between work periods (including shift turnover time).

d) Except during extended shutdown periods, the use of overtime should be considered on an individual basis and not for the entire staff on-shift.

5.5.9 Recognizing that very unusual circumstances may arise requiring deviation from the above guidelines, such deviation shall be authorized by the General Manager - Salem Operations or Assistant General Manager - Salem Operations, or higher levels of management. The paramount consideration in such authorization shall be that significant reductions in the effectiveness of operating personnel would be highly unlikely. Authorized deviations to the working hour guidelines shall be documented and available for NRC review.

5.5.10 In addition, procedures are encouraged that would allow licensed operators at the controls to be periodically relieved and assigned to other duties away from the control board during their tours of duty.

5.6 Shift turnover shall be in accordance with OMP-20, Shift Turnover Requirements, which shall comply with applicable "Lessons Learned" commitments and TMI Action Plan requirements.

6.0 RESPONSIBILITIES

6.1 Succession of Responsibility and Authority

The need for all personnel to have, at all times, a clear understanding of who is in charge of station operation is an obvious necessity for safe and reliable operation. The primary management responsiblity for safe operation of the station rests with the Senior Shift Supervisor under all conditions during his watch.

The Senior Shift Supervisor is in charge of his shift. All operating duties and responsibilities for operation of the units are his overall responsibility. He maintains an overview of the unit's status and condition, makes decisions, and directs operations by giving specific directions and responsibilities to his shift personnel. All personnel must have a clear understanding that the Senior Shift Supervisor is in charge and responsible for all station operations while he is on duty. The name of the duty Senior Shift Supervisor shall be entered in the Senior Shift Supervisors log.

This does not preclude the Operations Manager, Assistant General Manager or General Manager from giving instructions, directions, or orders; but such directives shall be issued through the Senior Shift Supervisor. He, in turn, is responsible for giving instructions and orders to the Shift Supervisor, Shift Supervisors-Engineers, Nuclear Control Operators, or any other operator on duty. It does not preclude department heads from making precautionary comments to the Nuclear Control Operators

Whenever two Senior Shift Supervisors are present, the one that is "on duty" is in charge and responsible for the overall station operation. He may assign the other Senior Shift Supervisor responsibility for a specific operation. Care should be taken to ensure that all shift personnel know who is responsible for specific operations at all times.

The Senior Shift Supervisor, Shift Supervisors, and Shift Supervisors-Engineers must remain free to survey and analyze all operating parameters. Intense involvement in any particular detail may run the risk of losing control and perspective of the overall operation. Hence, a supervisor who is compelled to "jump in" to prevent a misoperation or mitigate an unusual occurrence must quickly back away to survey all operating parameters so that he never loses sight of the entire operation.

Above all, only one person can be in charge and it must be clearly understood who that person is. To do otherwise will only create confusion and jeopardize the operation of the station.

6.2 Licensed Operators

6.2.1 The licensed operators on duty shall have the authority and responsibility to shutdown the reactor when he determines:

a) The safety of the reactor is in jeopardy.

b) A safety limit has been exceeded.

c) Operating parameters exceed any of the reactor protection circuit setpoints and automatic shutdown does not occur.

6.2.2 Licensed operators on duty shall:

a) Conduct all necessary plant related technical/administrative business in a manner that does not compromise professional attitude or attentiveness.

b) Ensure all materials and activities not directly job related are not used or conducted (i.e., radios, TV, alcohol or drugs, horseplay, hobbies, games or novels).

about the condition of the unit, such as "watch the low level in the pressurizer or steam generators" or "the temperature is getting too high." All specific instructions involving operating orders, such as "remove No. 11 Feed Pump" or "drop the load 30 megawatts" must, however, come from Operating Department management through the Senior Shift Supervisor as described above.

The Shift Supervisor or Shift Supervisor-Engineer is an extension of the authority and responsibility of the Senior Shift Supervisor. The Shift Supervisor or Shift Supervisor-Engineer maintains an overview of the unit's status and condition. In the areas of operation to which he is assigned, he is given the authority and responsibility to make decisions and direct operations by giving specific direction and responsibility to the shift personnel. All operating personnel are subject to the orders, direction and instruction of the Shift Supervisor or Shift Supervisor-Engineer as though he were the Senior Shift Supervisor. He coordinates the operation activities of the shift personnel with the Senior Shift Supervisor to avoid conflict of action and to assure that all operations are performed according to the orders, direction and instructions of the Senior Shift Supervisor.

The Nuclear Control Operator is responsible for the direct control and operation of his assigned unit as indicated in the existing job specifications. This often involves giving instructions, orders, and communicating with Equipment Operators and Utility Operators. For those units which have a "desk" operator and "board" operator assigned, the "board" operator is responsible for giving all Control Room directions, orders, and manipulations in the absence of the Senior Shift Supervisor, Shift Supervisor or Shift Supervisor-Engineer. The latter condition shall require the "board" operator to possess a valid SRO license during Modes 1, 2, 3, or 4 (see 6.4.1.d).

If under unique or emergency situations, senior licensed station management personnel determine it necessary to give orders directly to Nuclear Control Operators, they must immediately inform the Senior Shift Supervisor and all Control Room personnel that they have assumed responsibility for the unit. When responsibility is returned to the Senior Shift Supervisor, all shift personnel shall again be informed. The times of both actions shall be noted in the Senior Shift Supervisor's Log.

6.3 Operations Manager/Operating Engineer

The Operations Manager/Operating Engineer shall approve taking the reactor critical at any time. In the event the Operations Manager and Operating Engineer are not available, the General Manager may grant the necessary approval. The Operations Manager shall initiate an Inspection Order for the purpose of providing monthly inspections for the proper conduct of shift operations and for approving the inspection results.

6.4 Senior Shift Supervisor/Shift Supervisor

6.4.1 The Senior Shift Supervisor/Shift Supervisor shall:

a) Ensure operation in accordance with Technical Specifications.

b) Notify the appropriate management personnel and the appropriate agencies in accordance with AP-6, Incident Report and Reportable Occurrence Program, and EP I-1, Notification of Unusual Event.

c) Obtain additional personnel as required to assure safe operation of the station.

d) Designate an individual to assume the Control Room command function during his absence. In Modes 1, 2, 3 or 4, the individual shall possess a valid SRO license; in Modes 5 or 6, the individual shall possess either a valid RO or SRO license.

e) Ensure all personnel assigned to the shift are capable of performing the duties assigned.

f) In an emergency:

1) Direct Operations personnel to take the necessary action to minimize personnel injury, damage to the facility and to protect health and safety.

2) Make appropriate notifications in accordance with EP I-1, Notification of Unusual Event.

3) Remain free from individual details to ensure an overall view of operating parameters.

6.5 Nuclear Control Operators

6.5.1 One Nuclear Control Operator should be assigned as the "Control Board" Operator and one as the "Desk" Operator.

a) The "Control Board" Operator shall:

1) Not leave the Control Board Area except as required to obtain operating data.

2) Be present in the applicable Control Room and shall be responsible for operating the unit controls, equipment and maintaining the operating logs.

3) Not, under any circumstances, leave the surveillance area defined by the boundaries of the specific unit Control Room for any non-emergency reason (i.e., to confer with others on personal matters, review a blueprint in the file room, etc.) without obtaining a qualified relief operator.

4) Issue orders and instructions to Equipment Operators and Utility Operators pertaining to the proper operation of the reactor unit to which he is assigned.

5) Be responsible for all Control Room directions, orders and manipulations, in the absence of the Senior Shift Supervisor or Shift Supervisor.

6) In an emergency, monitor vital parameters, ensure all immediate automatic actions occur and perform all immediate manual actions.

b) The "Desk" Operator shall:

1) Perform the administrative functions of the Control Room (i.e., tagging requests, maintaining valve deviation log).

2) Maintain a narrative log of shift events.

3) Assist the "Control Board" Operator as required by plant conditions.

4) In an emergency:

(a) Read the appropriate Emergency Instruction to ensure all immediate automatic and manual actions have occurred.

(b) Direct and assist the "Control Board" Operator in completing the subsequent actions of the Emergency Instruction.

6.6 Shift Technical Advisor (STA)/Shift Supervisor-Engineer (SSE)

The STA/SSE shall:

6.6.1 Act as an advisor to the Senior Shift Supervisor primarily in assessing accident/transient occurrences.

6.6.2 Maintain a log book of all events pertaining to plant safety. The log should provide a chronology of significant occurrences and include the shift STA Data Sheets completed for each day. The log book shall be utilized in the shift turnover between STAs.

6.6.3 Check the reasonability of system parameter values for existing conditions and notify the Duty Senior Shift Supervisor of items requiring corrective action.

6.6.4 Investigate all outstanding (unclearable) alarms and notify the Duty Senior Shift Supervisor of subsequent findings to allow these alarms to be cleared.

6.6.5 Prepare reports of significant findings and recommendations for dissemination, as required, to the operating staff, Senior Nuclear Training Supervisor and to appropriate management personnel where additional actions (i.e., investigations or corrective actions) are required. This shall include any deficiencies discovered in a reactor system that is needed to mitigate or prevent the consequences of an Anticipated Transient without scram (ATWS). Reports shall be submitted to the Operations Manager with copies to the Assistant General Manager, Senior Nuclear Training Supervisor, On-Site Safety Review Group, General Manager - Nuclear Services and the Manager - Quality Assurance Operations and Maintenance.

6.6.6 Conduct an investigation of all incidents and initiate an Incident Report in accordance with AP-6, "Incident Report and Reportable Occurrence Program".

6.6.7 Perform verification of equipment status in accordance with AP-15, "Safety Tagging Program".

6.6.8 Review all Salem Licensee Event Reports (LER) and significant industry LER's.

6.6.9 Interface with the On-Site Safety Review Group, as required.

6.7 Equipment and Utility Operators

The Equipment and Utility Operators shall perform equipment observations and inspections, record operational data, perform surveillances, conduct valve manipulations and operate the equipment in accordance with approved Operating Instructions.

7.0 CONTROL ROOM REFERENCES

To assist Shift Operations personnel in the conduct of their duties, reference information related to any aspect of plant operation, safety, and administration is permitted in the Control Rooms. However, for the actual conduct of operations, only specific, approved reference information shall be used. To meet these needs, the specific reference information listed below shall be available in the Shift Supervisor's Office or Control Rooms:

Technical Specifications
Administrative Procedures
Station Plant Manual
Safety Manual
Security Manual
Operating Instructions
Computer Codes
Tank Graphs
Operations Directive Manual
Reactor Engineer's Manual
Fire Fighting Manual
RPS Logic Diagrams
Heat Tracing Alarm Book
Computer Test Programs
Steam Tables
Emergency Plan Procedures

Additional reference matter may be kept in the Control Room at the discretion of the Operations Manager. Typical of this category of reference documents are vendors manuals, training course notes, engineering handbooks, and technical texts.

7.1 Operations Directives Manual

The Operations Directives Manual specifies those routine directives and special directives necessary for the proper shift-to-shift and day-to-day activities of the Operating Department. Operations directives shall be authorized only by the Operations Manager. All directives shall be consistent with Operating Instructions and Technical Specifications.

7.2 Night Order Book

A Night Order Book shall be maintained in the Shift Supervisor's Office. This book should be used by the Operations Manager and Operating Engineer to provide written orders of a short-term nature to the Shift Supervisors. Such short-term items may include, but are not limited to: daily schedule matters, short-term operational plans, precautions of a special or short-term nature and special observation requirements or tests. Temporary instructions identified in the Night Order Book shall not conflict with approved procedures and instructions. Each days entry shall be signed and dated by the Operating Engineer or Operations Manager. After assuming shift duties, each Shift Supervisor shall read and initial the Night Order Book entries made subsequent to his last review, signifying that he has read and understands the orders.

7.3 Operations Logs and Checklists

Operations Logs and Checklists shall be completed by shift personnel as required. The log and checklist entries shall be neat, legible and acurate with all entries made in black ink. Corrections to logs and checklists shall consist of a line drawn through the incorrect entry, followed by the correct entry and initials of the performing individual. The Operations Directives Manual shall specify the correct use and handling of the Operations Department Logs and Checklists.

7.4 Control Room Visual Aids

Certain visual aids are authorized in the Control Rooms to assist the Operating Department. These include, but are not limited to:

7.4.1 Pressure Temperature Curve

7.4.2 IRPI Conversion Chart

7.4.3 Large Placard Drawings of Piping Systems

7.4.4 Recorder panel identification and alarm points

The Operating Engineer or Operations Manager may authorize additional items as necessary.

8.0 PROCEDURES

8.1 Procedure Adherence

All operations conducted by the Operating Department shall be in accordance with approved procedures. All procedural revisions and on-the-spot changes shall be accomplished in accordance with AP-3. The use of procedures shall be in accordance with OMP-36, Use of Operating Department Procedures.

8.2 Surveillance Procedures

Surveillance Procedures shall be performed in accordance with the applicable portions of the Technical Specifications. The execution of a Surveillance Procedure that involves the operation of equipment shall be done only with the concurrence of the Senior Shift Supervisor/Shift Supervisor. The Operations Directives Manual specifies the correct use and handling of the Surveillance Procedures. Surveillance Procedures for valve alignment shall include a requirement to notify the SQAE prior to beginning the surveillance.

8.3 Check-Off Sheets

The Check-Off Sheets are an aid to the shift personnel in determining the status of equipment and serve as guides when performing vital procedural steps. The completed Check-Off Sheets constitute a record of status determination and procedure performance.

Check-Off Sheets shall be completed as specified by the applicable Operating Instructions and/or Surveillance Procedures. The Operations Manager and/or applicable operating instructions shall prescribe the system check offs to be performed following major maintenance, refueling operations or extended outages. The Operations Directives Manual specifies the correct use and handling of these Check-Off Sheets.

9.0 ACCESS CONTROL

9.1 Control Room

The Senior Shift Supervisor and Shift Supervisor shall be responsible for maintaining control of personnel entering the Control Rooms. The Senior Shift Supervisor and Shift Supervisor shall have the authority to refuse entry or to direct personnel to leave the Control Room if their presence interferes with operations or may compromise

plant safety. The specific area beyond the red and white restriction signs in front of the control console is restricted to all personnel except the licensed operators on duty. Entry beyond this area requires the permission of the duty licensed operators.

9.1.1 During normal operating conditions, individuals shall be permitted entry into the Control Room only when specific duties require such entry (i.e. observing operations, conducting tests, performing maintenance, QA verification activities, etc.).

9.1.2 During emergency conditions, access to the Control Room shall be limited to those individuals responsible for the direct operation of the facility, technical advisors required to support operation, NRC Resident Inspectors and personnel specifically requested by the Senior Shift Supervisor or Shift Supervisor. During emergency conditions, Control Room access shall be limited to only authorized persons, not to exceed fifteen (15) persons in the Control Room at any time. The Senior Shift Supervisor or Shift Supervisor may request the assistance of the security force in controlling and limiting access to the Control Room.

9.2 Containment

A Containment Entry List shall be maintained in the affected Control Room to provide the operating shift personnel with a daily reference of who is in the containment of each unit after containment integrity has been established. The record shall contain the following information:

9.2.1 Date

9.2.2 Name of personnel entering

9.2.3 Time of entry

9.2.4 Time of exit

9.2.5 Airlock surveillance completed

9.3 Keys

9.3.1 Keys for the operation of certain switches, valves, and switchgear; components with special operational importance or safety significance, except for keys to high radiation areas, shall be maintained in a locked cabinet under control of the Senior Shift Supervisor/Shift Supervisor. A key identification list and a key log shall be maintained in the

Senior Shift Supervisor's Office. Before authorizing the use of a key, the Senior Shift Supervisor/Shift Supervisor shall ensure that the individual intending to use the equipment understands and is aware of the particular operational or safety requirements associated with the equipment. At the completion of the operation or task, the individual responsible for the key shall ensure that the lock control is in the proper position and return the key to the Senior Shift Supervisor/Shift Supervisor. The Senior Shift Supervisor/Shift Supervisor shall enter the following information in the key log: purpose for key issue, name of the individual utilizing the key, time of issue and time of return.

9.3.2 Keys to high radiation areas shall be maintained in key traps located in the Radiation Protection Office. The keys shall be under the control of the Senior Supervisor-Radiation Protection. Permission of the Senior Shift Supervisor/Shift Supervisor shall be required prior to use.

9.3.3 Keys for the entry into vital and protected area boundaries shall be under the control of the Security Supervisor and maintained in accordance with Section 10 of the Security Manual.

9.3.4 Key control for non-vital areas and equipment shall be maintained by the responsible department.

10.0 RECORDS

Operating Department generated records (i.e., Operating Logs, data sheets, checklists, Lifted Leads and Jumpers Log, etc.) shall be retained in accordance with AP-11, Record Retention Program.

11.0 REFERENCES

11.1 Regulatory Guide 1.114, Guidance on Being Operator at the Controls of a Nuclear Power Plant

11.2 NUREG 0660, Action Plans for Implementing Recommendations of the President's Commission and Other Studies of TMI-2 Accident

11.3 Code of Federal Regulations, Title 10, Energy

11.4 Salem Generating Station Technical Specifications

11.5 IE Circular No. 81-02, Performance of NRC Licensed Individuals While on Duty

11.6 ANSI 18.7, 1976, Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants

ATTACHMENT 1
MINIMUM SHIFT COMPOSITION

OTHER UNIT IN MODE 5 OR 6 OR DE-FUELED

UNIT 1

POSITION	APPLICABLE MODES	
	1,2,3 & 4	5 & 6
SS	1*	1*
SRO	1*	none
RO	2	1
AO	2	2**
STA	1	none
MAINTENANCE ELECTRICIAN	none	none

UNIT 2

POSITION	APPLICABLE MODES	
	1,2,3 & 4	5 & 6
SS	1*	1*
SRO	1*	none
RO	2	1
AO	3	2**
STA	1	none
MAINTENANCE ELECTRICIAN	1	none

OTHER UNIT IN MODES 1, 2. 3 OR 4

UNIT 1

POSITION	APPLICABLE MODES	
	1,2,3 & 4	5 & 6
SS	1*	1*
SRO	1*	none
RO	2	1
AO	2	1
STA	1*	none
MAINTENANCE ELECTRICIAN	none	none

UNIT 2

POSITION	APPLICABLE MODES	
	1,2,3 & 4	5 & 6
SS	1*	1*
SRO	1*	none
RO	2	1
AO	3***	1
STA	1*	none
MAINTENANCE ELECTRICIAN	1*	none

* - Individual may fill same position on both units.

** - One of the two required individuals may fill the same position on both units (total of 3 AO's).

*** - One of the three required individuals may fill the same position on both units (total of 5 AO's).

SS - Shift Supervisor with a Senior Reactor Operators License on applicable unit

SRO - Individual with a Senior Reactor Operators License on applicable unit

RO - Individual with a Reactor Operators License on applicable unit

AO - Auxiliary Operator

STA - Shift Technical Advisor

Except for the Shift Supervisor, shift crew composition may be one less than the minimum requirements for a period of time not to exceed two (2) hours in order to accomodate unexpected absence of on-duty shift crew members provided immediate action is taken to restore the shift crew composition to within the minimum requirements. This provision does not permit any shift crew position to be unmanned upon shift change due to an oncoming shift crewman being late or absent.

APPENDIX J

Design, Procurement and Technical Procedures and Instructions

(Cross Referenced to Section 5 of this Report)

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J.1 Seismic Testing of Electrical and Control Equipment, Westinghouse WCAP-7817 Supplement 6 . . . . . J-1

J.2 Seismic and Environmental Classification Instrumentation and Control CD-M-37 . . . . . J-2

J.3 Instruction Manual for Type DB-50 Air Circuit Breakers Westinghouse Document No. I.B. 33-850-3D J-13

J.4 Westinghouse - Nuclear Service Division Spare Parts Report . . . J-50

J.5 AP-19, Material Procurement, Receiving, Storage, Issue, Transfer Shipping and Service Program Revision 4 . . . . . J-61

J.6 Quality Assurance Instructions

QAI 2-1 Salem Q-List J-93
QAI 4-1 Procurement Document Control J-96
QAI 4-2 QAD Review and Approval of Specifications . . J-98
QAI 4-3 Review of Procurement Documents J-100
QAI 7-1 Procurement Control System J-110
QAI 2-14 QA for Environmental Qualification of Equipment J-116

J.7 NRC RI Inspection Report 50-272/77-04 Unresolved Item for Project Directive-7 . . . . . J-121

WCAP-7817
SUPPLEMENT 6

NES Class 3

SEISMIC TESTING OF ELECTRICAL AND CONTROL EQUIPMENT (TYPE DB REACTOR TRIP SWITCHGEAR)

Ref: 20

E. K. Figenbaum
E. L. Vogeding

August 1974

APPROVED: _____ APPROVED: _____

A. H. Imagawa, Manager
Electrical Power Systems

A. E. Blanchard, Manager
Reactor Control Systems

Work Performed Under Shop Order PGE 385

WESTINGHOUSE ELECTRIC CORPORATION
Nuclear Energy Systems
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PSE&G

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December 8, 1980

CD-M-37
Revision 3

SALEM NUCLEAR GENERATING STATION
NOS. 1 AND 2 UNITS
SEISMIC AND ENVIRONMENTAL CLASSIFICATION
INSTRUMENTATION AND CONTROLS

This document supersedes and voids CD-M37, Revision 2, issued December 7, 1973.

Attached is the official listing of the seismic and environmental classification for instrumentation and controls which are the responsibility of the Controls Division. Instrument schematics, selected electrical diagrams and control area arrangement drawings, serve as the basis for the classification list. A list of drawings for which classifications have been completed is also attached. Revisions to this document will be issued as necessary.

The following definitions apply for the seismic/ environmental classification of equipment:

Seismic Class I

Applies to equipment which is essential to the safe shutdown and isolation of the reactor or whose failure or damage could result in a significant release of radioactive material. This includes equipment which initiates reactor trip and containment isolation, actuates engineered safeguards and maintains post-accident cooling and heat removal.

Environmental Class A

Applies to equipment mounted within the reactor containment but which does not have to operate in a post - loss of coolant accident (LOCA) environment.

The Energy People

Environmental Class B

Applies to equipment mounted within the reactor containment and which must operate in a post-LOCA environment.

Environmental Class C

Applies to safety-related equipment located outside of the reactor containment and which must operate in the normal and transient environmental conditions anticipated at its location.

Environmental Class P

Applies to equipment mounted in or on piping (control valves (1), flow elements, temperature elements, etc.) to indicate that it must conform to the respective piping design conditions.

There are seismic/environmental classifications of equipment for each drawing on the attached list. Each page of the document has its reference drawing number, system and code. The equipment is listed by item number, a brief description, its location and the seismic/environmental classification. In addition, the manufacturer and model number are given with respective specification sheet documents and applicable seismic qualifaction documents.

The pages of the document are grouped by reference drawing number in three sections - instrument schematics, electrical diagrams and control area arrangement drawings.

(1) Control valves are also given an environmental classification of A, B, or C, whichever applies, placed in parenthesis next to the P Classification which indicates that the valve operator and controls must remain functional for the indicated environmental conditions.

All safety-related control equipment is Seismic Class I, and must remain functional during and/or following a seismic event. Some control equipment (control valves, flow elements, rotameters, thermowells, etc.) must meet seismic requirements because it is part of a piping system which must remain intact (structurally) during a seismic event. This equipment is listed as Seismic Class I/Environmental Class P, in the document with the remark of "SCI Pipe" to indicate that the equipment does not perform a safety control function nor is it required to remain functional but must only meet the seismic requirements of

the piping system. These devices are not required to meet all pertinent requirements of "safety-related" equipment. Seismic Class I, items with no remarks concerning seismic classification of piping are "safety-related" equipment and must satisfy all applicable requirements.

Items listed from the instrument schematics include specification sheet documents and seismic qualification documents if applicable. These documents are listed by a reference code. The seismic qualification references are listed in the attached Table I, with the document's title, identification and equipment qualified. The specification sheet reference of W 9.31 (etc.) indicates the Westinghouse specification sheet for Westinghouse supplied items. Valve specification sheets are listed in the attached Table II, with the document's title, identification and remarks. A valve specification reference of A-116, indicates that specification Sheet 116, of Reference A, is applicable.

The following notes and criteria pertain to the seismic/ environmental classification:

1. Equipment for which the Controls Division is responsible is listed - this includes instrumentation, controls, diaphragm operated valves, flow elements and temperature elements which peform a safety-related function.

2. Equipment that is listed Seismic Class I, is considered "safety-related" unless indicated Seismic Class I, for piping considerations.

3. Equipment mounted on the control console (as indicated on the instrument schematic) is not listed individually in the classification document since these have already been qualified on a generic basis for Seismic Class I, conditions. (See Seismic Qualification Document, Reference 11).

4. All equipment located within the containment is classified either Seismic Class I, or Non-Seismic (N) and assigned an environmental class of A or B, whichever applies. A Non-Seismic (N) classification indicates that the item is not safety-related. All equipment mounted within the containment is listed individually so that the environmental classification of the equipment is documented.

5. Safety-related equipment located outside of the reactor containment is listed as Seismic Class I, along with its Environmental Class C. Non-safety related equipment located outside of the reactor containment is not given an environmental classification and is not listed in the classification document. This equipment only operates under normal conditions.

6. Only equipment with a seismic/environmental classification is individually listed for each drawing. Equipment requiring no seismic/environmental classification is specified generally as having no classification and included in the listing.

7. Temperature elements, thermowells, etc., are not listed individually in the classification document unless part of the protection system. These items must meet the applicable requirements of the piping system in which they are located.

8. Instrumentation which is a part of the protection system is identified in the classification document by listing it as an "input to SSPS."

9. Equipment classifications are listed for Unit 1, equipment only unless indicated otherwise. Unit 2, equipment classifications are identical to those of Unit 1.

10. Equipment classifications, "YES-F" and "YES-N", which appear on the instrument and valve lists, signify safety-related functional and nonfunctional respectively. Functional means that the equipment has to function for a safe shutdown; nonfunctional means that the equipment has to meet the seismic criteria but does not have to function for a safe shutdown.

The Westinghouse Specification Sheets A and B, are also attached. Specification Sheet A, describes the requirements for equipment of Environmental Class A. Specification Sheet B, describes the requirements for equipment of Environmental Class B. Environmental Class C, equipment requirements are specified by the sponsor engineer for the anticipated normal and transient environmental conditions at the equipment location. Most items of Environmental

Class C, are standard manufacturer's models and do not have any special requirements. Items which must meet specified environmental requirements are listed as such in the classification document.

Any additions or revisions to this Seismic/Environmental Classification list will be in the form of Addenda to CD-M-37, with the appropriate information and instructions attached.

R. L. Gura.
R. L. Gura
Salem Controls Project Sponsor

RLG:sw

Distrubution

Chief Controls Engineer
Asst. Chief Controls Engineer
Manager - Salem Project
Gen. Mgr. - Quality Assurance
CD-M- Standard Distribution
Salem Controls Engineers (systems only)

P8204/04 02/06

PSEG

Public Service Electric and Gas Company 80 Park Place Newark, N.J. 07101 Phone 201/622-7000

December 7, 1973

CD-M-37
Revision 2

SALEM NUCLEAR GENERATING STATION
NOS. 1 AND 2 UNITS
SEISMIC AND ENVIRONMENTAL CLASSIFICATION
INSTRUMENTATION AND CONTROLS

This document supersedes and voids CD-M-37, Revision 1 issued June 13, 1973.

Attached is the official listing of the seismic and environmental classification for instrumentation and controls which are the responsibility of the Controls Division. Instrument schematics, selected electrical diagrams and control area arrangement drawings, serve as the basis for the classification list. A list of drawings for which classifications have been completed is also attached. Revisions to this document will be issued as necessary.

The following definitions apply for the seismic/environmental classification of equipment:

Seismic Class 1

Applies to equipment which is essential to the safe shutdown and isolation of the reactor or whose failure or damage could result in a significant release of radioactive material. This includes equipment which initiates reactor trip and containment isolation, actuates engineered safeguards, and maintains post-accident cooling and heat removal.

Environmental Class A Non S.R

Applies to equipment mounted within the reactor containment but which does not have to operate in a post - loss of coolant accident (LOCA) environment.

Environmental Class B Safety Related

Applies to equipment mounted within the reactor containment and which must operate in a post-LOCA environment.

Environmental Class C S. R.

Applies to safety-related equipment located outside of the reactor containment and which must operate in the normal and transient environmental conditions anticipated at its location.

Environmental Class P Non. S.R.

Applies to equipment mounted in or on piping (control valves (1), flow elements, temperature elements, etc.) to indicate that it must conform to the respective piping design conditions.

There are seismic/environmental classifications of equipment for each drawing on the attached list. Each page of the document has its reference drawing number, system and code. The equipment is listed by item number, a brief description, its location and the seismic/environmental classification. In addition, the manufacturer and model number are given with respective specification sheet documents and applicable seismic qualification documents.

The pages of the document are grouped by reference drawing number in three sections - instrument schematics, electrical diagrams and control area arrangement drawings.

(1) Control valves are also given an environmental classification of A, B, or C, whichever applies, placed in parenthesis next to the P classification which indicates that the valve operator and controls must remain functional for the indicated environmental conditions.

All safety-related control equipment is Seismic Class I and must remain functional during and/or following a seismic event. Some control equipment (control valves, flow elements, rotameters, thermowells, etc.) must meet seismic requirements because it is part of a piping system which must remain intact (structurally) during a seismic event. This equipment is listed as Seismic Class I/Environmental Class P in the document with the remark of "SC1 Pipe" to indicate that the equipment does not perform a safety control function nor is it required to remain functional but must only meet the seismic requirements of the piping system. These devices are not required to meet all pertinent requirements of "safety-related" equipment. Seismic Class I items with no remarks concerning seismic classification of piping are "safety-related" equipment and must satisfy all applicable requirements.

Items listed from the instrument schematics include specification sheet documents and seismic qualification documents if applicable. These documents are listed by a reference code. The seismic qualification references are listed in the attached Table I with the document's title, identification and equipment qualified. The specification sheet reference of W 9.31 (etc.) indicates the Westinghouse specification sheet for Westinghouse supplied items. Valve specification sheets are listed in the attached Table II with the document's title, identification and remarks. A valve specification reference of A-116 indicates that spec sheet 116 of reference A is applicable.

The following notes and criteria pertain to the seismic/environmental classification:

1. Equipment for which the Controls Division is responsible is listed - this includes instrumentation, controls, diaphragm operated valves, flow elements and temperature elements which perform a safety-related function.

2. Equipment that is listed Seismic Class I is considered "safety-related" unless indicated Seismic Class I for piping considerations.

3. Equipment mounted on the control console (as indicated on the instrument schematic) is not listed individually in the classification docume since these have already been qualified on a ge.eric basis for Seismic Class I conditions. (See seismic qualification document reference 11)

4. All equipment loc'ted within the containment is classified either Seismic Class I or Non-Seismic (N) and assigned an environmental class of A or B whichever applies. A Non-Seismic (N) classification indicates that the item is not safety-related. All equipment mounted within the containment is listed individually so that the environmental classification of the equipment is documented.

5. Safety-related equipment located outside of the reactor containment is listed as Seismic Class I along with its Environmental Class C. Non safety-related equipment located outside of the reactor containment is not given an environmental classification and is not listed in the classification document. This equipment only operates under normal conditions.

6. Only equipment with a seismic/environmental classification is individually listed for each drawing. Equipment requiring no seismic/environmental classification is specified generally as having no classification and included in the listing.

7. Temperature elements, thermowells, etc., are not listed individually in the classification document unless part of the protection system. These items must meet the applicable requirements of the piping system in which they are located.

8. Instrumentation which is a part of the protection system is identified in the classification document by listing it as an "input to SSPS."

9. Equipment classifications are listed for Unit 1 equipment only unless indicated otherwise. Unit 2 equipment classifications are identical to those of Unit 1.

The Westinghouse Specification Sheets A and B are also attached. Specification Sheet A describes the requirements for equipment of Environmental Class A. Specification Sheet B describes the requirements for equipment of Environmental Class B. Environmental Class C equipment requirements are specified by the sponsor engineer for the anticipated normal and transient environmental conditions at the equipment location. Most items of Environmental Class C are standard manufacturer's models and do not have any special requirements. Items which must meet specified environmental requirements are listed as such in the classification document.

Any additions or revisions to this seismic/environmental classification list will be in the form of addenda to CD-M-37 with the appropriate information and instructions attached.

R. L. Gura
Salem Controls Project Sponsor

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PALEM / LEAR GENERATING STATION
SEISMIC / ENVIRONMENTAL CLASSIFICATION
INSTRUMENTATION AND CONTROLS

CONTROL AREA ELEVATION 84'

SHEET 1 OF 1

EQUIPMENT IDENTIFICATION	DESCRIPTION	LOCATION	SEISMIC/ ENVIRON. CLASS	SEISMIC QUAL. DOCUMENT	REMARKS
1ADE	28V DC Distribution Cabinet	Control Area-El. 84	1-C	Ref. 6	
1CDE	"	"	1-C	Ref. 6	
	Reactor Trip Breaker	"	1-C		
1DDC	125V DC Distribution Cabinet	"	1-C	Ref. 6	

Instructions for Types DB-50, DBF-16 and DBL-50 Air Circuit Breakers



Westinghouse Electric Corporation

Switchgear Division, East Pittsburgh, Pa.

I.B. 33-850-3D, Effective May, 1970. Supersedes I.B. 33-850-3-C, March, 1966.

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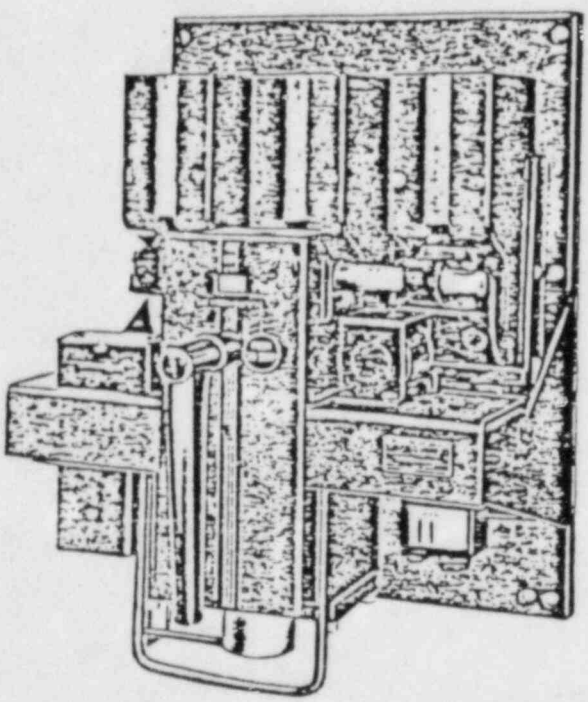
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eneral

ype "DB" air circuit breaker is designed
give continuous and reliable service as
e protective link between the power source
and associated productive equipment. This breaker is built to operate with a minimum of maintenance, while at the same time its simplified construction permits maximum accessibility for inspection and adjustment when required. The ease with which attachments may be added or removed is an outstanding feature of the "DB" design.

For the greatest measure of safety to operating personnel and also to minimize maintenance requirements, the breaker should be mounted in an enclosure suitable to local operating conditions. A selection of standard enclosures is available for various applications.

IMPORTANT: To assure proper functioning, inspect each breaker at regular intervals in accordance with a systematic maintenance schedule. The frequency and character of the inspections will for the most part be determined by the severity of the duty performed. The minimum requirements, however, should consist of a light monthly inspection, with a thorough inspection semi-annually. Occasional checks on calibration as well as on coordination and freedom of all moving parts, must be included in the maintenance schedule. Consult Westinghouse engineering and service personnel for recommendations pertaining to special operating or maintenance conditions.

PART 1 - RECEIVING, HANDLING, AND STORING

Type "DB-50" air circuit breakers, with all attachments mounted in place, are shipped in special cartons.

Important: To avoid damage to the breakers, do not use hooks in handling.

Net weights of Type DB-50 are given in Table No. 1 below.

TABLE NO. 1 – Type DB-50

	2-Pole	3-Pole
MANUAL	220 lbs.	280 lbs.
ELECTRIC	295 lbs.	355 lbs.

Add 20 Lbs. for Drawout Details.
Add 45 Lbs. for DBL Details.

Immediately upon receipt, examine shipment for any loss or damage incurred during transit. If injury or rough handling is evident, file a damage claim at once with the transportation company and notify the nearest Westinghouse Sales Office.

When unpacking, be sure that no loose parts are missing or left in the packing material. Report all shortages at once. Blow out any dust or particles of packing material that may have accumulated on the circuit breaker parts. Do not remove tape from top of arc chutes until breaker is to be placed in service.

INSPECTION

The "DB" breaker assembly consists of a coordinated group of sub-assemblies mounted on a steel supporting panel. The complete breaker assembly is to be mounted with the steel panel in a vertical position. All inspections for proper operation should, therefore, be made with the breaker in this position. Final inspection should preferably be made with the breaker in its permanent mounting.

Inspect the breaker as follows:

1. Raise and lower the trip bar by hand to make sure that it does not bind.

2. Rotate the manual operating handle slowly in a clockwise direction to move the contacts toward the closed position.

a. Observe whether all parts are in proper alignment and move freely.

b. Make certain that the studs have not been forced out of alignment.

c. Be sure that the contacts are clean and properly aligned. For a description of contact alignment, refer to "Contacts", Page 9.

3. If the contacts are in alignment and all parts move freely, continue the clockwise rotation until the breaker is latched.

4. Push the push-to-trip button to trip the breaker.

a. The toggle linkage should collapse and the moving contact assembly move freely to the full open position. This should be followed immediately by complete resetting of the links in the toggle mechanism.

b. The links must always be free to move without friction or binding.

5. Check the attachments for operation in accordance with the appropriate instructions as given under "Maintenance", Part 3 of this book.

NOTE: It is not advisable to lubricate any parts of the breaker. The lubrication supplied during factory assembly is sufficient for years of service. The lubricant is of a special form which is used sparingly. The addition of oil will only promote the accumulation of dust and dirt.

STORING

If circuit breakers are not to be installed in their permanent location at once, they should be carefully inspected for loose or damaged parts and then stored in a clean dry place in an upright position to avoid damage to the circuit breaker parts. A covering of paper will prevent dust from settling on the circuit breaker parts and is preferred to packing or other materials that are apt to absorb moisture. Remove the tape from the top of the arc chutes before placing in service.

PART 2 - INSTALLATION

Type "DB-50" circuit breakers are furnished as complete unit assemblies and the installation consists of: (1) bolting them to the supporting framework or structure; (2) connecting the current-carrying cables or bus bars; and (3) completing any secondary control wiring that may be necessary.

CAUTION: During installation, the circuit breaker should be in the open position. Be sure to de-energize the load and control leads to be connected, and also the section of the switchboard where installation is being made.

Mounting dimensions and details of the front enclosure cutouts are shown in Fig. 1.

To prevent distortion of the breaker panel, the supporting structure should be checked for alignment.

CONNECTIONS

Typical circuit breaker wiring diagrams are shown in Fig. 2. The connecting cables or bus bars should have adequate current-carrying capacity, otherwise, heat will be conducted to the circuit breaker resulting in possible excessive temperature rise. Connecting cables or bus bars must be supported so that the circuit breaker studs will not be subjected to unnecessary stresses.

The circuit breaker studs and all connections should be clean, smooth, and free from burrs to assure full contact area. They should be firmly clamped or bolted in place to prevent excessive heating.

TABLE NO. 2

Closing Solenoid Control Voltages, Tripping Currents, Closing Currents and Fuse Ratings

CLOSING COIL BURDEN	NOMINAL CONTROL VOLTAGE	CLOSING AMPERES	TRIPPING AMPERES	RECOMMENDED CLOSING FUSE AMPERE RATING STANDARD NEC		FUSE STYLE NUMBER
				250 VOLT	600 VOLT	
*STD.	24 DC	—	9.5			
	48 DC	—	5.0			
	125 DC	18	2.0	10		120A823H04
	250 DC	8	1.0	6		120A823H03
	230 AC	10	.5	6		120A823H03
	460 AC	5	.2			120A824H01
	575 AC	4	.3		3	120A824H01
	115 AC	20	1.	10		120A823H04

For A-C closing use 3 KVA source or larger. Supplied for breakers having dual overcurrent tripping devices (Long Delay - Instantaneous Type) or for breakers having dual selective overcurrent tripping devices (Long Delay - Short Delay Type) plus discriminator details.

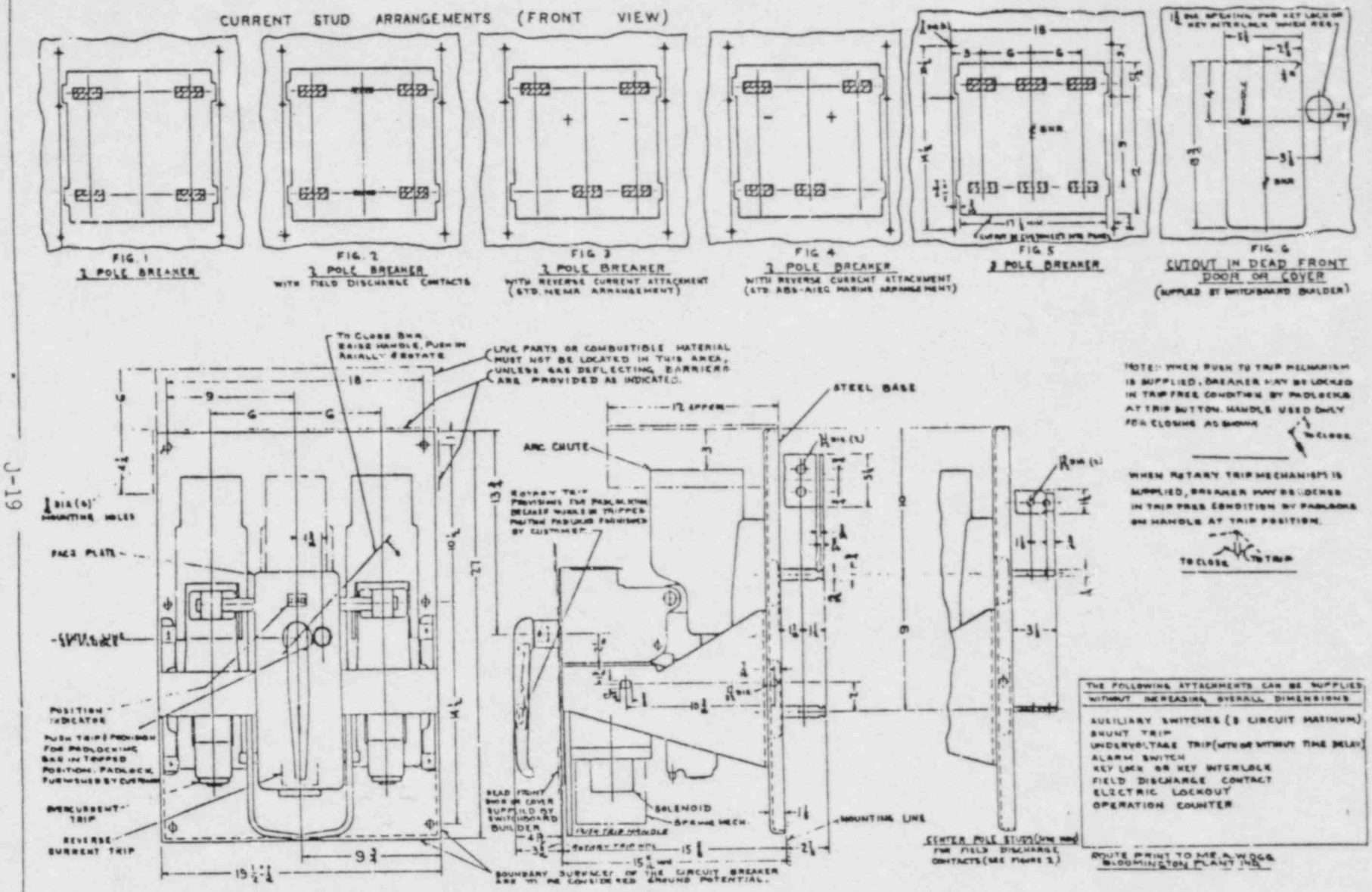


Fig. 1 - Type DB-50 Fixed Circuit Breaker Outline Dimensions and Mounting Details

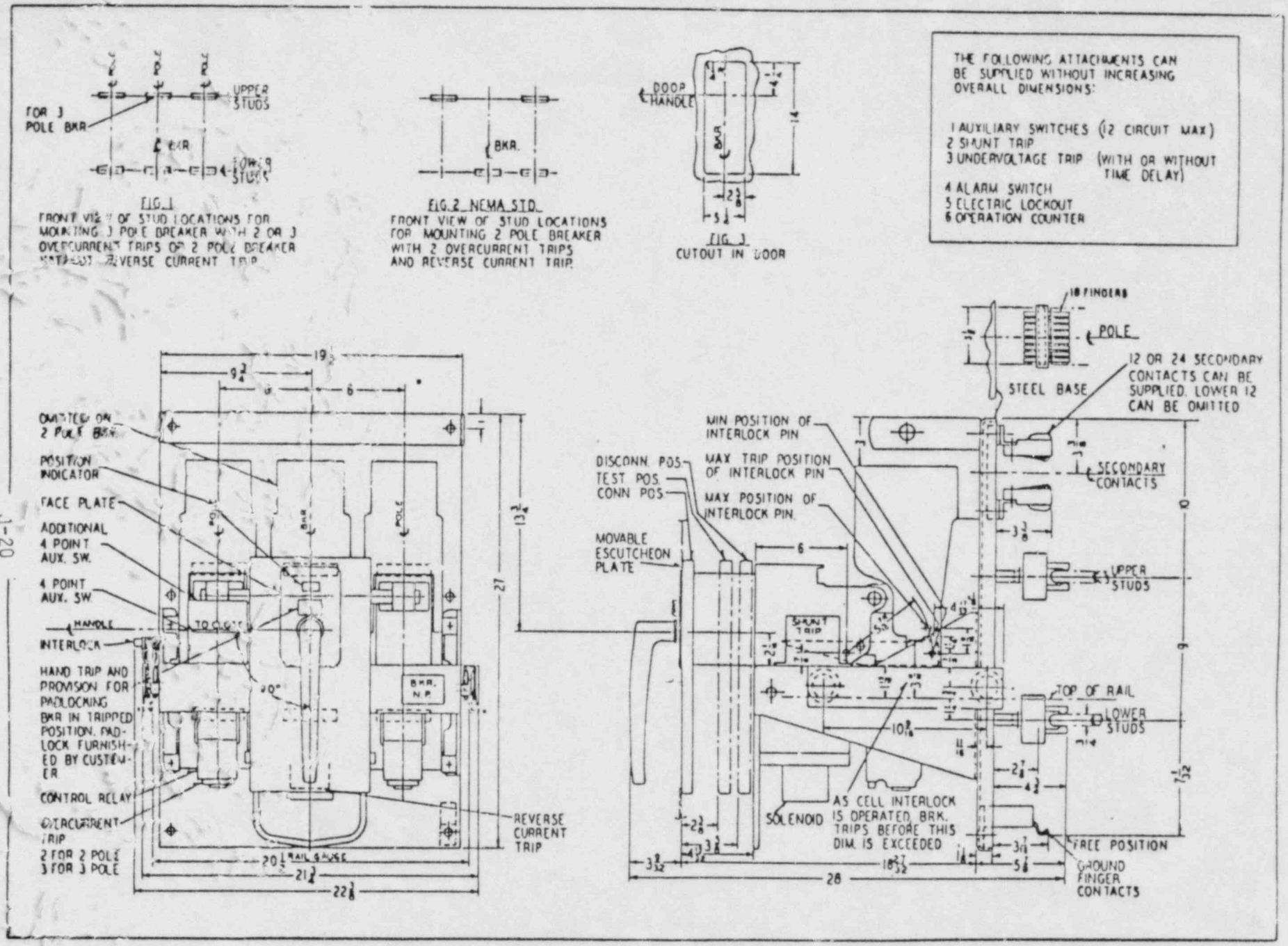


FIG. 1
FRONT VIEW OF STUD LOCATIONS FOR MOUNTING 3 POLE BREAKER WITH 2 OR 3 OVERCURRENT TRIPS OR 2 POLE BREAKER WITH 2 OVERCURRENT TRIPS AND REVERSE CURRENT TRIP

FIG. 2 NEMA SID.
FRONT VIEW OF STUD LOCATIONS FOR MOUNTING 2 POLE BREAKER WITH 2 OVERCURRENT TRIPS AND REVERSE CURRENT TRIP

FIG. 3
CUTOUT IN DOOR

Fig. 1A - Type DB-50 Three Position Drawout Outline Dimensions

PART 3 - MAINTENANCE

POLE UNIT

Each pole unit is mounted on a separate molded base through which the breaker studs pass. (See Fig. 3.) The molded bases are attached to the steel mounting panel and provide insulation for the breaker studs.

The upper stud and contact are attached to the molded base by two bolts. The moving contact is pivoted on the molded base and attached to the cross bar through insulating links. The series coil and lower stud are fastened to the molded base by four bolts.

Contacts. (See Fig. 3.)

The DB-50 arcing contact should touch first on closing, open last on opening. Contact pressure on the mains is maintained by adjusting gap G to be .050-.093 inches. This gap is adjusted by removing the cross bar and screwing the insulating link in or out on the stud. Be sure to tighten the lock nuts after each adjustment.

Do not over-adjust as this will cause the contact springs to compress to the solid position and thus increase the closing effort. Check for over-adjustment by prying the stationary arc tips open to at least 1/16-inch gap.

Maintenance of Contacts.

Rough or high spots should be removed with a file or sandpaper. To replace the arcing contacts, open the breaker, remove the arc chutes and then the stationary arcing contacts. Close the breaker and remove the moving arcing contacts. The new contacts can then be added in the reverse order.

CAUTION: All power should be removed when changing, maintaining or adjusting contacts.

OPERATING MECHANISM

The operating mechanism (see Fig. 3) is non-adjustable and consists of a series of non-ferrous links designed to secure low closing and tripping forces. To check for friction, raise the trip bar and slowly rotate the manual operating handle in close direction. The linkage should follow the handle without sticking.

A small quantity of lubricant is placed on the handle shaft, the roller lever roller, and the latch plate at the factory.

CLOSING SPRING ASSEMBLY

The closing spring assembly is shown in Fig. 3A.

Rotating the closing handle clockwise raises the lift link and lower spring guide to compress the closing spring. Near the end of the closing stroke the top end of the lift link strikes the first toggle lever to start the breaker closing. As the breaker closes, the push rod raises the toggle link and push link out of the toggle which permits the closing spring to complete the breaker closing.

Slow emergency operation to check the contact sequence can be obtained by exerting a slight closing pressure on the closing handle and simultaneously pushing forward on the breaker cross bar to start the breaker closing.

Maintenance

Oil the pins and slides every 10,000 operations.

CLOSING SOLENOID

The closing solenoid (see Fig. 14) is non-adjustable. It is designed for intermittent duty only. Check for loose bolts.

To remove closing coil, trip breaker. Disconnect closing coil leads from control circuit wiring. Take off bolts (9), washers (12), relay release arm (8), bolts (10), washers (11) and plate (2). Drop closing coil (7) with brass tube (5).

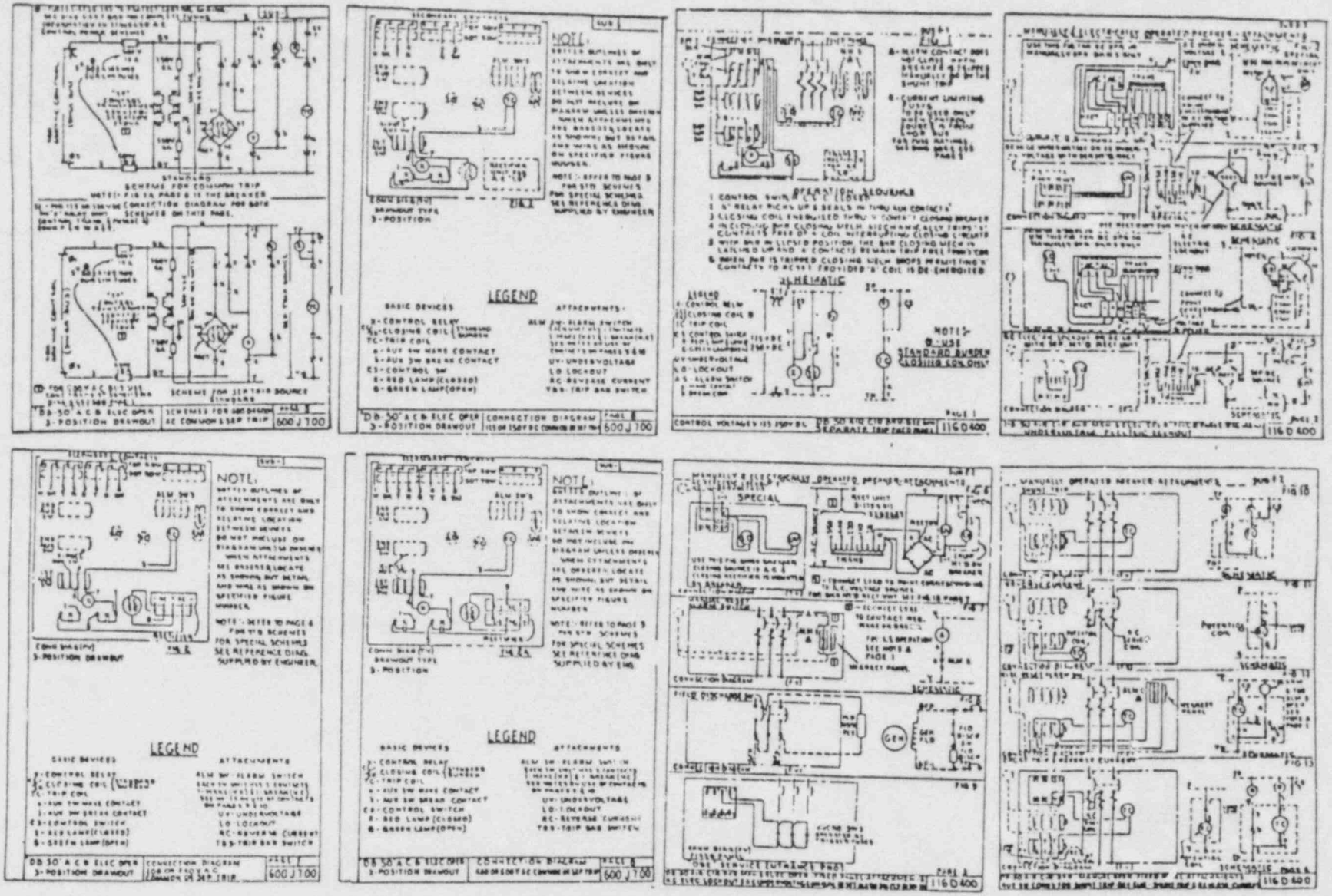


Fig. 2 - Typical Wiring Diagrams - Type DB-50 Circuit Breaker

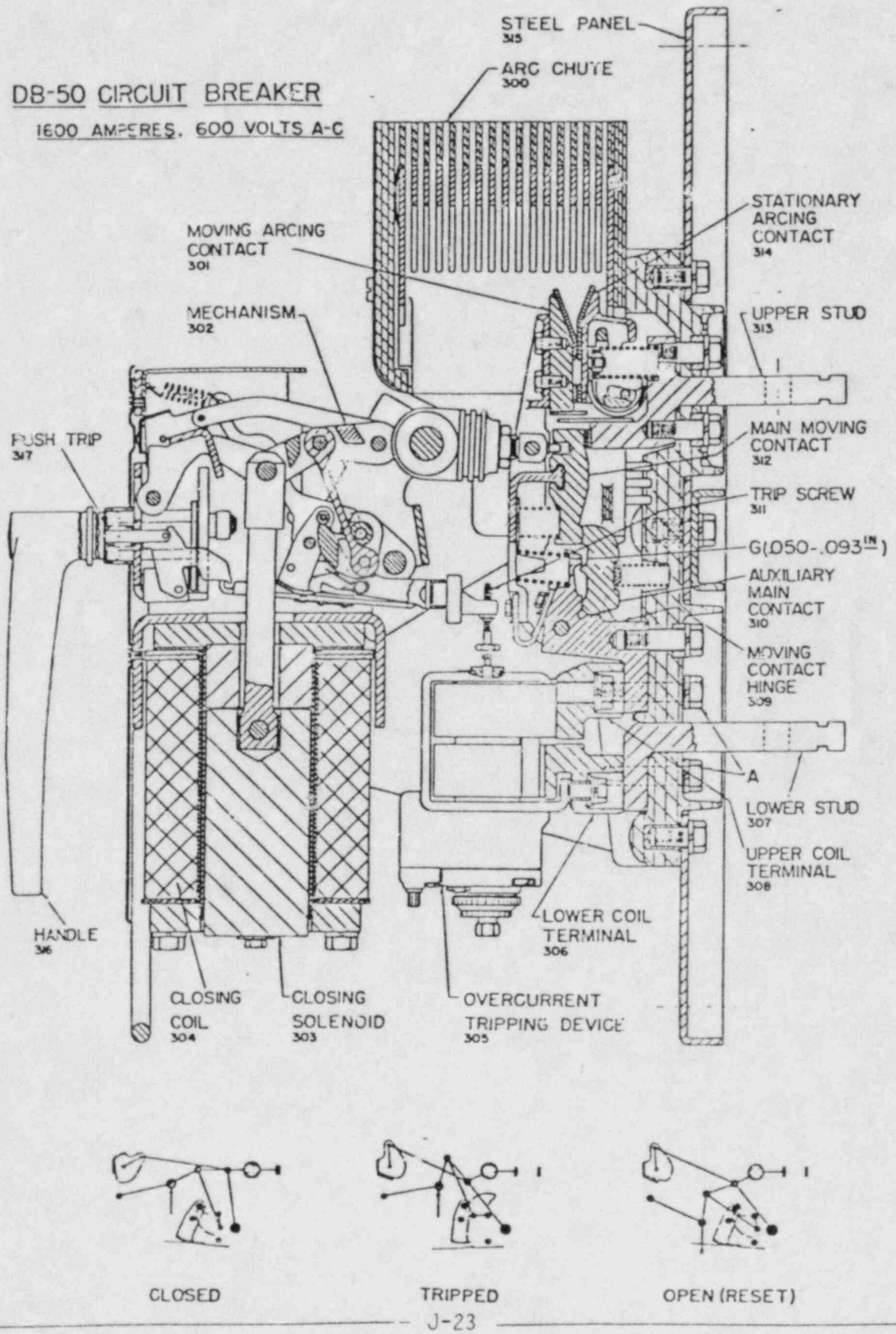


Fig. 3 - Cross-Sectional View of Type DB-50 Circuit Breaker

In replacing closing coil be sure to replace brass tube (5) so that stationary core (4) and moving core (3) are aligned in the tube. Re-assemble closing coil and details in reverse order from removal.

If the circuit breaker is permanently mounted near the floor so that the closing coil cannot be dropped far enough for removal then follow these directions. Trip breaker and remove breaker manual operating handle and breaker face plate. Disconnect closing coil leads from control circuit wiring. Take off bolts (9), washers (12), relay release arm (8), bolts (10), washers (11) and plate (2). Drop closing coil (7) with brass tube (5) so that pin (6) is exposed. Push pin (6) to right into hole on right hand side of solenoid yoke (1) and allow moving core (3) to drop into brass tube (5). Pick up closing coil with brass tube and moving core and bring out through the U-shaped foot on breaker.

Re-assemble closing coil and details in reverse order from removal. Take care to align stationary core (4) and moving core (3) in brass tube (5).

OVERCURRENT TRIPPING DEVICE

The overcurrent trip is an air delayed device that can be supplied with various rating coils ranging from 200 to 1600 amperes. The construction, except for the coils, is similar for all ratings.

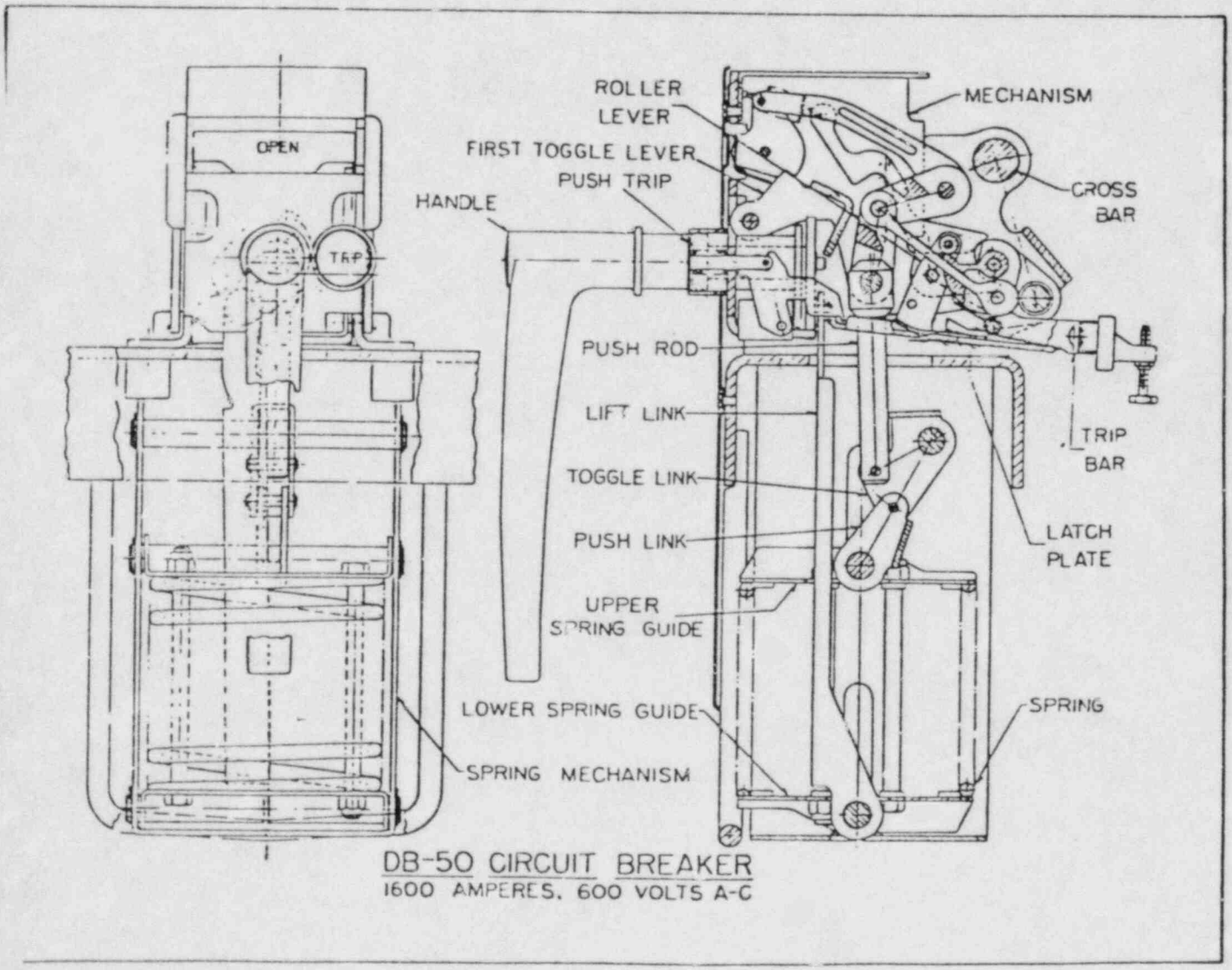


Fig. 3A - Type DB-50 Spring Closing Assembly

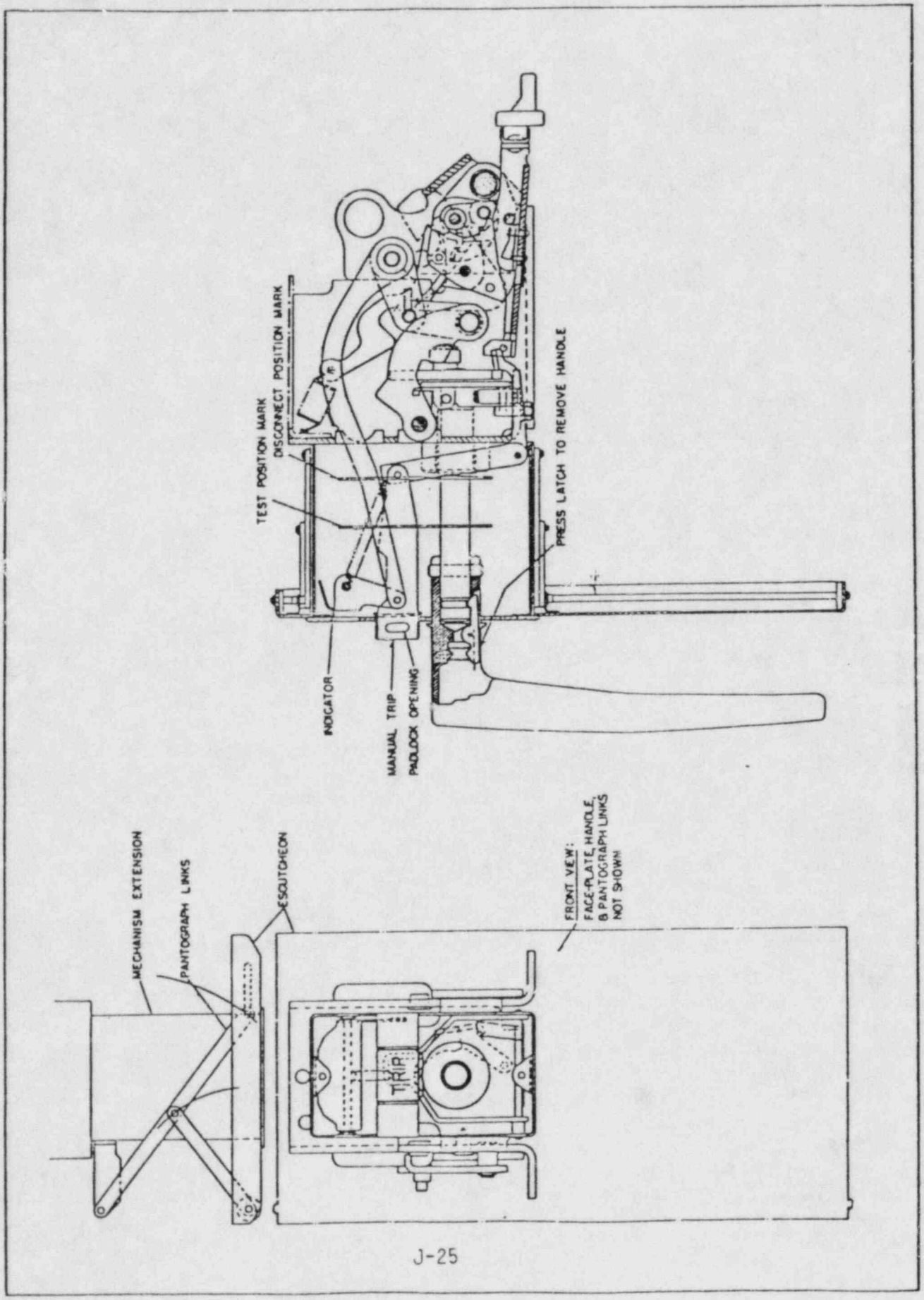


Fig. 3B - Type DB-50 Three Position Operating Mechanism

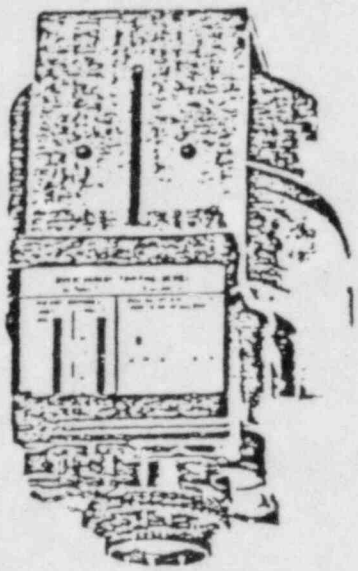


Fig. 4 - Series Overcurrent Tripping Device with Long Time and Instantaneous Element

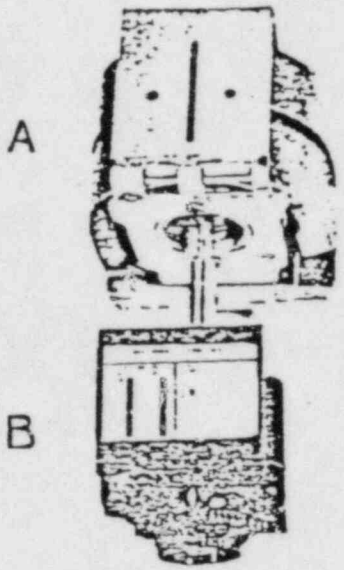


Fig. 5 - Series Overcurrent Tripping Device Showing the Assembly of Calibration Case to Magnetic Circuit.

es. The construction, except for the s, is similar for all ratings.

The overcurrent tripping device can ily be removed from the breaker and laced with another unit of different rating of the same rating without affecting the brations.

allation and Removal

TION: Before removing or installing a trip- device, be sure that the breaker is in the position and de-energized. To remove an urrent tripping device from the breaker, re- the four bolts A Figure 3 which hold the ng device to the breaker base. Before re- ıg the last bolt, hold the tripping device to nt it from falling.

'o install the overcurrent trip to the ıit breaker it is merely necessary to -t the device into the pole unit so that ıpper coil terminal makes contact with ower part of the moving contact hinge the lower coil terminal contacts the r breaker stud as shown in Fig. 3. The :s then bolted in this position by means ır hexagon head, steel bolts 2-1/2 inches shown at A, Fig. 3. Use only one lock er under the head of each of the bolts. should be taken to make sure that bolts longer than specified above are not used, because the ends of the bolts may bottom in coil terminal thereby causing a loose connection.

OVERTRAVEL ADJUSTMENT

CAUTION: Do not attempt to check overtravel adjustment until the breaker has been completely disconnected from any normal voltage source.

The trip screw mounted on the trip finger above the overcurrent tripping device should be adjusted to get the same amount of overtravel that occurred when the tripping device was calibrated for time delay. If a tripping device is removed for any reason, and reinstalled on the breaker, the overtravel adjustment should be rechecked. When a new tripping device is installed the overtravel must be adjusted.

To manually check the overtravel refer to Fig. 6. The air delay device can be made inoperative by opening the instantaneous valve (or the short delay valve in the case of selective type tripping devices). The valve is opened by lifting the instantaneous (or short delay) armature. A slot is provided in the side of the molded case and a small rod approximately 1/16 diameter can be entered through the side of the case and used as a lever to lift the armature. After the valve is blocked open, the trip plunger

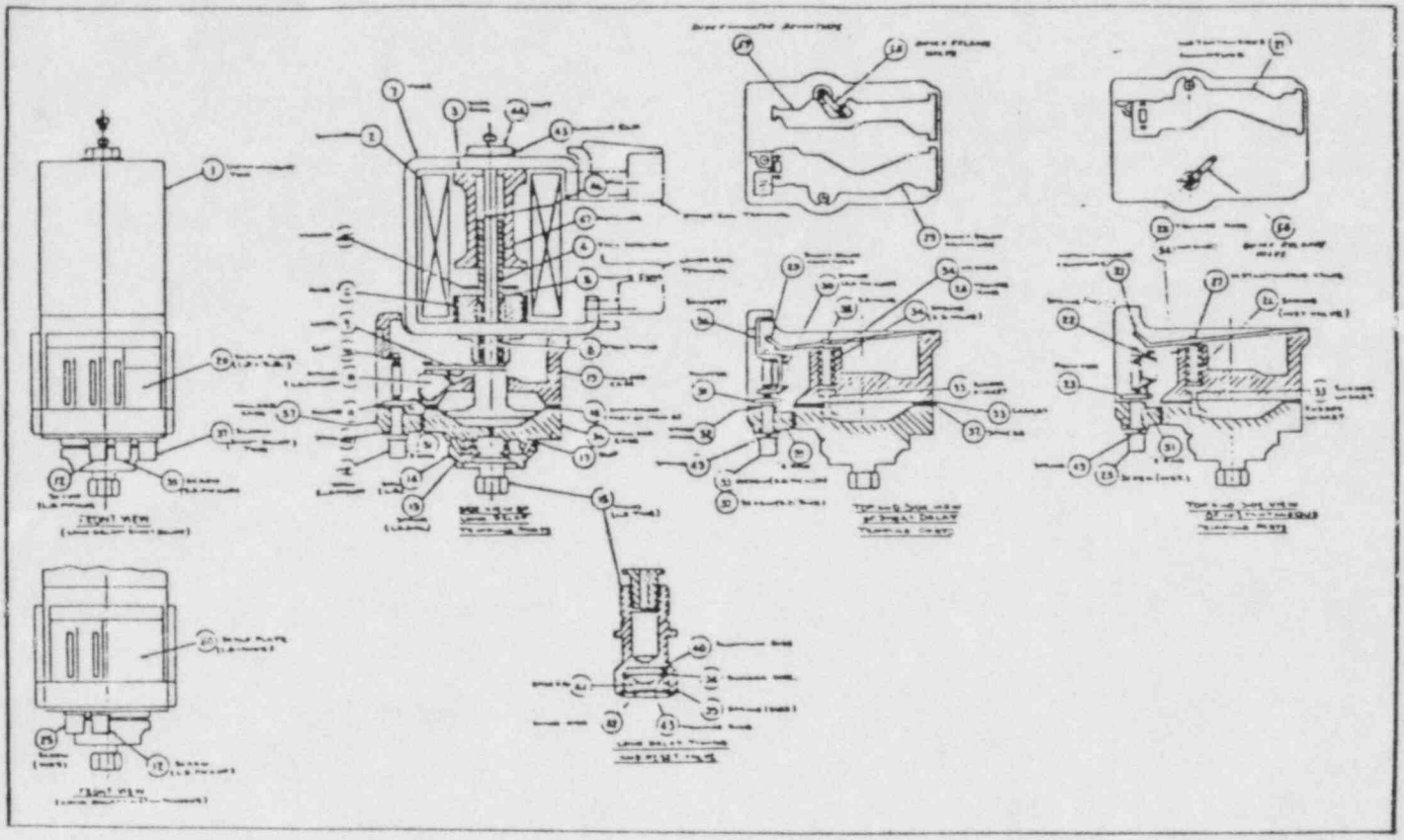


Fig. 6 - Cross-Sectional View of Series Overcurrent Tripping Device with Long Delay and Instantaneous Elements

can readily be moved upward to check the tripping action. The trip plunger extends out the top of the tripping device and has a neck and head under which a forked tool can be engaged to lift the trip plunger against the trip screw. Close the breaker and move the trip plunger upward being careful to keep hands and face clear of parts which move when the breaker trips. Adjust the trip screw until the trip plunger moves it just far enough to trip the breaker. Repeated trials may be necessary. Trip and close the breaker before each trial so that normal latch lap will always be used. When adjustment, which gives just enough travel of the trip bar to trip the breaker, has been found, add the standard overtravel which is one-half turn of the trip screw downward.

Construction

The overcurrent tripping device is air delayed with all of its elements completely adjustable. A typical unit is shown ready for mounting on a circuit breaker pole unit in Figure 4.

The tripping device consists of two main subassemblies namely:

1. The magnetic frame and coil assembly as shown in Figure 5A.

2. The delay elements assembly as shown in Figure 5B. The two assemblies are held together by means of the two white mounting screws as seen from the bottom of the calibration case.

As seen from the sectional view Figure 6, the magnet frame and coil assembly consists of a yoke, a coil, a stationary and moving core together with their necessary insulation.

The delay elements assembly as seen from the same figure contains an air chamber, a diaphragm, and trip plunger as well as all the armatures, springs, and valves to produce the adjustable long delay, short delay and instantaneous characteristics of the circuit breaker tripping curve.

Time-Current Classification

The overcurrent tripping devices can be supplied with any combination of the three tripping elements, namely, long delay, short delay, and instantaneous elements. The most popular combinations are listed below:

Dual Overcurrent Series Tripping Device

This unit has an adjustable long delay and an adjustable instantaneous element, the characteristic curve of which is shown in Figure 7.

The calibration for the various elements are:

(a) Long delay pick-up

Adjustable with calibrated marks at 80-100-120-140 and 160 percent of coil rating.

(b) Long delay

Adjustable with two calibrated marks at 30 and 20 seconds. Calibrated marks at 20 and 12 seconds or at 60 and 40 seconds may be supplied for special applications.

(c) Instantaneous pick-up

Adjustable with two calibrated marks at 800-1200 percent or 500-1000 percent.

2. Dual Selective Overcurrent Series Tripping Device For Group or Tie Breakers

A selective device is equipped with an adjustable long delay and an adjustable short delay element. These two elements combine to give a typical selective curve as shown in Figure 8. This unit can be made selective with a standard device or another selective device of the same or of a different rating.

The calibration for the various elements are:

(a) Long delay pick-up

Adjustable with calibrated marks at 80-100-120-140 and 160 percent of coil rating.

(b) Long delay

Adjustable with two calibrated marks at 30 and 20 seconds. Calibrated marks at 20 and 12 seconds or at 60 and 40 seconds may be supplied for special applications.

(c) Short delay pick-up

Adjustable with calibrated marks at 500-750 and 1000 percent of coil rating.

(d) Short delay

Adjustable with calibrated marks at 6-14 and 30 cycles.

3. Instantaneous Trip Only

This device is equipped with an adjustable instantaneous element only. A typical time-current characteristic for such a device is shown in Figure 9.

This device is available with an instantaneous pick-up which is adjustable and has calibrated marks at 80-100-120-140 and 160 percent of coil rating.

OPERATION

1. Dual Overcurrent Series Tripping Device

An overload or short circuit through the series coil D, Fig. 10, will cause the moving core C to be attracted and move toward the stationary core B. At low currents, the moving core C will carry the tripping stem F along with it, and the motion will be retarded by the diaphragm E. The rate of travel of the diaphragm is determined by the rate at which air is permitted to enter

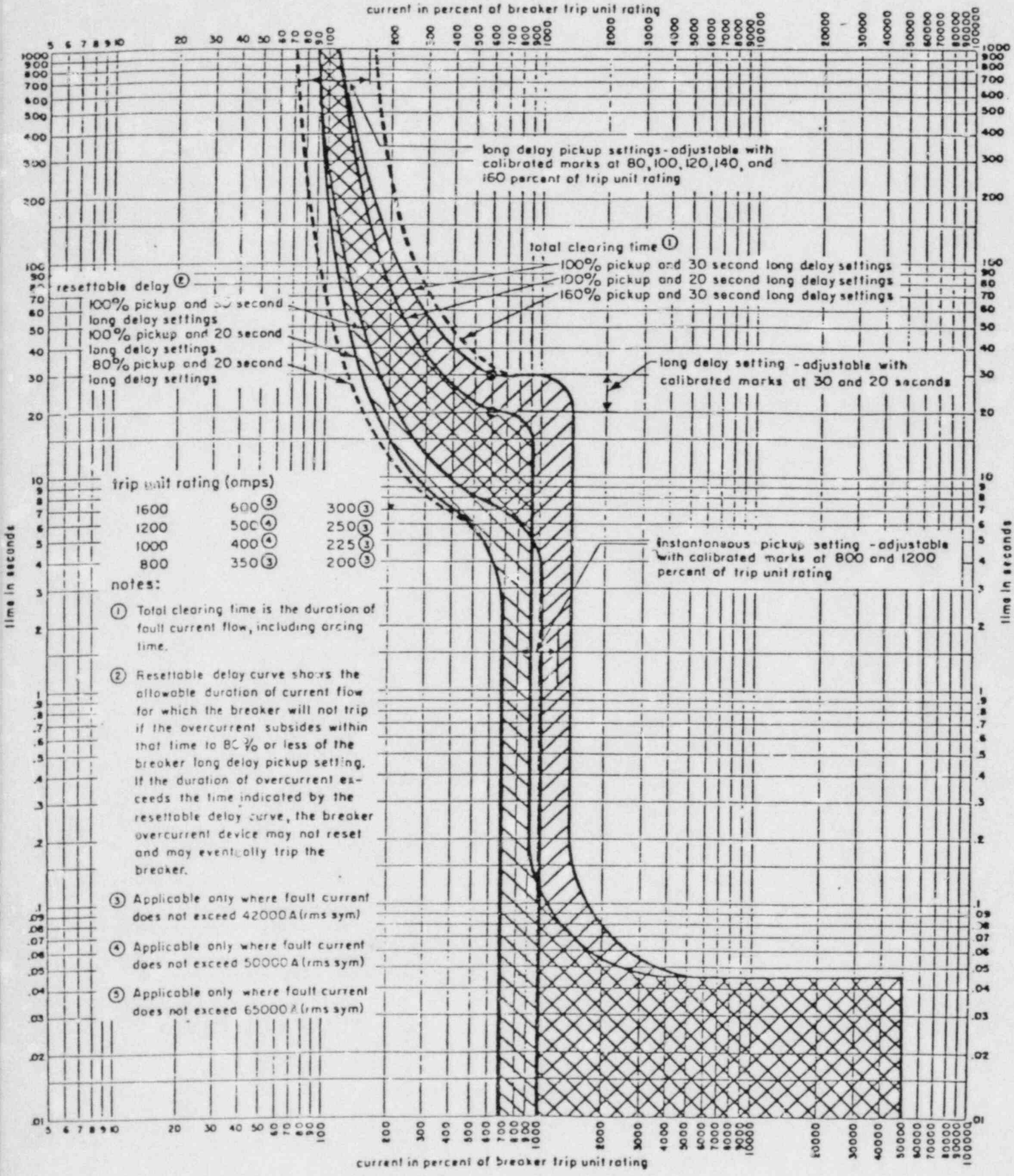


Fig. 7 - Tripping Characteristics of Standard Series Overcurrent Tripping Device with Long Delay and Instantaneous Elements

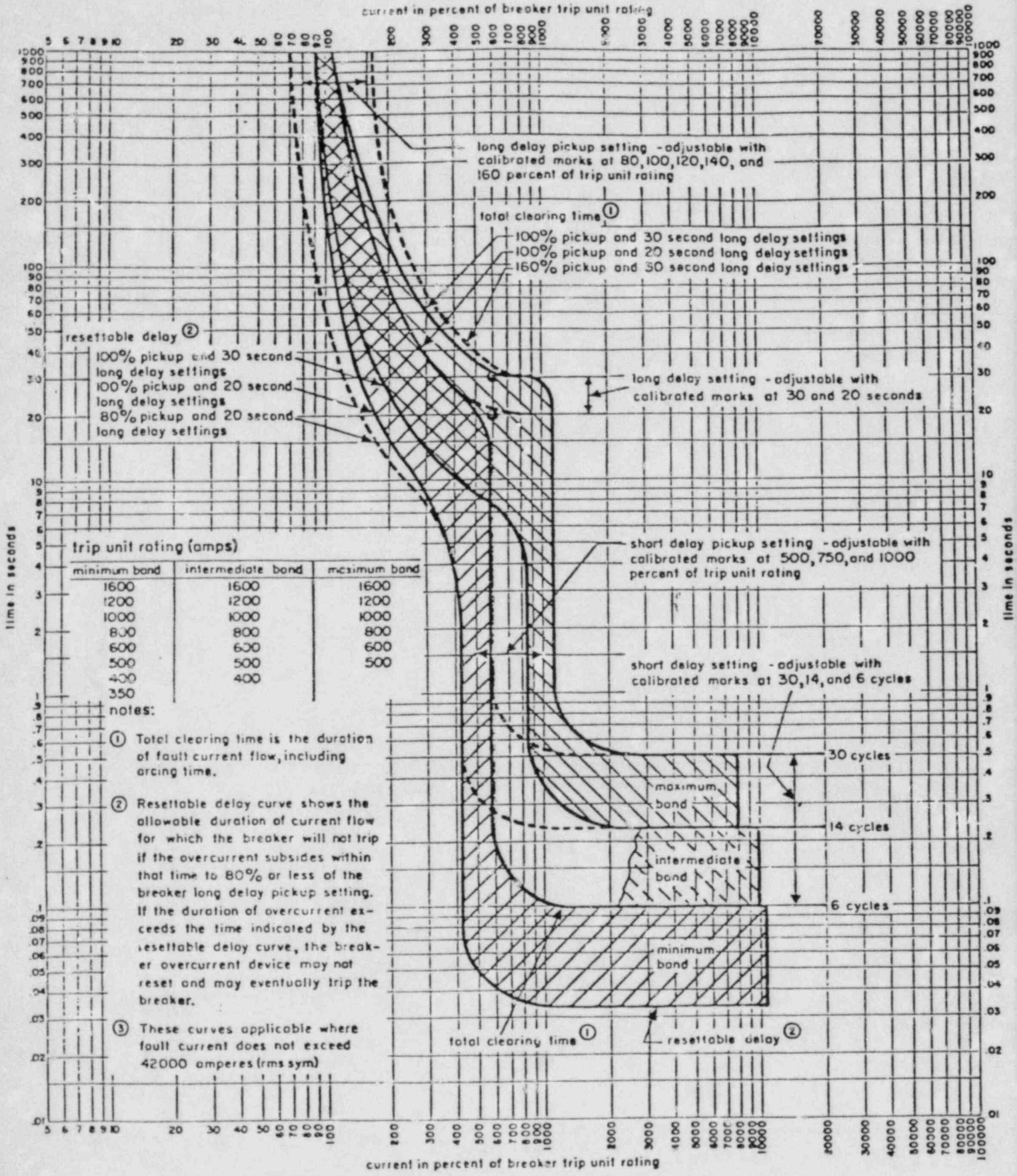


Fig. 8 - Tripping Characteristics of Selective Series Overcurrent Tripping Device with Long Delay and Short Delay Elements

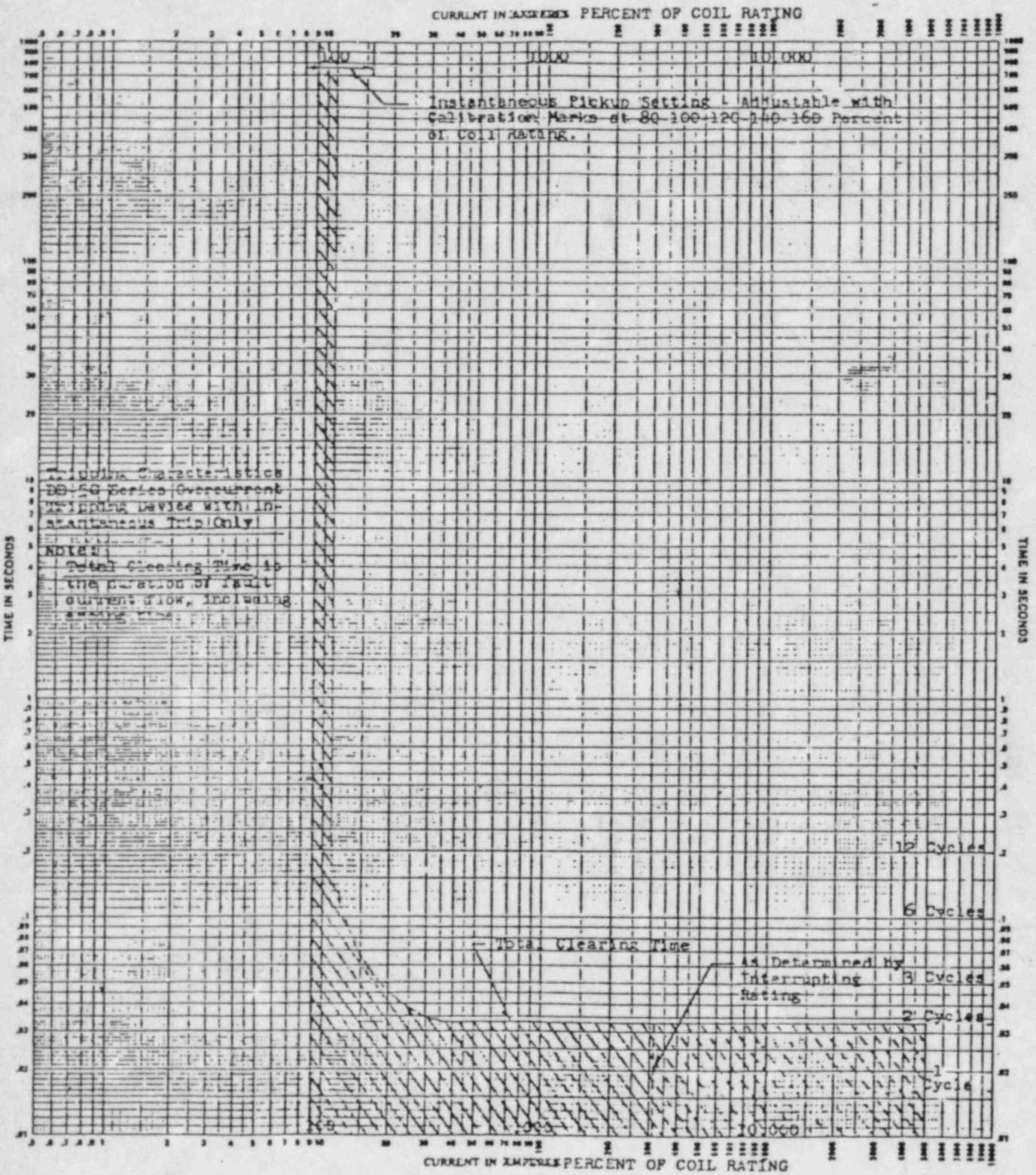


Fig. 9 - Tripping Characteristics of Special Series Overcurrent Tripping Device with Instantaneous Element Only

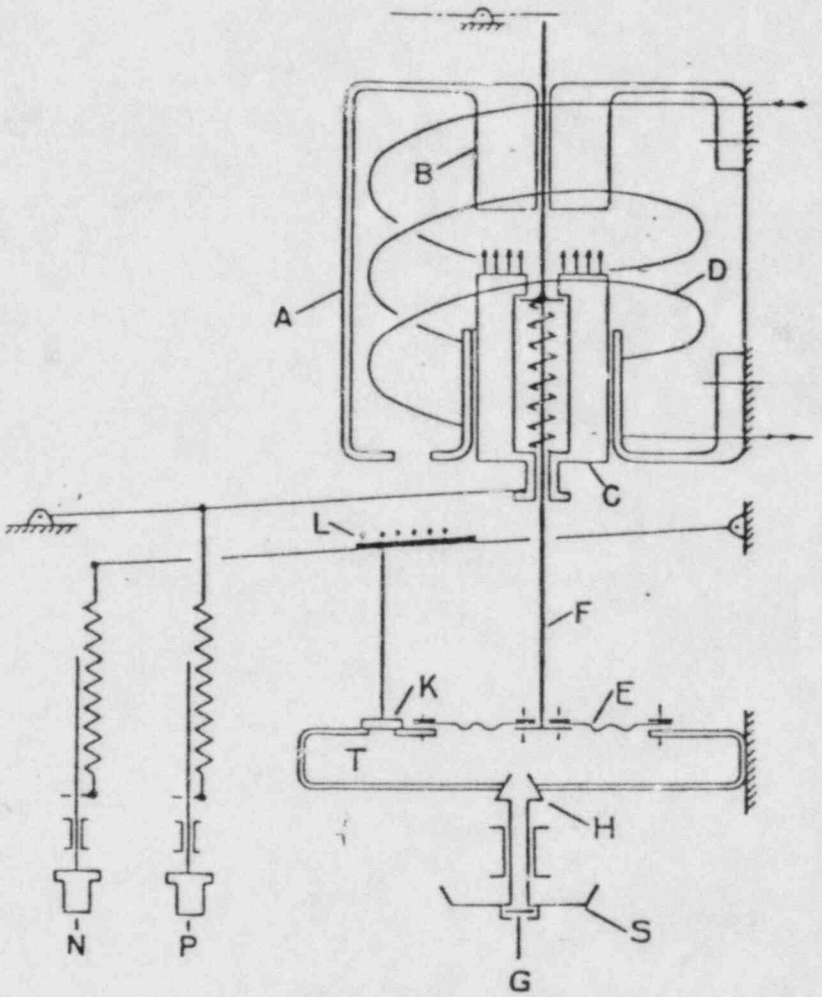


Fig. 10 - Schematic Diagram of Standard Overcurrent Tripping Device with Adjustable Long Delay and Adjustable Instantaneous Element

chamber T by the various valves H and K. When the diaphragm has reached approximately 60 percent of its travel, a quick release valve (shown in Fig. 6) is mechanically opened. This quick release feature permits the full force of the magnet to be used for tripping the breaker after the timing cycle is completed. At higher currents when the attraction between the moving core C and the stationary core B is greater than the load on the spring inside of the moving core, the moving core will compress the spring and travel independently of the tripping stem F. This spring insures a constant force pattern acting on the diaphragm E. The reset valve is shown as G.

Valve H is the long delay valve and it is permanently open to a calibrated setting. This setting which controls the tripping time can be changed by means of dial S, Figure 10. The magnitude of current at which the long delay will begin to operate is determined by the long delay pick-up adjusting knob P, Figure 10. The magnitude of current at which the instantaneous trip will operate is determined by the instantaneous pick-up adjusting knob N, Figure 10.

2. Dual Selective Overcurrent Series Tripping Device For Group or Tie Breakers

The operation of the dual selective tripping device is similar to that of the dual overcurrent tripping device except that for this device the following details are included:

A. A short delay valve J, Fig. 11, controls the size of orifice and consequently the tripping time in the short circuit region. This orifice is adjustable by means of knob R.

B. A quick release valve (shown in Fig. 6-short delay tripping parts) which functions as described for dual overcurrent tripping device.

C. Discriminator armature, Fig. 6.

D. Discriminator operating linkage.

The discriminator operating linkage, Fig. 13 and the discriminator armature, Fig. 6 are used on the selective overcurrent tripping device to make the device behave as an instantaneous type tripping device while the breaker is being closed and for approximately 0.5 seconds after closing. During this period, the discriminator armature is free to lift the quick release valve and permit instantaneous tripping, if the current is greater than the discriminator armature pick-up setting. If the current does not rise above this value, the breaker remains closed and the discriminator linkage assumes a position which makes the discriminator armature inoperable and restores the selective tripping feature to the tripping device.

3. Instantaneous Trip Only Device

The instantaneous trip only device, in principle, is the simplest of the three. As seen from Figure 12, the adjustable instantaneous trip is merely a modification of the adjustable long delay pick-up of the dual overcurrent series tripping device.

TIME-CURRENT CHARACTERISTICS

The time-current curve of this air delayed device has an inverse time characteristic up to approximately 600 percent of coil rating in the long delay range as shown in Figure 7. Within this range, the moving core and tripping stem move as a unit, that is, the magnetic pull has not increased sufficiently to overcome the loaded spring inside the moving core. Above 600 percent, the tripping time is essentially constant with increase in current. Within this region, the magnetic force is sufficient to overcome the spring inside the moving core at the outset, thereby subjecting the diaphragm to the constant force pattern of the spring. The tripping time will remain constant until interrupted by the instantaneous or short delay pick-up wherever they occur. For the same reason, the tripping time in the short delay region remains constant with increasing current for a given setting of the short delay.

Adjustment of Calibration Settings

CAUTION: As a safety measure, the breaker should be disconnected from the circuit before making any adjustment.

1. Long Delay Pick-Up

The long delay pick-up can be adjusted by means of P, Figure 10, also shown in Figure 6. The unit has been calibrated and the calibration plate marked at five settings, namely 80, 100, 120, 140 and 160 percent of the coil rating. The pick-up was placed on the 100 percent setting before shipment. A different setting can be obtained by carefully turning the adjusting knob with the help of a small screwdriver inserted in the slots for that purpose.

2. Long Delay Calibration

The long delay can be adjusted by means of the long time adjusting dial S, Figure 10, also shown in Figure 6. The dial adjustment is limited to slightly less than one turn. Two points have been calibrated at the factory and are indicated by white marks on the outer edge of the dial. The dial has markings from 1 to 10. When the higher-numbered white mark on the dial coincides with the white indicator on the front of the lower case, the tripping time will be the higher long delay value shown in seconds on the scale plate. Conversely, when the lower-numbered white mark on the dial coincides with the white indicator on the front of the lower case, the tripping time will be the lower long delay value shown in seconds on the scale plate. These tripping times are calibrated with currents which are 600 percent of the coil rating applied. The dial settings are scribed on the scale plate under long delay dial setting heading.

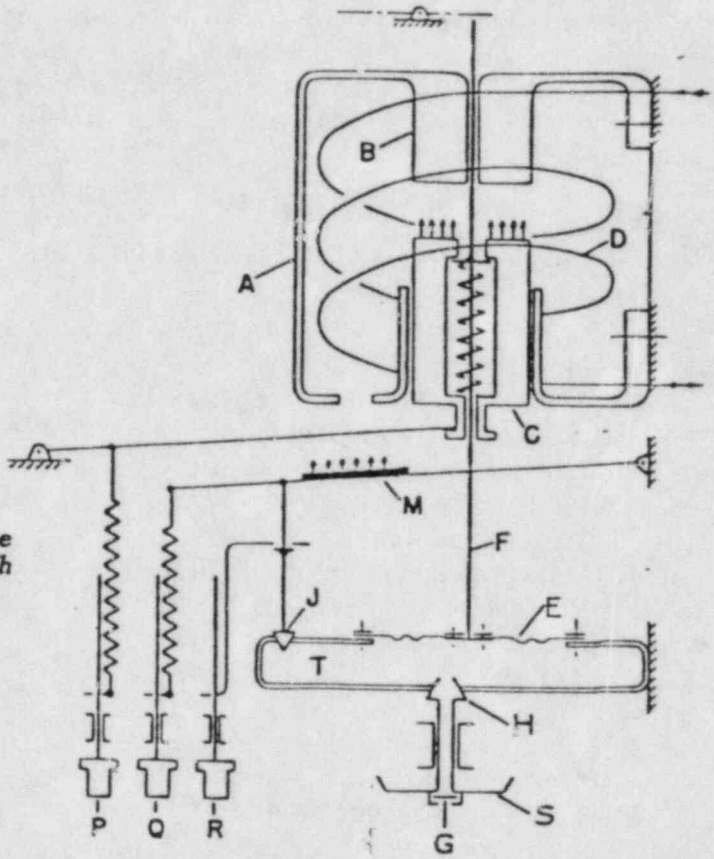


Fig. 11 - Schematic Diagram of Selective Series Overcurrent Tripping Device with Adjustable Long Delay and Short Delay Elements

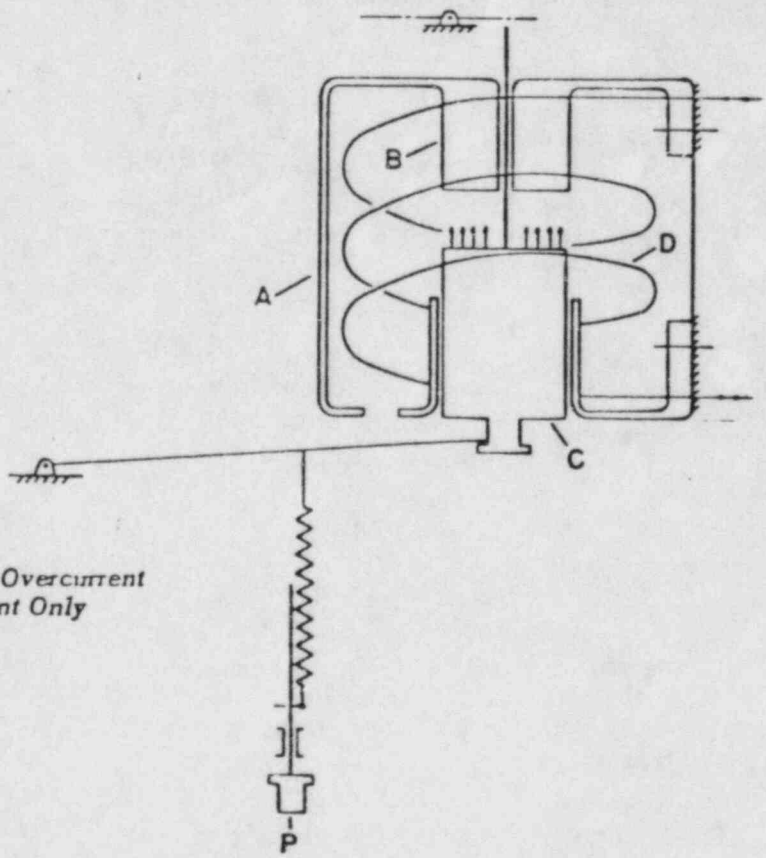


Fig. 12 - Schematic Diagram of Special Series Overcurrent Tripping Device with Instantaneous Element Only

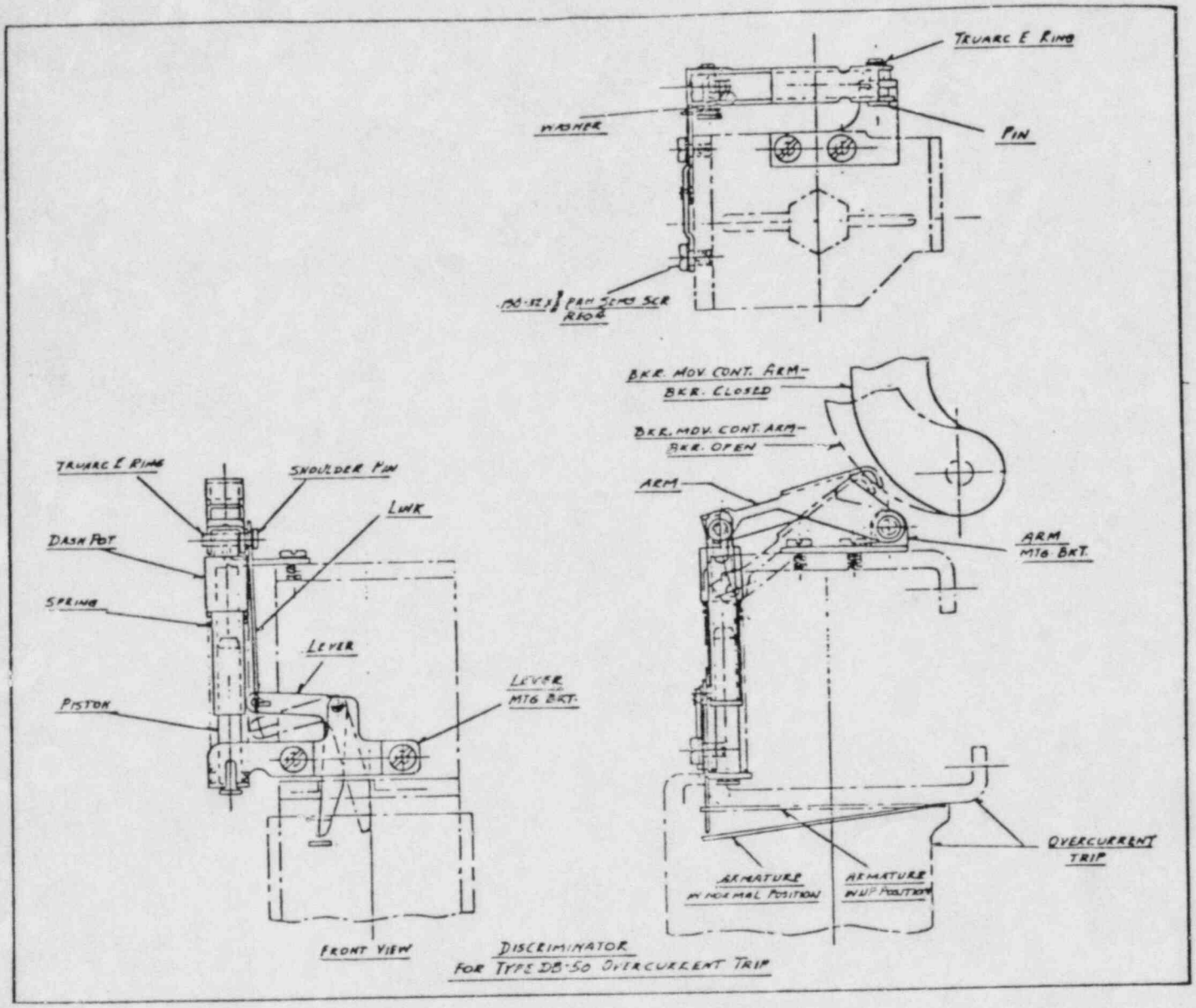


Fig. 13 - Discriminator for Tripping Device

3. Instantaneous Pick-Up

The instantaneous pick-up can be adjusted by means of knob N, Figure 10, also shown in Figure 6. The instantaneous pick-up has been calibrated at 8 and 12 times or 5 and 10 times the coil rating at the factory. The adjusting knob can be turned carefully with the help of a small screwdriver inserted in the slots for that purpose, if a different setting is desired.

4. Short Delay Pick-Up

The short delay pick-up can be adjusted by means of knob Q, Fig. 11. The unit has been calibrated and the calibration plate marked at 500-750 and 1000 percent of the coil rating. The pick-up is usually placed on the 500 percent setting before shipment. A different setting can be obtained by carefully turning the adjusting knob with the help of a small screwdriver inserted in the slots for that purpose.

5. Short Delay Calibration

The short delay can be adjusted by means of knob R, Fig. 11. The unit has been calibrated and the calibration plate marked at 6-14 and 30 cycles. The short delay is usually placed on the 6 cycle

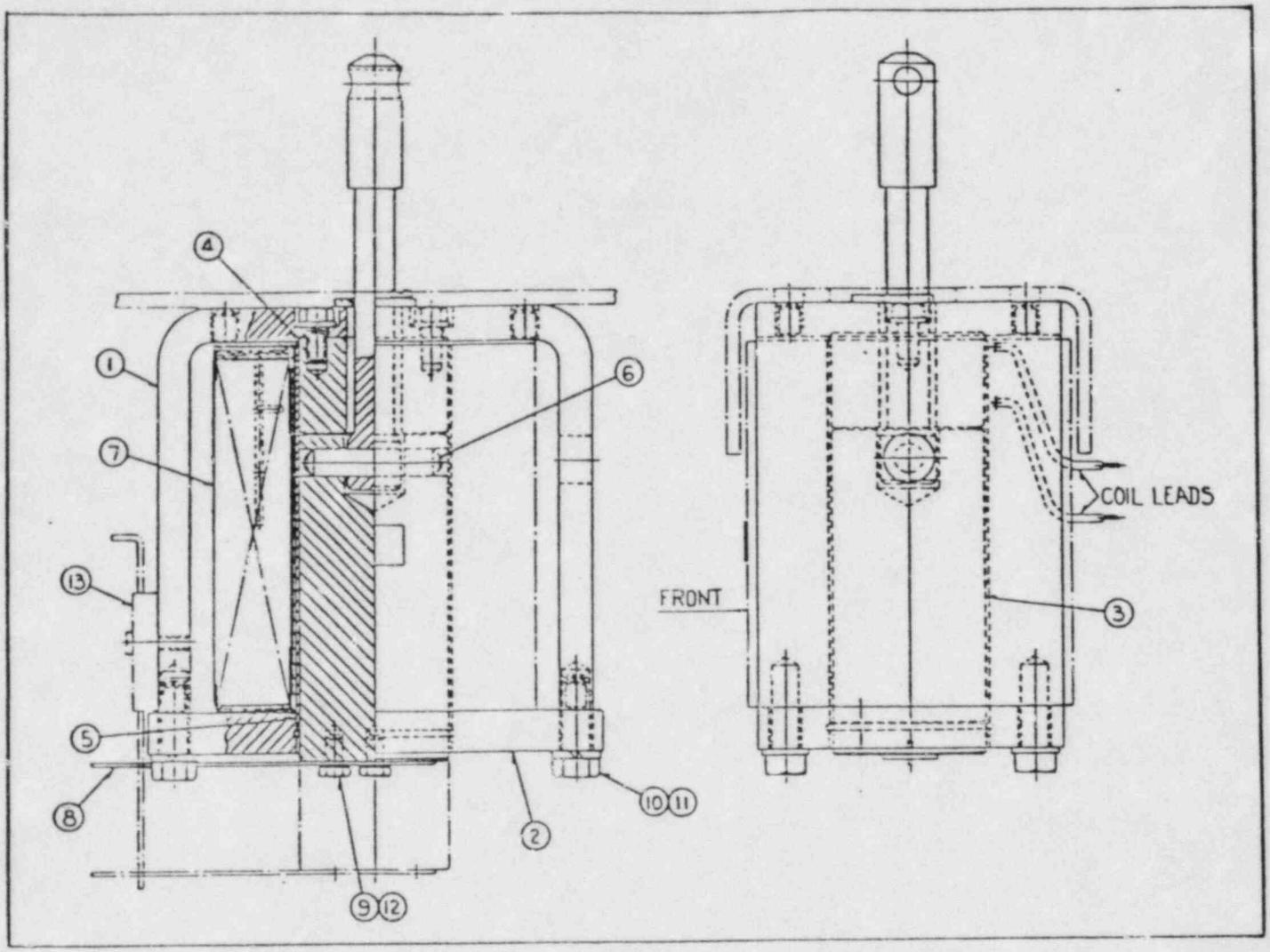


Fig. 14 - Closing Solenoid - Construction Details

setting before shipment. A different setting can be obtained by carefully turning the adjusting knob with the help of a small screwdriver inserted in the slots for that purpose.

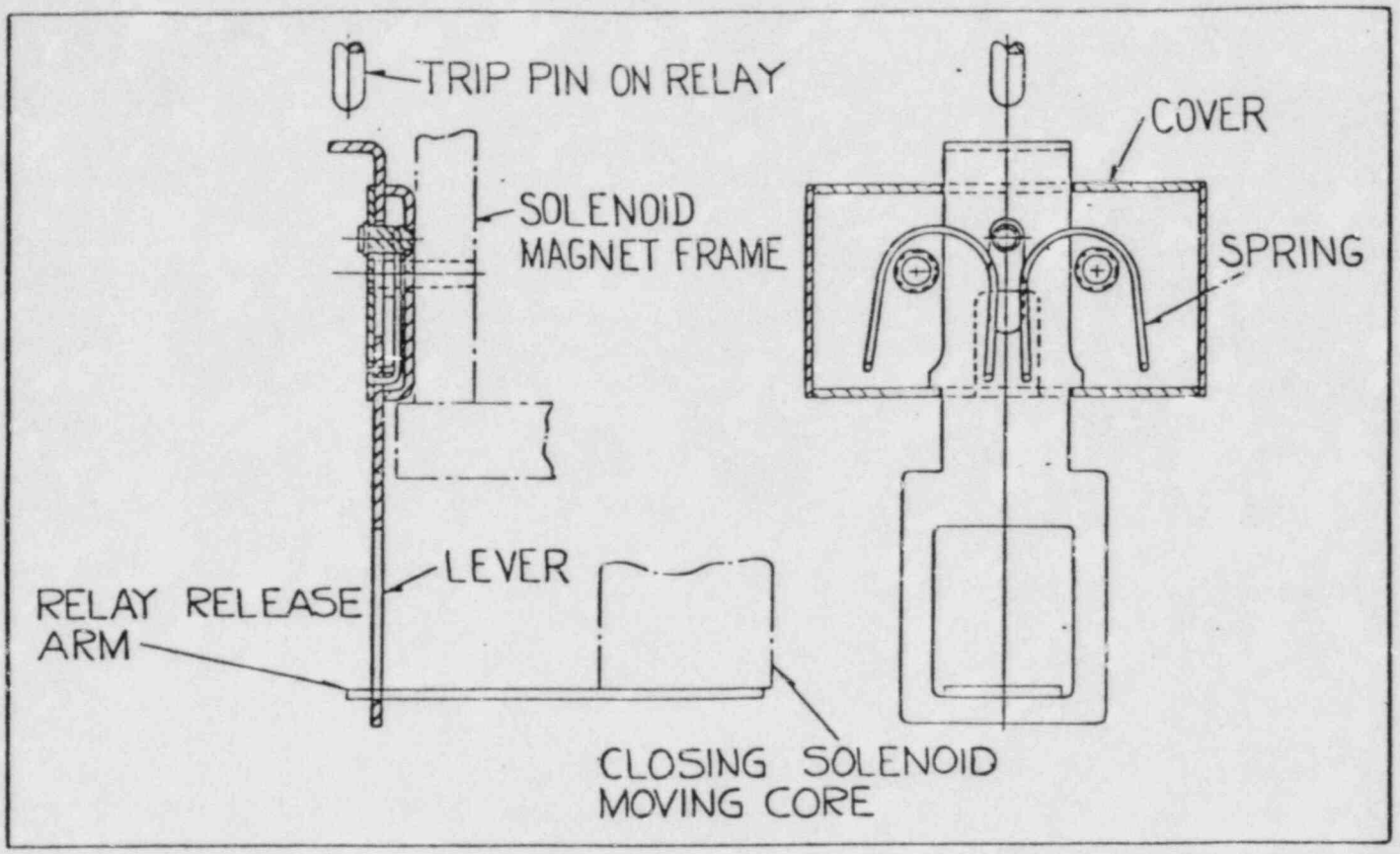
6. Instantaneous Only Pick-Up

The instantaneous pick-up can be adjusted by means of knob P, Fig. 12. The unit has been calibrated and the calibration plate marked at 80-100-120-140 and 160 percent of the coil rating. The pick-up is usually placed on the 100 percent setting before shipment. A different setting can be obtained by carefully turning the adjusting knob with the help of a small screwdriver in the slots for that purpose.

CONTROL RELAY

The control relay (see Fig. 15) mounts directly under the auxiliary switch. It is a single-coil, mechanically-tripped device with the coil suitable for continuous energization. The operation sequence is outlined in Fig. 2, Page 10. The contacts should normally last the life of the breaker, but are replaceable if found necessary.

The relay trip assembly may be checked for correct operation of the relay and the relay release arm as follows: (Refer to Fig. 15.) Disconnect the closing coil leads from the control circuit wiring.



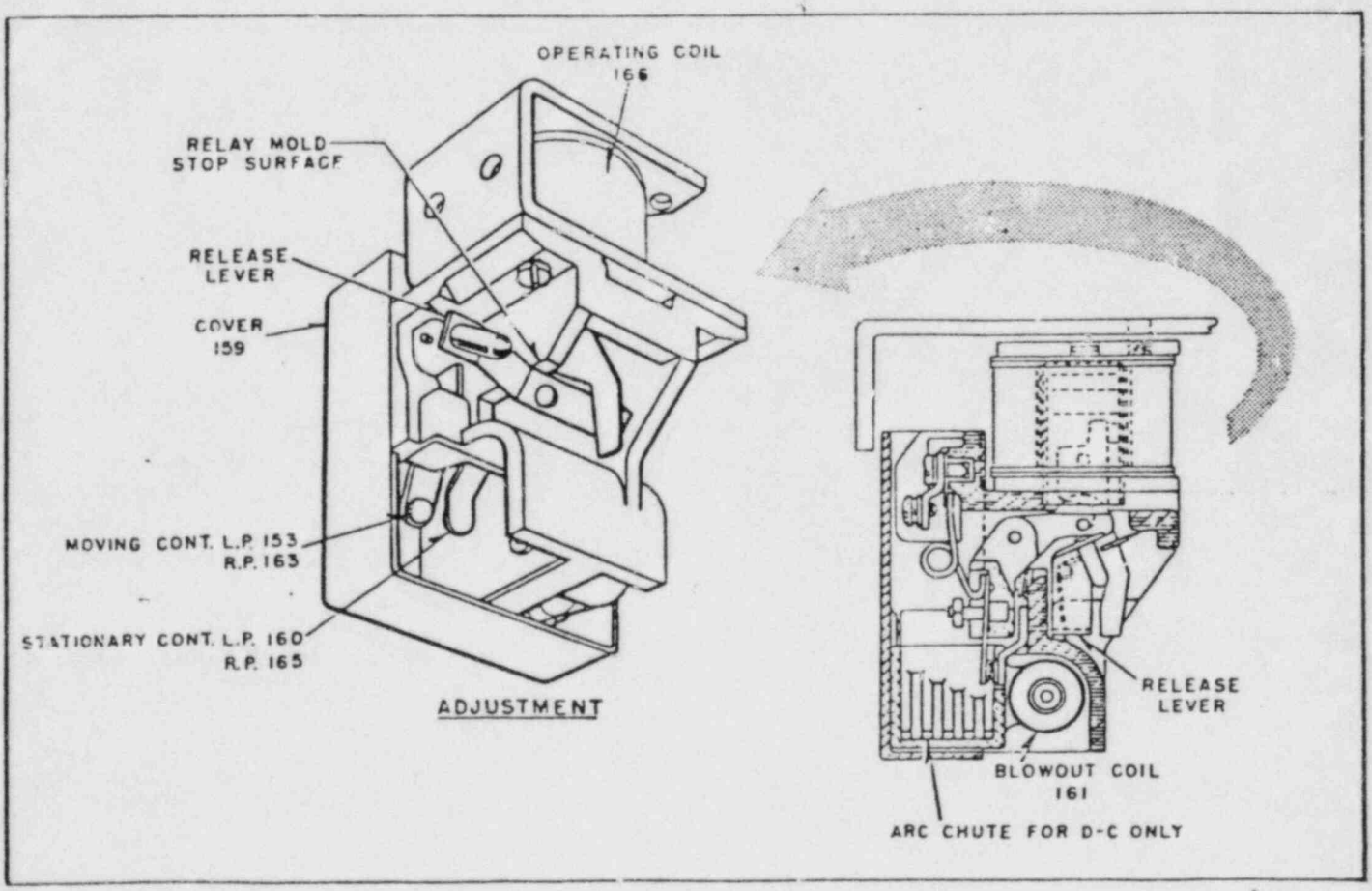


Fig. 15 - Control Relay - Adjustment and Construction Details

Energize relay operating coil. Slowly close the breaker manually. The relay release arm should operate the relay trip assembly and the relay trip assembly should open the relay contacts just before the breaker latches. This position can best be determined by watching the pawl in the breaker operating mechanism, which should snap in place just after the relay contacts open. If this operation sequence is not correct, the relay release arm should be bent to suit. Make sure that the relay release arm does not rub on either side of the relay trip assembly lever aperture. When the breaker is latched, de-energizing and then energizing the relay operating coil should not cause the relay contacts to move toward the closed position. Trip breaker.

Reconnect closing coil leads to the control circuit wiring. Check electric closing of breaker.

SHUNT TRIP ATTACHMENT

The shunt trip mounts on top of the platform immediately to the right of the operating mechanism. (See Fig. 16.)

It is non-adjustable and is intended for intermittent duty only. The shunt trip circuit must always be opened by an auxiliary switch contact. Tripping currents are tabulated in Table No. 2, Page 7.

Inspection

With the breaker in the open position, manually push the moving core against the stationary core and rotate the breaker handle to the closed position. The breaker should be trip free.

The trip lever of the shunt trip should have from 1/32 to 1/8-inch clearance to the trip bar.

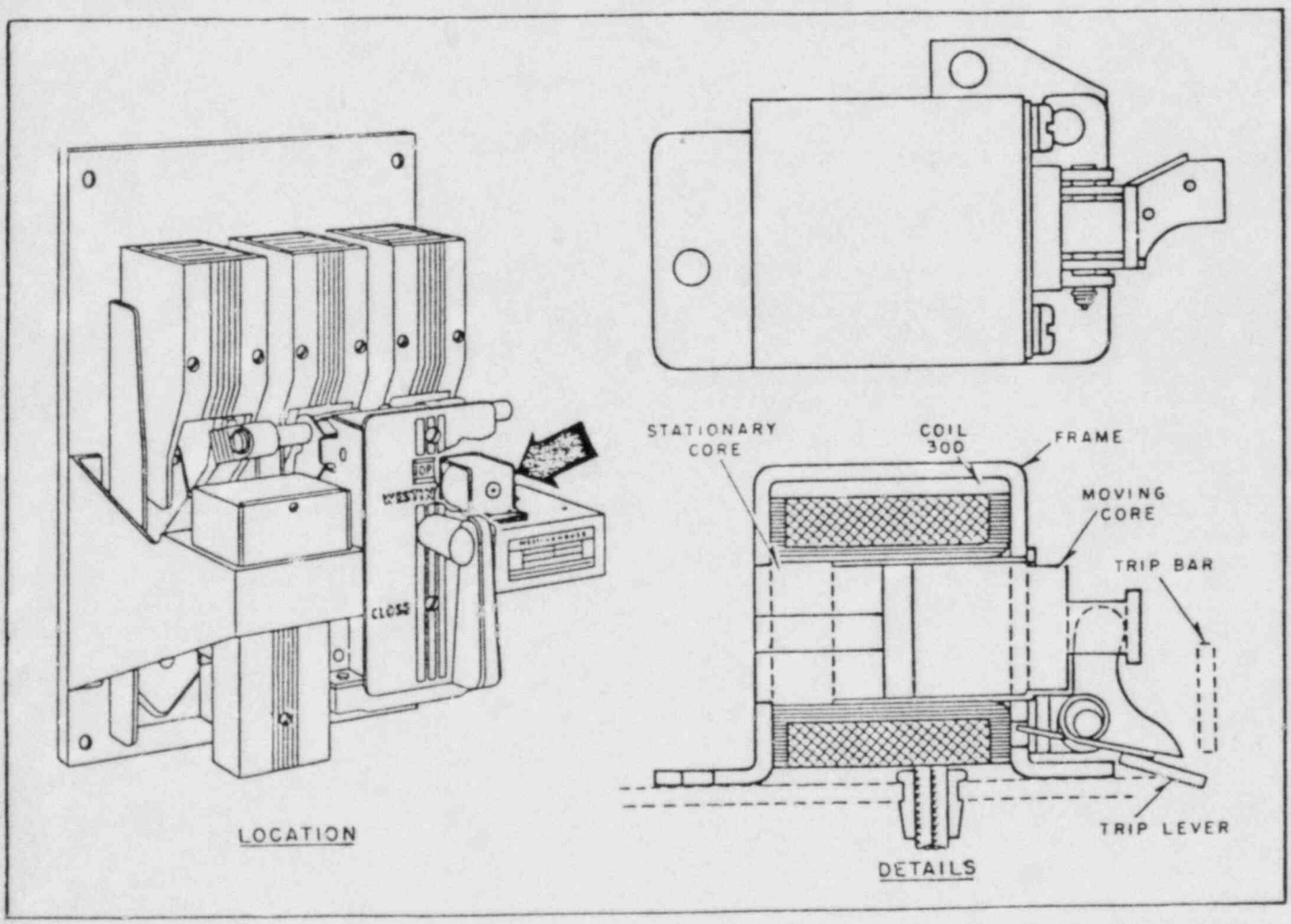


Fig. 16. Shunt Trip Attachment - Location and Construction Details

Maintenance

Check for loose bolts and faulty coil.

UNDERVOLTAGE TRIP ATTACHMENT

The undervoltage trip mounts on top of the platform, to the right of the shunt trip. (See Fig. 17). Its function is to trip the breaker when the voltage falls to between 30 to 60 percent of normal.

The moving core is normally held magnetically against the stationary core to hold the Micarta rod and consequently the reset lever, in the reset position. When the coil voltage is reduced sufficiently, the reset lever spring overcomes the magnetic attraction of the cores and rotates the reset lever clockwise. As the reset lever rotates, it carries with it the latch pin which rotates relative to the latch until the latch is released. When the latch releases, the trip spring rotates the trip lever counterclockwise to trip the breaker. The latch is reset by the cross bar moving the adjustable reset lever as the breaker opens. Fig. 17 shows the cross bar in the open position of the breaker.

The self-locking screw in the moving core is set at the factory and should not require adjustment. It is used to secure latch release when the moving core is 7/32 outside the frame.

Always connect the coil to the line side of the breaker unless the attachment is equipped with a time delay device. In this case, the time delay will delay the tripping of the breaker long enough to permit energization of the undervoltage coil from the load side. Do not use an auxiliary switch contact in the undervoltage circuit.

The trip lever of the undervoltage should have approximately 1/16 inch clearance to the trip bar when the breaker is half way closed.

UNDERVOLTAGE TIME DELAY ATTACHMENT

The undervoltage air dashpot time delay attachment mounts on the front of the undervoltage trip, replacing moving core cover. (See Fig. 17.) The needle valve screw in the top regulates the opening through which the air is forced and hence the time delay. (See Fig. 18.) The attachment does not have a quick reset feature and therefore approximately one minute should be allowed between operations to permit complete resetting. It is set to trip within 4 to 7 seconds.

Inspection

Hold the trip bar down and close the breaker manually. Release the trip bar slowly, allowing the undervoltage trip spring to raise the trip bar and trip the breaker.

Maintenance

Check for loose bolts and faulty coils.

REVERSE CURRENT TRIP ATTACHMENT

This attachment mounts directly on the center molded pole unit base, in the space ordinarily occupied by the overcurrent attachment. (See Fig. 19.) It is used to trip the breaker when the direction of current flow in that pole is reversed. When the series coil current is flowing in the forward direction, armature movement is prevented by a stop. When the series coil current is reversed, the armature rotates in the opposite direction to trip the breaker. Calibration adjustment covers 5 and 25 percent reverse current, based on normal current rating.

After tripping the reverse current armature is reset by opening the potential coil circuit. For this purpose an "a" contact of the breaker auxiliary switch should be connected in series with the potential coil.

Inspection

Close the breaker manually, and push backward on the spring stud located on the bottom

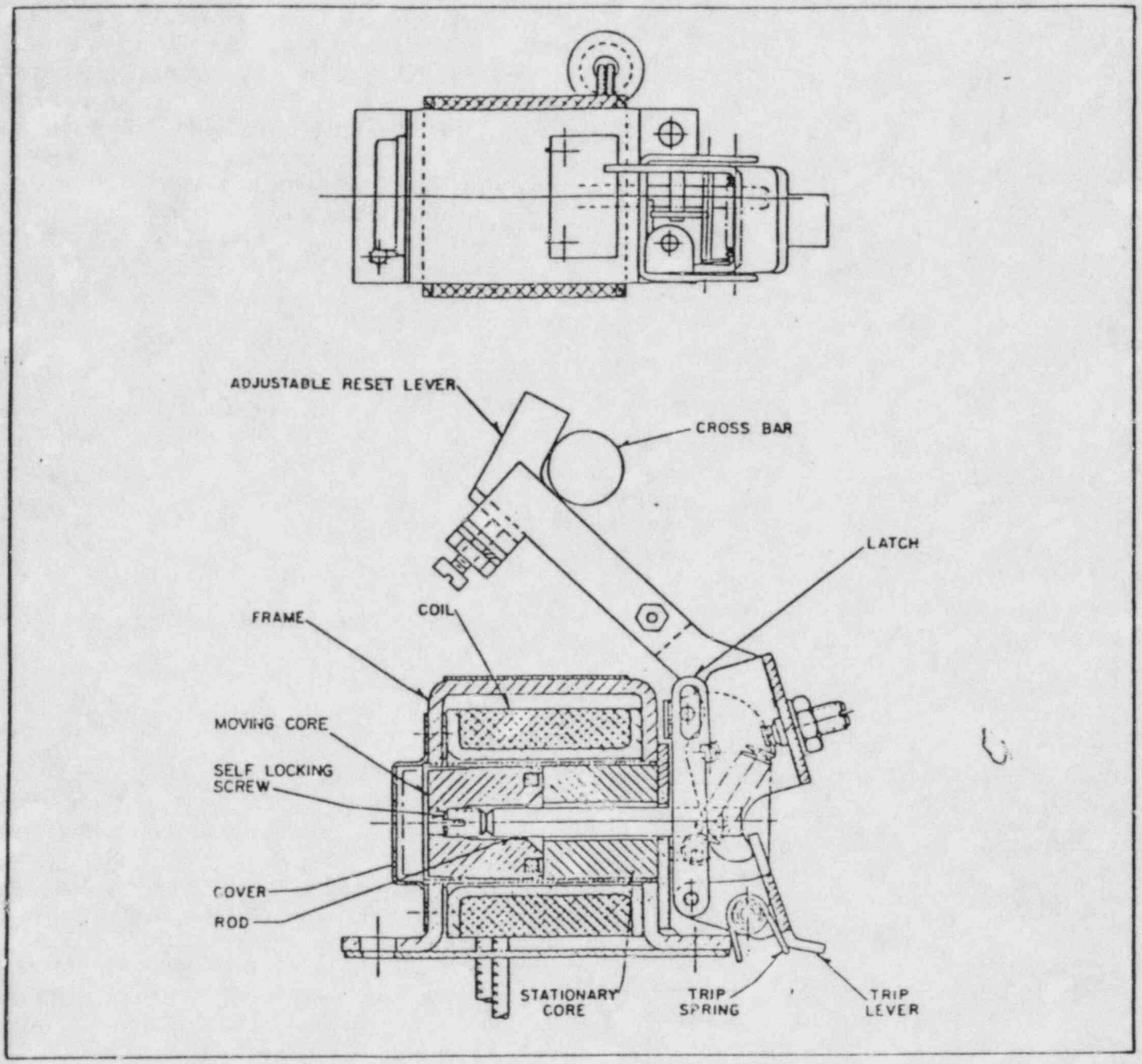


Fig. 17 - Undervoltage Trip Attachment - Construction Details

of the armature, to trip the breaker. The armature should move without friction, and should have approximately 1/32-inch overtravel after tripping.

Final inspection should be made electrically, after the circuit connections are complete as shown in Fig. 2, Page 10.

Maintenance

Remove all power from the breaker and repeat the mechanical inspection given above. Check for loose bolts and open circuit in potential coil.

FIELD DISCHARGE SWITCH

The DBF-16 breaker is a two-pole DB-50 breaker having special arc chutes and modified arcing contacts plus a field discharge switch mounted on the center pole (Fig. 20).

The field discharge switch is shipped with the gap setting shown in Fig. 20, for generator field protection. However, the

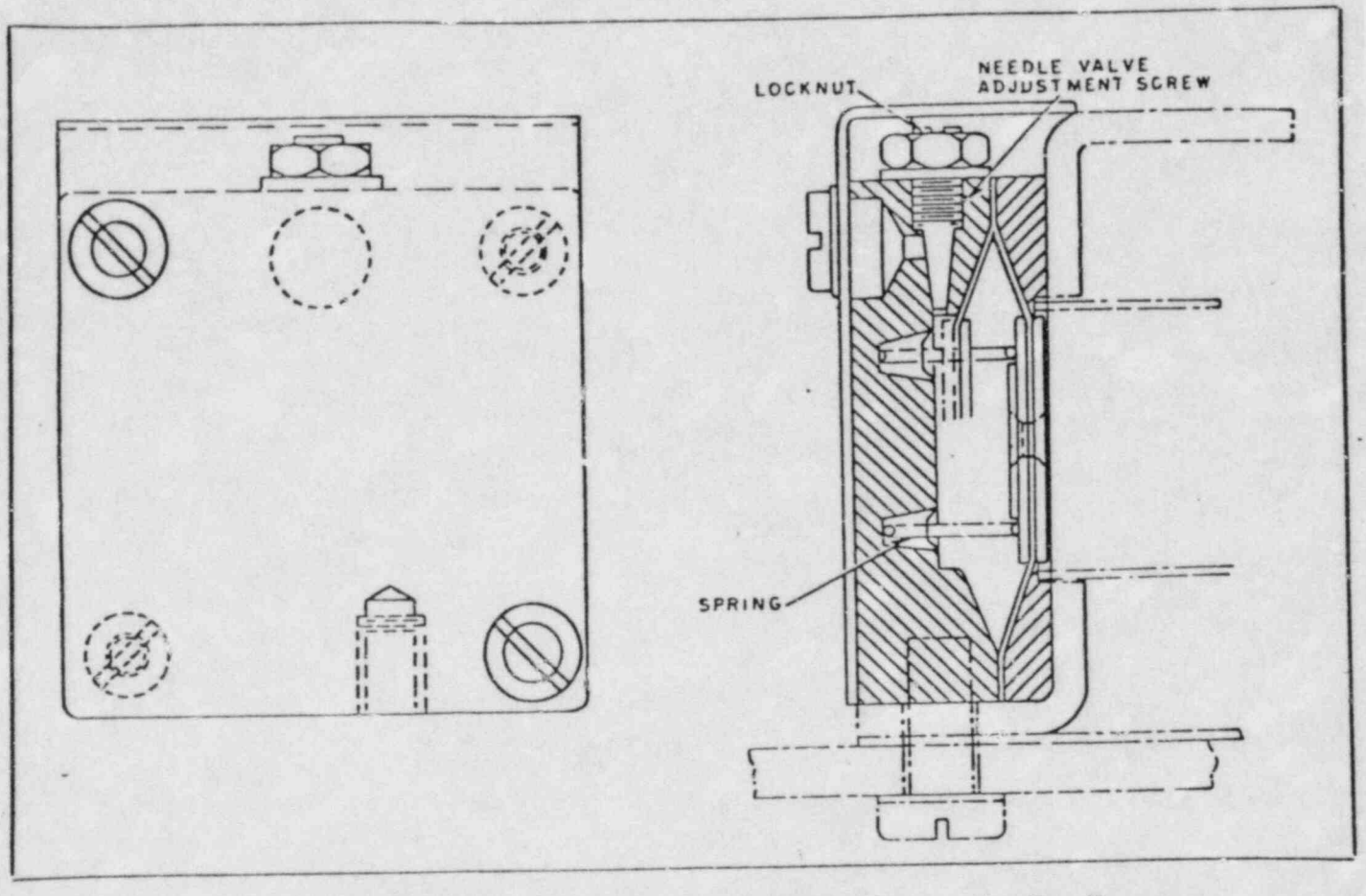


Fig. 18 - Undervoltage Time Delay Attachment - Construction Details

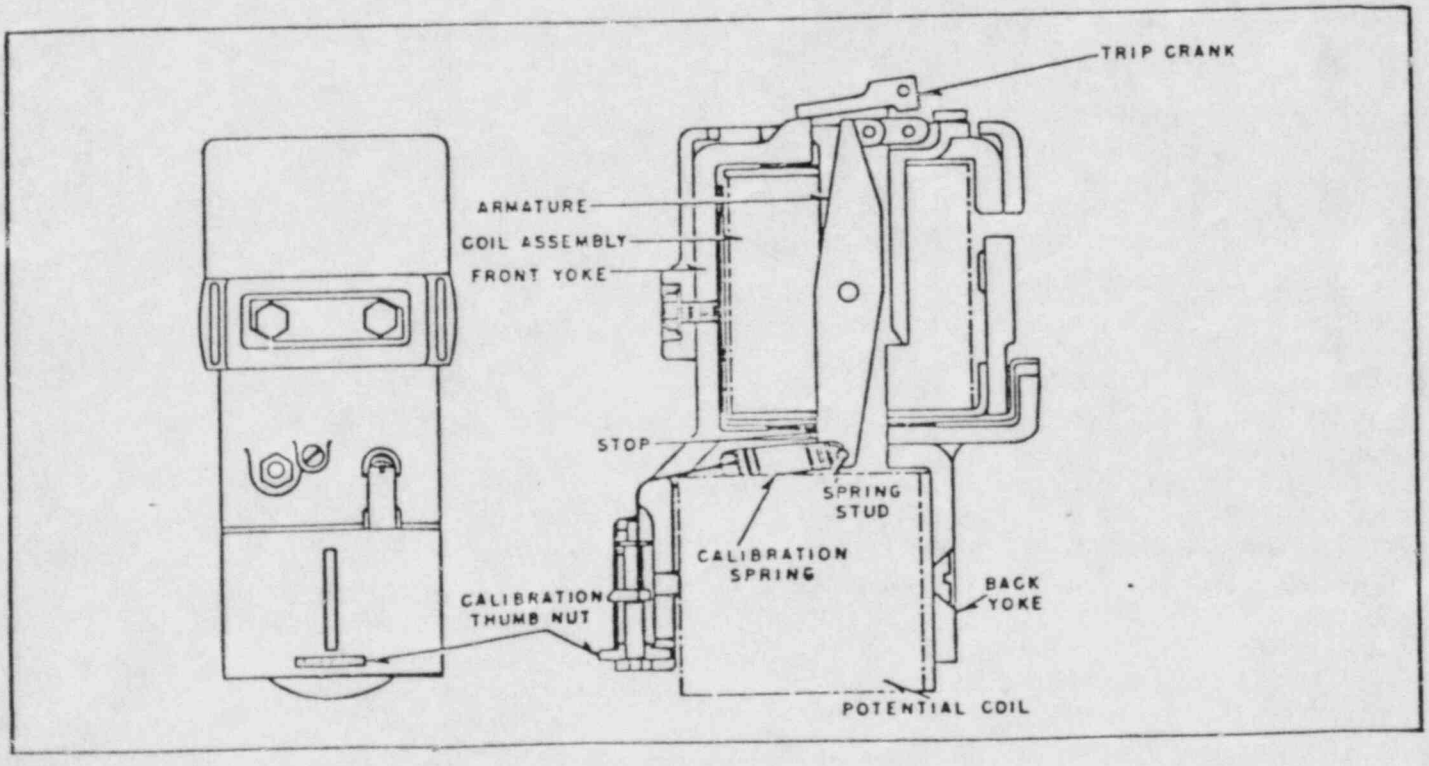


Fig. 19 - Reverse Current Trip Attachment - Construction Details

gap setting can be reduced to zero or set to open after the breaker contacts close, if desired. An arc chute is always supplied to interrupt motor starting secondary currents.

Inspection

Remove the arc chute, close the breaker manually and check for freedom of motion. The break distance is adjusted by loosening the lock nut and turning the sleeve in or out. Always leave a slight gap at the stop surface.

Maintenance

Remove power from the breaker, clean the contacts if necessary, check the contact separation and adjust if necessary. Check for loose bolts.

AUXILIARY SWITCH

The auxiliary switch mounts on top of the platform to the left of the operating mechanism. (See Fig. 21.) The contacts will carry 15 amperes continuously or 250 amperes for 3 seconds.

TABLE NO. 3

Interrupting Capacity

VOLTS	INTERRUPTING CAPACITY IN AMPERES	
	NON-INDUCTIVE CIRCUIT	INDUCTIVE CIRCUIT
48 V. D-C	25	15
125 V. D-C	11	6.25
250 V. D-C	2	1.75
115 V. A-C	75	15
450 V. A-C	25	5

The switch is a shaft-operated, 4-pole, rotary type having two "a" contacts (closed when the breaker is closed) and two "b" contacts (closed when the breaker is open). The rotor operates through a 90-degree angle and is non-adjustable however, the contacts may be changed from "a" to "b" or vice versa. To change, remove the switch from the platform, remove the back cover, shaft and end bushing. Remove the rotor and change the contacts as desired. Be sure to replace the shaft in the original position relative to one of the unchanged contacts.

Inspection

Remove front cover and make sure contacts are touching well before the end of travel.

Maintenance

Check for loose bolts. Replace contacts if necessary.

ALARM SWITCH ATTACHMENT

The alarm switch mounts above the shunt trip attachment (see Fig. 22) and will energize the alarm circuit on all opening operations excepting those initiated through the push-to-trip button or shunt trip. The alarm switch may be reset manually by operating the push-to-trip button or electrically by energizing the shunt trip coil (when electrical resetting has been provided). Manually or electrically closing breaker also resets alarm switch.

Inspection

Close the breaker manually and trip by means of push-to-trip button to be sure the contacts do not "make". Repeat the above procedure except trip by raising the trip bar and note that the alarm contacts do make contact.

Maintenance

Clean the alarm contacts when necessary. Check for loose bolts.

ELECTRIC LOCKOUT ATTACHMENT

The electric lockout mounts on the top of the platform immediately to the left of the operating mechanism and behind the auxiliary switches. (See Fig. 23.) Its function is to hold the breaker open (trip free) until the lockout coil is energized. The lockout coil can be de-energized after closure of the breaker, if desired.

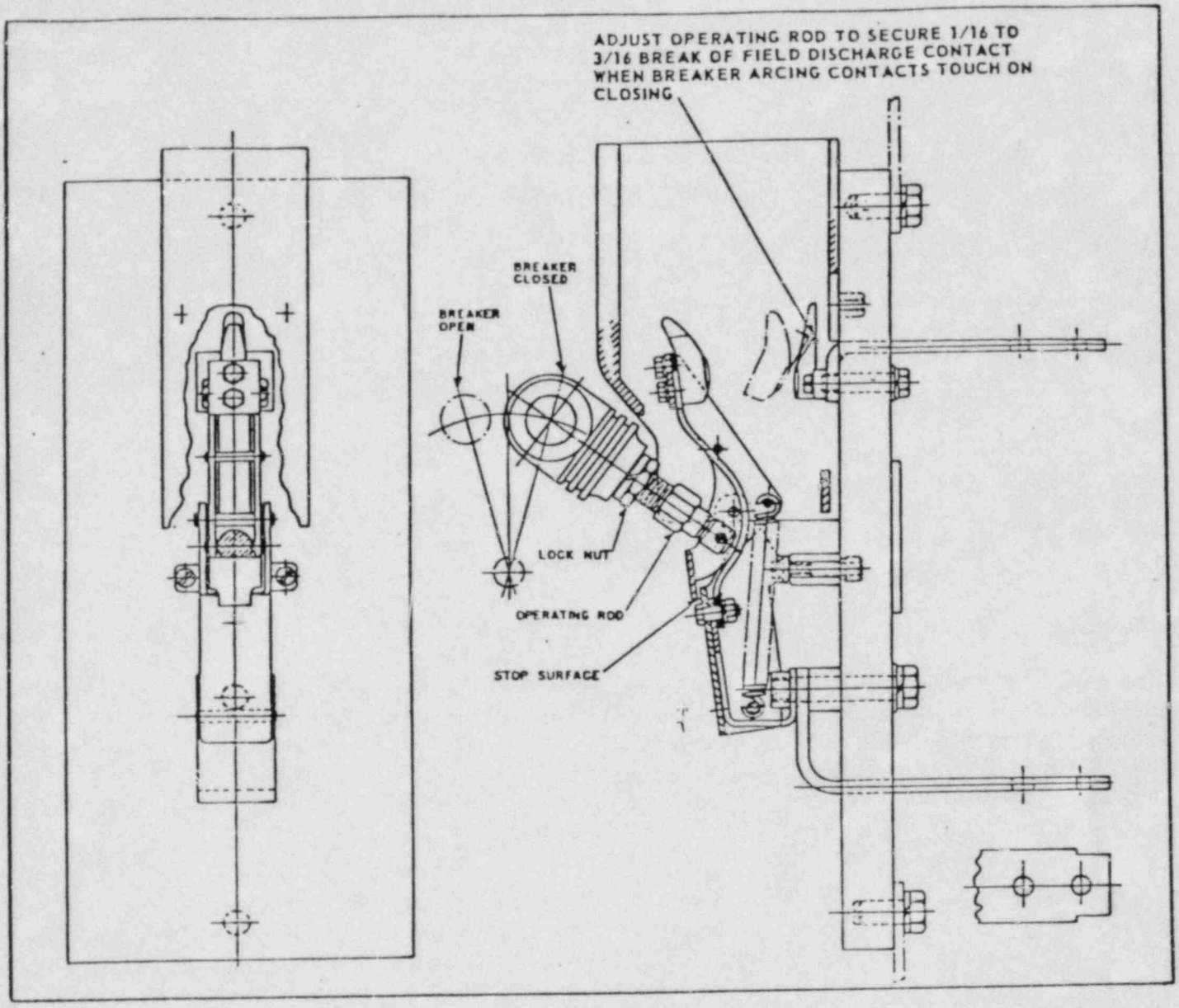


Fig. 20 - Field Discharge Switch - Construction Details

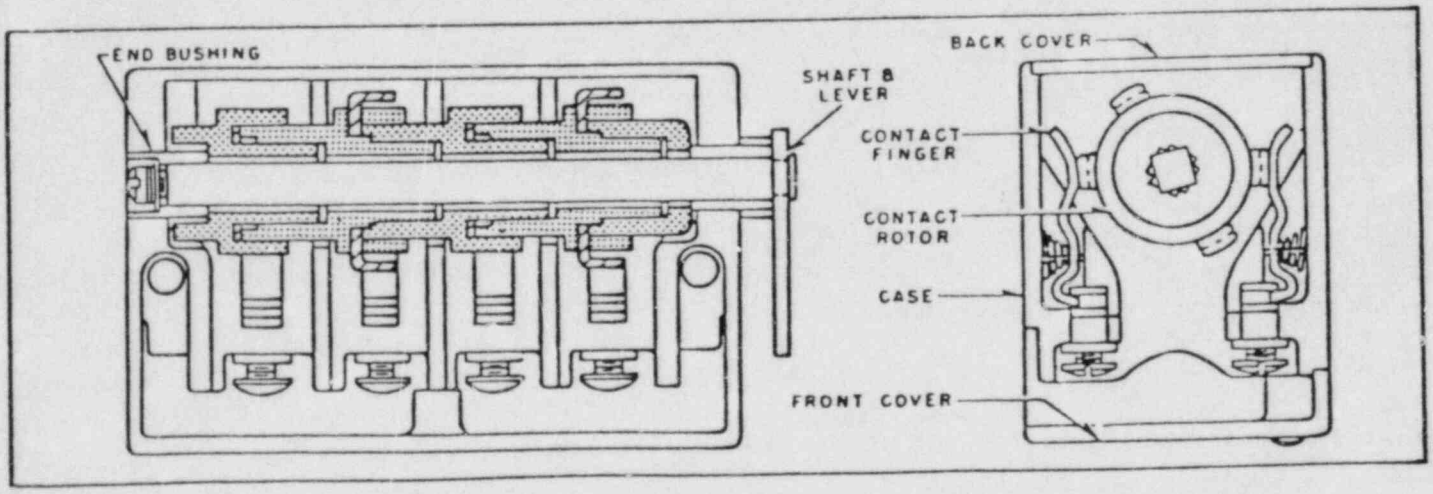


Fig. 21 - Auxiliary Switch - Construction Details

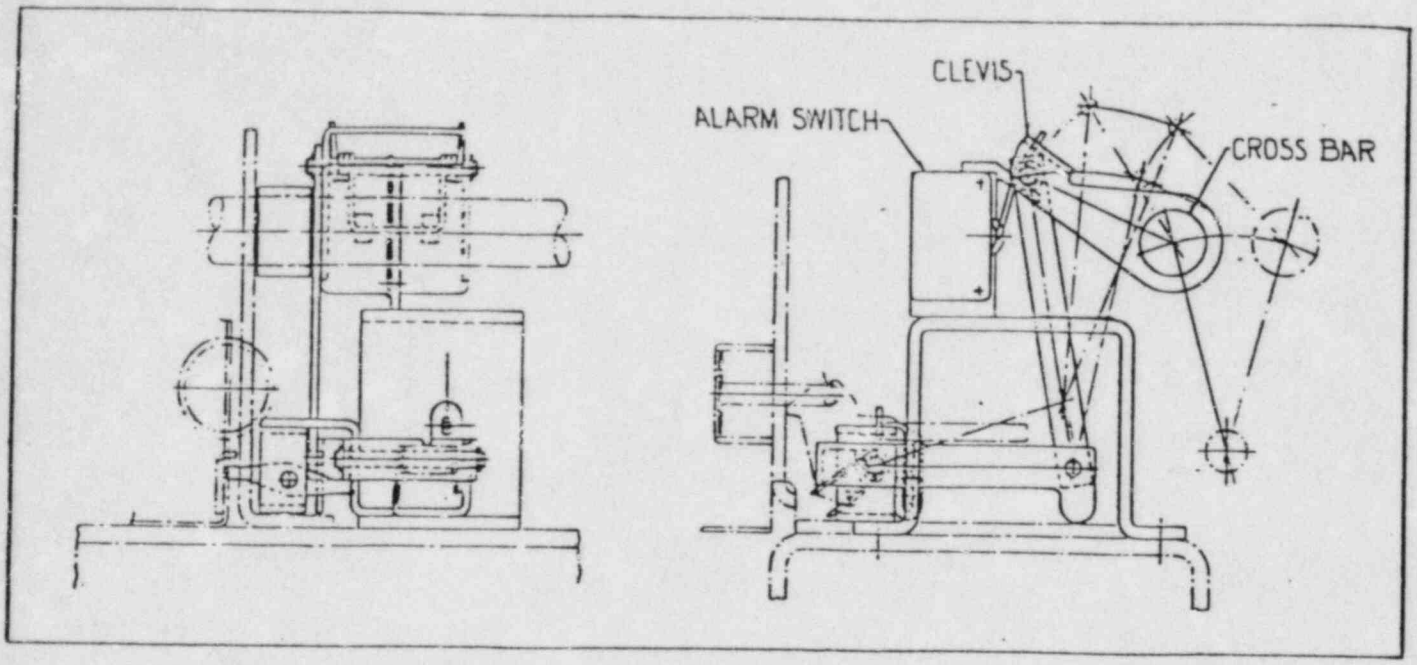


Fig. 22 - Alarm Switch Attachment - Construction Details

Inspection

Rotate the breaker handle to the closed position. The lockout should prevent closure of the breaker by holding the trip bar in the trip free position. Holding the lockout armature in the closed position should permit closure of the breaker. Releasing the armature after closure should not trip the breaker.

Maintenance

The device is non-adjustable. Check for open-circuited coil and for loose bolts.

KEY LOCK ATTACHMENT FOR FIXED BREAKERS

The key lock mounts on the right side of the operating mechanism frame. (See Fig. 24.) The key can be removed in the open or closed position of the breaker.

Inspection

Push the trip button and turn key to the locked position. The key is then removable and the breaker is locked in the tripped position. Replace key and rotate to the unlocked position to free breaker trip button. The key is also removable in this position.

Maintenance

The device is non-adjustable. Check for loose bolts only.

KEY INTERLOCK ATTACHMENT FOR FIXED BREAKERS

The key interlock mounts on the right side of the operating mechanism frame. (See Fig. 24.) When the key interlock attachment is furnished, the key lock attachment cannot be supplied. In the key interlock attachment the key cannot be removed unless the breaker is locked in the tripped position.

Inspection

Push the trip button and turn the key to the locked position. The key is then removable and the breaker is locked in the tripped position. Replace the key and rotate to the unlocked position to free the breaker trip button. The key is not removable in this position.

Maintenance

The device is non-adjustable. Check for loose screws and nuts only.

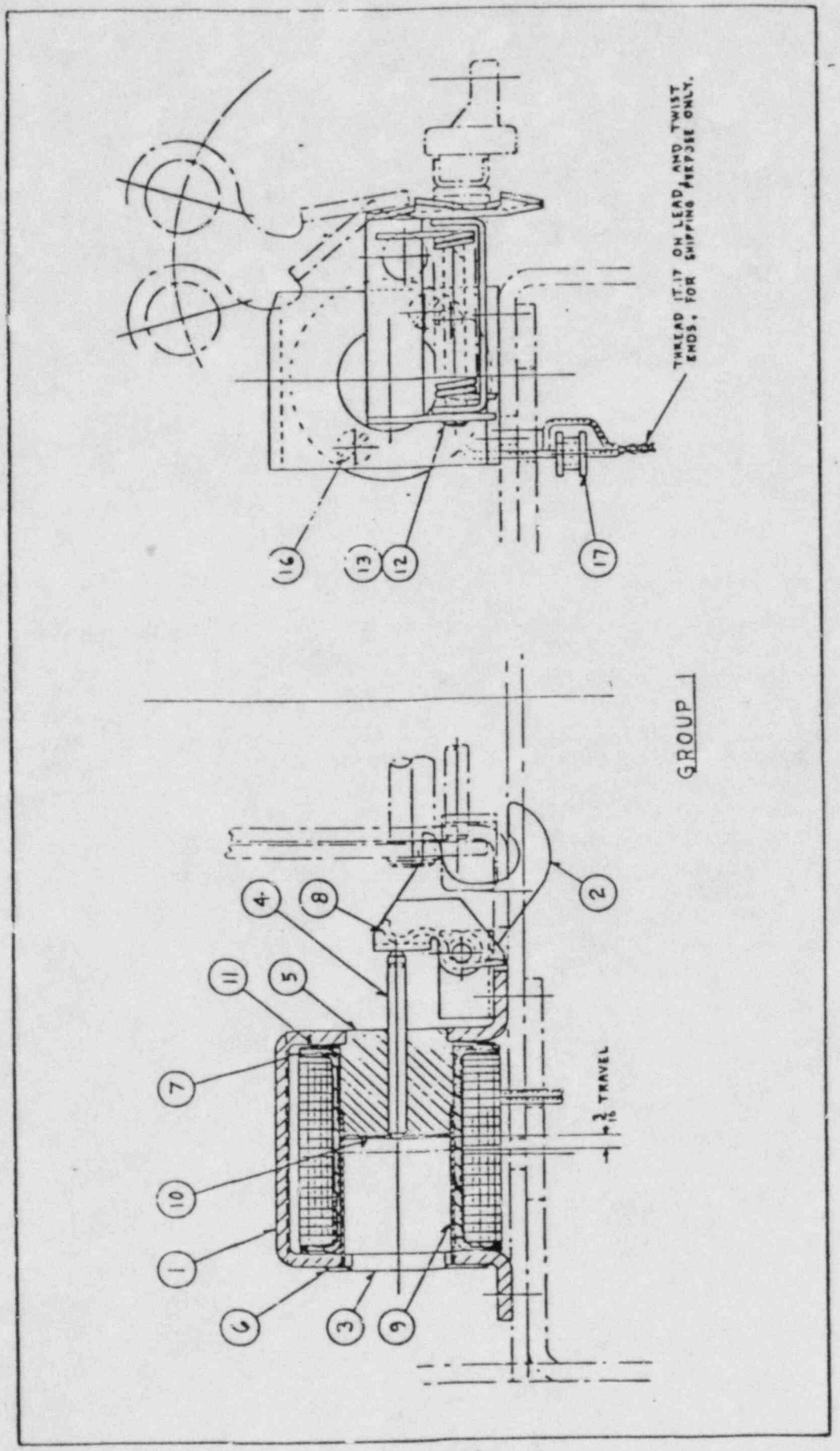


Fig. 23 - Electric Lockout Attachment - Construction Details

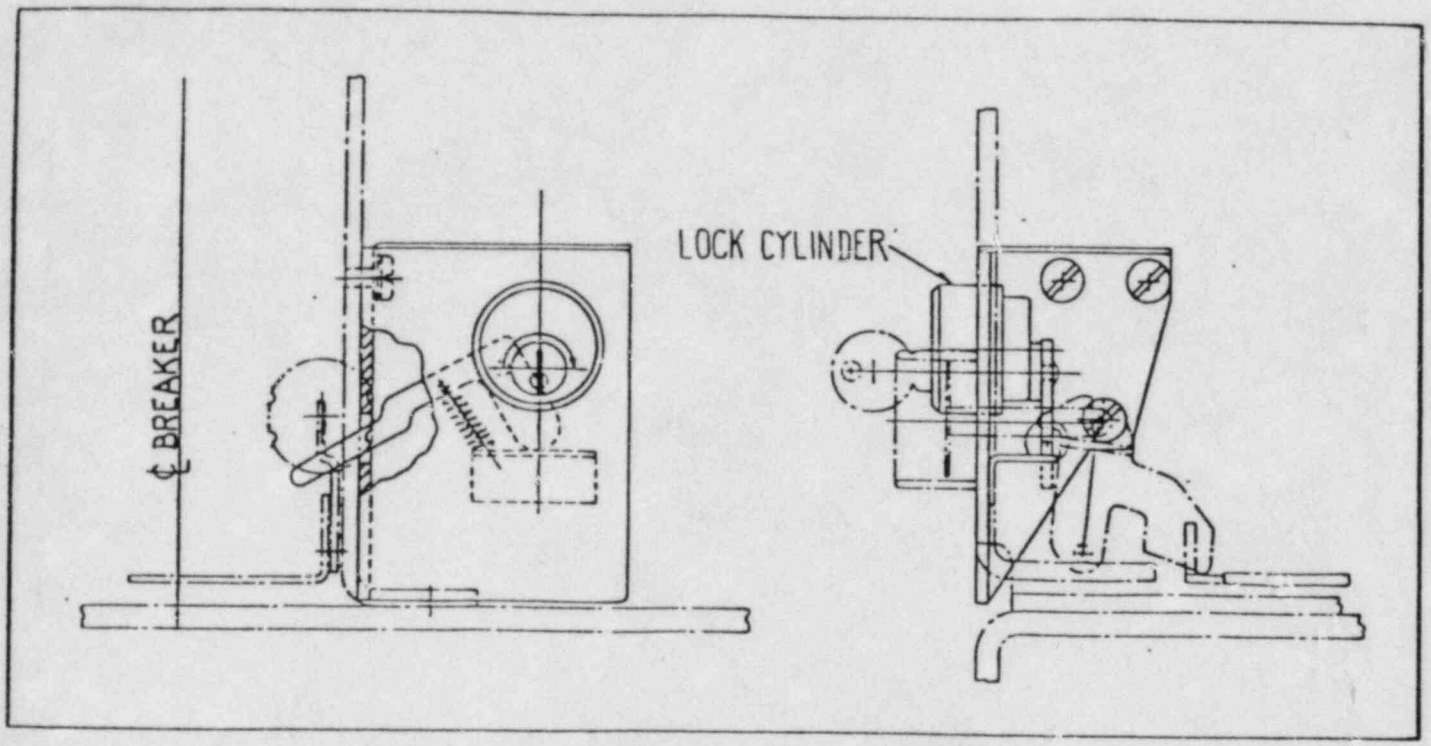


Fig. 24 - Key Lock or Key Interlock Attachment For Fixed Bkrs. - Construction Details

RECTIFIER UNIT FOR A-C ELECTRIC LOCKOUT ATTACHMENT

When an a-c electric lockout attachment is required, a rectifier unit is mounted underneath the breaker platform under the undervoltage device as shown in Fig. 25. An auto-transformer is provided in the unit so that the common voltages for 60 cycles can be connected to the appropriate terminal on the unit. A terminal block is mounted on the rectifier unit to facilitate all wiring.

NOTE: For A-C operated breakers with the closing rectifier mounted on the right side of the closing solenoid mechanism, the rectifier unit required for A-C electric lockout attachment must be mounted external to the breaker.

Inspection

There are no moving parts. Make certain a-c incoming leads are connected to proper terminals.

Maintenance

Check for loose connections.

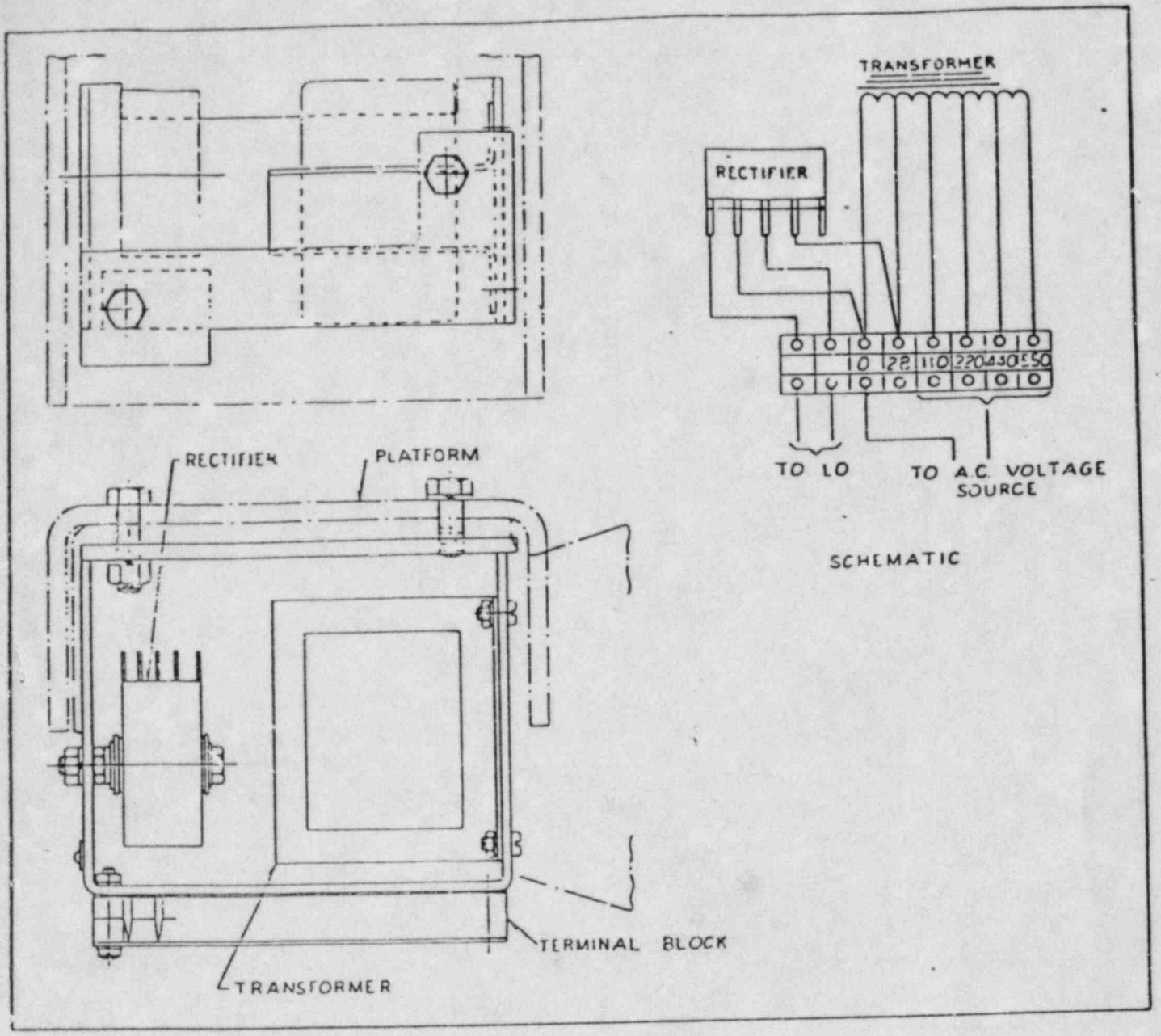


Fig. 25 - Rectifier Unit for A-C Electric Lockout Attachment

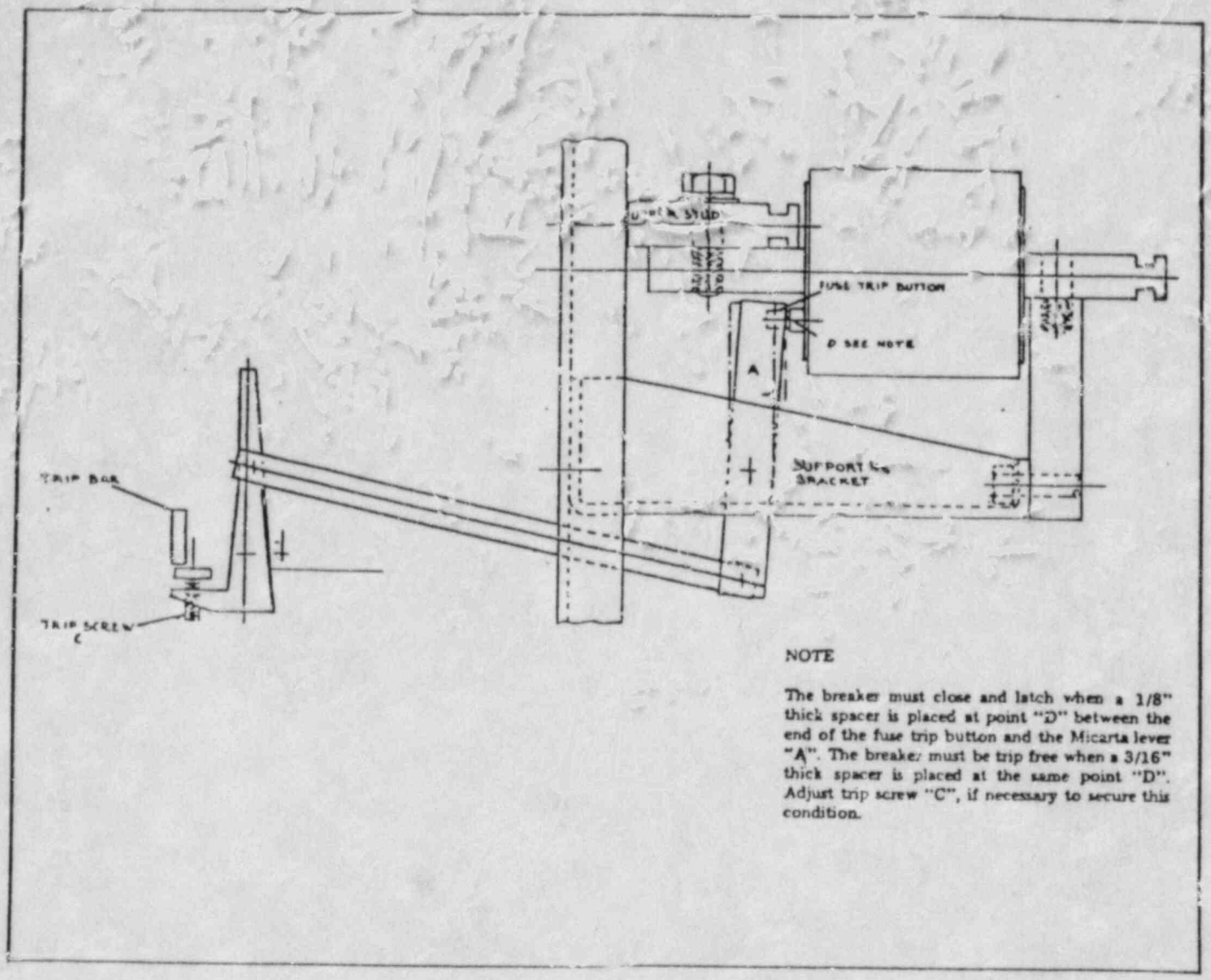


Fig. 26. Type "DBL" Air Circuit Breaker

DBL-50 BREAKER

The DBL-50 breaker consists of a standard DB-50 breaker with special current limiting trigger fuses mounted on the top studs (Ref. Fig. 26).

Recommended Spare Parts for DB50 Air Breaker

NAME OF PART (ALWAYS GIVE BREAKER S.O. REFERENCE)	STYLE NUMBER OR REFERENCE	NUMBER PER BREAKER OR DEVICE	NUMBER RECOMMENDED FOR BREAKERS		
			1	2 TO 5	6 UP
AUXILIARY SWITCH	FIG. 21				
4 POLE SWITCH UNIT	NO. 187	1 OR 2	-	1	2
FRONT COVER	NO. 186	1	-	-	1
CONTACT FINGER 184	139762A	8	-	4	8
CONTACT ROTOR 185	1397641	4	-	4	8
CONTROL RELAY	FIG. 15				
OPERATING COIL	NO. 166	1	-	1	2
BLOWOUT COIL & CIRCUIT-DC	NO. 161	1	-	1	2
MOVING CONTACT-LEFT POLE	NO. 153	1	-	2	4
MOVING CONTACT-RIGHT POLE	NO. 163	1	-	1	2
STATIONARY CONTACT-LEFT POLE	NO. 160	1	-	2	4
STATIONARY CONTACT-RIGHT POLE	NO. 165	1	-	1	2
COVER	NO. 159	1	-	-	1
POLE UNIT	FIG. 3				
STATIONARY ARCING CONTACT	NO. 314	3	3	6	12
STATIONARY MAIN CONTACT	NO. 313	3	-	1	3
MOVING ARCING CONTACT	NO. 301	3	3	6	12
MOVING MAIN CONTACT	NO. 312	6	-	2	4
AUXILIARY MAIN CONTACT	NO. 310	12	-	2	4
ELECTRIC OPERATION					
CLOSING COIL	FIG. 3 NO. 304	1	-	1	2
SHUNT TRIPPING COIL	FIG. 16 NO. 320	1	-	1	2
OVERCURRENT DEVICE COMPLETE	FIG. 6	3	-	1	2
RETAINING RINGS ASSORTMENT	497A346G03	1	1	2	3

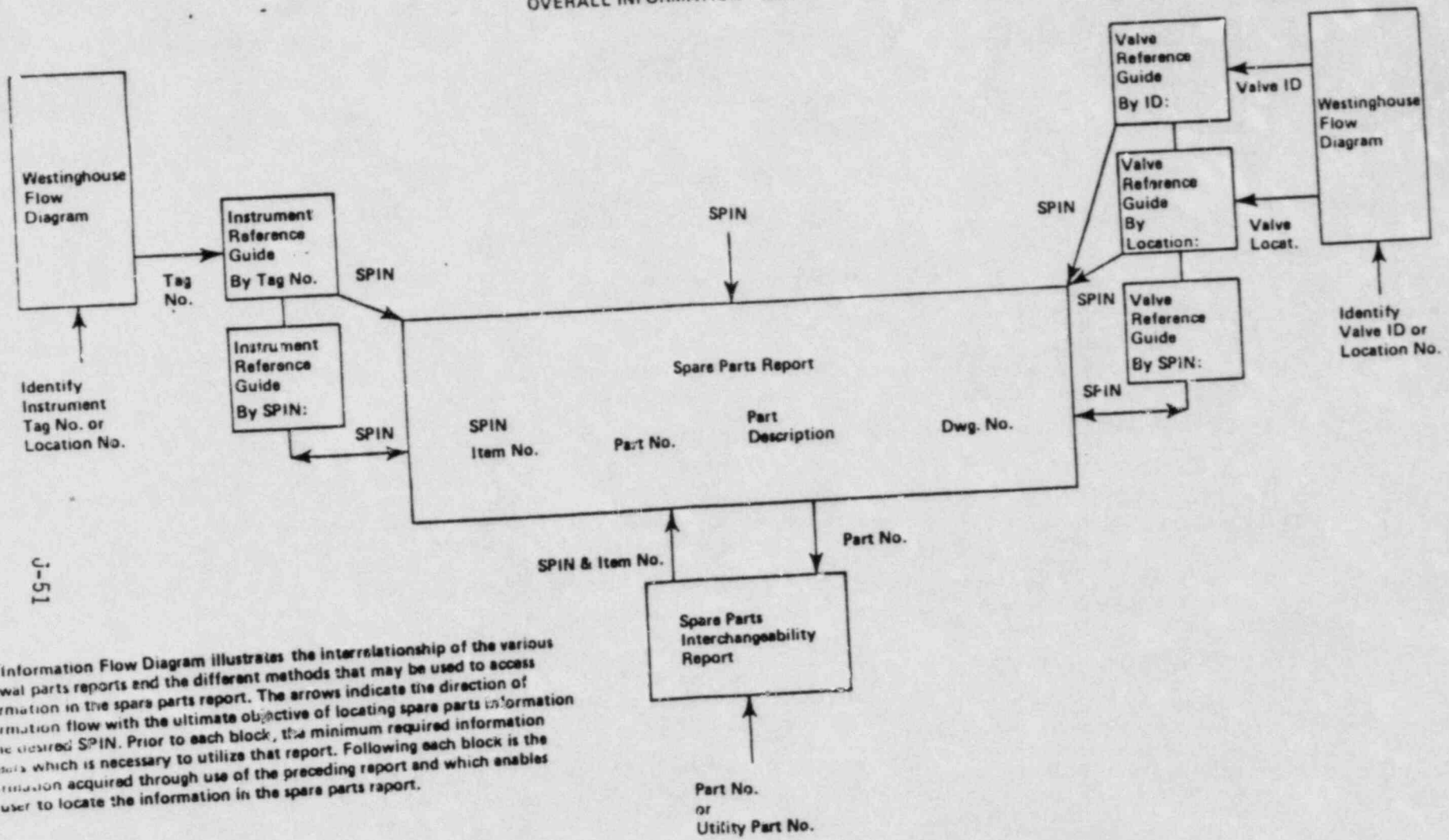
WESTINGHOUSE
NUCLEAR STEAM SUPPLY SYSTEM

SPARE PARTS REPORT

J-50

PREPARED BY
WESTINGHOUSE NUCLEAR ENERGY SYSTEMS

WESTINGHOUSE NSD RENEWAL PARTS REPORTS
OVERALL INFORMATION FLOW DIAGRAM



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The Information Flow Diagram illustrates the interrelationship of the various renewal parts reports and the different methods that may be used to access information in the spare parts report. The arrows indicate the direction of information flow with the ultimate objective of locating spare parts information in the desired SPIN. Prior to each block, the minimum required information to utilize that report is listed. Following each block is the information acquired through use of the preceding report and which enables the user to locate the information in the spare parts raport.

INTRODUCTION

The SPARE PARTS REPORT is a compilation of recommended spare parts for the Nuclear Steam Supply System furnished by the Westinghouse Water Reactor Division.

This report, when used in conjunction with the Parts Interchangeability Report, also serves as a source document for determining the interchange capability of similar parts in this system as well as other Nuclear Steam Supply Systems. Additionally, the combined use of the two reports provides 1) an inventory management device, 2) a guide for equipment protection to ensure safeguard compliance, 3) a catalog of parts in equipment maintenance planning, and 4) an identification of the component instruction book and associated reference material.

The Spare Parts Report is arranged alphabetically according to a Standard Plant Item Number, commonly referred to as S.P.I.N. A S.P.I.N. designation is located in the upper left-hand column on each page of this report. An explanation of S.P.I.N. and how it it used is provided below.

The Spare Parts Report is divided into four distinct sections:

- Original Equipment Information
- Renewal Parts Information
- Spare Parts Report Index by Shop Order
- S.P.I.N.s That Were Added or Changed Since (Revised Date)

ORIGINAL EQUIPMENT INFORMATION

This information is defined as follows:

PLANT:
Westinghouse designation for a particular utility.

SHOP ORDER:
Westinghouse internal shop order number for component.

COMPONENT:
Piece of equipment described on page.

NUMBER OF COMPONENTS:
Number of described components used in this application in the NSSS.

VENDOR CODE:
Code used by Renewal Parts to print canned vendor information.

E/SPEC/DRAWING:
Equipment spec or assembly drawing which relates to this particular component.

INSTRUCTION BOOK:
Vendor-supplied technical manual number.

REVISED DATE:
Date of last change or additions to S.P.I.N.

SAFETY CLASS:
Safety classes applying to fluid system components, as defined in ANSI Standard N18.2.

Safety Class 1: Components whose failure during normal reactor operations would prevent orderly reactor shutdown and cooldown assuming makeup is provided by normal makeup systems only.

Safety Class 2: (a) Reactor containment including isolation valves and components; (b) Pressure containing components not covered in Safety Class 1; (c) Safety systems which is any system that functions to shut down the reactor, cool the core, or cool another safety system.

Safety Class 3: Components, the failure of which would result in release to the environment of radioactive gases to be held for decay: (a) Portions of reactor coolant auxiliary systems; (b) Portions of Waste Disposal System.

Safety system components necessary to system functioning of: (a) Reactor aux system which provides boric acid; (b) Portions of containment cooling and air cleanup systems; (c) Portions of emergency feedwater.

NON-NUCLEAR SAFETY (NNS):

Any component not applying to criteria defined in ANSI N18.2.

PURCHASE ORDER:

Original purchase order number placed by Westinghouse with component vendor.

VENDOR ORDER NO:

Vendor internal control number.

VENDOR NAME,
VENDOR ADDRESS,
VENDOR PHONE:

Equipment supplier name, address and telephone number.

RENEWAL PARTS INFORMATION

Standard Plant Item Number

This instruction defines a standard system of identification for all NSSS equipment. Standard Plant Identification Numbers are assigned to each component. These S.P.I.N.s identify the applicable system or subsystem, the class of equipment, the type of equipment within a class and the specific component number or S.P.I.N. modifier.[a] Table 1 lists the items in each of the categories.

a. Assigned By The Westinghouse Nuclear Service Division Renewal Parts Activity.

TABLE 1
STANDARD PLANT ITEM NUMBER KEY

AB System Or Subsystem Designations

- AA = No Hardware
- AB = Internal Scheduling Item
- AC = Auxiliary Coolant (obsolete)
- AF = Auxiliary Feedwater
- AI = Air Compressor Cooling
- AL = Acoustic Leak Monitoring System
- AS = All Systems (limited application)
- BP = Burnable Poison Rod Assembly Handling Tool
- BR = Boron Recycle
- BS = Exceptional Emergency Systems (Bunker)
- CA = Compressed Air
- CC = Component Cooling
- CD = Emergency Diesel Cooling
- CF = Containment Filtration
- CI = Containment Spray and Iodine Removal
- CN = Ice Containment
- CP = Rod Control and Position
- CR = Core Protection and Surveillance System
- CS = Chemical and Volume Control
- CW = Circulating Water
- DB = Dual Basket Transfer System
- DC = Diagnostic Computer Center
- DD = Demineralizer Water
- DO = Diesel Oil
- DS = RCP Double Dam Seals
- EB = Emergency Boron Injection
- ES = Electrical Systems
- FC = Feedwater Chemical Control
- FD = Floor Drain Equipment
- FH = Fuel Handling
- FP = Fire Protection
- FW = Feedwater
- GA = General Application
- GH = Waste Processing (gas)
- HS = Heat System

AB System Or Subsystem Designations (Cont)

- IC = Incore Instrumentation
- IP = Integrated Projection System
- IV = Integrated Vessel Head Package for One-Lift Operation
- LF = Load Follow Upgrade Package
- MI = Metal Impact Monitoring System
- MW = Makeup Water
- NI = Nuclear Instrumentation
- NN = Nuclear Noise Monitoring System
- NS = New Steamline Break Protection System
- PS = Protection and Surveillance Upgrade Package
- QA = Seismic and Environmental Qualified Instrumentation
- QB = Seismic Qualified Instrumentation
- QD = RCP Electrical Quick Disconnects
- RA = Rod Control Cluster Assembly Change Fixture Sheave Guards
- RD = Rod Control Cluster Change Tool
- RC = Reactor Coolant System
- RH = Residual Heat Removal
- RM = Radiation Monitoring
- RO = Repair, Operation and Maintenance Program System
- RR = Rapid Refueling
- RT = Deletion of RT Following TT Below 50% Power
- RW = Radiation Waste
- SA = Auxiliary System
- SB = Steam Generator Blowdown
- SD = Steam Dump
- SF = Spent Fuel Cooling
- SG = Safeguard Actuation
- SI = Safety Injection
- SH = Reactor Vessel Stud Handling System

AB System Or Subsystem Designations (Cont)

- SM = RCP Seal Maintenance System
- SP = RCP Motor Oil Spillage Protection and Control
- SS = Sampling
- SW = Service Water
- TN = Transportation
- TR = Boron Thermal Regeneration
- TT = N-16 Transit Time Flow Meter
- TV = Portable Underwater TV System
- UH = Upper Head Injection
- VM = Vibration Monitoring System
- WD = Waste Disposal (solid)
- WE = 15 GPM Waste Evaporator System
- WP = Waste Processing (liquid)
- WS = Refueling Water Storage
- XI = Process Instrumentation and Control
- XX = "Other" (limited application)

CD Class Of Equipment Designations

- AD = Air Distribution Equipment
- AH = Auxiliary Heat Exchangers
- AP = Auxiliary Pumps
- AT = Auxiliary Tanks
- CH = Chemicals
- CR = Control Rods
- DB = Dual Basket
- DM = Demineralizers
- EL = Electrical Equipment
- ES = Equipment Supports
- EV = Evaporators
- FA = Fuel Assemblies
- FL = Filters
- HC = Head Closure
- HD = Hardware
- HE = Hydraulic Equipment

CD Class Of Equipment Designations (Cont)

- IC = Incore Components – Mechanical
- IH = Integrated Head
- IN = Insulation
- ME = Mechanical Equipment
- MN = Manifolds
- OR = Orifices
- PC = Primary Pressure Containing Equipment
- RI = Reactor Internals
- RN = Resin
- SC = Special Cranes
- SE = Storage Equipment
- SR = Strainers
- ST = Special Tools
- UW = Underwater
- VA = Valves

EF Type Of Equipment Designations

The EF type of equipment designation represents a two-letter abbreviation for the particular piece of equipment under consideration, for example:

- SG = Steam Generators

GH Designation

The component number designation "GH" is a two-digit serial number signifying only the component number of the same "type of equipment" within a given plant.

The S.P.I.N. consists of eight characters: "ABCDEFGHI."

AB	CD	EF	GH
System or Subsystem	Class of Equipment	Type of Equipment	Component Number or SPIN Modifier

The following is an example:

SI	AP	SI	01
Safety Injection System	Auxiliary Pumps	Safety Injection Pump	Pump No. 1

The Spare Parts Report also supplements existing information such as the more extensive and detailed information of component instruction books and drawings. Although Westinghouse exerts every effort to provide correct information in such areas as part numbers, packaging, storage, and Quality Assurance, the issue of this report is intended for reference only.

When ordering components or parts from pages of the Spare Parts Report, please include all the information under the heading of the report page. As a suggestion, a copy of the page, marked to indicate the desired purchase, will minimize errors and save time.

Explanation of Column Headings

An explanation of the column headings in the Spare Parts Report is as follows:

ITEM:
The "0" in the item column is always reserved for the complete component. The succeeding numbers in the item column are the recommended spare parts to refurbish or maintain the component.

PART NUMBER:
The manufacturer's assembly drawing, model number or part number for that particular component or part.

PART DESCRIPTION:
A complete or abbreviated name for the component or part, sometimes accompanied by the model number and/or function. Where applicable, Westinghouse drawing and item number is included.

QTY REQ.:
Total quantity required: The total here means the total of the components of this designation and the total of each of the recommended spare parts to refurbish or maintain all components at the same time.

QTY REC.:
Total quantity recommended: Since it is unlikely that all the components will require maintenance at the same time, the total here is the experienced, conservative, recommendation for spare components and/or component parts, that assures adequate component protection yet minimizes the spare part inventory. An asterisk (*) in this column indicates that the part is used in another component (S.P.I.N.) in this Nuclear Steam Supply System or in another Nuclear Steam Supply System in the same utility. In this event, a review of the Interchangeability Report will indicate where the part is recommended as well as all applications for the part.

INV:
Inventory: The total here reflects the inventory of the plant. The number in this column is updated, by the utility, using the on line system.

QTY USD:
The actual number of spare components or parts used throughout the existing year. (January 1 through printout date of report)

QTY ORD:
Total number of parts on order at time of publication of printout.

QA:
Quality level code recommended by Westinghouse:

A. Requires review of E spec and/or drawings for current code requirements as they apply to the part recommended.

B. (Unknown Q.A. level) Requires review for assignment to A, C or D level in accordance with current code requirements.

C. Does not require review (off shelf items)

D. A renewal part or assembly is designated as Quality Assurance code D if the following criteria apply:

(1) Documentation of a particular kind is needed, e.g., verification tests, certificate of compliance, etc.

(2) The part is of relatively simple fabrication, e.g., RC pump gasket and reactor vessel O-rings.

(3) The part does not warrant direct surveillance as determined by Quality Assurance.

PK:

Packaging level recommended: The requirements for activities covered by this column are divided into four levels with respect to protective measures to prevent damage, deterioration, or contamination of the items, based upon the important physical characteristics and not upon the important functional characteristic of the item with respect to safety, reliability, and operation. It should be recognized, however, that within the scope of each level there may be a range of controls and that the detailed requirements for an item are dependent on the importance of the item to safety or reliability. For example, even though a reactor vessel and structural steel are classified as level D, the degree of protection and control over the reactor vessel should exceed that of the structural steel. Each of the spare parts recommended by Westinghouse is classified into one of these four levels. The manufacturer's documented standard or minimum requirement has been considered when classifying the items. Items, once packaged according to the requirements of one level, should not be shipped, received, stored, or handled according to a level of lower grade. Any package unit or assembly made up of items of different levels is classified to the highest level designated for any of the respective parts.

Items covered by this column are categorized under the following levels.

Level A – Items classified to level A are those that are exceptionally sensitive to environmental conditions and require special measures for protection from one or more of the following effects: temperatures outside required limits, sudden temperature changes, humidity and vapors, gravitational (g) forces, physical damage, and airborne contamination (e.g. rain, snow, dust, dirt, salt spray, fumes).

The following were used as a guide for classifying items in this level classification.

(1) Special electronic equipment and instrumentation.

(2) Special materials, such as chemicals that are sensitive to the environment.

(3) Special nuclear material and sources. The requirements of the NRC and other governmental agencies shall be met.

Level B – Items classified to level B are those that are sensitive to environmental conditions and require measures for protection from the effects of temperature extremes, humidity and vapors, gravitational (g) forces, physical damage, and airborne contamination and should not require special protection required for level A items.

The following were used as a guide for classifying items in this level classification.

(1) Instrumentation

(2) Electrical penetrations

(3) Batteries

(4) Welding electrode and wire

(5) Control rod drives

(6) Motor control centers, switchgear, and control panels

(7) Motors and generators

(8) Precision machined parts

(9) Spares such as gaskets and "O" rings

(10) Air handling filters

(11) Computers

Level C – Items classified to level C are those that require protection from exposure to the environment, airborne contaminants, gravitational (g) forces, and physical damage. Protection from water vapor and condensation is not so important as that for level B items.

The following were used as a guide for classifying items in this level classification.

(1) Pumps

(2) Valves

(3) Fluid filters

(4) Reactor internals

(5) Compressors

(6) Auxiliary Turbines

(7) Instrument cable

(8) Refueling equipment

(9) Thermal insulation

(10) Fans and blowers

(11) Cement

Level D – Items classified to level D are those that are less sensitive to the environment than level C. These items require protection against the elements, airborne contamination, and physical damage.

The following were used as a guide for classifying items in this level classification.

(1) Tanks

(2) Heat exchangers and parts

(3) Accumulators

(4) Demineralizers

(5) Reactor vessel

(6) Evaporators

(7) Steam generators

(8) Pressurizer

(9) Piping

(10) Electrical cable

(11) Structural items

(12) Reinforcing steel

(13) Aggregates

This column lists the recommendations for packaging of items for protection against corrosion, contamination, physical damage, or any effect which would lower the quality or cause the item to deteriorate during the time it is shipped, handled, and stored. The degree of protection specified should vary according to storage conditions and duration, shipping environment and handling conditions.

Implementation of this packaging section is accomplished by identifying the item and the appropriate packaging level and then applying the appropriate criteria concerning cleaning, preservatives, desiccants, inert gas blankets, cushioning, caps and plugs, barrier and wrapping materials, tapes, blocking and bracing, containers, marking, and other quality assurance provisions and documentation.

The following packaging criteria are divided into four levels corresponding to the categories listed above.

Level A – Items classified to level A require the highest degree of protection and should conform to the following criteria:

(1) Package design requirements are for extraordinary environmental protection to avoid the deleterious effects of shock and vibration, to control temperature or humidity within specified limits, or for any other special requirements.

(2) Items shall have been inspected for cleanliness immediately before packaging. Dirt, oil residue, metal chips, or other forms of contamination shall have been removed by approved cleaning methods. Any entrapped water shall have been removed.

(3) Items which are not immediately packaged shall be protected from contamination.

(4) All items shall be packaged with a barrier so that water vapor, salt air, dust, dirt, and other forms of contamination do not penetrate the package.

(5) Items shall be packaged in containers or crates.

(6) Items which can be damaged by condensation trapped within the package shall be packaged with an approved desiccant inside the sealed water-vaporproof barrier or by an equivalent method.

(7) All openings into items shall be capped, plugged or sealed. Weld end preparations shall be protected against corrosion and physical damage.

(8) Items packed in containers shall be blocked, anchored, braced and/or cushioned to prevent physical damage to the item or barrier.

(9) Items and their containers shall be identified by marking.

Level B – Items classified to level B require a high degree of protection and the package shall be designed to avoid the deleterious effects of shock, vibration, physical damage,

water vapor, salt spray, condensation, and weather during shipping, handling, and storage. This packaging shall be equivalent to that for level A except that the extremes of paragraph (1) need not apply. Level B items such as control panels or similar special items may be shipped with a minimum of protection when transported in a fully enclosed furniture-type van with special suspension, provided the shipment goes through to its destination in the original vehicle and level B storage facilities are available at the site.

Level C — Items classified to level C require protection from exposure to salt spray, rain, dust, dirt, and other airborne and windblown contaminants. Protection from water vapor and condensation is less important than for level B items. The following criteria shall apply.

(1) Criteria (2), (3), (5), (7), (8), and (9) for level A items shall apply to level C items.

(2) Items shall be packaged with a waterproof enclosure so that water, salt spray, dust, dirt, and other forms of contamination do not penetrate to the item.

(3) Items subject to detrimental corrosion, either internal or external, shall be suitably protected.

Level D — Items classified to level D require protection from physical and mechanical damage. The following criteria shall apply.

(1) Items, just before packaging, shall have been inspected for cleanliness according to the requirements specified in the purchasing document. Dirt, oil residue, metal chips, or other forms of contamination shall have been removed by approved cleaning methods. Any entrapped water shall have been removed.

(2) All openings into items shall be capped, plugged, and sealed. Weld end preparations shall be protected from corrosion and physical damage.

(3) Items subject to detrimental corrosion, either internal or external, shall be suitably protected.

(4) Items packed in containers shall be blocked, braced and/or cushioned to prevent physical damage.

(5) The identity of the item shall be maintained by marking or other appropriate means.

Cleaning includes the preparation of items for preservation or packaging, or both, to minimize the requirements for site cleaning. Items shall be inspected for cleanliness immediately before packaging according to the cleaning requirements specified in the purchase document. Any dirt, oil residue, metal chips, or other forms of contamination shall be removed by documented cleaning methods. Any entrapped water shall be removed. Any item which is not immediately packaged shall be protected from further contamination.

Items subject to deleterious corrosion shall be protected by using either contact preservatives, inert gas blankets, or vaporproof barriers with desiccants.

ST:

Storage Level Recommended: Environmental conditions for items classified at levels A, B, C, and D described in the PK column explanation should meet requirements as described in the following paragraphs.

(1) Level A items shall be stored under special conditions similar to those described for level B items but with additional requirements such as temperature and humidity control within specified limits, a ventilation system with filters to provide an atmosphere free of dust and harmful vapors, and any other appropriate requirements.

(2) Level B items shall be stored within a fire resistant, tear resistant, weathertight, and well-ventilated building or equivalent enclosure. Precautions shall be taken against vandalism. This area shall be situated and constructed so that it will not be subject to flooding; the floor shall be paved or equal, and well drained. Items shall be placed on pallets or shoring to permit air circulation. The area shall be provided with uniform heating and temperature control, or its equivalent, to prevent condensation and corrosion. Minimum temperature shall be 40°F and maximum temperature shall be 140°F or less if so stipulated by a manufacturer or supplier. More specific instructions are listed in the NSSS Component Receiving and Storage Criteria manual provided by the Westinghouse Nuclear Service Division.

(3) Level C items shall be stored indoors or equivalent with all provisions and requirements as set forth in level B items except that heat and temperature control is not required

(4) Level D items may be stored outdoors in an area marked and designated for storage, which is well drained, preferably gravel covered or paved, and reasonably removed from the actual construction area and traffic so that possibility of damage from construction equipment is minimized. Items shall be stored on cribbing or its equivalent to allow for air circulation and to avoid trapping water.

SH LF:
Shelf Life: The shelf or storage life of the component or parts in years. If the shelf life is unknown, this column will be blank or have a zero entry.

SR LF:
Service Life: The expected life of the component or part in years. If the service life is unknown, this column will be blank or have a zero entry.

LD TM:
Lead Time: The elapsed time, in months, between placing an order to purchase the component or part and its delivery.

UNIT PRICE:
Unit price for each of the spare parts recommended. These prices are subject to change without notice and do not necessarily constitute an offer to sell on the part of Westinghouse.

HIST YR QTY:
This section of the report serves as an historical source information on quantity used. This is dependent on utility input into quantity used column. Using this history (3 yrs) as a guide, emergency requisitions during refueling should be held to a minimum.

SPARE PARTS REPORT INDEX BY SHOP ORDER

In this part of the report the following information is provided:

(a) List of all Westinghouse shop order numbers in book

(b) List of all S.P.I.N.s in book under that shop order

(c) Page numbers of all S.P.I.N.s

For your guidance Table 2 on the next page lists the generic titles for Westinghouse shop orders.

S.P.I.N.S THAT WERE ADDED OR CHANGED SINCE

This information indicates all S.P.I.N.s that had changes or were added to report since the last spare parts report update.

INDEXES

Two indexes are supplied as companion documents to the Spare Parts Report. The first index lists process instrumentation and control equipment by tag (or location) number versus S.P.I.N. Its complementary index is sorted by S.P.I.N. versus tag (or location) number. The second index is for valves and is similarly arranged. A reference guide is provided with each index.

If a component is not listed in the indexes, it may be located in the Spare Parts Report by proceeding as follows:

(1) Identify the system in which the component is used or installed. This is the fixed list, alphabetically arranged, AB category of S.P.I.N.

(2) Identify the equipment class of the component by referring to the CD category of S.P.I.N. which is also arranged alphabetically with the list fixed at twenty-five classes.

(3) Since the EF and GH category of S.P.I.N. is not a fixed list, locating the particular component in the report can be accomplished with any of the following methods:

Method A:
Perform Steps 1 and 2 above to locate the section of the report in which the particular component is listed. Proceed through the report, page by page, until the component line (line three) in the left hand margin identifies the particular component.

Method B:
Perform Steps 1 and 2 above to locate the section of the report in which the particular component is listed. Proceed through the report, page by page, until the Part Description column of the Item column's "0" line identifies the particular component.

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Method C.
Method C is the most rapid but requires familiarity with the system and components. Using this method is based on knowing how the S.P.I.N. characters in the EF and GH positions are assigned.

To help become familiar with this method: First perform Steps 1 and 2 above to locate the section of the report in which the component is listed. Second, abbreviate the name of the spare part you want to locate, then search for the EF and GH S.P.I.N. characters which identify the part. See Table 1 for examples of EF and GH S.P.I.N. designations.

TABLE 2
SHOP ORDER TITLES

S.O.	Title	S.O.	Title
30	Fuel Assembly Auxiliary Comp.	310	Monitoring Systems (RMS)
42	Mechanical Core Structures	320	Process I&C Systems
90	Incore Instrumentation	325	Process I&C (Field Mounted)
105	Reactor Vessel and Associated Equipment	330	NIS Detectors
107	Reactor Vessel Stud Tensioner Head Closure Tool	340	Rod Control and Position Indicating System
115	F/L Control Rod Drive Mechanism	350	Electrical Systems (Turnkey)
116	P/L Control Rod Drive Mechanism	360	Incore Instrumentation
120	Steam Generators	381	Axial Power Distribution Monitoring System
125	Reactor Coolant Pumps	370	Process Computers
126	RCP Seal Maintenance Package	386	Electric System and Equipment (Rod Drive MG Set, Pressurizer Heater Controllers)
130	Pressurizer	387	Solid State Protection Systems
135	RC Loop Stop Valves	395	Control Board Activity (Annunciators)
184	Fuel Handling Equipment Engineering	397	Advanced Control Room
185	Fuel Transfer System and Handling Equipment	398	Main Control Board Engineering (NSSS)
188	Refueling Equipment	810	Reactivity Computer
189	Integrated Head Package	902	Ice Condenser
205	Pumps and Compressors	917	Hydrogen Recombiner (Electric)
210	Heat Exchangers	918	Spent Fuel Leak Detection System
211	Mechanical Components – Waste Disposal	919	Metal Impact Monitoring System
215	Tanks and Filters	941	Waste Encapsulation System
216	Waste Disposal Tanks	945	Boron Concentration Measurement
220	Auxiliary Valves	946	Reactor Cavity Filtration System
221	Steam Dump Valves	957	RCS Equipment Supports
222	Steam Generator Safety Valves	9030	Electric Hydrogen Recombiner
223	Main Steam Stop Valves	9060	Boron Concentration Measurement System
224	Manually Operated Globe and Check Valves		
226	Primary System Loop Bypass Valves		
228	Strainers – Miscellaneous Equipment		
230	Engineered Packages and Products		
232	Chillers/Evaporators		
245	Reactor Containment Fan Cooler		
246	Recirculation Containment Fan Coolers		
255	Hydrogen Recombiner		

PLANT	PSE	SAFETY CLASS	2
SHOP ORDER	385	PURCHASE ORDER	NA32027 Y2
COMPONENT	REACTOR TRIP SWITCHGEAR	VENDOR ORDER NO	24-Y-7268
NUMBER OF COMPONENTS	4	VENDOR NAME	WESTINGHOUSE ELECTRIC C
VENDOR CODE	W E PGH	VENDOR ADDRESS	EAST PITTSBURGH DIVISIO
E.SPEC/DRAWING	676586-1		700 BRADDOCK AVENUE
INSTRUCTION BOOK	247268		EAST PITTSBURGH PENNSYL
REVISED DATE	08/24/81 LR4	VENDOR PHONE	412-256-7000

S.P.I.N. ESPDTS

ITEM	PART NUMBER	PART DESCRIPTION	QTY REQ	QTY REC	QTY INV	QTY USD	QTY ORD	QA	CFR 21	P K	S T	SH LF	SR LF	LD TM
0	TYPE DB-50 34-2004	REACTOR TRIP SWITCHGEAR	4	0				C	NO					
1	200B570G01	CONTACT,MOVING (MAIN)	24	12				C	NO	B	B	40		
2	28A1391H25	CONTACT,AUX.	48	24				C	NO	B	B	40		
3	309C855G01	MOVING ARCING CONTACT	12	6				C	NO	B	B	40		
4	1611758	LINK,OPERATING	12	6				C	NO	B	B	40		
5	1611764	STAT MAIN CONT & UP STUD	12	6				C	NO	B	B	40		
6	1611743	CONTACT,STAT ARCING	12	6				C	NO	B	B	40		
7	1611767	STUD,LOWER	12	6				C	NO	B	B	40		
8	497A346G03 34-8947	RETAINING RING ASSORTMT	12	6				C	NO	B	B	40		
9	1589689	BREAKER LEVER	4	2				C	NO	B	B	40		
10	1589692	ROLLER LEVER	4	2				C	NO	B	B	40		
11	499A453H01	SPRING,ROLLER LEVER	4	2				C	NO	B	B	40		
12	1589691	PAWL	4	2				C	NO	B	B	40		
13	1584-520	SPRING,PAWL	4	2				C	NO					
14	1589682	LATCH SEGEMENT	4	2				C	NO	B	B	40		
15	300P606G01	COIL,CLOSURE	4	2				C	NO	B	B	40		
16	1491-403	COIL,SHUNT TRIP	4	2				C	NO					
17	1529444	COIL,CONTROL RELAY	4	2				C	NO	B	B	40		
18	1589340	COIL,BLOWOUT	4	2				C	NO	B	B	40		
19	33A2746G32	CONTROL RELAY	4	1				C	NO					

ADMINISTRATIVE PROCEDURES

SALEM GENERATING STATION

ADMINISTRATIVE PROCEDURE NO. 19

MATERIAL PROCUREMENT, RECEIVING, STORAGE, ISSUE, TRANSFER, SHIPPING AND SERVICES PROGRAM

1.0 PURPOSE

This procedure delineates the methods to be used when procuring, receiving, storing, issuing, transferring, shipping material and services.

2.0 SCOPE

This procedure defines the administrative controls relating to the procuring, receiving, storing, issuing, transferring and shipping of materials, including the procurement of contractor services.

3.0 REFERENCES

3.1 ANSI 45.2.2, "Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants (During Construction Phase)"

3.2 10CFR21, "Reporting of Defects and Noncompliances"

3.3 Clerical Office Procedures (COP)

3.4 Storeroom Procedures (SRP)

3.5 Operational Quality Instructions (OQI's)

3.6 Quality Assurance Instructions (QAI's)

3.7 Master Equipment List (formerly Project Directive 7)

3.8 Suppliers With Approved Quality Systems (Quality Assurance Department List)

4.0 DEFINITIONS/FORMS

4.1 Supplier - Any individual or organization under contract for furnishing items or services, including the terms vendor, seller, contractor, subcontractor, fabricator and consultant.

4.2 Certificate of Compliance - A written statement, signed by a qualified party, attesting that the items or services are in accordance with specified requirements and accompanied by additional information to substantiate the statement.

NOTE

Use of the Certificate of Compliance should be limited to ASME Code items

4.3 Westinghouse Quality Control Release (WQCR) - A written statement utilized by Westinghouse to document that the quality requirements of their purchase order have been met and are available for review upon request by PSE&G.

4.4 Commercial Catalog Item (CCI) - An item which could be installed in a safety-related system or component, and:

4.4.1 Is not unique to facilities or activities licensed by the NRC.

4.4.2 Is manufactured in quantity to published manufacturer's fixed design and quality requirements.

4.4.3 For replacement (CCI) items, a document exists which identifies the item (to be ordered) as an authorized replacement for the original or existing item. Such documents include the manufacturer's parts list, bill of material, repair, maintenance or instruction manual or a PSE&G Engineering listing of replacement or interchangeable parts. Substitution of authorized parts require engineering approval.

4.4.4 The item part number is listed in the supplier's sales catalog as opposed to a manufacturer's bulletin or circular.

4.4.5 The item requires no supplier documentation (i.e., test data, NDE results, certificate of analysis, certificate of compliance, etc.).

4.4.6 Is identifiable via physical marking, tagging or containerization. The identification shall be capable of being maintained throughout storage.

4.4.7 Meets applicable classification requirements of Table I below, but does not fall within the category of Table II.

Table I

Typical Items Classified as Commercial Catalog Items

(a) Electronic Components and Assemblies; i.e., resistors, capacitors, transistors, integrated circuits, diodes, transmitters, instrumentation.

(b) Electrical Components; i.e., breaker contacts, brushes, relays, lamps, fuses, terminals, transformers, switches, instruments, recorders, etc.

(c) Mechanical Components; i.e., bearings, gaskets, packing, O-rings, handwheels and non-ASME Code fittings, small nuts, bolts, studs, etc.

Table II

Items Not Classified as Commercial Catalog Items

(a) Components with Unique Requirements (requiring special screening, selection, modification, handling and inspection).

(b) ASME Boiler and Pressure Vessel Code Items.

NOTE

Items in the (CCI) category do not require imposition of 10CFR Part 21 on the supplier and do not have any traceability requirements.

4.5 Traceability - The ability to trace the history, application or location of an item and like items by means of recorded identification.

4.5.1 The traceability of a safety-related item and/or an item with QA provisions to the QA records pertaining to its purchase/transfer shall be maintained via the Inspection Release Tag.

4.6 Inspection Release Tag - A green tag utilized by the Office Administrator to indicate that the receiving inspection of a safety-related and/or an item with QA provisions has been satisfactorily completed. The tag is attached to the item to indicate that the item is acceptable for use.

NOTE

The traceability of CCI's via the Inspection Release Tag is not required.

4.7 Master Equipment List - List of Salem items and appropriate safety, seismic and QA required ("QA") classification. The list is maintained and distributed by the Engineering Department.

4.8 Material Order/Item Classification (MO/IC) (Form AP-19-1) - Self-explanatory (See Attachment 1 for detailed entry instructions).

4.9 Material Request and Receiving Record (MR/RR) (Attachment 2) - The form utilized by the Office Administrator to provide detailed ordering information, including quantity, applicable codes or standards, engineering specifications, intended use, safety-related, QA and Commercial Catalog Item classifications.

4.10 Receiving and Invoice Record (Attachment 3) - The form utilized by the Stockhandler to document the results of the receiving inspection.

4.11 Special Receiving Instructions (Form AP-19-2) - The form used by the initiating supervisor and/or the Quality Assurance representative to provide applicable instructions to the inspector (i.e., receiving inspections, storage, maintenance, special handling, etc.).

4.12 Data Review Receiving, QAF-19 (Attachment 4) - The form used by the Station Quality Assurance Engineer (SQAE)/Quality Assurance Department (QAD) to identify the QA documents required and to provide evidence of satisfactory document review at either the vendor's facility or during station receiving inspection.

4.13 Storeroom Material Issue Ticket (Attachment 5)

4.14 Storeroom Material Return Ticket (Attachment 6)

4.15 Material/Equipment Transfer Request Form 101/102 (Attachment 7)

4.16 Store House Order Form (Attachment 8)

4.17 Storehouse Order (Attachment 9)

PROCUREMENT METHODS

All procurement methods shall receive a QA review to ensure that items/services purchased receive the proper classifications, QA requirements and 10CFR21 considerations.

5.1 Direct Charge - Item and/or service procurement for a specific job. Used upon receipt and does not require long term storage or inventory control.

5.2 Confirming Order - Items and/or services of an emergency nature verbally placed through the Purchasing Department.

5.3 Stores (Folio) - Items frequently used in the routine operation of the plant and are stored and inventoried by the Storeroom. Folio numbers are established for the identification of each item.

5.3.1 Folio Reorder - Item is reordered when the order point established on the perpetual inventory card has been reached or if a supervisor requests additional quantities for a specific job.

5.4 Blanket - Purchase order to a specific vendor to cover the procurement of items/services as needed from time to time during a period of one year.

5.4.1 Blanket Reorder - Items procured through Blanket Purchase Orders are processed via a Material Request and Receiving Record with a sequential Release Number.

NOTE

When blanket orders involve both safety-related and/or QA required and non-safety related items/services, two separate purchase orders shall be issued to prevent "mixing" of orders with quality requirements and orders with no quality requirements.

5.5 Local Order - Routine procurement for small quantities of "non-safety related/no QA provisions required" materials or services not to exceed the amount specified by the Office Administrator.

5.6 Safety-Related or QA Required Services - Services which support (i.e., review, analyze, prepare procedures for, recommend changes to, etc.) PSE&G activities (Regulatory Guide 1.33) or equipment classified as safety-related. Special examples of safety related services include, but are not limited to, the following:

5.6.1 Calibration

5.6.2 Environmental Monitoring/Measuring Services

5.6.3 Fire Protection Inspection by Fire Consultants

5.6.4 Inspection

5.6.5 Maintenance and Betterment

5.6.6 Nondestructive Examination

5.6.7 Preparation of Safety-Related Procedures

5.6.8 Radiation Monitoring/Protection

5.6.9 Radwaste

5.6.10 Security

6.0 PROCUREMENT RESPONSIBILITIES

The procurement methods described in Section 5.0 shall be handled by a two step process. Step 1 shall consist of item identification, classification and the establishment of the applicable quality requirements utilizing the Material Order/Item Classification Form (MO/IC). Step 2 shall consist of formalizing the order and performing the final administrative review and approval utilizing the Material Request and Receiving Record.

Step 1 - Material Order/Item Classification

All departments should establish a status file (tickler system) for MO/IC's initiated by their respective supervisors.

6.1 The requesting supervisor shall for all methods except a folio reorder (5.3.1):

6.1.1 Complete the MO/IC (Form AP-19-1) in accordance with Attachment 1 and forward to his department head.

6.1.2 Prepare a Special Receiving Instructions Form (Form AP-19-2), if required, detailing the required inspection, maintenance or cleanliness and/or storage instructions and initial as requisitioner. The AP-19-2 form shall be attached to the MO/IC and forwarded to the initiating supervisor's department head.

6.2 The requisitioning department head shall for all methods except a folio reorder (5.3.1):

6.2.1 Review the MO/IC and AP-19-2 form (if initiated), and if approved, sign the MO/IC and AP-19-2 form and forward to the SQAE. Return the green copy to the requesting supervisor.

a) For a confirming order, notify QAD their services are required to coordinate the placing of the order. After removing the green copy of the form, forward to QAD.

b) Return the green copy to the requesting supervisor.

6.2.2 For a folio reorder (5.3.1), utilizing the MO/IC supplied by the Office Administrator, review the order points and revise as necessary, sign and forward to the SQAE.

NOTE

For those items classified as "CCI", return the MO/IC to the Office Administrator. Retention of the pink copy of the MO/IC is optional.

6.3 The SQAE shall for all methods except confirming orders (5.2) and folio reorders (5.3.1) classified as CCI:

6.3.1 Review the MO/IC for entry information. Insufficient/incorrect MO/IC's shall be returned to the requesting supervisor for correction.

6.3.2 Review the MO/IC for its nuclear safety related classification, CCI classification, QA provisions (if applicable) and 10CFR21 application in accordance with the applicable OQI and enter the information and sign the form. Retain the yellow copy of the form.

a) If the item/service is not listed in the Master Equipment List, the SQAE shall initial the form and transmit it to Engineering Department Coordinator for classification. Retain the yellow copy of the MO/IC. The Engineering Department Coordinator will be responsible for obtaining the item/service classification from the Sponsor Engineer and QA provisions (if applicable) from QAD and returning the MO/IC with applicable QAF's attached to the SQAE.

6.3.3 Review and initial the AP-19-2 form, if initiated; review and sign the QAF-19 (Data Review Receiving - Attachment 4) if initiated by a QA staff member. The SQAE may initiate an AP-19-2 form where additional receiving instructions are considered necessary. Forward all forms to the Office Administrator.

6.3.4 For folio reorder (5.3.1), review the copy of the folio card and MO/IC for its nuclear safety-related classification, CCI classification, QA provisions (if applicable) and 10CFR21 application in accordance with the applicable OQI and

1. Scope

This instruction applies to PSE&G organizations involved in the Operational QA Program.

2. Purpose

The purpose of this instruction is to provide identification in one place of all the activities, items, components and structures to which the Operational QA Program applies.

3. Reference Documents

10CFR50 Appendix B - Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants

Regulatory Guide 1.33 - Quality Assurance Program Requirements (Operation)

Regulatory Guide 1.17 - Protection of Nuclear Power Plants Against Industrial Sabotage

10CFR50 Appendix R - Fire Protection Program for Nuclear Power Plants

Regulatory Guide 8.8 - Information Relevant to Maintaining Occupational Radiation Exposure as Low as Practical (Nuclear Reactors)

10CFR71 - Packaging of Radioactive Material for Transport and Transportation of Radioactive Material Under Certain Conditions

Salem FSAR

Master Equipment List (MEL)

Regulatory Guide 1.29 - Seismic Design Classification

4. Implementation

4.1 General

4.1.1 The Operational QA Program shall be applied to the items identified on the Q List, Attachment No. 1.

*General Revision

4.1.2 Not all items included on the Q List were designed and constructed under the QA Program. No design or construction retrofit effort shall be made to these items unless specifically requested and authorized by PSE&G management. The items that were designed and constructed under the QA Program are identified elsewhere. The extent of the application of the QA Program shall be commensurate with the item's importance to safety. The gradations of QA Program applicability shall be established by QAD.

4.2 Interim Item Classification

When the need arises for procurement or replacement of items for which the MEL classification is not provided, a numbered "Material Order/Item Classification" form (MO/IC) will be used to document the classification. Upon receipt of a MO/IC, the responsible QAE shall categorize the item into one of two categories.

4.2.1 Items meeting Commercial Catalog Item (CCI) guidelines or items having procurement history, or items included on the Q List.

4.2.1.1 The QAE shall identify these items and the applicable QA requirements if other than CCI.

4.2.1.2 Procurement action may be initiated in parallel with forwarding the MO/IC to the Engineering Department MO/IC coordination.

4.2.1.3 Engineering should review the MO/IC classification for concurrence and update the MEL. Disagreements with the classifications should be brought to QAD's attention to enable corrective action for the specific procurement.

4.2.1.4 The responsible QAE should initiate action to correct any erroneous procurement activity.

4.2.2 Items not meeting CCI guidelines, items which have no procurement history, or items not included on the Q List.

4.2.2.1 The QAE shall review the MO/IC to assure adequate description and forward the form to the Engineering Department MO/IC coordinator.

4.2.2.2 The Engineering Department should classify the item and forward the form to the QAD.

4.2.2.3 The QAE shall review the MO/IC, provide the necessary QA forms, as applicable, initial/sign and return it to the initiating organization.

5. Attachment

(1) Q List

*General Revision

TITLE	STATION	DOC. NO. QA1 2-1	ATTACHMENT NO. 1
		VOLUME	REV. 0 PAGE 1 OF 4
Q LIST	SALEM	2	DATE 11/12/81

The listing below identifies those activities, services, structures, components and systems to which the operational Quality Assurance Program applies. Not all of these items were designed and constructed under the QA Program.

I. Activities/Services

A. Activities included in 10CRF50 Appendix B

A.1 Verification by checking, auditing, inspection or surveillance
A.2 Control of cleanliness
A.3 Training
A.4 Review for status and adequacy
A.5 Design Control including seismic/stress analyses or qualification
A.6 Document Control
A.7 Material Control including handling, storage and shipping. Identification and control of nonconforming material.
A.8 Special Process Control including welding, brazing, soldering, heat treating, concreting, NDE, protective coating control, and cleaning.
A.9 Control of Testing
A.10 Test Equipment Control
A.11 Procurement Control of Items and Services
A.12 Records Management

B. Safety Related Activities Delineated in Regulatory Guide 1.33, App. A (See R. G. for further breakdown of activities)

B.1 Administrative Procedures

a) Security Program (Regulatory Guide 1.17)
b) Equipment Control (e.g., Locking and Tagging)
c) Shift and Relief Turnover
d) Bypass of Safety Functions and Jumper Control
e) Maintenance of Minimum Shift Complement and Call-In of Personnel
f) Fire Protection Program per 10CFR50 App. R including Inspection by Fire Consultants
g) Communication System

B.2 General Plant Operating Procedures
B.3 Startup, Operation, and Shutdown of Safety-Related Systems
B.4 Abnormal, Offnormal, or Alarm Conditions
B.5 Combating Emergencies and Other Significant Events
B.6 Control of Radioactivity

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enter the information and sign the form. Initial the copy of the folio card and return both to the Office Administrator.

a) Changes shall be noted on the copy and AP-19-2 form or QAF-19, as applicable or processed as necessary in accordance with Section 6.3.2.a. Retain the yellow copy of the form.

6.4 The Office Administrator shall:

6.4.1 For a confirming order (5.2), supply QAD with a purchase requisition number.

6.4.2 For a folio reorder (5.3.1), make a copy of the folio card and initiate a MO/IC and forward to the user department head. Retain the green copy of the form until the original is returned by the department head/SQAE.

6.5 QAD will for a confirming order (5.2):

6.5.1 Review the MO/IC for entry information. Insufficient/incorrect MO/IC's will be returned to the requesting supervisor for correction.

6.5.2 Process the MO/IC in accordance with the applicable QAI.

6.5.3 After receipt of the purchase order number from the Purchasing Department (if safety related or QA required), transmit the number to the requesting supervisor.

6.5.4 Forward the MO/IC and attachments to the Office Administrator.

Step 2 - Material Request and Receiving Record (MR/RR)

Upon receipt of a completed MO/IC, the Office Administrator shall prepare a MR/RR (Attachment 2) for processing in accordance with the Clerical Office Procedures (COP) Manual.

6.6 A MR/RR that is typed for an item or service which is classified as "CCI" or "Nuclear Safety-Related - No, QA Provisions - No" or which on previous order(s) has been classified as "CCI" requires only the Office Administrator's and Station Manager's approval before forwarding to the Purchasing Department in Newark for processing into a purchase order.

6.7 A MR/RR that is typed for an item or service and is classified as: Nuclear Safety-Related - "Yes" and/or QA Provisions - "Yes", in addition to the Office Administrator's and Station Manager approval requires processing by the Office Administrator as follows:

6.7.1 A copy of the MO/IC and the QAF-19 and AP-19-2 form (if applicable) shall be attached to the MR/RR and forwarded to QAD.

a) The Office Administrator shall retain copies of the AP-19-2 form/QAF-19 (if applicable) and process them in accordance with the applicable COP.

6.8 QAD will review the MR/RR and applicable QAF-19 and AP-19-2 form in accordance with the applicable QAI and, if approved, return to the Office Administrator.

6.8.1 A change to the classification or quality provisions of the MR/RR will be processed by the QAD representative as follows:

a) Changes to the classification of an item requires the initiating of a MO/IC by the QAD representative. The MO/IC will be marked, e.g., 000001-1 and processed accordingly by the QAD representative. A copy of the revised MO/IC shall be transmitted to the department head, Office Administrator and SQAE.

b) Changes to the inspection/quality requirements, as specified by a QAF-19 require the initiating of a revised QAF-19 by the QAD representative. The revised QAF-19 will be marked, e.g., MM101-"A" and processed by the QAD representative. A copy of the revised QAF-19 shall be transmitted to the Office Administrator and SQAE.

6.9 The Office Administrator shall complete the processing of the request and attachments (if applicable) when returned by QAD in accordance with the COP and return a copy of the request containing the applicable request number to the initiating supervisor.

6.9.1 The Office Administrator shall retain copies of the AP-19-2 form/QAF-19 (if applicable) and process them in accordance with the applicable COP.

6.10 The Station Manager shall review all MR/RR's and attachments (if applicable) and indicate his approval by signing the appropriate block, thereby releasing the MR/RR for further processing.

NOTE

ALL CHANGES in procurement documents shall be subject to the same degree of control as utilized in the preparation of the original documents. Amendments to purchase orders shall be assigned the same classification (safety-related/QA/CCI/10CFR21) as the original order.

6.11 The Purchasing Department in Newark will process the MR/RR and attachments in accordance with the applicable Purchasing Department procedures.

7.0 RECEIVING

The Office Administrator shall be responsible for the receiving of all items ordered by the Production Department. Sub-contractors shall be responsible for implementing a PSE&G approved plan for receiving of those items ordered by the sub-contractor.

Items received by the station shall be placed in a designated receiving hold area by a stockhandler. The hold area shall comply with the minimum storage level requirements for the item being inspected (see Section 8.0). Items such as large motors, piping assemblies, etc., need not be placed in the hold area provided they are promptly moved to a designated receiving area where receiving inspection shall be performed.

The Security Department shall notify the Senior Performance Supervisor-RP when radioactive/contaminated material arrives on site. The Senior Performance Supervisor-RP shall direct the placement of the material to an area administratively and radiologically suitable for control, where the receiving inspection shall be performed by the stockhandler.

7.1 Receiving Inspection Responsibilities

7.1.1 The Stockhandler shall perform the receiving inspection in accordance with the Storeroom Procedure which shall comply with the applicable requirements of ANSI N45.2.2.

7.1.2 The Storekeeper shall:

a) Review Certificates of Compliance and Westinghouse Quality Control Releases (if applicable). The Storekeeper should request assistance from the SQAE in resolving or clarifying matters concerning documentation.

b) Complete the checklist on the AP-19-2 form (if applicable) or notify the requesting supervisor of the arrival of his order.

c) Notify the SQAE that an item requiring a QA document review (AP-19-2 form/QAF-19, if applicable) has been received.

7.1.3 The SQAE shall perform the following inspection/review relating to:

Special Receiving Instructions, Form AP-19-2

a) Arrange for special tests as necessary.

b) Complete the AP-19-2 form, signifying acceptance, as applicable.

Data Review Receiving, QAF-19

a) Documentation as required by the QAF-19 is received.

b) Documentation and information is legible and requirement measurements are within specification, e.g., material test report.

c) Enter initials in Section B for accepted documents and complete Sections C and D of the QAF-19, signifying acceptance, as applicable.

7.2 Identifying Nonconformances

There are two catagories of nonconformances that the Storekeeper/SQAE shall be responsible for identifying during the performance of receiving inspection of safety-related/QA required purchase orders.

7.2.1 Hardware

The Storekeeper or SQAE shall:

a) Initiate a DR for processing in accordance with AP-20.

b) Attach a QA Reject Tag to the item. The item shall remain in the hold area pending disposition of the DR.

7.2.2 Documentation

The Storekeeper or SQAE shall:

a) Attach a QA Reject Tag to the item.

b) Inform the supplier of the document deficiency.

c) Initiate a DR for processing in accordance with AP-20. The DR number shall be entered on a QA Reject Tag and QAF-19 as appropriate. The rejected item shall remain in the hold area pending disposition of the DR. If the item is returned to the vendor a copy of the DR shall accompany the item.

NOTE

The Office Administrator shall be responsible for the return of items to the applicable vendor.

7.3 Inspection Release Tags

The Storekeeper shall initiate Inspection Release Tags for all acceptable safety-related and/or QA required items in accordance with the Storeroom Receiving and Inspection Procedures. Items shall not be placed in storage until satisfactory receiving inspection has been completed.

8.0 STORAGE

The Office Administrator shall be responsible for the storage of items and shall designate storage areas as either Level A, B, C or D storage areas. Storage level descriptions in the Storeroom Procedures shall be in accordance with ANSI N45.2.2. Access to the A, B, C and D storage areas shall be controlled by the Office Administrator with the exception of those areas defined in 8.5.

8.1 Priorities

The Storekeeper shall store the items in accordance with the following guidelines in the order of priority listed:

8.1.1 Manufacturer's/vendor's recommended storage requirements.

8.1.2 Requirements as identified on the AP-19-2 form.

8.1.3 Guidance provided by the Storeroom Procedures which shall be consistent with the classification requirements of ANSI N45.2.2.

8.1.4 The SQAE shall assist the Storekeeper in determining the storage requirements for items when the above recommendations are not clear.

8.2 Care and Preservation of Items

8.2.1 Items received with protective covering, caps, plugs, or other closures if required to be removed for inspection shall be replaced prior to being stored.

NOTE

Items placed in outside storage shall have all openings capped, plugged or sealed and shall be stored on cribbing or equivalent to allow for air circulation and to avoid trapping water.

8.2.2 Temporary preservatives shall be left intact during storage. Should reapplication of preservatives be required at the site, only PSE&G approved preservatives shall be used.

8.2.3 Items stacked for storage shall be arranged so that racks, cribbing or crates are bearing the full weight without distortion of the item.

8.2.4 All items and their containers shall be arranged so as to be easily identifiable and shall be stored in such a manner as to permit ready access for inspection or maintenance without excessive handling.

8.2.5 Items requiring periodic care, maintenance or cleanliness control, as identified on the AP-19-2 form (e.g., insulation resistance checks, shaft rotation, lubrication, check of dessicant humidity indicators, etc.) shall be placed on the Inspection Order System (AP-10) by the requesting department. The periodic inspection shall be performed by the responsible department.

8.3 Shelf Life Items

8.3.1 Shelf life items shall be stored in accordance with the Storeroom Procedures.

8.3.2 Safety-related and/or QA items found beyond the shelf life expiration date shall be removed from the shelf and the Storekeeper shall initiate a DR for processing in accordance with AP-20.

8.3.3 The Inspection Order System (AP-10) should be utilized to assist in controlling the shelf life time of limited life items.

8.4 Hazardous Material

Hazardous chemical, paints, solvents, and other materials of a like nature shall be stored in well ventilated areas not in close proximity to important nuclear plant items.

NOTE

Good housekeeping practices shall be enforced by the Storekeeper at all times in the storage area. The Inspection Order System should be utilized to assist in administering the inspections of the storage areas.

8.5 Department Storage (other than areas assigned by the Office Administrator)

If a department elects to store items they shall develop procedures which comply with the storage control requirements of ANSI N.45.2.2. The procedures shall:

8.5.1 Designate department's storage areas.

8.5.2 Describe access control of the areas.

8.5.3 What level of storage each area is.

8.5.4 Describe how the department shall maintain traceability via the Inspection Release Tag of the safety-related and/or QA required items.

8.5.5 Utilize the Inspection Order System to control the shelf life time of limited life items.

NOTE

Instructions for the storage of safety-related and/or QA required items shall not conflict with the applicable controls described in this Administrative Procedure.

9.0 ISSUE

The Office Administrator shall be responsible for the issue of all items processed by the Storeroom and Warehouse.

9.1 Routine (stockhandler present)

9.1.1 The requesting supervisor shall fill out a Material Issue Ticket (Attachment 6) and present it to the stockhandler (Storeroom/Warehouse).

a) A green Material Issue Ticket shall be utilized for the issue of safety-related and/or QA required items and a white Material Issue Ticket shall be utilized for the issue of all other items.

9.1.2 The stockhandler shall verify that the Issue Ticket has been completed properly and ensure that Inspection Release Tags are issued with all safety-related or QA required items.

9.2 Non-Routine (stockhandler not on shift)

9.2.1 The requesting supervisor shall obtain access through the Security Department in accordance with the Storeroom Procedures Manual.

NOTE

- The utilizing supervisor shall enter the work order number on the Inspection Release Tag (or copy) prior to the completion of the activity. The Inspection Release Tag shall be retained in accordance with departmental instructions.

9.3 Non-Routine (testing purposes)

9.3.1 The requesting supervisor shall:

a) Fill out a green Material Issue Ticket if the item is to be used in a safety-related or QA required system. The ticket shall state in the "To Be Used For" section, "For Test Purposes".

b) Fill out a green Material Return Ticket (Attachment 6) in duplicate and attach original to the Material Issue Ticket.

9.3.2 The stockhandler shall place the copy of the Material Return Ticket in a suspense file in the Storeroom until the item is returned to the Storeroom.

9.4 Return of Items

When it becomes necessary to return items to the Storeroom to be replaced in stock:

9.4.1 The supervisor in possession of the item shall fill out a Material Return Ticket and present it to the stockhandler. The supervisor's signature shall signify that the integrity of the item has not been violated or so note.

9.4.2 The stockhandler shall verify the traceability of the item (as applicable) has been maintained and notify the Storekeeper that an item has been returned.

9.4.3 The Storekeeper/Stockhandler shall visually inspect the item and review the Material Return Ticket. If both are acceptable he shall sign the Material Return Ticket.

9.5 For items that are to be returned to a vendor for rework or repair

9.5.1 The supervisor in possession of the item shall:

a) Initiate a MO/IC and obtain department head approval in accordance with Sections 6.1 and 6.2 of this procedure.

b) Place the item in the designated shipping area of the Warehouse.

c) Give the Storekeeper the MO/IC.

9.5.2 The Storekeeper shall:

a) Submit the MO/IC to the Office Administrator for processing in accordance with applicable Sections of 6.0.

b) Arrange for the return of the item to the vendor after confirming the processing of the MO/IC with the Office Administrator.

10.0 TRANSFER

10.1 Items to be transferred from United Engineers and Constructors, Inc. (Material/Equipment Transfer Request Form 101)

10.1.1 The supervisor in need of an item from UE&C shall contact the appropriate site Sponsor Engineer and inform him of the item required.

10.1.2 The Sponsor Engineer or requesting supervisor shall fill out a "Material/Equipment Transfer Request Form 101/102" (Attachment 7) and forward it to UE&C Construction Department.

a) Administrative controls of UE&C are delineated in their General Construction Procedure 2007-1.

10.1.3 UE&C Material Receiving Department shall notify the requesting supervisor when the item is ready for pickup.

10.1.4 The requesting supervisor shall pick-up the item from the UE&C Material Receiving Department and sign a "Store House Order" (Attachment 8) signifying receipt.

10.1.5 After item pick-up by Public Service, UE&C Material Receiving Department shall send to the Storekeeper:

a) 101/102 Material/Equipment Transfer Request Form

b) 2007-1 Transferring Authorization

c) Store House Order

d) Shipping Memorandum

10.1.6 The Storekeeper or requesting supervisor shall verify the signature on the "Store House Order" and sign the shipping memorandum.

a) If the item is safety-related or QA required, the QC number, vendor, and purchase order number shall be written on the shipping memorandum.

b) The Storekeeper or requesting supervisor shall initiate Inspection Release Tags for safety-related and/or QA required items utilizing the "QC" number in lieu of the purchase order number.

c) A QC number/purchase order number cross-reference index shall be maintained by the Technical Document Room as part of the Quality Vendor Documentation (QVD) file

10.2 Items to be transferred from United Engineers and Constructors, Inc. (Storehouse Order Form)

10.2.1 The Storehouse Order (Attachment 9) shall be used in lieu of the Material/Equipment Transfer Request Form 101/102 for bin level items considered as stock and surplus on Unit No. 2.

10.2.2 The controls established in Section 10.1 shall apply to this section except the Storehouse Order shall be utilized in place of the 101 Form.

10.3 Items to be transferred to United Engineers and Constructors, Inc.

10.3.1 The Public Service Sponsor Engineer shall fill out a "Material/Equipment Transfer Request Form 101/102" and forward it to UE&C Construction Department.

a) Administrative steps taken by UE&C are delineated in their General Construction Procedure 2007-1.

10.3.2 The Storekeeper shall notify the appropriate UE&C personnel that the item is ready for pick-up.

10.3.3 UE&C personnel requesting the item shall pick-up the material from the Storeroom and sign a "Material Issue Slip" signifying receipt.

10.3.4 After item pick-up by UE&C, the following forms shall be sent to the UE&C Material Receiving Department by the Storekeeper.

a) 101/102 Material/Equipment Transfer Request Form

b) 2007-1 Transferring Authorization

c) Material Issue Slip

d) Shipping Memorandum

NOTE

If the item is safety-related and/or QA required the Inspection Release Tag shall accompany the item.

10.4 Items from Other Locations

The SQAE shall be contacted so that the requirements of the quality program may be verified for items transferred to Salem Generating Station from other fossil or nuclear powered generation stations.

11.0 HANDLING

All departments, including subcontractors, shall handle items that are to be relocated within the station in such a manner as to prevent damage from occurring. Detailed packaging and handling instructions and procedures shall be prepared by the responsible department for all items that require special handling instructions due to weight, size, susceptibility to shock damage, high nil ductility transition temperatures, or any other conditions that warrant special instructions. Such instructions or procedures shall be made available prior to the time the item is to be handled and shall give weights, sling locations, balance points, methods of attachment, maximum hoist line speeds and other pertinent features to be considered as necessary for safe handling. Instructions related to special item handling shall be described in the applicable department manuals and shall comply with the requirements of ANSI N45.2.2.

The Stockhandler shall visually check all rigging equipment upon return to the Storeroom after use. Equipment that appears frayed, distorted or damaged shall receive a Reject Tag.

12.0 SHIPPING

The Office Administrator shall be responsible for the packaging and/or shipping of all materials and items, including radioactive/contaminated items exclusive of radwaste shipments and laundry shipments, leaving the station.

12.1 Non-radioactively contaminated items to be returned to a supplier/vendor shall be packaged in accordance with supplier packaging instructions or packaging guidelines delineated in ANSI N45.2.2.

12.2 Radioactive/Contaminated Items (non-waste)

12.2.1 The Senior Performance Supervisor-RP shall be notified by the Storekeeper prior to the packaging of any contaminated/radioactive items.

12.2.2 Radioactive/contaminated items to be returned to a supplier/vendor for deconning, rework or repair shall be packaged in accordance with AP-29 and the applicable Radiation Protection Instructions.

12.2.3 The Senior Performance Supervisor-RP shall arrange for the required surveys in accordance with the Radiation Protection Instructions prior to shipment to the supplier/vendor.

13.0 PERIODIC INSPECTIONS

13.1 The Storeroom Procedures shall provide implementing instructions for:

13.1.1 Inspection and examination of items in storage in accordance with applicable requirements of ANSI N45.2.2.

13.1.2 Inspection of storage areas for housekeeping in accordance with applicable requirements of ANSI N45.2.3.

13.2 The Maintenance Engineer shall be responsible for the preparation of implementing instructions and the inspection of handling equipment and rigging in accordance with applicable requirements of ANSI N45.2.2.

13.2.1 The inspection instructions shall identify the means of documenting the results, i.e., form or log.

NOTE

The Inspection Order System (AP-10) should be utilized by all departments to identify applicable periodic inspections to be performed relating to these areas.

14.0 RECORDS

The Office Administrator shall be responsible for the retention of safety-related and/or QA required procurement records in accordance with AP-11. Specific instructions pertaining to the submittal of the required records to the TDR shall be included in the COP. Examples of the required records are:

14.1 Purchase Order

14.2 Receiving and Invoice Record (when completed)

14.3 Form AP-19-2 (when completed)

14.4 QAF-19 (when completed) and required documentation

14.5 Certificate of Compliance/Certificate of Conformance and Westinghouse QCR's

MATERIAL ORDER/ITEM CLASSIFICATION

VENDOR (1) _____

ADDRESS _____

_____

SYSTEM/COMPONENT (2) _____

CONFIRMING ORDER: YES ☐ (4) NO ☐ DATE REQ. (4) _____

R/C (3) _____ EST. COST (3) _____

AUTH. (3) _____ CE (3) _____

ACCT. (3) _____ LOC. CODE (3) _____

SUPERVISOR'S CONTROL NUMBER 000001

ITEM NO.	QTY.	U/M	MATERIAL DESCRIPTION/SERVICE REQUIRED	FOLIO INFORMATION					*ITEM CLASSIFICATION					QUALITY PROVISIONS
				REQ	CL	CODE	OR PT.	OR	SE	NU	1-E	10 CFR 21	QA	QA#-19/OTHER
(5)	(5)	(5)	(6)	(7)	(7)	(7)	(7)	(7)	(10)	(10)	(10)	(10)	(10)	(10)

SUPERVISOR (8) _____ DATE (8) _____ DEPT. HEAD (9) _____ DATE (9) _____

*SE: SEISMIC 1, 2, 3, NA
NU: NUCLEAR CLASS 1, 2, 3, NA
1E: CLASS 1E ELECTRICAL EQUIP, NA
10CFR21 APPLIES: Y-YES N-NO
QA: 1 - SAFETY-REL./QA PROVISIONS
2 - NON-SAFETY-REL./QA PROVISIONS
3 - COMMERCIAL CATALOG ITEM
4 - NON-SAFETY-REL./NO QA PROVISIONS

SPONSOR ENG. (12) _____ DATE (12) _____

SQAE (11) _____ DATE (11) _____ QAD (13) _____ DATE (13) _____

REQ. NO. (14) _____ LOCAL P. O. NO. (14) _____ BLANKET REQ. NO. (14) _____ P. O. NO. (14) _____

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AP-19 FORM AP-19-1 REV. 4

SPECIAL RECEIVING INSTRUCTIONS

A. GENERAL

Supervisor's Control No. _____ Part Description _____

Initiated By _____ Date _____

B. RECEIVING INSTRUCTIONS

Handling

Document No. _____

Other _____

Receiving Inspection/Tests

Document No. _____

Other _____

Shelf Life Requirements* (e.g., rubber products, paint special fluids, decontamination cleaners, etc.)

Storage

Desicant _____

Nitrogen Purge (Document No. _____)

Heaters _____

Protective Covers _____

Storage Level (A, B, C) _____

Storage Inspection* _____

Other _____

Periodic Maintenance* (Specify requirement and frequency)

Rotation Requirements _____

Fluid Replacement _____

Runout Readings _____

Meggar Checks _____

Other _____

C. RESULTS

		Initials/Date
Handling	Completed ☐	
Receiving Inspection	Accept ☐ Reject ☐ DR No. _____	
Shelf Life	*IO No(s) _____	
Storage	Completed ☐ *IO No. _____	
Periodic Maint.	*IO No(s) _____	

INSTRUCTIONS FOR COMPLETING FORM AP-19-2

1. Initiator — Complete Section A and enter applicable receiving instructions in Section B.

2. Receiving Personnel — Complete Section C for designated requirements; enter initials and date.

NOTE

For all periodic requirements (i.e., shelf life, storage inspection, periodic maintenance, etc.), initiate Inspection Order(s) and enter I.O. number.

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ATTACHMENT 1

MATERIAL ORDER/ITEM CLASSIFICATION FORM INSTRUCTIONS

1.	Supervisor/Office Administrator	Name and address of vendor - For items that are known to be nuclear safety-related or have QA provisions applied, the suggested supplier, if entered, shall be on the QAD list of approved suppliers.
2.	Supervisor	Anticipated use of item by system or whole component in which material or service is to be used for. NOTE: The work order/DCR number shall also be entered.
3.	Supervisor/Office Administrator	Accounting codes (supplied by the Office Administrator).
4.	Supervisor	Indicate if a confirming order is requested and date required.
5.	Supervisor/Office Administrator	Assign item number, quantity desired, unit of measure (e.g., each, pint, dozen, cord).
6.	Supervisor/Office Administrator	Enter detailed ordering information including, as applicable: (a) P.S. Specification, part numbers, serial numbers, model numbers, catalog numbers, size, class, rating. (b) Required information per Attachment 1A for piping materials, valve parts, ASME, ASTM, ANSI, etc.
7.	Supervisor/Office Administrator	Indicate Y (Yes)/N (No). If folio is required, indicate order point and reorder quantity. The Office Administrator shall assign Class/Code for new items and review existing Class/Code numbers for reorders as applicable.
8.	Supervisor	Signature of requesting supervisor and date prepared.
9.	Department Head	Signature of requesting department head and date reviewed.
10.	QA Staff Member	Assign classifications and QA provisions in accordance with applicable OQI.
	Sponsor Engineer	Assign classifications in accordance with the applicable Engineering directives.
	QAD Representative	Assign QA provisions in accordance with the applicable QAI.
11.	SQAE	Signature of QA staff member and date prepared if classification and QA provisions are known. If unknown or questionable initial/date and forward to the Engineering Department Coordinator.
12.	Sponsor Engineer (when required)	Signature of Sponsor Engineer that assigns the classification and date prepared.
13.	QAD Representative (when required)	Signature of QAD representative that assigns the QA provisions and date prepared.
14.	Office Administrator	Enter applicable ordering information in accordance with the applicable COP.

ATTACHMENT 1A

ADDITIONAL ORDERING INFORMATION FOR SPECIAL MATERIAL

1. Piping Materials: Reference to P.S. Specification 61-6200, Revision 1, date of issuance.

2. Valve Parts: Reference to the PSBP is required.

3. ASME: Material designation, B&PVC edition, addendum and code cases considered.

4. ASTM, ANSI, Etc.: Material designation, standard number, year of issuance and supplmentary requirements.

MAT. REQUEST AND RECEIVING RECORD

ATTACHMENT 2

PSE&G Public Service Electric and Gas Company

NEW JERSEY SALES AND USE TAX
DIRECT PAYMENT PERMIT – DP-221-212-800

☐ PURCHASE REQUISITION NO.
☐ LOCAL PURCHASE ORDER NO.
☐ SHIPMENT OF MATERIAL RELEASE
☐ MEMORANDUM FOR CHANGE-IN-ORDER
☐ RECEIVING AND INVOICE RECORD (NON-GENERAL STORES MATERIAL OR SERVICE)

VENDOR

SHIP TO

VIA

DATE PREPARED	LOCATION CODE NO.	STOREROOM
DATE OF P.O.	PURCHASE ORDER NO.	
INVOICE NO.	INVOICE DATE	DATE INV. APP
RESPONSIBILITY CENTER	COST ELEMENT	

QUALITY ASSURANCE

NUCLEAR SAFETY RELATED ☐ YES ☐ NO ☐ CCI
QA PROVISIONS ☐ YES ☐ NO
10CFR PART 21 APPLIES ☐ YES ☐ NO
QAF-29: CONTROL NO. _____
QAF-19: CONTROL NO. _____
OTHER _____
REQUISITIONER _____
QA APPROVAL _____

QUANTITY REQUIRED	DESCRIPTION: MATERIAL OR SERVICES	AUTH/ACCT. NO. STOCK CODE NO.	QUANTITY RECEIVED	COST DATA

DATE REQUIRED	TO BE USED FOR	ESTIMATED COST ☐ UNDER $500 AMOUNT ☐ $500 & OVER	REQUISITIONER TEL. EXT
POINT OF SHIPMENT		TERMS OF PAYMENT	APPROVED
			APPROVED

ORDERED BY	DELIVERY TICKET NO.	WEIGHT	NO./KIND CONTAINERS	DATE RECEIVED
TRANSPORTATION CHARGES	☐ PREPAID ☐ TO FOLLOW	☐ PAID LOCALLY – AMOUNT _____ ACCOUNT _____	RECEIVED BY	APPROVED

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ATTACHMENT 3

PUBLIC SERVICE ELECTRIC AND GAS COMPANY

RECEIVING AND INVOICE RECORD

DATE RECEIVED	STRM. NO.	VENDOR NO.	REQ'N. OR RELEASE NO.	STORES INV. NO.	PURCHASE ORDER NO.

DESCRIPTION AND/OR REMARKS	AUTH./ACCT. OR STOCK CODE NO.	QUANTITY RECEIVED	EX CD	TRANSACTION 10 AMT. OF INVOICE	TRANSACTION 13 FREIGHT (P. C. PAYMENT)	TRANSACTION MISC.
		TOTAL				

VERED		RECEIVED BY	
DOR		APPROVED BY	
	DATE OF INVOICE	DATE INVOICE APPROVED	DELIVERY TICKET NO. OR OTHER IDENTIFICATION
ND KIND ONTAINERS		WEIGHT	R & I RECORD NUMBER
SPORTATION RGES	☐ PREPAID ☐ TO FOLLOW ☐ PAID LOCALLY	AMOUNT PAID LOCALLY	ACCOUNT

ATTACHMENT 4

The Energy People

PSE&G

QUALITY ASSURANCE DEPARTMENT

SUPPLIER DOCUMENTATION REQUIREMENTS

REPORT NO. _____

RECEIVING REPORT _____

PAGE 1 OF _____

A. GENERAL

SUPPLIER _____ SUB-SUPPLIER _____

ADDRESS _____ ADDRESS _____

_____ _____

NOMENCLATURE _____ DRAWING NO. _____ REV. _____

P.O. NO. _____ LINE ITEM NO. _____ SPEC. NO. _____

NUCLEAR CLASS _____ SEISMIC CLASS _____ REQUISITION NO. _____

B. CHECKLIST OF REQUIRED DOCUMENTS *Circle as Applicable

Required	Not Req'd.	Reviewed & Accepted	DOCUMENT TYPE
☐	☐	____	WELDING PROCEDURES _____
☐	☐	____	WELDERS QUALIFICATION _____
☐	☐	____	WELDING HISTORY RECORDS _____
☐	☐	____	NDE PROCEDURES - (UT-PT-MT-RT-VI) *
☐	☐	____	NDE PERSONNEL QUALIFICATION - (UT-PT-MT-RT-VI) *
☐	☐	____	NDE REPORTS - (UT-PT-MT-RT-VI) *
☐	☐	____	RADIOGRAPHS
☐	☐	____	CODE CERTIFICATES

NOTE: THE "REQUIRED" COLUMN IS FILLED IN WITH 1, 2 OR 3

1. SHALL BE SUBMITTED TO PSE&G FOR REVIEW AND APPROVAL PRIOR TO START OF MANUFACTURING.

   MANAGER - QUALITY ASSURANCE
   ENGINEERING AND CONSTRUCTION DEPARTMENT
   PUBLIC SERVICE ELECTRIC AND GAS COMPANY
   ROOM 216MP
   80 PARK PLACE
   NEWARK, N.J. 07101

2. SHALL BE AVAILABLE DURING SHOP SURVEILLANCE.
3. SHALL ACCOMPANY EACH SHIPMENT.

Required	Not Req'd.	Reviewed & Accepted	DOCUMENT TYPE
☐	☐	____	P.S. SHIPMENT RELEASE
☐	☐	____	BILL OF MATERIALS
☐	☐	____	INDEX OF DOCUMENTS
☐	☐	____	TEST PROCEDURES _____
☐	☐	____	TEST REPORTS _____
☐	☐	____	HEAT TREAT PROCEDURES _____
☐	☐	____	HEAT TREAT RECORDS _____
☐	☐	____	CLEANING & PACKAGING PROCEDURES
☐	☐	____	MARKING & IDENTITY PROCEDURES
☐	☐	____	FABRICATION HISTORY RECORDS
☐	☐	____	REPAIR RECORDS
☐	☐	____	MATERIAL TEST REPORT
☐	☐	____	CERTIFICATE OF COMPLIANCE
☐	☐	____	PROCEDURES LIST
☐	☐	____	_____
☐	☐	____	_____
☐	☐	____	_____
☐	☐	____	_____
☐	☐	____	_____
☐	☐	____	_____
☐	☐	____	_____

_____ ORIGINATOR - QAE _____ DATE _____ APPROVAL _____ DATE

C. DATA REVIEW

_____ CHECKLIST B – DOCUMENTS ACCEPTED _____ ORGANIZATION _____ DATE

D. ACCEPTANCE

DATA PACKAGE ACCEPTED. ITEM READY TO BE RELEASED FOR INSTALLATION/STORAGE.

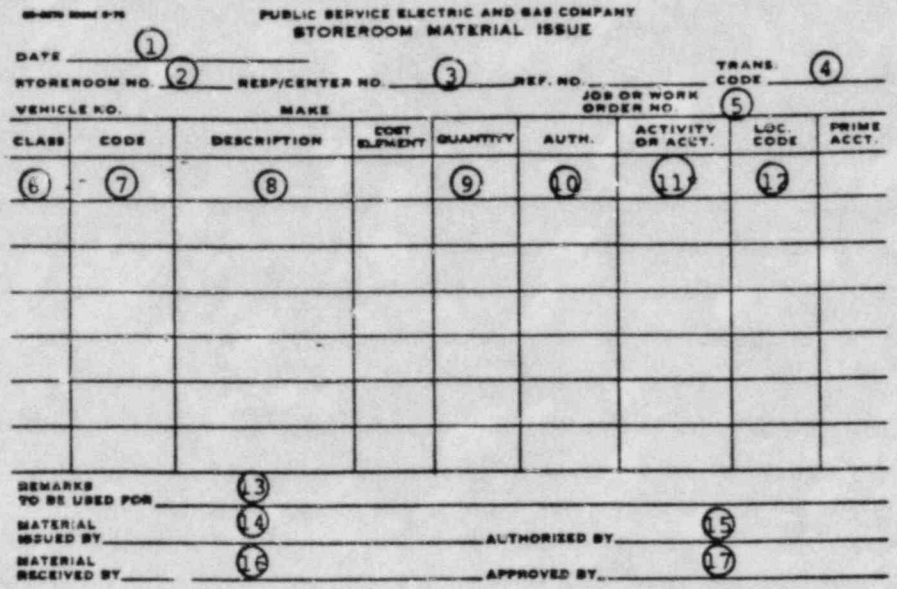
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_____ REVIEWER _____ QA/QC ORGANIZATION _____ DATE

REV. 7 11/79
AD-1 D

ATTACHMENT 5

STOREROOM MATERIAL ISSUE TICKET AND INSTRUCTIONS FOR COMPLETION



PUBLIC SERVICE ELECTRIC AND GAS COMPANY
STOREROOM MATERIAL ISSUE

DATE (1)
STOREROOM NO. (2) RESP/CENTER NO. (3) REF. NO. TRANS. CODE (4)
VEHICLE NO. MAKE JOB OR WORK ORDER NO. (5)

CLASS	CODE	DESCRIPTION	COST ELEMENT	QUANTITY	AUTH.	ACTIVITY OR ACCT.	LOC. CODE	PRIME ACCT.
(6)	(7)	(8)		(9)	(10)	(11)	(12)	

REMARKS TO BE USED FOR (13)
MATERIAL ISSUED BY (14) AUTHORIZED BY (15)
MATERIAL RECEIVED BY (16) APPROVED BY (17)

The supervisor shall enter the following information:

Block

1 — Date - Date material is issued.

4 — Transaction Code - The Code is numbered. For example, #1 is an issue,* #3 is an inventory adjustment, #4 is an accounting change or folio correction.

5 — Job or Work Order No. - Associated job on which material is being used for.

8 — Description - Description of material requested.

9 — Quantity - Amount being issued.

10&11* — Authorization/Account - Authorization and account to which the material is to be charged.

13 — To Be Used For - Reason the material is being issued.

15 — Authorized By - Signature of requesting supervisor.

16 — Material Received By - Signature of person receiving material.

The Stockhandler shall enter the following information:

2 — Storeroom No. - Enter #185

3 — Resp/Center No. - 061 - Operations; 062 - Performance; 063 - Maintenance; 064 - Catalytic; 069 - Management/Staff; 185 - Storeroom

6&7 — Class and Code - Complete folio number if information is available from RAMPS Catalog.

12 — Location Code - 1614 - Salem; 1627 - Switchyard Salem

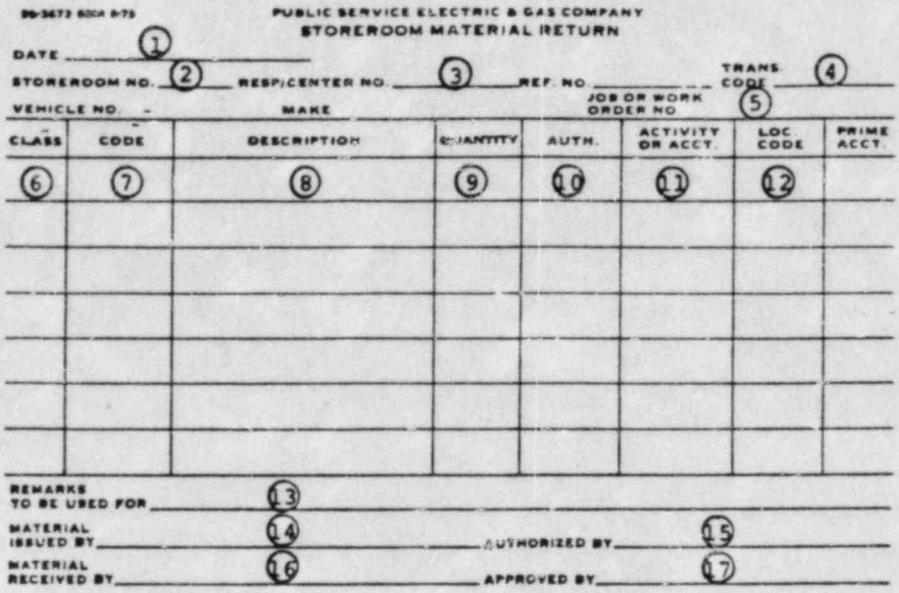
14 — Material Issued By - Signature of Stockhandler.

17 — Approved By - Signature of Storekeeper.

*If requesting supervisor does not have the Authorization and Account available, he shall write a brief description of the job on line 13 so the Storekeeper can assign the proper accounting on the ticket before forwarding to the Clerical Office.

ATTACHMENT 6

STOREROOM MATERIAL RETURN TICKET AND INSTRUCTIONS FOR COMPLETION



PUBLIC SERVICE ELECTRIC & GAS COMPANY
STOREROOM MATERIAL RETURN

DATE (1)
STOREROOM NO. (2) RESP/CENTER NO. (3) REF. NO. TRANS. CODE (4)
VEHICLE NO. MAKE JOB OR WORK ORDER NO. (5)

CLASS	CODE	DESCRIPTION	QUANTITY	AUTH.	ACTIVITY OR ACCT.	LOC. CODE	PRIME ACCT.
(6)	(7)	(8)	(9)	(10)	(11)	(12)	

REMARKS TO BE USED FOR (13)
MATERIAL ISSUED BY (14) AUTHORIZED BY (15)
MATERIAL RECEIVED BY (16) APPROVED BY (17)

The supervisor shall enter the following information:

Block

1 — Date - Date material is returned.

5 — Job or Work Order No. - Job or work order to which material originally was intended for.

6&7 — Class and Code - Complete folio number.

8 — Description - Description of material being returned.

9 — Quantity - Amount of material being returned.

10&11 — Authorization/Account - Authorization and account material was originally charged to.

13 — To Be Used For - From what job or work order material is being returned.

14 — Material Returned By - Signature of person returning material.

15 — Authorized By - Signature of returning supervisor.

The Stockhandler shall enter the following information:

2 — Storeroom No. - Enter #185.

3 — Resp/Center No. - 061 - Operations
062 - Performance
063 - Maintenance
064 - Catalytic
069 - Management/Staff
185 - Storeroom

4 — Trans. Code - Enter #2.

12 — Location Code - 1614 - Salem
1627 - Switchyard Salem

16 — Material Received By - Signature of Stockhandler.

17 — Approved By - Signature of Storekeeper.

ATTACHMENT 7

MATERIAL/EQUIPMENT TRANSFER REQUEST FORM 101/102

Direct Request From _____ No. _____

Actual Date Required _____ Date _____

MATERIAL/EQUIPMENT TRANSFER REQUEST FORM 101/102

1. The following material/equipment is requested:

Quantity	Technical Description (All Specifics)

2. Procurement Responsibility

UE&C PSE&G

3. Disposition of material/equipment to be returned:

   a. Return to vendor for repair/rework.

   b. Repair on site.

   c. No repair/rework necessary.

   d. Salvage parts.

   e. Scrap

4. Material/Equipment Classification:

   Safety Related Non-Safety Related

5. Reason for disapproval:

6. Special Instructions:

SIGNATURE/DATE:

Principal Construction Engineer	UE&C Discipline Superintendent
Field Engineering	Requisition No.

ATTACHMENT 8

STORE HOUSE ORDER

J. O. No. _____ **Store House Order** _____ 19

Quantity	DESCRIPTION		To be used for

FORM 3244

_____ Issued by

Material Dept

UNITED ENGINEERS & CONSTRUCTORS INC

_____ Signed

Requisitioner

ATTACHMENT 9

STOREHOUSE ORDER

TO BE USED FOR _____ SHO NO. _____

_____ DATE _____

_____

QUANTITY	UNIT	DESCRIPTION

ORIGINATED BY _____ RECEIVED BY _____

APPROVED BY _____ ISSUED BY _____

FORM NO. 5.6.6-2

Job Number _____
Work Order _____
DCR _____
Material Order # _____

a) Liquid Radioactive Waste System
b) Solid Waste System
c) PWR Gaseous Effluent System
d) Radiation Protection including Occupational Radiation Exposure per R.G.8.8
e) Area Radiation Monitoring System Operation
f) Process Radiation Monitoring System Operation
g) Meteorological Monitoring and Data Collection Program
h) Packaging and Transport of Radioactive Material per 10CFR71
i) Decontamination

B.7 Tech Spec. Surveillance
B.8 Performing Maintenance
B.9 Chemical and Radiochemical Control

C. Additional NRC Requirements:

C.1 Tech Spec Administrative Controls

a) SORC
b) NRB
c) Reportable Occurrences

C.2 Inservice Inspection Plan
C.3 Reporting of Defects and Noncompliance
C.4 Fuel Management
C.5 License Conditions

a) Shift Technical Advisor
b) Shift Supervisor Duties
c) Safety Review Group and Onsite Evaluation

II. Equipment, Components, and Structures

A. The following are items and systems contained in commitment letters to the NRC and Appendix C to the FSAR.

A.1 Accident Monitoring Instrumentation.
A.2 AC control power buses and inverters.
A.3 All systems which penetrate containment, up to and including the containment isolation valve (identified in FSAR Section 5.4)
A.4 Anticipatory reactor trip on turbine trip.
A.5 Auxiliary Building (including Control Room and Diesel Generator Area).
A.6 Auxiliary Building Ventilation System (supply and exhaust units)
A.7 Auxiliary Feedwater Storage Tank
A.8 Auxiliary Feedwater System
A.9 Component Cooling System.

A.10 Containment (including penetrations, concrete shielding, interior structures, air locks, equipment hatch)
A.11 Containment Polar Crane
A.12 Containment Pressure - Vacuum Relief System
A.13 Control Area Air Conditioning System
A.14 Control Panels - Class IE circuits
A.15 Electrical Cable Tunnels
A.16 Emergency Plan
A.17 Emergency Power for Pressurizer Heaters.
A.18 Emergency Power Supply Systems

a) DC Power Supply System
b) Diesel Generator Area Ventilation System
c) Diesel Generators (including associated fuel oil, lubeoil, starting auxiliary systems, fuel storage and day tanks, jacket cooling, governor, voltage regulation and excitation systems)
d) Control Boards and Motor Control Centers
e) Control equipment, facilities and lines required for above items
f) Power distribution lines to equipment required for emergency transformers and switchgear supplying Engineered Safety Features (includes 4 kV, 460V and 230V vital buses).

A.19 Emergency Response Facilities (NUREG-0696 document. control and verification of functionality only).
A.20 Engineered Safety Features

a) Containment Spray System (including spray pumps, spray headers, spray additive tank, connecting piping and valves)
b) Containment Ventilation System (including fan coolers, distribution ducts, dampers, HEPA filters and moisture separators).
c) ECCS (including Safety Injection and RHR pumps, RWST, Accumulators, RHR Heat Exchangers, containment sump, sump screen, vortex suppression devices, and connecting piping and valves)
d) Portions of the CVCS (including Centrifugal Charging pumps, Boron Injection Tank, connecting piping and valves).

A.21 Expendable and consumable items necessary for the functional performance of critical structures, systems, and components (i.e., weld rod, boric acid, fuel oil, etc).
A.22 Feedwater System (to outermost isolation valve)
A.23 Fire Protection System for safety-related areas (hardware).
A.24 Fuel Handling Building
A.25 Fuel Handling Building Ventilation System (exhaust units)
A.26 Fuel Handling System
A.27 Fuel Transfer Tube (see C.14 also)
A.28 Hydrogren Recombiners, hydrogen analyzers, and supports.

A.29 Instrument Air System (including accumulators, interconnecting piping and valves) for air-operated valves that perform a safety function.
A.30 Instrumentation and Control Systems required for safe shut down (including safety related instrumentation)
A.31 Instrumentation for detection of inadequate core-cooling.
A.32 Leakage Detection System (as discussed in FSAR Section 4.2.7.).
A.33 Main Steam System (to isolation valve)
A.34 Meteorological Data Collection Program (Hardware).
A.35 Missile Barriers (protecting safety-related equipment).
A.36 Nuclear Instrumentation System
A.37 Plant Shielding
A.38 Process Instrumentation and Controls (those portions required for Class I equipment and systems)
A.39 Radiation Monitoring System (those portions required for Class I equipment and systems)
A.40 Radioactive Waste Disposal Systems

a) Gas Decay Systems
b) Compressor

A.41 Reactor Coolant System (Including piping, valves, steam generators, pressurizer, safety and relief valves, block valves, piping to pressurizer relief tank, reactor coolant pumps, and supports)
A.42 Reactor (including vessel, supports, internals, fuel assemblies, RCC assemblies and drive mechanisms, supporting and positioning members, and in-core instrumentation)
A.43 Reactor Protection System

A.44 Residual Heat Removal System.
A.45 Safety Parameter Display Console (instrument calibration and verification only).
A.46 Sampling System (to outermost containment isolation valve)
A.47 Service Water Intake Structure
A.48 Service Water System (entire system serving the nuclear portion of the plant, as shown in FSAR Figure 9.9-1)
A.49 Shoreline Dike (for protection against excessive wave action).
A.50 Spent Fuel Pool Cooling System
A.51 Steam Generator Blowdown System (to outermost containment isolation valve)
A.52 Switchgear Room Ventilation System
A.53 Valve operators for all valves incorporated in this list.

B. Items designated in the Salem Master Equipment List (MEL) as safety-related "Yes" and other items designated safety-related "No", QA "Yes".

C. Items Required by Reg. Guide 1.29 "Seismic Design Classifications"

TITLE	STATION	VOLUME
PROCUREMENT DOCUMENT CONTROL	SALEM	2

1. SCOPE

This instruction applies to the control of procurement documents for safety related and nonsafety related procurements requiring a quality program.

2. PURPOSE

To define the responsibilities of PSE&G QAD and station quality assurance personnel and the Construction Manager, United Engineers & Constructors, Inc. (UE&C) for assuring control of procurement documents within the scope.

3. APPLICABLE DOCUMENTS

None

4. IMPLEMENTATION

4.1 Procurement documents and changes thereto shall be controlled through a review and approval process which assures the requirements necessary to achieve requisite quality are stated.

4.2 A designated Quality Assurance Engineer (QAE) shall be responsible for review of procurement documents to assure that appropriate quality requirements, such as the following, are addressed:

4.2.1 Approval of supplier's quality assurance program.

4.2.2 Basic technical requirements and acceptance criteria.

4.2.3 Provisions for source inspection, surveillance and audit.

4.2.4 Provisions for extending quality assurance requirements to lower tier suppliers.

4.2.5 Inclusion of the supplier on the PSE&G "Suppliers With Approved Quality Systems" list.

4.2.6 Inclusion of regulatory requirements.

4.2.7 Review of document changes.

4.2.8 Separation of safety related and nonsafety related purchases.

4.2.9 Specification of required supplier documentation.

4.2.10 Replacement or spare parts controlled in equivalent manner to original items.

4.3 The General Office QAE shall review procurement documents by General Office Engineering and Construction or other departments.

4.4 The Station QAE shall be responsible for the following:

4.4.1 Review of procurement documents to assure that appropriate quality assurance requirements are included.

4.4.2 Identification of recommended suppliers who are not on the "Suppliers With Approved Quality Systems" list.

4.4.3 Referring all procurements to the Resident QAE for his review and action.

4.5 QAD Resident QAE, in consultation with the Quality Assurance Engineering Division, shall review procurement documents referred by station personnel.

4.6 The Project QAE shall review all UE&C safety related purchase requisitions for inclusion of appropriate quality assurance provisions.

4.7 UE&C shall submit to the Project QAE, as applicable, the following for approval:

4.7.1 Contractors, bidders lists.

4.7.2 Apparent successful bidders previously unapproved by PSE&G.

4.7.3 Field procurement document changes.

4.7.4 Changes to quality requirements of purchase orders or contracts.

4.8 Local orders less than $50 which are not processed through the Purchasing Department shall not be used for the procurement of safety related items or nonsafety related items with quality requirements.

5. ATTACHMENTS

None

TITLE	STATION	VOLUME
QAD REVIEW AND APPROVAL OF SPECIFICATIONS	SALEM	2

1. SCOPE

This instruction applies to Quality Assurance Department (QAD) approval, for quality content, of specifications for safety related items prepared by the Engineering and Construction Department, the Fuel Supply Department or Electric Production Department. This instruction may also apply to non-safety related specifications for which quality requirements are designated.

2. PURPOSE

To provide instructions for Quality Assurance Engineers (QAE) when reviewing PSE&G specifications for acceptability of quality content.

3. APPLICABLE DOCUMENTS

ANSI N45.2, "Quality Assurance Program Requirements for Nuclear Power Plants"
Standard Specification Q-01, "Quality Requirements for Contractors"

4. IMPLEMENTATION

4.1 The QAE's review of each specification shall consider each of the following:

4.1.1 Imposition of ANSI N45.2 in whole or part or equivalent quality requirements.

4.1.2 PSE&G approval of supplier quality assurance and process procedures, indicating which ones, when approval shall be granted, to whom submitted.

4.1.3 Defines data package contents, approvals required (PSE&G and supplier) and where and when the data are to be sent.

4.1.4 Format conforms to originating department manual.

4.1.5 Clear identification of material and/or equipment specification and code requirements with applicable edition or revision.

4.1.6 Specific technical requirements with tolerances and acceptance criteria.

4.1.6.1 Mill test reports or certificates of compliance for raw materials requirements specified.

*General Revision

4.1.6.2 Quality systems requirements to control production.

4.1.6.3 Handling requirements.

4.1.6.4 Completeness of special process requirements.

4.1.6.5 Testing requirements, seismic qualification and related documentation.

4.1.6.6 Cleaning, preservation, packing, and shipping requirements.

4.1.6.7 Personnel qualification: quality assurance/quality control NDE, other special processes.

4.1.6.8 Applicable regulatory codes, N stamps and standards.

4.1.6.9 Storage requirements at PSE&G and intra-site/station special handling.

4.1.6.10 Material qualification requirements, including radiation qualification.

4.1.6.11 Reference to Standard Specification Q-01.

4.2 Comments resulting from QAD specification review shall be recorded on QAF-11 and forwarded to the originator in a timely manner.

4.3 QAD specification approval shall be withheld until all comments have been satisfactorily resolved. QAD approval is granted when the Manager - Quality Assurance, or his designee, signs the specification approval block.

4.4 Changes to specifications shall be reviewed and approved using the same criteria applied to the original specification.

5. ATTACHMENTS

None

TITLE	STATION	VOLUME
REVIEW OF PROCUREMENT DOCUMENTS	SALEM	2

1. SCOPE

This instruction applies to the Quality Assurance Department's review of procurement documents for designated items and services.

2. PURPOSE

The purpose of this instruction is to describe the Quality Assurance Department review of procurement documents for specified items.

3. REFERENCE DOCUMENTS

10CFR Part 21 - Reporting of Defects and Noncompliance.

4. IMPLEMENTATION

The documents listed below shall be reviewed by the Quality Assurance Department (QAD) as described.

4.1.1 SPECIFICATIONS

Specifications shall be reviewed and approved by the QA Engineering and Construction Division in accordance with the applicable QAI.

4.1.2 BID PACKAGE

4.1.2.1 Bid packages for items or services on the Salem Q List, or non-safety related with QA provisions or any other item or service to which the QA Program applies shall be reviewed by the applicable QA division for quality content. This review shall be accomplished prior to submittal to prospective suppliers through the Purchasing Department. If the review is satisfactory, the Manager - QA Services shall initial and date the bid request cover letter and forward it to the Purchasing Department. Comments resulting from the review shall be documented and transmitted to the requesting department for resolution. Bid packages shall be approved by the Manager - QA Services upon resolution of all comments and forwarded to the Purchasing Department.

4.1.3 SUPPLIER QUOTATIONS

Quotations or proposals from successful bidders shall be reviewed by the applicable QA division for compliance with quality requirements and engineering specifications. Discrepancies noted shall be documented and brought to the attention of the sponsor engineer. Supplier quotations or proposals shall be approved by the applicable manager upon resolution of all comments.

4.1.4 MATERIAL ORDER/ITEM CLASSIFICATION FORM

The material Order/Item Classification (MO/IC) form shall be processed by the responsible QA O&M QAE as follows:

4.1.4.1 For items meeting Commercial Catalog Item (CCI) guidelines, items having procurement history, or items included on the Q-List:

(a) The responsible QAE shall identify these items and the applicable QA requirements if other than CCI as described in 4.1.4.3.
(b)* Procurement action may be initiated in parallel with forwarding the MO/IC to the Engineering Department Engineering Coordinator.
(c) Engineering should review the MO/IC classification for concurrence and update the Master Equipment list (MEL). Disagreements with classifications should be brought to QAD's attention to enable corrective action for the specific procurement.
(d) The responsible QAE should initiate action to correct any erroneous procurement activity.

*Note: The MO/IC need not be forwarded to the Engineering Coordinator if the item is already included on the MEL.

4.1.4.2 For items not meeting CCI guidelines, items which have no procurement history or items not included in the Q-List:

(a) The responsible QAE shall review the MO/IC to assure adequate description and forward the form to the Engineering Department Engineering Coordinator.
(b) The Engineering Department should classify the item and forward the form to the QAD for further processing per 4.1.4.1.

4.1.4.3 In addition to the identification of the applicable QA provisions, the review of the MO/IC shall assure that the item classification section has been completed correctly. If an item is classified as a CCI (see Attachment No. 2, Item E), it cannot also be classified as Seismic (Item A), Nuclear (Item B), IE (Item C), or 10CFR21 (Item D). Items A, B, C, and D should all be "NA" if an item is classified as a CCI.

4.1.4.4 Upon completion of classification review, the responsible QAE shall:

(a) Enter the QA Form (QAF) number(s) and other QA provisions, as applicable, and attach the completed QAF(s) to the MO/IC form.
(b) Sign as provided, indicating approval.
(c) Return form and applicable QAF(s) to the forwarding organization.

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4.1.5 MATERIAL REQUEST AND RECEIVING RECORD

4.1.5.1 Material Request and Receiving Record (MR/RR) forms which are designated safety related or non-safety related with quality provisions shall be submitted to the following QAD organizations:

(1) MR/RR forms initiated at Salem Generating Station shall be reviewed and approved by the QA Operations and Maintenance Division.

(2) MR/RR forms initiated by the Engineering Department shall be reviewed and approved by the QA Services Division.

Non-safety related requisitions which do not include quality provision do not require QA approval for reorders.

4.1.5.2 Items requiring quality provisions shall not be included on material requisitions or purchase orders with items that do not require quality provisions.

4.1.5.3 The following information shall be supplied in the "Quality Assurance" block (see Attachment 1) by the requesting organization.

Key

(a) 1 Check safety related "yes", or
(b) 2 Check safety related "no", or
(c) 3 Check Commercial Catalog Item (CCI)

Note: One of the above and only one shall be checked.

(d) 4 Check "QA provisions" block. If "yes", documentation, forms, etc. may be required. If "no", nothing is required other than item number and definition of what is being procured. The "QA provisions" block shall be checked "yes" for non-safety related items which require QA Program provisions, e.g., Fire Protection Equipment.

(e) 5 Check the applicability of 10CFR Part 21.

4.1.5.4 The material request shall be reviewed by the responsible QAE for the following, prior to submittal to Purchasing or further processing to the initiating department.

(1) Equipment specification is included, approved by QAD.

(2) Adequate material description per 4.3.2.1 through 4.3.2.3.

(3) Completion of "Quality Assurance" block per 4.1.5.3.

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(4) Supplier, if identified, is included on the list of "Suppliers with approved Quality Systems".

4.1.5.5 The designated QAE shall complete the "Quality Assurance" block (see Attachment 1) as follows:

Key

(a) 6 Provide QAF-29 control number. If not required, indicate NA.

(b) 7 Similar to 4.

(c) 8 Check "other" for indications of documentation submission, standard specification applicability or other special requirements.

(d) 9 Check for signature of requisitioner.

(e) 10 "QA approval" line shall have the signature of the responsible Manager - Quality Assurance or his designated representative.

4.1.5.6 The appropriate Quality Assurance Forms shall be prepared and attached to the MR/RR form as required.

4.1.6 CONTRACTS

Contracts for safety related items or services or non-safety related with QA provisions shall be reviewed and approved by the QA Services Division prior to execution.

4.1.6.1 Purchase orders or contracts issued for the above services shall be classified as safety related and the appropriate Quality Assurance provisions applied:

The only exceptions shall be those procurements providing manpower only and which specify the following:

(a) Supplier personnel shall perform their activities in accordance with approved PSE&G procedures.

(b) Supplier personnel shall work under direct PSE&G supervision.

(c) Supplier personnel shall be trained and certified by PSE&G in the same way as new PSE&G employees.

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4.1.6.2 Examples of services include:

Consultant services
Calibration services
Design analyses/stress calculations
Inspection
Nondestructive examination
Security
Operating procedures preparation
Radiation monitoring/protection
Radwaste
Seismic and geologic surveys
Station Emergency Plan
Fire protection inspection by fire consultants
Maintenance and betterment
Meteorological data collection program
Environmental Qualification Testing

4.1.7 ISSUED PURCHASE ORDERS/CONTRACTS

4.1.7.1 Local orders less than $50 which are not processed through the Purchasing Department shall not be used for procurement of items requiring quality provisions.

4.1.7.2 Upon receipt of a copy of the issued purchase order, the QA Services Division shall review it for inclusion of the previously established quality assurance requirements and correct classification. Discrepancies shall be brought to the attention of the Purchasing Department representative and resolved.

4.1.8 SUPPLIER DOCUMENTS

Review of supplier documents shall be in accordance with the applicable QAIs.

4.2 CHANGES TO PROCUREMENT DOCUMENTS

4.2.1 Changes to documents already approved and/or reviewed shall be handled in the same manner as was the original document.

4.2.2. Changes in classification of previously approved procurement documents (i.e., safety related to non-safety related and vice-versa) shall be reviewed and approved by the responsible QA Division prior to issuance.

4.2.3 Change orders involving technical or quality requirements shall not be issued without an approved material request form.

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4.2.4 Change orders originated by the Purchasing Department do not require prior QAD approval. These change orders shall be limited to:

4.2.4.1 Small quantity changes to conform to standard packaging.

4.2.4.2 Changes in commercial terms of the order, e.g., price, terms of payment, etc., which are not associated with a change in scope of order.

4.3 RESPONSIBILITIES OF OTHER DEPARTMENTS

4.3.1 PURCHASING DEPARTMENT

The cognizant Purchasing Department representative shall:

(1) Check bid package and material request forms which are designated "safety related" or "non-safety related with quality provisions" to verify that quality provisions have been designated and that QAD has reviewed them. If no designation is evident, Purchasing Department representatives shall forward documents to the responsible Manager - Quality Assurance for corrective action.

(2) Officially transmit requirements, commitments and changes in the purchase documents from PSE&G to the supplier and assure that all requirements identified in the MR are correctly transcribed to the purchase order.

(3) Notify suppliers of 10CFR21 applicability.

(4) Purchase orders or contracts for items or services to which the QA Program applies (safety related and non-safety related with QA Provisions) shall only be issued to suppliers included on the "List of Suppliers with Approved Quality Systems" with the following exceptions and clarifications.

(a) Original manufacturers of commercial catalog items need not be included on the list.

(b) Distributors of commercial catalog items need not be included on the list.

(c) Suppliers of Fire Protection hardware when the only QA provisions is a UL or FM listing need not be included on the list.

(d) Sales Office, if other than the specified facility, need not be included on the list. In these cases the purchase order shall specify that the procured item be supplied by the approved facility as identified on the list.

(e) A completed and approved QAF 34 has been issued. QAD approval of a MR/RR is not sufficient documentation of supplier approval.

(5) Allow no substitution of the identified Commercial Catalog Item unless authorized by Engineering and Quality Assurance Department representatives.

(6) Forward copies of purchase orders and contracts with attachments, to the responsible Manager - Quality Assurance in parallel with those going to the requisitioner.

4.3.2 ENGINEERING AND CONSTRUCTION DEPARTMENT, NUCLEAR FUEL DEPARTMENT AND NUCLEAR DEPARTMENT

The requestor/requisitioner shall, on the MM/RR form, specification or attachments:

4.3.2.1 Completely identify the intended procurement item(s) including quantity, component type, part number and intended use. Either part number, size class, or rating should be included as applicable.

4.3.2.2 Where codes or standards apply, furnish a complete identification consisting of:

(for ASME)
- material designation
- B&PVC edition
- addendum referenced
- code cases considered

(for ASTM, ANSI and others)
- material designation
- standard number
- year of issuance
- supplementary requirements

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4.3.2.3 List applicable PSE&G specification including revision number and date of issuance.

4.3.2.4 Specify whether specific packaging, handling, storage/preventive maintenance, or receiving instructions have been supplied.

4.3.2.5 On the material request form, do the following:

(1) Complete the "Quality Assurance" block per 4.1.5.3.

(2) Identify commercial catalog items (CCI) as such.

4.4 MATERIAL MANAGEMENT SYSTEM

The Material Management System (MMS) incorporates automated functions including Inventory Control and Accounting, Purchasing and Accounts Payable.

Automated purchasing relies on the concept of standardized pre-established quality requirements for each item included in the computerized material inventory.

As with the standard procurement system, the quality assurance requirements are identified by the applicable QAF generated by the QAE. In addition to generating the applicable QAFs, the QA Services Division shall be responsible for maintenance of a QA Table Matrix containing the standard quality requirements.

Upon request for procurement of an item within the computerized inventory, a report is generated which includes a descriptiion of the item, quantity ordered, location, delivery date, and a QA code associated with each item. The printout shall be reviewed by the responsible QA Services QAE for accuracy of information. Normally two days is allowed for the QAE review prior to automaitc generation of a requisition and subsequently the purchase order. Requisitions generated via the MMS do not require QAD review and approval. All other procurement control requirements shall be adhered to.

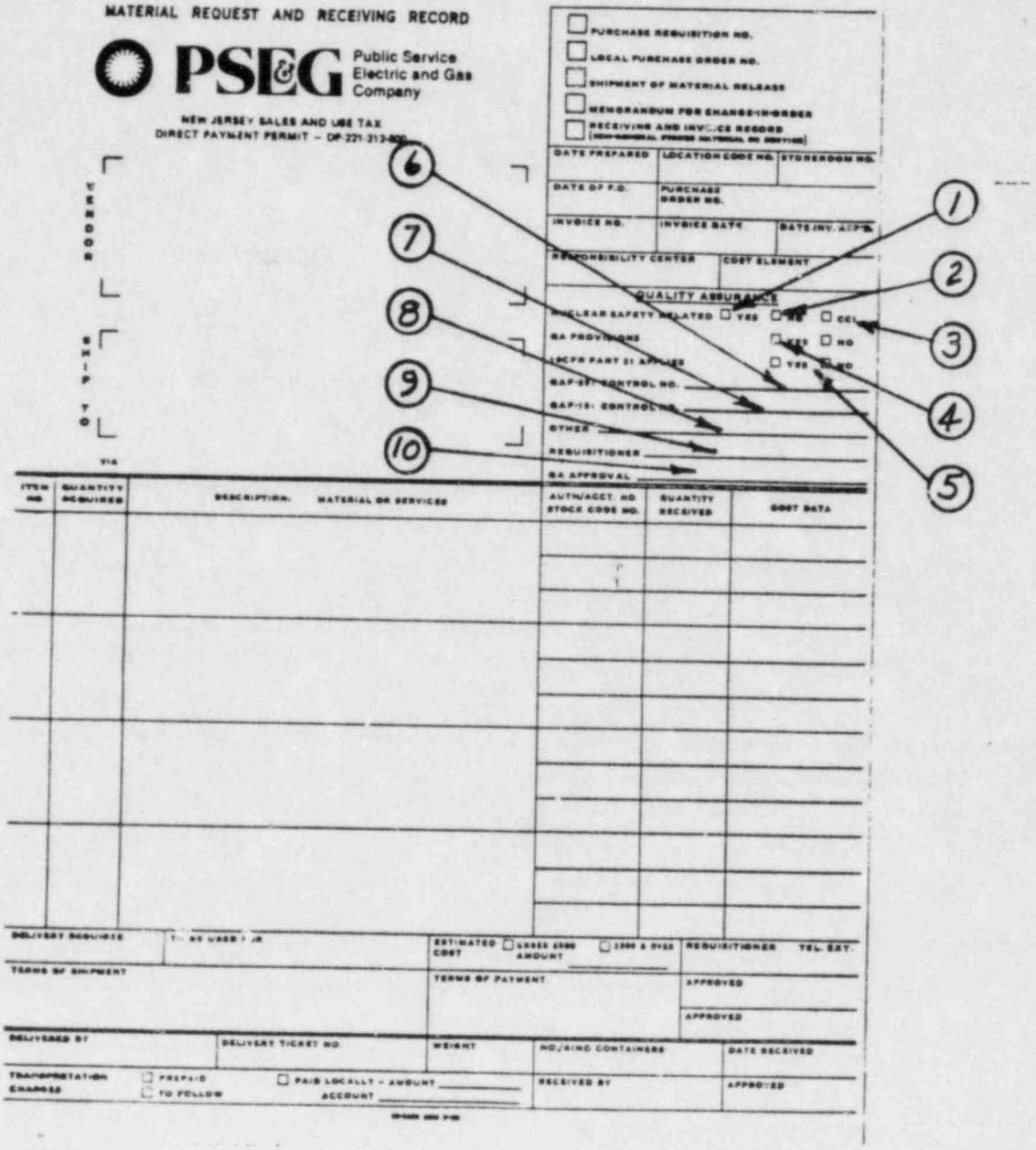
5. ATTACHMENTS

(1) PSE&G Material Request (purchase requisition) form.

(2) PSE&G Material Order/Item Classification form (MO/IC).

M P82 48 10 1/8

TITLE	STATION	DOC. NO.	ATTACHMENT NO. 1
PSE&G MATERIAL REQUEST FORM (PURCHASE REQUISITION)	SALEM	QAI 4-3	REV. 3 PAGE 1 OF 1
		VOLUME 2	DATE 4/29/80



MATERIAL REQUEST AND RECEIVING RECORD

PSE&G Public Service Electric and Gas Company

NEW JERSEY SALES AND USE TAX
DIRECT PAYMENT PERMIT – DP-221-213-805

☐ PURCHASE REQUISITION NO.
☐ LOCAL PURCHASE ORDER NO.
☐ SHIPMENT OF MATERIAL RELEASE
☐ MEMORANDUM FOR CHANGE-IN-ORDER
☐ RECEIVING AND INVOICE RECORD

ORDER

SHIP TO

VIA

DATE PREPARED | LOCATION CODE NO. | STOREROOM NO.

DATE OF P.O. | PURCHASE ORDER NO.

INVOICE NO. | INVOICE DATE | DATE INV. RCVD.

RESPONSIBILITY CENTER | COST ELEMENT

QUALITY ASSURANCE

NUCLEAR SAFETY RELATED ☐ YES ☐ NO ☐ CCL

QA PROVISIONS ☐ YES ☐ NO

10CFR PART 21 APPLIES ☐ YES ☐ NO

QAP-07 CONTROL NO.

QAP-13 CONTROL NO.

OTHER

REQUISITIONER

QA APPROVAL

ITEM NO.	QUANTITY REQUIRED	DESCRIPTION: MATERIAL OR SERVICES	AUTH/ACCT. NO. STOCK CODE NO.	QUANTITY RECEIVED	COST DATA

DELIVERY REQUIRED | TO BE USED FOR | ESTIMATED COST ☐ UNDER $500 AMOUNT ☐ $500 & OVER | REQUISITIONER TEL. EXT.

TERMS OF SHIPMENT | TERMS OF PAYMENT | APPROVED | APPROVED

DELIVERED BY | DELIVERY TICKET NO. | WEIGHT | NO./KIND CONTAINERS | DATE RECEIVED

TRANSPORTATION CHARGES ☐ PREPAID ☐ TO FOLLOW ☐ PAID LOCALLY – AMOUNT ACCOUNT | RECEIVED BY | APPROVED

SHOW ONE P.O.

6
7
8
9
10
1
2
3
4
5

M P81 147 07/8-srd

J-109

MATERIAL ORDER/ITEM CLASSIFICATION

VENDOR _____ R/C _____ EST. COST _____

ADDRESS _____ AUTH. _____ CE _____

_____ ACCT. _____ LOC CODE _____

SYSTEM/COMPONENT _____ SUPERVISOR'S CONTROL NUMBER 000000

CONFIRMING ORDER: YES ☐ NO ☐ DATE REQ. _____

ITEM NO.	QTY.	U/M	MATERIAL DESCRIPTION/SERVICE REQUIRED	FOLIO INFORMATION: REQ	CJ	CODE	OR PT.	OR	*ITEM CLASSIFICATION: SE	NU	1-E	10 CFR 21	QA	QUALITY PROVISIONS: QAF-19/OTHER
									A	B	C	D	E	

SUPERVISOR _____ DATE _____ DEPT. HEAD _____ DATE _____

SPONSOR ENG. _____ DATE _____

SQAE _____ DATE _____ QAD _____ DATE _____

*SE SEISMIC 1, 2, 3, NA
NU NUCLEAR CLASS 1, 2, 3, NA
1E CLASS 1E ELECTRICAL EQUIP. NA
10CFR21 APPLIES Y-YES N-NO
QA 1 - SAFETY REL./QA PROVISIONS
2 - NON-SAFETY-REL./QA PROVISIONS
3 - COMMERCIAL CATALOG ITEM
4 - NON SAFETY-REL./NO QA PROVISIONS

REQ. NO. _____ LOCAL P. O. NO. _____ BLANKET REQ. NO. _____ P. O. NO. _____

AP-19 FORM AP-19-1 REV. 4

OFFICE

TITLE: PSE&G Material Order/Item Classification Form

STATION: Salem

DOC. NO. QAI-4-3

VOLUME 2

ATTACHMENT NO. 2

REV. 0 PAGE 1 OF 1

DATE 11/12/81

TITLE	STATION	VOLUME
PROCUREMENT CONTROL SYSTEM	SALEM	2

1. SCOPE

This instruction provides a description of the procurement system used for safety related items and services and for non-safety related items for which quality assurance requirements apply.

2. PURPOSE

This instruction identifies the activities which are necessary to control the quality of items within its scope. It further defines the interface of the Quality Assurance Department (QAD) with other departments during the procurement cycle.

3. APPLICABLE DOCUMENTS

None

4. IMPLEMENTATION

4.1 The control of purchased equipment, material and services is accomplished through a combination of the following activities conducted by QAD or others as identified in QAI's and/or other departmental manuals:

(1) Review and control of procurement documents.

(2) Evaluation and qualification of suppliers.

(3) Identification of quality assurance requirements for suppliers.

(4) Control of supplier activities.

(5) Review and acceptance of suppliers documentation.

(6) Receiving inspection.

4.2 The standard procurement control cycle is illustrated in Attachment No. 1. The illustration depicts in broad terms the general responsibilities and functions of the various participating organizations.

4.3 RESPONSIBILITIES

4.3.1 REQUESTING DEPARTMENT

4.3.1.1 The requesting department shall furnish a complete description of the item to be procured including but not limited to the following, as applicable:

(1) Quantity

(2) Applicable Code or Standard

(3) Engineering Specification

(4) Seismic, environmental or other qualification requirements.

(5) Intended Use

(6) Quality Classification

(7) Special shipping requirements

(8) Special handling requirements

(9) Special storage requirements

(10) Specific receiving inspection requirements

(11) Shelf life requirements

(12) Quality documentation requirements

4.3.1.2 The requesting department shall forward the requisition to QAD for approval.

4.3.2 QUALITY ASSURANCE DEPARTMENT

The Quality Assurance Department shall have the following typical responsibilities:

(1) Evaluation and approval of supplier's quality capability.

(2) Review and approval of purchase requisitions.

(3) Identification of required supplier quality program requirements.

(4) Establishment of a Notification Point Program when applicable.

(5) Review and approval of supplier procedures.

(6) Identification of required supplier documentation when not provided by requesting organization.

(7) Performance of supplier surveillance and issuance of Quality Shipment Release, when not assigned to a QAD Agent.

(8) Audit of procurement control activities.

4.3.3 PURCHASING DEPARTMENT

The Purchasing Department shall have the following typical responsibilities:

(1) Verification that the requisition contains QAD approval.

(2) Accurate transfer of requirements of the requisition onto the Purchase Order (PO).

(3) Issuance of PO to QAD approved suppliers.

(4) Verification of QAD approval on change orders.

(5) Proper distribution of PO.

4.3.4 RECEIVING ORGANIZATION

The organization responsible for the receipt and acceptance of the procured items shall conduct appropriate receiving inspection in accordance with written and approved procedures. Documentation shall be sufficient to show the identity of the inspector, item inspected, parameters or characteristic inspected, the results of the inspection, the status of the item following the inspection and the action taken in connection with any nonconformance.

4.4 COMMERCIAL CATALOG ITEM (CCI)

The procurement of CCI as defined in Attachment 2 intended for use in safety related equipment may be procured without specific quality requirements. The receipt inspection and subsequent installation test shall be sufficient to demonstrate proof of satisfactory component acceptability. This method of procurement does not alter the function of a CCI, nor does it change the controls placed on the installation. Modification, rework or repair of safety related equipment is governed by the Quality Assurance Program. Items in the (CCI) category do not require imposition of 10CFR Part 21 on the supplier.

4.5 CONFIRMING ORDERS

At times it is necessary to expedite obtaining safety related material for immediate use; the confirming order is used to accomplish this. However, before a confirming purchase order is issued by Purchasing Department, prior oral approval from QAD shall be mandatory. The requisitioner desiring a confirming order shall contact QAD. The QAD shall notify the Purchasing Department of the necessary quality requirements and QAD approval. After this, the Purchasing Department may issue the purchase order number. The QAD shall forward written verification of approval to Purchasing Department within one week of the date approval was given. Confirming purchase orders issued subsequent to the approval of the material requisition do not require separate written verification of QAD approval. Oral request for material shall not be made to the supplier prior to receipt of confirming order number from Purchasing Department.

5. ATTACHMENTS

Attachment 1 - Flow Chart - PSE&G Procurement
Attachment 2 - Commercial Catalog Items
Attachment 3 - Flow Chart - Confirming Orders

"Commercial Catalog Item" - an item which complies with all of the following requirements:

(1) The item is not unique to facilities or activities licensed by the NRC.

(2) The item is manufactured in quantity to published manufacturer's fixed design and quality requirements.

(3) For replacement (CCI) items, a document exists which identifies the item (to be ordered) as an authorized replacement for the original or existing item. Such documents include the manufacturer's parts list, bill of material, repair, maintenance or instruction manual or a PSE&G Engineering listing of replacement or interchangeable parts. Substitution of authorized parts require engineering approval.

(4) The item part number is listed in the supplier's sales catalog as opposed to a manufacturer's bulletin or circular.

(5) The item requires no supplier documentation (i.e., test data, NDE results, certificate of analysis, certificate of compliance, etc.).

(6) The item is identifiable via physical marking, tagging or containerization. The identification shall be capable of being maintained throughout storage.

(7) The item meets applicable classification requirements of Table I below, but does not fall within the category of Table II.

TABLE I

Typical Items Classified as Commercial Catalog Items

(a) Electronic Components and Assemblies; i.e., resistors, capacitors. transistors, integrated circuits, diodes, transmitters, instrumentation.

(b) Electrical Components: i.e., breaker contacts, brushes. relays, lamps, fuses, terminals, transformers, switches, instruments, recorders, etc.

(c) Mechanical Components; i.e., bearings, gaskets, packing, o-rings, handwheels and non-ASME Code fittings, small nuts, bolts, studs, etc.

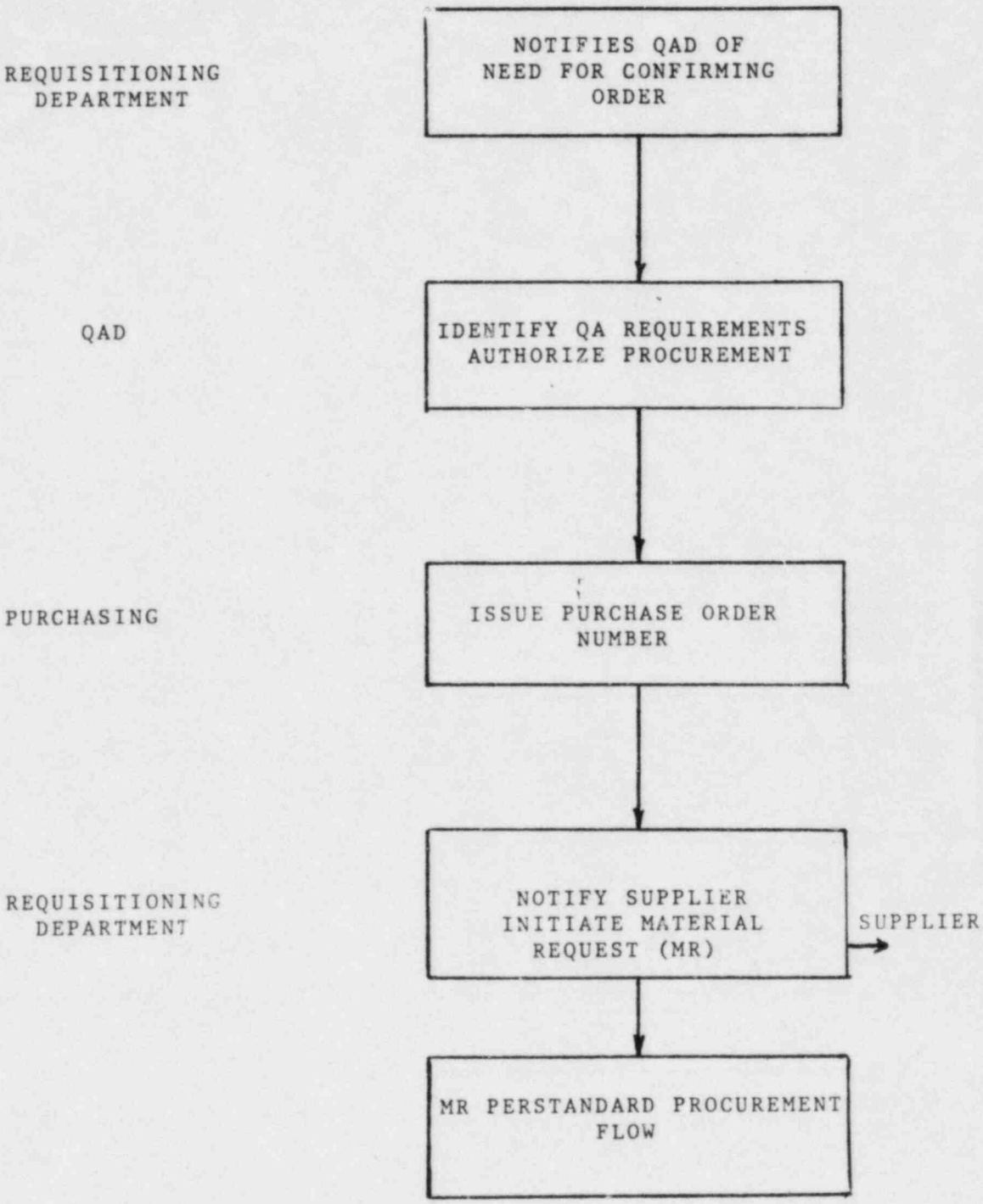
TABLE II

Items Not Classified as Commercial Catalog Items

(a) Components with Unique Requirements (requiring special screening, selection, modification, handling and inspection).

(b) ASME Boiler and Pressure Vessel Code Items.

TITLE	STATION	DOC. NO	ATTACHMENT NO 3
FLOW CHAI[illegible] CONFIRMING [illegible]	SALEM	QAI 7-1	REV. 2 PAGE 1 OF 1
		VOLUME 2	DATE 9/17/79



TITLE: Quality Assurance for Environmental Qualification of Equipment

STATION: Salem

VOLUME: 2

1. Scope

This instruction applies to the design, specification, and procurement of equipment requiring environmental qualification.

2. Purpose

This instruction describes the Quality Assurance Program elements which shall be applied to the design, specification, and procurement of equipment requiring environmental qualification.

3. Reference Documents

IEEE STD. 323-1974 Edition - "Standard for Qualifying Class 1E Equipment for Nuclear Generating Stations".
NUREG-0588 "Interim Staff Position on Environmental Qualification of Safety - Related Electrical Equipment".
NRC IE Bulletin 79-01B "Environmental Qualification of Class 1E Equipment.
NRC Regulatory Guide 1.89 "Qualification of Class 1E Equipment for Nuclear Power Plants".
PSE&G Environmental Qualification Review Report

4. Implementation

4.1 Engineering Department Responsibilities

4.1.1 The Engineering Dept. is responsible for establishing equipment qualification requirements and developing appropriate equipment specifications incorporating these requirements.

4.1.1.1 The equipment specification should include the following as applicable:
- Environmental Requirements
- Performance Requirements
- Aging Requirements
- Fire Exposure Requirements
- Radiation Exposure Requirements
- Chemical Spray Requirements

4.1.2 The Engineering Department is responsible for establishing a list of equipment and components previously environmentally qualified.

4.1.2.1 The list shall identify the level of replacement which can be made without jeopardizing the qualification status.

4.1.3 The Engineering Department is responsible for identifying environmentally qualified equipment and components subject to environmental degradation and specifying the associated maintenance program.

4.1.4 The Engineering Department is responsible for assuring that the equipment is environmentally qualified in accordance with the requirements prescribed by the equipment specifications.

4.1.5 The Engineering Department is responsible for reviewing, evaluating and approving the environmental qualification baseline data to assure results meet the requirements prescribed by the equipment specifications.

4.2 Quality Assurance Department Responsibilities

4.2.1 The Quality Assurance Department shall review and approve the equipment specifications prior to issue.

4.2.2 The Quality Assurance Department shall perform a review of environmental qualification baseline results subsequent to the Engineering Department's review and verification.

4.2.3 The Quality Assurance Department shall audit Engineering Department activities concerning environmental qualification of equipment

4.2.4 The Quality Assurance Department shall perform quality assurance audits, as required, of contractors providing environmental qualification services.

4.2.4.1 The Quality Assurance Department shall review and approve all contractors providing environmental qualification services as required by the applicable QAI.

4.2.4.2 The Quality Assurance Department shall perform surveillance of environmental qualification contractors during the qualification testing, when feasible, to assure conformance with prescribed requirements.

4.3 Procurement Control of Replacement Equipment

4.3.1 Procurement of replacement equipment or components therein (e.g. circuit breaker for Class 1E Motor Control Center) which have been previously environmentally qualified shall be controlled as safety-related equipment as required by the applicable QAI. Procurement of this equipment shall require initiation and completion of the "Certificate of Configuration - Qualification Form" (QAF-21).

4.3.1.1 The "Certificate of Configuration - Qualification Form" (QAF-21) is to be used to document the configuration of replacement equipment or components which have been previously qualified. It is not intended for documentation of new qualifications.

4.3.1.2 The QAF-21 (see Attachment 1) shall be completed as follows by the personnel indicated:

1. Number to be assigned by group reviewing/initiating procurement - Responsible QAE. Prefix suggested: P = Production initiated order, E = Engineering initiated order, C = Construction initiated order.
2. Supplier name and address - Responsible QAE.
3. PSE&G destination - Responsible QAE.
4. Pertinent item information - Responsible QAE.
5. Identification of the specific qualification report and standards used - Sponsor Engineer
6. Date of qualification test report - Sponsor Engineer.
7. Responsible sponsor engineer or field engineering representative
8. Supplier representative - only item not completed by PSE&G.

4.3.3 Environmentally qualified equipment shall be segregated and identification maintained throughout receiving inspection and storage.

4.4 Installed Equipment

4.4.1 Licensee Event Reports, Deficiency Reports and surveillance records shall be reviewed periodically by the Quality Assurance Department to identify environmentally qualified equipment degradation and potential failure. Candidate equipment shall be referred to the Engineering Department for further investigation and analysis.

4.5 Central Files

4.5.1 Environmental qualification of equipment shall be an auditable activity. The procedures for originating and maintaining technical information submitted for qualification shall be organized in a readily understandable and traceable manner. This shall permit independent auditing of the conclusions or influences based on the information.

5. Attachments

Attachment 1 - Certificate of Configuration - Qualification Form (QAF-21).

Attachment 2 - Currently Environmentally Qualified Class 1E Equipment.

TITLE	STATION	DOC. NO.	ATTACHMENT NO. 1
Certificate of Configuration - Qualification Form (QAF-21)	Salem	QAI 2-14	REV. 0 PAGE 1 OF 1
		VOLUME 2	DATE 11/12/81

The Energy People
PSE&G
QUALITY ASSURANCE DEPARTMENT

CERTIFICATE NO. (1)

CERTIFICATE OF CONFIGURATION – QUALIFICATION

FROM: (2)

TO: (3)

PART NAME:

PART NO.:

FOLIO NO.: (4)

PSE&G P.O. NO.:

REQ. NO.:

QUANTITY:

MODEL:

SERIAL NO.(S):

The item(s) identified on the subject purchase order has been previously qualified to (5) DATE OF TEST: (6)

(7) PSE&G SPONSOR ENGINEER

This document is to certify that the subject item has been processed in compliance with the following requirements:

1. No design change has been implemented subsequent to the original procurement and qualification testing.
2. No material changes have been made subsequent to the original procurement and qualification testing.
3. No process or manufacturing changes have been made which may have altered the performance of the item in a manner which would compromise the validity of the qualification test results.

Very truly yours,

(8)
TITLE DATE

QAF 21

. ASCO - NP Series Solenoid Valves
NP831654E, NP8316A74E
NP8344A76E, NP8344A78E
206-380-6F, 206-381-3F, 206-381-6F

. Rosemount 1153A Transmitters

. NAMCO - EA180 Limit Switches

. Electric Cables -

American Insulated Wire
Samuel Moore
Boston Insulated Wire
including Coaxial - XLPE Insulation and
Coaxial Tefzel EFTE Insulation
Triangle PWC, Inc.
Anaconda
Rockbestos/Cerro/Silicon
Okonite

. PSE&G Instrument Panels

. Barton Sensing Bellows Model 351

. Charging/Safety Injection Pump Motor
Westinghouse Spin #PNJCSAPCH (Unit 1)
#PSECSAPCH (Unit 2)

. Safety Injection Pump Motor
Westinghouse Spin #PNJSIAPSI (Unit 2)
#PSESIAPSI (Unit 1)

. RHR Pump Motor
Westinghouse Spin #PSEACAPRN (Unit 1)
#PNJACAPRN (Unit 2)

. Chemical Spray Pump Motor
Westinghouse Spin #PSESIAPCS (Unit 1)
#PNJSIAPCS (Unit 2)

. Electrical Penetrations - Conax
Canister Type - LVP, MVP

. Terminal Blocks - Buchanan
2B100N Series

. Cable Splices (Raychem)
WSF-N

. Fan Cooler Motor
Westinghoue Spin #PSERCADCF (Unit 1)
#PNJRCADCF (Unit 2)

PART 3 - MAINTENANCE

POLE UNIT

Each pole unit is mounted on a separate molded base through which the breaker studs pass. (See Fig. 3.) The molded bases are attached to the steel mounting panel and provide insulation for the breaker studs.

The upper stud and contact are attached to the molded base by two bolts. The moving contact is pivoted on the molded base and attached to the cross bar through insulating links. The series coil and lower stud are fastened to the molded base by four bolts.

Contacts. (See Fig. 3.)

The DB-50 arcing contact should touch first on closing, open last on opening. Contact pressure on the mains is maintained by adjusting gap G to be .050-.093 inches. This gap is adjusted by removing the cross bar and screwing the insulating link in or out on the stud. Be sure to tighten the lock nuts after each adjustment.

Do not over-adjust as this will cause the contact springs to compress to the solid position and thus increase the closing effort. Check for over-adjustment by prying the stationary arc tips open to at least 1/16-inch gap.

Maintenance of Contacts.

Rough or high spots should be removed with a file or sandpaper. To replace the arcing contacts, open the breaker, remove the arc chutes and then the stationary arcing contacts. Close the breaker and remove the moving arcing contacts. The new contacts can then be added in the reverse order.

CAUTION: All power should be removed when changing, maintaining or adjusting contacts.

OPERATING MECHANISM

The operating mechanism (see Fig. 3) is non-adjustable and consists of a series of non-ferrous links designed to secure low closing and tripping forces. To check for friction, raise the trip bar and slowly rotate the manual operating handle in close direction. The linkage should follow the handle without sticking.

A small quantity of lubricant is placed on the handle shaft, the roller lever roller, and the latch plate at the factory.

CLOSING SPRING ASSEMBLY

The closing spring assembly is shown in Fig. 3A.

Rotating the closing handle clockwise raises the lift link and lower spring guide to compress the closing spring. Near the end of the closing stroke the top end of the lift link strikes the first toggle lever to start the breaker closing. As the breaker closes, the push rod raises the toggle link and push link out of the toggle which permits the closing spring to complete the breaker closing.

Slow emergency operation to check the contact sequence can be obtained by exerting a slight closing pressure on the closing handle and simultaneously pushing forward on the breaker cross bar to start the breaker closing.

Maintenance

Oil the pins and slides every 10,000 operations.

CLOSING SOLENOID

The closing solenoid (see Fig. 14) is non-adjustable. It is designed for intermittent duty only. Check for loose bolts.

To remove closing coil, trip breaker. Disconnect closing coil leads from control circuit wiring. Take off bolts (9), washers (12), relay release arm (8), bolts (10), washers (11) and plate (2). Drop closing coil (7) with brass tube (5).

-- Quality Assurance Program Review (Details, Paragraph 4).
-- Design Changes and Modifications (Details, Paragraph 5).
-- Operational Records (Details, Paragraph 6.c and d).
-- Procurement (Details, Paragraph 7.a, b, c, and d).
-- Portal Monitor Calibration (Details, Paragraph 8).
-- Quality Assurance Audits (Details, Paragraph 9.a).
-- General Orientation Training (Details, Paragraph 11.a and b).
-- In-Plant Craft Personnel Training (Details, Paragraph 12.b).
-- Requalification Training (Details, Paragraph 13.a, b, and c).

2. Unresolved Items

-- 77-04-06 - Revise procedure PD-7 to eliminate inconsistencies between required practices and current practices employed with regard to application of QA program controls (Details, Paragraph 7.e).

-- 77-04-07 - Define criteria and actions for followup/escalation of station QA audit findings in writing, including actions of Manager-Salem Generating Station (Details, Paragraph 10.a).

-- 77-04-08 - Define criteria and actions for followup/escalation of QAD audit findings in writing, including actions of Vice President-Engineering and Construction (Details, Paragraph 10.b).

-- 77-04-09 - Follow licensee's actions on QA audit findings to verify Criterion I requirements for QA organization are met (Details, Paragraph 10.c).

-- 77-04-10 - Complete corrective action for CAR 76-13 in the area of Quality Assurance indoctrination (Details, Paragraph 11.e).

-- 77-04-11 - Complete corrective action for CAR's 76-15 and 76-16 by defining retraining requirements, in writing, for Performance and Maintenance Departments (Details, Paragraph 12.a).

-- 77-04-12 - Document the current practices for selection of LER's for inclusion in the Requalification Training Program (Details, Paragraph 13.e).

The inspector reviewed these items and determined that: parts were inspected upon delivery; parts were properly handled in accordance with measures established for control and separation of nonconforming parts; and, parts were supplied by an approved vendor.

The inspector identified no discrepancies.

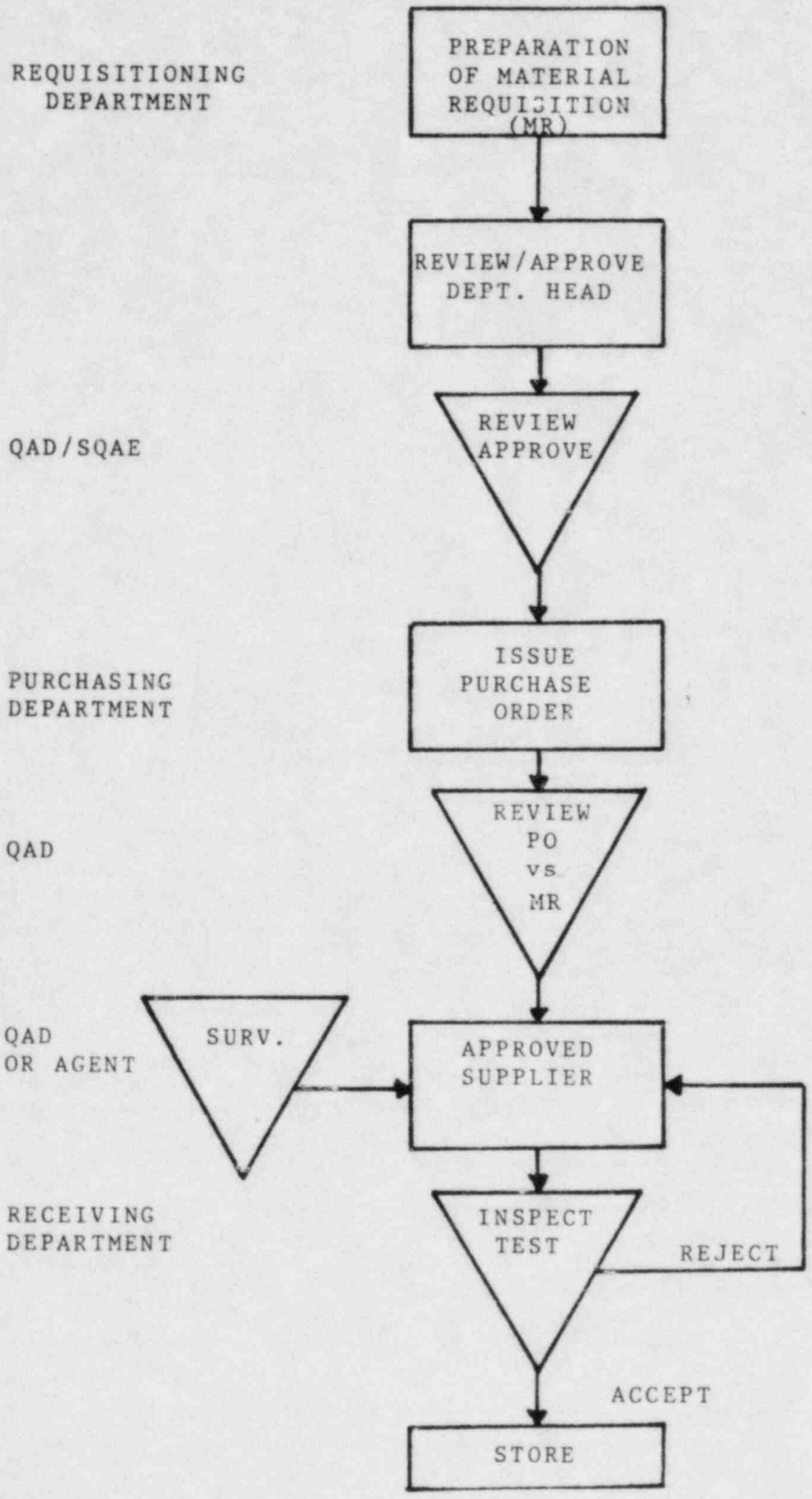
e. Project Directive 7 (PD-7)

Administrative Procedure 19, PROCUREMENT, RECEIVING, STORAGE, ISSUE AND SHIPPING OF SPARE PARTS AND MATERIAL, Revision 1 dated January 25, 1977 states that the safety related and quality assurance classifications are those shown in PD-7. When the inspector reviewed PD-7 on a sampling basis, the following inconsistencies were found:

-- welding electrodes and filler material are purchased as QA required, but these items are not listed in PD-7.
-- fuel for the reactor is purchased as QA required, but is not listed in PD-7;
-- six safety injection system valves (1SJ1, 1SJ2, 1SJ4, 1SJ5, 1SJ12, and 1SJ13) which are required to operate to establish a flow path from the RWST through the pumps and the BIT to the loops are not listed as safety related or QA required in PD-7, but a Work Request for two of these valves (1SJ1, 1SJ2) was reviewed and was being controlled as QA required; and,
-- the instrumentation for measuring/recording any seismic event at the site was listed in PD-7 as no seismic qualifications required (the instrument was determined by Station QA to be seismic qualified).

As noted above, each case reviewed by the inspector indicated that the required controls had been applied. However, since the purchasing department, maintenance department, and others are required to use the classifications given in PD-7 for making decisions, this document must be accurate. The licensee stated that, on or before May 30, 1977, PD-7 would be reviewed in an attempt to eliminate inconsistencies between current practices and practices required by PD-7. The licensee also stated that lubricants for safety-related rotating equipment, currently listed in PD-7 as not requiring QA and currently handled without QA requirements, would be subjected to an engineering evaluation to determine if QA controls should be applied. Until this review and evaluation have been completed, this item (77-04-06) is unresolved.

TITLE	STATION	DOC. NO.	ATTACHMENT NO. 1
FLOW CHART PSE&G PROCUREMENT	SALEM	QAI 7-1 VOLUME	REV. 2 PAGE 1 OF 1 DATE 9/17/79



APPENDIX K

Surveillance Procedures

(Cross Referenced to Section 6 of this Report)

Contents

K.1 PD 18.1.008, Solid State Protection System Functional Test - Train A, Revision 1, June 9, 1982 . . . . . K-1

K.2 PD 18.1.004, SSPS Reactor Trip Breaker and P-4 Permissive, Revision 1, July 30, 1982 . . . . . K-55

K.3 PD 18.4.002, Response Time Testing of SSPS Logic - Reactor Trip - Train A, Revision 0, July 1, 1982 . . . . . K-67

K.4 Completed SP(O) 4.3.1.1.1 Reactor Trip Breakers K-73

SALEM NUCLEAR GENERATING STATION

PUBLIC SERVICE ELECTRIC & GAS COMPANY

ELECTRIC GENERATION DEPARTMENT

SAFETY RELATED

PROCEDURE APPROVAL COVER SHEET

PROCEDURE: 1PD-18.1.008 - SOLID STATE PROTECTION SYSTEM

REMARKS: FUNCTIONAL TEST - TRAIN A

REV. 1 - General Revision to incorporate On-The-Spot-Changes.

REV	SUBMITTED	EED APPROVED	QA REVIEWED	PERF. ENGR. APPROVED	SORC REVIEWED	STA. SUPT. APPROVED
0	1/29/82	N/A 1/29/82	2/1/82	2/3/82	82-13	2/4/82
1	5/24/82	N/A 5/24/82	6/2/82	6/2/82	82-50	6/9/82

X

SALEM GENERATING STATION

PERFORMANCE DEPARTMENT (I & C)

TEST PROCEDURE

NUMBER – 1PD-18.1.008

REV. NO. 1

DATE 5/24/82

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

1.0 Purpose:

1.1 The purpose of this procedure is to verify the operability of Solid State Protection System Train A.

1.2 To satisfy the train surveillance requirement of the technical specifications.

2.0 References:

2.1 Solid State Protection System Manual.

2.2 Wiring Diagrams: 203688, 222885, 224305

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

3.0 Precautions:

3.1 Test conditions must be applied to only Train A. A reactor trip will occur if both trains have a general warning condition. Therefore, it is extremely important that the doors to only one train at a time are open, to preclude the introduction of test conditions into both trains.

3.2 Test conditions may be applied to one train using its built-in testers, while the opposite train is used to maintain the plant protection and provide data to the demultiplexers. If in the process of testing, malfunctions are detected, they can be isolated by carefully following the procedures in Section 6 of the Solid State Protection Manual.

3.3 This procedure must be completed in the sequence given to insure successful completion.

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

4.0 Limitations and Actions:

4.1 If, at any time during the performance of this test, there is any reason to suspect that the test equipment being used may not be performing properly, a comparison check shall be performed with a similar device or the device shall be checked for calibration against a standard. This shall be done prior to taking any other corrective action.

4.2 If, during the performance of this test, the "As Found" data does not meet the requirements of the specified accuracy, the Job Supervisor shall be notified immediately and PD-14.1.001 shall be performed.

4.3 If, during the performance of this procedure, the required status indication cannot be obtained, the Job Supervisor shall be notified immediately. Exceptions to the required indication, due to plant conditions at the time of the test, may be made by the Job Supervisor. Any exceptions of this nature must be indicated and explained in the Remarks section of this procedure.

4.4 An entry will be made in the Remarks section of this procedure indicating any deficiency and the corrective action taken.

X

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

5.0 Test Equipment:

Device Name	PD No.	Recal. Date
Fluke (2)		
Stop Watch		

X

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

6.0 Prerequisites:

6.1 The individual assigned to perform this procedure is qualified to do so in accordance with Solid State Protection System Qualification Card 2.6.

_____
Supervisor

6.2 The Senior Shift Supervisor/Shift Supervisor has granted permission to perform this procedure.

_____
Senior Shift Supervisor/Shift Supervisor

_____
Date/Time

6.3 The Control Operator is aware of all of the alarms and indications that will result from the performance of this procedure.

_____
Control Operator

X

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

7.0 System Line-up:

7.1 The following conditions must be established and/or verified by the Control Operator.

7.1.1 Reactor Trip Bypass Breaker B is open and in the Racked Out position.

7.1.2 Safeguard actions which are being blocked by virtue of having been Reset from the Control Bezel will be re-initiated at the completion of this test if the necessary logic signal is present. The Safeguard actions involved are:

1. Containment Spray
2. Phase A Isolation
3. Phase B Isolation
4. Feedwater Isolation
5. Containment Ventilation Isolation from Safety Injection signal

_____
Control Operator

X

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions:

8.1 Measure and record the following instrument Bus Voltages (Required 117 ± 10 VAC).

8.1.1 Bus #1 TB-110 - 11 & 12 _____VAC

8.1.2 Bus #2 TB-210 - 11 & 12 _____VAC

8.1.3 Bus #3 TB-310 - 11 & 12 _____VAC

8.1.4 Bus #4 TB-410 - 11 & 12 _____VAC

8.1.5 Bus #1 TB-654 - 1 & 12 _____VAC

8.2 Open the front doors of Train A Logic Bay and Train A Output Relay Bay. _____

8.3 On the Logic Tester Panel, verify and record the following Power Supply Voltages

8.3.1 +48VDC #1 Required 48.7 ± 0.2 VDC

_____ _____
As Found As Left

8.3.2 +48VDC #2 Required 48.7 ± 0.2 VDC

_____ _____
As Found As Left

X

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.3.3 +15VDC #1 Required 15.7 ± 0.2 VDC

_____ _____
As Found As Left

8.3.4 +15VDC #2 Required 15.7 ± 0.2 VDC

_____ _____
As Found As Left

8.4 Verify the following Solid State Protection System General Warnings Lamps are Off.

8.4.1 General Warning Lamp - Train A _____

8.4.2 General Warning Lamp - Train B _____

8.5 Depress the following General Warning Lamps and verify the Lamp Lights, and then remains OFF.

8.5.1 General Warning Lamp - Train A _____

8.5.2 General Warning Lamp - Train B _____

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.6 On the Logic Test Panel, verify that each of the following indicators will light by depressing it.

8.6.1	Testing	_____
8.6.2	Bad	_____
8.6.3	Good	_____
8.6.4	Continuity	_____
8.6.5	Memory Set	_____
8.6.6	1/1	_____
8.6.7	1/2	_____
8.6.8	1/3	_____
8.6.9	1/4	_____
8.6.10	2/2	_____
8.6.11	2/3	_____
8.6.12	2/4	_____

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.7 Record UV Coil Voltage Meter Reading.

Required 43 VDC ± 2 VDC _____
(when shutdown 0 VDC ± 2 VDC) As Found

8.8 On the Output Relay Test Panel, place the Mode Selector Switch in the Test position. _____

8.9 Verify the Operate Lamp is not lighted. _____

8.10 Verify the General Warning Lamp is lighted. _____

8.11 Verify the operation of the Semi-Automatic Tester. Self-check as follows:

-NOTE-
Steps 8.11.6 through 8.11.11 will result in continuous alarms in the Control Room if there are any tripped inputs to the SSPS.

8.11.1 Verify that the continuity lamp is lighted. _____

8.11.2 On the Tester PC Card (A108), verify that the top four LED's (light emitting diodes) are lighted. _____

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.11.3 Depress the test pushbutton. Verify that the continuity lamp and the top four LEDS on A108 extinguish. _____

8.11.4 Release the TEST pushbutton. Verify that the continuity lamp and the top four LEDS on A108 light. _____

8.11.5 On the Logic Test Panel, place the Input Error Inhibit switch to the Inhibit position. _____

8.11.6 Place the MULTIPLEXER TEST switch to the A & B position. _____

8.11.7 Place the BLOCKING FUNCTION TEST switch to the BLOCKS NOT INHIBITED position. _____

8.11.8 Depress and release the TEST pushbutton. _____

8.11.8.1 Verify that the amber testing lamp lights. _____

8.11.8.2 In approximately 1.6 seconds, verify that this lamp extinguishes. _____

8.11.8.3 Verify that the GOOD lamp lights. _____

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.11.8.4 In approximately 1.6 seconds, verify that the good lamp extinguishes and repeatedly blinks on and off for these periods. _____

8.11.9 Place the BLOCKING FUNCTION TEST switch to the INHIBIT BLOCKS position. _____

8.11.10 Depress and release the Test pushbutton. _____

8.11.10.1 Verify that the AMBER TESTING lamp LIGHTS. _____

8.11.10.2 Verify that the red BAD lamp lights. _____

8.11.11 Place the MULTIPLEXER TEST switch to INHIBIT. _____

8.12 Verify Reactor Trip Breaker A is CLOSED (if Reactor Trip Breaker is open have the Control Operator CLOSE Reactor Trip Breaker A) _____

8.13 Verify the following High Radiation ALARM Lights on panel 1RP1 are OFF. _____

8.13.1 1R-11A Containment or Vent Particulate _____

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.13.2 1R-12A Containment or Vent Gas Effluent. _____

8.13.3 1R-12B Containment or Vent Gas Effluent (Iodine). _____

8.14 If any high RADIATION ALARM is present in Steps 8.13.1 through 8.13.3, lift the field lead on terminal TB-506-2. _____

8.15 Perform the following for LOGIC and PERMISSIVE testing. Record results on TABLE I.

WARNING: If a malfunction within the logics is detected, the red BAD LAMP will come on at the instant of detection and remain on. It is then necessary to refer to Section 6.3 of the Solid State Protection System Manual to troubleshoot and define the cause.

8.15.1 Verify the following switches are in the positions indicated.

8.15.1.1 Logic A OFF _____

8.15.1.2 Logic B 24 _____

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.15.1.3	Logic C	24	_____
8.15.1.4	Logic D	24	_____
8.15.1.5	Permissives	OFF	_____
8.15.1.6	Memories	OFF	_____

8.15.2 Place Logic A switch to position "1" and verify that Function Logic Lamp 2/3 lights. _____

8.15.3 Depress and release the TEST pushbutton. The amber testing lamp will LIGHT. After all combinations of logics are tested, the Amber TESTING Lamp should extinguish and the Green GOOD Lamp should light. The GOOD Lamp will extinguish the next time the TEST pushbutton is depressed. _____

8.15.4 Place the Blocking Function Test Switch to the opposite position and repeat Steps 8.15.2 and 8.15.3. _____

8.15.5 Using Table I, perform Step 8.15.2 through 8.15.4 for the positions of the logic and permissive switches as listed. _____

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PER-MIS-SIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
OFF	24	24	24	OFF	OFF	-	-	(GOOD OR BAD)	
1	24	24	24	OFF	LOSS OF FLOW, LOOP 1	2/3			
2	24	24	24	OFF	LOSS OF FLOW, LOOP 2	2/3			
3	24	24	24	OFF	LOSS OF FLOW, LOOP 3	2/3			
4	24	24	24	OFF	LOSS OF FLOW, LOOP 4	2/3			
5	24	24	24	OFF	LOSS OF FLOW, RCP	2/4			
6	24	24	24	OFF	PRESSURIZER, LOW PRESSURE TRIP	2/4			

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PERMISSIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
7	24	24	24	OFF	PRESSURIZER, HIGH PRESSURE TRIP	2/4			
8	24	24	24	OFF	PRESSURIZER, HIGH WATER LEVEL TRIP	2/3			
9	24	24	24	OFF	LOW FEEDWATER FLOW, LOOP 1	1/2			
10	24	24	24	OFF	LOW FEEDWATER FLOW, LOOP 1	1/2			
11	24	24	24	OFF	LOW FEEDWATER FLOW, LOOP 2	1/2			
12	24	24	24	OFF	LOW FEEDWATER FLOW, LOOP 2	1/2			

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PER-MIS-SIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
13	24	24	24	OFF	LOW FEEDWATER FLOW, LOOP 3	1/2			
14	24	24	24	OFF	LOW FEEDWATER FLOW, LOOP 3	1/2			
15	24	24	24	OFF	LOW FEEDWATER FLOW, LOOP 4	1/2			
16	24	24	24	OFF	LOW FEEDWATER FLOW, LOOP 4	1/2			
17	24	24	24	OFF	OIL PRESSURE SWITCHES REACTOR TRIP	2/3			
18	24	24	24	OFF	STOP VALVES GENERATOR TRIP	2/2			
19	24	24	24	OFF	STOP VALVES GENERATOR TRIP	2/2			

TITLE ~~SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST~~ TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PER-MIS-SIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
20	24	24	24	OFF	STOP VALVES REACTOR TRIP	2/2			
21	24	24	24	OFF	SOURCE RANGE TRIP	2/2			
22	24	24	24	OFF	SOURCE RANGE TRIP	2/2			
23	24	24	24	OFF	FEED THRU TO LOGIC B	-	-	-	-
23	1	24	24	OFF	INTERMEDIATE RANGE TRIP	2/2			
23	2	24	24	OFF	INTERMEDIATE RANGE TRIP	2/2			
23	3	24	24	OFF	POWER RANGE, LOW SETPOINT TRIP	2/4			

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PER-MIS-SIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
23	4	24	24	OFF	POWER RANGE, HIGH SETPOINT TRIP	2/4			
23	5	24	24	OFF	OVERTEMPERATURE DELTA T TRIP	2/4			
23	6	24	24	OFF	OVERPOWER DELTA T TRIP	2/4			
23	7	24	24	OFF	RCP UNDERVOLTAGE TRIP	2/4			
23	8	24	24	OFF	RCP UNDERVOLTAGE TRIP	1/2			
23	9	24	24	OFF	RCP UNDERVOLTAGE, TURB. FEED PUMP	1/2			

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PER-MIS-SIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
23	10	24	24	OFF	RCP UNDERVOLTAGE, TURB. FEED PUMP	2/4			
23	11	24	24	OFF	LOW STEAMLINE PRESSURE	2/4			
23	12	24	24	OFF	HIGH STEAMLINE FLOW, LOOP 1	1/2			
23	13	24	24	OFF	HIGH STEAMLINE FLOW, LOOP 2	1/2			
23	14	24	24	OFF	HIGH STEAMLINE FLOW, LOOP 3	1/2			
23	15	24	24	OFF	HIGH STEAMLINE FLOW, LOOP 4	1/2			

TITLE ~~SOLID STATE PROTECTION SYSTEM~~ FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PER-MIS-SIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
23	16	24	24	OFF	STEAMLINE ISOLATION	2/4			
23	17	24	24	OFF	HIGH CONTAINMENT PRESSURE, SAFETY INJECTION	2/3			
23	18	24	24	OFF	HI-HI CONTAINMENT PRESSURE, SPRAY ACTUATION	2/4			
23	19	24	24	OFF	HI-HI CONTAINMENT PRESSURE, SPRAY ACTUATION	2/4			
23	20	24	24	OFF	HI-HI CONTAINMENT PRESSURE, STEAM STOP VALVES	2/4			

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PER-MIS-SIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
23	21	24	24	OFF	HI-HI CONTAINMENT PRESSURE, PHASE B ISOLATION	2/4			
23	22	24	24	OFF	SAFETY INJECTION, PHASE A ISOLATION	1/1			
23	23	24	24	OFF	SAFETY INJECTION, CONTAINMENT VENTILATION ISOLATION	1/2			
23	24	24	24	OFF	FEED THRU TO LOGIC C	-	-	-	-
23	24	1	24	OFF	STEAMLINE DIFFERENTIAL PRESSURE, LOOP 1	2/3			

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PERMISSIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
23	24	2	24	OFF	STEAMLINE DIFFERENTIAL PRESSURE, LOOP 2	2/3			
23	24	3	24	OFF	STEAMLINE DIFFERENTIAL PRESSURE, LOOP 3	2/3			
23	24	4	24	OFF	STEAMLINE DIFFERENTIAL PRESSURE, LOOP 4	2/3			
23	24	5	24	OFF	PRESSURIZER PRESSURE	2/3			
23	24	6	24	OFF	PRESSURIZER PRESSURE	2/3			
23	24	7	24	OFF	PRESSURIZER PRESSURE	2/3			

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PER-MIS-SIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
23	24	8	24	OFF	STEAM GENERATOR LO-LO WATER LEVEL LOOP 1	2/3			
23	24	9	24	OFF	STEAM GENERATOR LO-LO WATER LEVEL LOOP 2	2/3			
23	24	10	24	OFF	STEAM GENERATOR LO-LO WATER LEVEL LOOP 3	2/3			
23	24	11	24	OFF	STEAM GENERATOR LO-LO WATER LEVEL LOOP 4	2/3			
23	24	12	24	OFF	STEAM GENERATOR LO-LO WATER LEVEL TRIP	1/4			

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TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PER-MIS-SIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
23	24	13	24	OFF	STEAM GENERATOR LO-LO WATER LEVEL, MOTOR FEED PUMP	1/4			
23	24	14	24	OFF	STEAM GENERATOR LO-LO WATER LEVEL, TURBINE FEED PUMP	2/4			
23	24	15	24	OFF	STEAM GENERATOR HI-HI LEVEL, GENERATOR 1	2/3			
23	24	16	24	OFF	STEAM GENERATOR HI-HI LEVEL, GENERATOR 2	2/3			
23	24	17	24	OFF	STEAM GENERATOR HI-HI LEVEL, GENERATOR 3	2/3			

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PERMISSIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
23	24	18	24	OFF	STEAM GENERATOR HI-HI LEVEL, GENERATOR 4	2/3			
23	24	19	24	OFF	LOW TAVG	2/4			
23	24	20	24	OFF	TAVG AND REACTOR TRIPPED	2/2			
23	24	21	24	OFF	UV DIODES AND OUTPUT	1/4			
23	24	22	24	OFF	SAFETY INJECTION DIODES & OUTPUT	1/4			
23	24	23	24	OFF	UV DIODES AND OUTPUT	1/4			

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PER-MIS-SIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
23	24	24	24	OFF	FEED THRU TO LOGIC D	-	-	-	-
23	24	24	1	OFF	SAFETY INJECTION DIODES & OUTPUT	1/3			
23	24	24	2	OFF	UV DIODES AND OUTPUT	1/4			
23	24	24	3	OFF	UV DIODES AND OUTPUT	1/4			
23	24	24	4	OFF	UV DIODES AND OUTPUT	1/4			
23	24	24	5	OFF	UV DIODES AND OUTPUT	1/4			
23	24	24	6	OFF	UV DIODES AND OUTPUT	1/4			

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PER-MIS-SIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
23	24	24	7	OFF	FEEDWATER CONTROL	1/2			
23	24	24	8	OFF	FEEDWATER CONTROL	1/1			
23	24	24	9	OFF	RCP UNDERFREQUENCY	2/4			
23	24	24	10	OFF	RCP UNDERFREQUENCY	1/2			
23	24	24	11	OFF	RCP UNDERFREQUENCY	1/2			
23	24	24	12	OFF	RCP UNDERFREQUENCY	2/4			
23	24	24	13	OFF	POWER RANGE, HI FLUX RATE TRIP	2/4			

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PERMISSIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
23	24	24	14	OFF	SAFETY INJECTION, PHASE A ISOLATION	1/1			
23	24	24	15	OFF	SAFETY INJECTION, PHASE A ISOLATION	1/1			
23	24	24	16	OFF	SAFETY INJECTION, PHASE A ISOLATION	1/1			
23	24	24	17	OFF	SAFETY INJECTION, PHASE A ISOLATION	1/1			
23	24	24	18	OFF	SAFETY INJECTION, PHASE A ISOLATION	1/1			
23	24	24	19	OFF	SAFETY INJECTION, PHASE A ISOLATION	1/1			

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PER-MIS-SIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
23	24	24	20	OFF	SAFETY INJECTION, PHASE A ISOLATION	1/1			
23	24	24	21	OFF	SAFETY INJECTION, PHASE A ISOLATION	1/1			
23	24	24	22	OFF	SAFETY INJECTION, PHASE A ISOLATION	1/1			
23	24	24	23	OFF	SAFETY INJECTION, PHASE A ISOLATION	1/1			
23	24	24	24	OFF	FEED THRU TO PERMISSIVES	-	-	-	-
23	24	24	24	1	P6	1/2			

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PERMISSIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
23	24	24	24	2	P8	2/4			
23	24	24	24	3	P10	2/4			
23	24	24	24	4	P7	1/3			
23	24	24	24	5	P9	2/4			
23	24	24	24	6	P12	2/4			
23	24	24	24	7	P12	2/4			
23	24	24	24	8	P12	2/4			

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE I

LOGIC & PERMISSIVES

FUNCTION SELECTORS						FUNCTION LOGIC		BLOCKING FUNCTION TEST SWITCH	
LOGIC A	LOGIC B	LOGIC C	LOGIC D	PER-MIS-SIVE	TEST FUNCTION	REQUIRED	ACTUAL	INHIBIT BLOCKS	BLOCKS NOT INHIBITED
23	24	24	24	9	P11	2/3			
23	24	24	24	10	P8 RCP BREAKERS	1/4			
23	24	24	24	11	P8 RCP BREAKERS	1/4			
OFF	24	24	24	OFF	OFF	OFF		-	-

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.16 Perform the following Memories Testing. Record results on TABLE II.

8.16.1 Place MEMORIES switch to position "1". _____

(The 1/4 function logic lamp will light whenever the MEMORIES switch is not in the OFF position).

8.16.2 In the MEMORY FUNCTION TEST portion of the LOGIC TEST PANEL, depress and release the RED pushbutton and verify that the MEMORY SET lamp lights. (If already on, depress and release BLACK pushbutton). _____

8.16.3 After MEMORY SET lamp lights, depress and release BLACK pushbutton. _____

8.16.4 Repeat Steps 8.16.2 and 8.16.3 for the positions of the MEMORIES switch as listed on TABLE II. _____

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE 2

MEMORIES

FUNCTION SELECTOR MEMORIES	TEST FUNCTION	FUNCTION LOGIC 1/4	MEMORY TEST RED	FUNCTION PUSHBUTTON BLACK
OFF	OFF	-	(ON OR OFF)	
1	POWER RANGE BLOCK			
2	INTERMEDIATE RANGE BLOCK			
3	SOURCE RANGE BLOCK			
4	SOURCE RANGE BLOCK			
5	SAFETY INJECTION BLOCK, PRESSURIZER			
6	SAFETY INJECTION BLOCK, PRESSURIZER			
7	SAFETY INJECTION BLOCK, STEAM LINE PRESSURE AND LEVEL			
8	SAFETY INJECTION BLOCK, STEAM LINE PRESSURE AND LOGIC			
9	AUTOMATIC SAFETY INJECTION BLOCK			
10	FEEDWATER VALVE CONTROL			
11	FEEDWATER VALVE CONTROL			
OFF	OFF	-	-	

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.17 Perform the following for Output Relay Testing and Record results on TABLE III.

8.17.1 Place the MASTER RELAY SELECTOR in Position "1". _____

8.17.2 Depress SLAVE TEST A pushbutton and verify that the required "A" lamps lights while pushbutton is depressed. Verify the required lamps light by placing an "X" under each on requirement. _____

8.17.3 Repeat Step 8.17.2 for SLAVE TEST B. _____

8.17.4 Repeat Steps 8.17.2 and 8.17.3 for each MASTER RELAY SELECTOR position listed on TABLE III. _____

8.17.5 Remove 'A' and 'B' lamps from Slave Test Panel. Verify ISOLATED on pins 5 of K601, K602, K603, K604, K605, K609, K610, and K611 relays. _____

8.17.6 Replace 'A' and 'B' lamps on Slave Test Panel. _____

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE III

LOGIC & PERMISSIVES

MASTER RELAY SELECTOR	SLAVE RELAY FUNCTION	SLAVE RELAY CONTINUITY LAMPS A1	A2	A3	A4	B1	B2	B3	B4
1	CONTAINMENT ISOLATION, PHASE A	ON	ON	ON	OFF	ON	ON	ON	OFF
2	CONTAINMENT VENTILATION ISOLATION	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
3	STEAM STOP VALVES	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
4	SPRAY ACTUATION	ON	OFF	OFF	OFF	ON	ON	OFF	OFF
5	CONTAINMENT ISOLATION, PHASE B	ON	ON	OFF	OFF	ON	ON	OFF	OFF
6	FEEDWATER VALVES (HI-HI STEAM GENERATOR LEVEL)	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
7	TRIP TURBINE/MAIN FEEDWATER PUMPS	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE III
LOGIC & PERMISSIVES

MASTER RELAY SELECTOR	SLAVE RELAY FUNCTION	SLAVE RELAY CONTINUITY LAMPS A1	A2	A3	A4	B1	B2	B3	B4
8	RCP UNDERFREQUENCY	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
9	SPARE	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
10	(NOT USED)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
11	(NOT USED)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
12	LO-LO TAVG STEAM DUMP INTERLOCK	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
13	LOSS OF POWER/TURBINE AUXILIARY PUMP	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
14	LOW WATER LEVEL/MOTOR AUXILIARY PUMP	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
15	LOW WATER LEVEL/TURBINE AUXILIARY PUMP	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

TABLE III
LOGIC & PERMISSIVES

MASTER RELAY SELECTOR	SLAVE RELAY FUNCTION	SLAVE RELAY CONTINUITY LAMPS A1	A2	A3	A4	B1	B2	B3	B4
16	GENERATOR TRIP & STEAM DUMP INTERLOCK	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
17	TAVG AND REACTOR TRIPPED	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
18	SAFETY INJECTION	ON	ON	ON	ON	ON	ON	ON	ON
19	(NOT USED)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
20	(NOT USED)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
21	(NOT USED)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
22	(NOT USED)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
23	(NOT USED)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.18 Place the MULTIPLEXER TEST switch to Normal. _____

8.19 Replace (if required) the field lead to TB-506-2 lifted in Step 8.14. _____

8.20 Inform the Control Operator that a containment ventilation isolation will be initiated if a high radiation alarm is present when this procedure is completed. Inform him that he may reset the containment ventilation isolation at this time. _____

8.21 Manual Input Function Test

-NOTE-

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Omit steps ~~8.21.4, 8.21.5, 8.21.14, 8.21.16~~ 8.21.1, 8.21.9 and ~~8.21.19~~ 8.21.10 if Reactor is Tripped

_____ Tripped _____ Operational

8.21.1 Have the Control Operator rack in and close Reactor By-pass Breaker A, and verify that the breaker is in Operate position and its light is illuminated. _____

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

-WARNING-

Reactor By-pass Breaker A must remain energized for the duration of the manual testing, otherwise a Reactor Trip will occur.

8.21.2 At the LOGIC TEST Panel place the LOGIC A Test Switch in Position 7. (Pressurizer High Pressure Trip). _____

8.21.3 In the MANUAL INPUT FUNCTION TEST portion of the LOGIC TEST PANEL, depress and hold any TWO pushbuttons. _____

8.21.4 At the Control Board, verify that Reactor Trip Breaker A is OPEN. _____

8.21.5 Verify the UV COIL VOLTAGE meter indicates approximately 0 VDC. _____

8.21.6 Release the pushbuttons depressed in Step 8.21.3. _____

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued)

		Initial
8.21.7	Place the LOGIC A Test Switch in the OFF position.	
8.21.8	Have the Control Opeator close the Reactor Trip Breaker A.	
8.21.9	Have the Control Operator OPEN Reactor By-Pass Breaker A.	
8.21.10	Have the Control Operator rack Out Reactor By-Pass Breaker A.	
8.21.11	Verify that the general warning test LED for SSPS Train A is extinguished in both Train A and Train B.	

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.22 Perform the following for SAFETY INJECTION RESET TIMING TEST.

8.22.1 Select position 9 on the MEMORIES switch and if the MEMORY SET lamp is illuminated, depress the BLACK button to extinguish it. _____

8.22.2 In the OUTPUT TEST cabinet, place test switch 602 in the BLOCK OUTPUT position. _____

8.22.3 Connect the Digital Voltmeter as follows:

8.22.3.1 TD-1, Terminal 6 (+) _____

8.22.3.2 Logic Ground (GND) _____

8.22.4 The DVM should read approximately +48 VDC. _____

8.22.5 Move the positive lead of the DVM from TD-1, Terminal 6 to TD-1, Terminal 2. _____

8.22.6 The DVM should indicate 0 VDC. _____

X

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.22.7 Latch-up Relay K602 by depressing the latch plunger and time the interval from this point until the voltmeter reads approximately +48 VDC. (The time should be 60 to 65 sec.)
_____sec. _____

8.22.8 At the Control Board depress the S.I. Block/Reset pushbutton and verify the following:

8.22.8.1 DVM indicates 0 VDC _____

8.22.8.2 MEMORY SET lamp lights _____

8.22.8.3 Relay K602 Resets _____

8.22.9 Return the MEMORIES switch to the OFF position. _____

8.22.10 Connect the Digital Voltmeter as follows:

8.22.10.1 TD-1, Terminal 6 (+) _____

8.22.10.2 Logic Ground (GND) _____

8.22.11 The DVM should read approximately +48 VDC. _____

X

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.22.12 Move the positive lead of the DVM to TD-1 Terminal 2 and measure the resistance to ground (GND). The DVM should indicate an Open. _____

8.22.13 Connect the Digital Voltmeter (AC Scale) as follows:

8.22.13.1 TD-1, Terminal 1 _____

8.22.13.2 TD-1, Terminal 5 _____

8.22.14 The DVM should read 0 VAC. _____

NOTE: A DVM indication of 25 VAC or less is considered noise. _____

8.22.15 Measure the resistance between TD-1, Terminal 1 and TD-1, Terminal 5. The DVM should indicate an OPEN. _____

8.22.16 In the output test cabinet, return the test switch 602 to the UNBLOCK output position and verify the TL/TXC Alarm light extinguishes. _____

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.22.17 Have the Control Operator reinstate the FLUX TRIP MANUAL Blocks from the Control Board. _____

NOTE: The pushbutton must be pushed even when BEZEL block light is lit. (ND blocks can be applied if their permissives are not present, therefore, only those permitted will be set.)

8.22.17.1 Block Source Range-Train A pushed _____

8.22.17.2 Block Intermediate Range-Train A pushed. _____

8.22.17.3 Block Power Range - Train A pushed. _____

WARNING: The Flux Trip Manual Blocks must be reinstated prior to placing the input error inhibit switch in the normal position.

8.22.18 Place the Input Error Inhibit Switch in the NORMAL position. _____

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.23 Perform the following for Spray Actuation Test.

8.23.1 Depress Spray Test pushbutton for each of the individual channels and verify proper indication at the Control Board.

8.23.1.1 Channel I Containment Pressure

Hi-Hi I _____

8.23.1.2 Channel II Containment Pressure

Hi-Hi II _____

8.23.1.3 Channel III Containment Pressure

Hi-Hi III _____

8.23.1.4 Channel IV Containment Pressure

Hi-Hi IV _____

8.23.2 Place input ERROR INHIBIT Switch in the INHIBIT position. _____

8.23.3 Place the MODE Selector switch in the OPERATE position. _____

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) **Initial**

8.23.4 Actuate the following MANUAL BLOCKS using the pushbuttons on the Control Board. No blocks can be applied if their permissives are not present; therefore, only those permitted will be set.

8.23.4.1 Pressurizer Safety Injection. _____

8.23.4.2 Steamline Pressure Safety Injection. _____

-NOTE-

Safeguard actions which are being blocked by virtue of having been Reset from the Control Bezels will be re-initiated at this time if necessary logic signal is present. The safeguard actions involved are:

1. Containment Spray
2. Phase A Isolation
3. Phase B Isolation
4. Feedwater Isolation
5. Containment Ventilation Isolation from Safety Injection Signal.

Inform the Control Operator of this condition.

_____
Control Operator

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.23.5 Place the Input ERROR Inhibit switch in the NORMAL position. _____

8.23.6 Have the Control Operator reset all unwanted safeguards actions which were re-initiated as a result of this test. _____

8.24 Perform the following for the Multiplexer checks.

WARNING: It is necessary that SSPS Train B Multiplexer Switch be in the normal position and that its general warning lamp be off. If the lamp is already on, it is necessary that it be cleared before the A & B position is selected in the other train.

8.24.1 Place Train A Multiplexer Test Switch to the A & B position. _____

8.24.2 Verify no intermittent condition exists. _____

NOTE: An intermittent (on/off) condition is when the indication appears at the control board and the computer at approximately one repetition per second. This indicates one of the two trains has a malfunction in its data multiplexing.

X

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.24.3 Place Train A Multiplexer Test Switch to the Normal position. _____

8.24.4 If the Shift Supervisor wants the Safety Injection block re-initiated for the train, short terminals 2 and 6 on TD1 and have the Controls Operator depress S.I. Reset for Train ~~B~~ A.

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Remove jumper: _____
Initial

_____
Senior Shift Supervisor/Shift Supervisor

9.0 System Return to Normal:

9.1 The Senior Shift Supervisor/Shift Supervisor has been notified that this channel has been returned to normal.

_____
Senior Shift Supervisor/Shift Supervisor

_____
Date/Time

X

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

10.0 Remarks: W.O._____ I.O._____

11.0 Completion:

11.1 Completed by:_____ _____ _____
Technician Date Time

11.2 Approved by:_____ _____ _____
Supervisor Date Time

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.24.3 Place Train A Multiplexer Test Switch to the Normal position. _____

8.24.4 If the Shift Supervisor wants the Safety Injection block re-initiated for the train, short terminals 2 and 6 on TD1 and have the Controls Operator depress S.I. Reset for Train B.

Remove jumper: _____
Initial

_____
Senior Shift Supervisor/Shift Supervisor

9.0 System Return to Normal:

9.1 The Senior Shift Supervisor/Shift Supervisor has been notified that this channel has been returned to normal.

_____
Senior Shift Supervisor/Shift Supervisor

_____
Date/Time

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.17 Perform the following for Output Relay Testing and Record results on TABLE III.

8.17.1 Place the MASTER RELAY SELECTOR in Position "1". _____

8.17.2 Depress SLAVE TEST A pushbutton and verify that the required "A" lamps lights while pushbutton is depressed. Verify the required lamps light by placing an "X" under each on requirement. _____

8.17.3 Repeat Step 8.17.2 for SLAVE TEST B. _____

8.17.4 Repeat Steps 8.17.2 and 8.17.3 for each MASTER RELAY SELECTOR position listed on TABLE III. _____

TITLE SOLID STATE PROTECTION SYSTEM FUNCTIONAL TEST TRAIN A

8.0 Instructions: (Continued) Initial

8.18 Place the MULTIPLEXER TEST switch to Normal. _____

8.19 Replace (if required) the field lead to TB-506-2 lifted in Step 8.14. _____

8.20 Inform the Control Operator that a containment ventilation isolation will be initiated if a high radiation alarm is present when this procedure is completed. Inform him that he may reset the containment ventilation isolation at this time. _____

8.21 Manual Input Function Test

-NOTE-
Omit steps 8.21.4, 8.21.5, 8.21.14, 8.21.16 and 8.21.19 if Reactor is Tripped

_____	_____
Tripped	Operational

8.21.1 Have the Control Operator rack in and close Reactor By-pass Breaker A, and verify that the breaker is in Operate position and its light is illuminated. _____

NOTE: PRESS HARD YOU ARE MAKING FIVE (5) COPIES

ADMINISTRATIVE PROCEDURE 3
ON-THE-SPOT CHANGE Train A.

CHANGE TYPE: [X] PERMANENT (GREEN) [ ] *TEMPORARY (ORANGE)

PROCEDURE TITLE S.S.P.S. Rx Trip Brk & P-4 Permissive Test *EXPIRES:

ALL ON-THE-SPOT CHANGES TO BE CONSIDERED FOR APPLICABILITY TO BOTH UNITS.

[X] UNIT 1 PROCEDURE NO. 1PD 18.1.004 REV. NO. 1 CHANGE NO. 1

[X] UNIT 2 PROCEDURE NO. 2PD 18.1.004 REV. NO. 1 CHANGE NO. 1

PROPOSED CHANGE:

Cover Sheet
Delete - "This procedure supersedes SP(O) 4.3.1.1.1"

REASON FOR CHANGE:

To remove inaccurate statement.

ACTION TAKEN FOR OTHER UNIT:

'SAME'

AUTHORIZATION: A. Ockerlle **SUPERVISOR IN CHARGE — D. A. Lawrence DUTY SENIOR SHIFT SUPERVISOR OR SHIFT SUPERVISOR — 11/24/82 DATE

**SIGNATURE ALSO VERIFIES THAT APPLICABILITY TO BOTH UNITS HAS BEEN CONSIDERED.

ACCEPTABLE: POST CHANGE-REVIEW/APPROVAL

YES	NO		
X		A. Ockerlle DEPARTMENT HEAD	11/24/82 DATE
X		for Brian Kaufman SQAE	11/29/82 DATE
MEETING NO. 82	107	L. Gilman SORC (CHAIRMAN)	12/1/82 DATE
/		H. J. McQuarrie MANAGER - SALEM GENERATING STATION	12/1/82 DATE

RETURN COMPLETED OR REJECTED FORM TO DEPARTMENT REQUESTING CHANGE.

FOLLOW-UP TO REJECTED ON-THE-SPOT CHANGE

ACTION TAKEN:

PERFORMED BY: _____ SIGNATURE _____ DATE

RETURN TO DEPARTMENT HEAD FOR ROUTING THROUGH POST CHANGE-REVIEW/APPROVAL CYCLE.

FORM AP-3-1 REV. 9

SALEM NUCLEAR GENERATING STATION

PUBLIC SERVICE ELECTRIC & GAS COMPANY

ELECTRIC GENERATION DEPARTMENT

PROCEDURE APPROVAL COVER SHEET **SAFETY RELATED**

PROCEDURE: 1PD-18.1.004 SOLID STATE PROTECTION SYSTEM

REMARKS: REACTOR TRIP BREAKER & PERMISSIVE P-4 TEST - TRAIN A

Rev. 1 - General Revision to incorporate On-The-Spot-Changes.

REV	SUBMITTED	EED APPROVED	QA REVIEWED	PERF. ENGR. APPROVED	SORC REVIEWED	STA. SUPT. APPROVED
0	5-1-80 A.G. Mastelle	N/A TAM	5/4/80	5/7/80	80-31	5/9/80
1	7/23/82 M. Bergeman	7/23/82 N/A MB	7-23-82	7-23-82	82-070	7/30/82 HJ-Lindner

X

SALEM GENERATING STATION

PERFORMANCE DEPARTMENT (I & C)

TEST PROCEDURE

NUMBER – 1PD-18.1.004

REV. NO. 1

DATE 6/24/82

TITLE SOLID STATE PROTECTION SYSTEM
REACTOR TRIP BREAKER & PERMISSIVE P-4 TEST - TRAIN A

1.0 Purpose

1.1 To verify the operability of the Reactor Trip Breakers to satisfy requirements of the Technical Specifications.

1.2 To verify the operability of the Reactor Trip Breaker/ Reactor Bypass Breaker P-4 permissive switches.

1.3 To satisfy the recommendations of Westinghouse Letter PSE-80-14.

2.0 References

2.1 Solid State Protection System Manual
2.2 Westinghouse Letter PSE-80-14 (2/22/80)
2.3 Wiring Diagrams - 203688, 222885, 224305, 203646
2.4 Technical Specifications

3.0 Precautions

3.1 Insure that all required safety precautions and tagging procedures have been complied with as stated in the Performance Department Manual.

TITLE SOLID STATE PROTECTION SYSTEM
REACTOR TRIP BREAKER & PERMISSIVE P-4 TEST - TRAIN A

4.0 Limitations and Actions

4.1 If, at any time during the performance of this test, there is any reason to suspect that the test equipment being used may not be performing properly, a comparison check shall be performed with a similar device or the device shall be checked for calibration against a standard. This shall be done prior to taking any other corrective action.

4.2 If, during the performance of this test, the "As Found" data does not meet the requirements of the specified accuracy, the Job Supervisor shall be notified immediately and PD-14.1.001 shall be performed.

4.3 If, during the performance of this procedure, the required status indication cannot be obtained, the Job Supervisor shall be notified immediately. Exceptions to the required indication, due to plant conditions at the time of the test, may be made by the Job Supervisor. Any exceptions of this nature must be indicated and explained in Section 10.0 of this procedure.

X

TITLE SOLID STATE PROTECTION SYSTEM
REACTOR TRIP BREAKER & PERMISSIVE P-4 TEST - TRAIN A

5.0 Test Equipment

DEVICE NAME	PD. NO.	RECAL. DATE
Fluke DVM		

TITLE SOLID STATE PROTECTION SYSTEM
REACTOR TRIP BREAKER & PERMISSIVE P-4 TEST - TRAIN A

6.0 Prerequisites

6.1 The individual assigned to perform this procedure is qualified to do so in accordance with the Solid State Protection System Qualification Card.

_____
Supervisor

6.2 The Senior Shift Supervisor/Shift Supervisor has granted permission to perform this procedure.

_____
Senior Shift Supervisor/Shift Supervisor

_____
Date/Time

6.3 The Control Operator is aware of all the alarms and indications that will be affected by the performance of this procedure.

_____
Control Operator

TITLE SOLID STATE PROTECTION SYSTEM
REACTOR TRIP BREAKER & PERMISSIVE P-4 TEST - TRAIN A

7.0 System Line-Up: Initial

The following conditions must be established and/or verified by the Control Operator.

7.1 Verify the following breaker line-up:

7.1.1 Reactor Trip Breaker A CLOSED. _____

7.1.2 Reactor Bypass Breaker A RACKED OUT. _____

7.1.3 Reactor Bypass Breaker B RACKED OUT. _____

_____
Control Operator

X

TITLE SOLID STATE PROTECTION SYSTEM
REACTOR TRIP BREAKER & PERMISSIVE P-4 TEST - TRAIN A

8.0 Instructions: (Continued) Initial

8.1 Connect the digital voltmeter as follows:

8.1.1 Reactor Trip Breaker A Cubicle TB3-1 (+). _____

8.1.2 Reactor Trip Breaker A Cubicle TB3-3 (-). _____

8.2 The DVM should read approximately 48 VDC. _____

8.3 Have the Control Operator RACK IN and CLOSE Reactor Bypass Breaker A. _____

8.4 Verify on the Control Board that Reactor Bypass Breaker A is CLOSED. _____

8.5 The DVM should read 0 VDC. _____

8.6 Have the Control Operator OPEN Reactor Trip Breaker A. _____

8.7 At the Control Board, verify Reactor Trip Breaker A is OPEN. _____

TITLE SOLID STATE PROTECTION SYSTEM
REACTOR TRIP BREAKER & PERMISSIVE P-4 TEST - TRAIN A

8.0 Instructions: (Continued) Initial

8.8 Connect the digital voltmeter as follows:

8.8.1 Reactor Trip Breaker A Cubicle TB3-3 (+). _____

8.8.2 Reactor Bypass Breaker A Cubicle TB6-8 (-). _____

8.9 The DVM should read approximately 48 VDC. _____

8.10 Have the Control Operator CLOSE Reactor Trip Breaker A. _____

8.11 The DVM should read 0 VDC. _____

8.12 Verify on the Control Board, Reactor Trip Breaker A is CLOSED. _____

8.13 Have the Control Operator OPEN Reactor Bypass Breaker A. _____

8.14 Connect the digital voltmeter as follows:

8.14.1 Reactor Trip Breaker A Cubicle TB3-1 (+). _____

8.14.2 Reactor Trip Breaker A Cubicle TB3-3 (-). _____

TITLE SOLID STATE PROTECTION SYSTEM
REACTOR TRIP BREAKER & PERMISSIVE P-4 TEST - TRAIN A

8.0 Instructions: (Continued) Initial

8.15 The DVM should read approximately 48 VDC. _____

8.16 Have the Control Operator RACK OUT Reactor Bypass Breaker A. _____

8.17 The DVM should read approximately 48 VDC. _____

8.18 Disconnect the DVM. _____

8.19 If the Shift Supervisor wants the Safety Injection Block reinstalled for this train, jumper terminals 2 and 6 on TD1 and have the Control Operator depress the S.I. Reset for this train. _____

_____
Senior Shift Supervisor/Shift Supervisor

8.20 If necessary, remove the jumper placed in step 8.19. _____

TITLE SOLID STATE PROTECTION SYSTEM
REACTOR TRIP BREAKER & PERMISSIVE P-4 TEST - TRAIN A

9.0 System Return To Normal:

The following conditions must be established and/or verified by the Control Operator.

9.1 None Required.

X

TITLE SOLID STATE PROTECTION SYSTEM
REACTOR TRIP BREAKER & PERMISSIVE P-4 TEST - TRAIN A

10.0 Remarks: I.C. # _____ W.O. # _____

11.0 Completion

11.1 Completed By: _____ _____ _____
Technician Date Time

11.2 Approved By: _____ _____ _____
Supervisor Date Time

SALEM NUCLEAR GENERATING STATION

PUBLIC SERVICE ELECTRIC & GAS COMPANY

ELECTRIC GENERATION DEPARTMENT

PROCEDURE APPROVAL COVER SHEET

SAFETY RELATED

PROCEDURE: 1PD-18.4.002 - RESPONSE TIME TEST OF SOLID STATE

REMARKS: PROTECTION SYSTEM LOGIC - Rx TRIP, TRAIN A

REV	SUBMITTED	PROCEDURE APPROVED	QA REVIEWED	PERF. ENGR. APPROVED	SORC REVIEWED	STA. SUPT. APPROVED
0	MP Barkgrum 6/23/82	6/23/82 MPB	[illegible]	L.B. Cuick 6/28/82	82-65	H.J. Midura 7/1/82

TITLE RESPONSE TIME TEST OF SOLID STATE PROTECTION SYSTEM LOGIC - Rx Trip, Train A

8.0 Instructions: (Continued) Initial

8.32 The Senior Shift Supervisor/Shift Supervisor has verified the following breakers cleared and tagged: No. 11 Control Rod Power Supply M-G breaker on No. 1E 460VAC bus and No. 12 Control Rod Power Supply M-G Breaker on No. 1G 460 V bus.

_____ _____
Senior Shift Supervisor/Shift Supervisor

_____
Date/Time

8.33 Connect Channel 3 of the visicorder to the Spare "B" contact of the auxiliary switch of Reactor Trip Breaker A. _____

8.34 Connect the spare conductors of cable RB63AT (located in the bypass breaker terminal cabinet) to TB3 terminals 11 & 12 in the Trip Breaker teminal cabinet. _____

8.35 Connect the spare conductors of cable RP363-A (located in the SSPS Train A Logic Cabinet) to the visicorder. (Note: In series with one conductor, connect a 6VDC latern-type battery.) _____

TITLE RESPONSE TIME TEST OF SOLID STATE PROTECTION SYSTEM LOGIC - Rx Trip, Train A

8.0 Instructions: (Continued) Initial

8.36 Close Reactor Trip Breaker A from the control console and repeat Steps 8.7 through 8.12 for Table 3, Step 56. To close the trip breaker, place the Mode Selctor Switch in Operate. _____

Response Time of Reactor Trip Breaker A _____

8.37 Remove the connections made in Step 8.33. Place the Mode Selector Switch in Test. _____

8.38 CAUTION: Terminals may be energized (115VAC) Disconnect the field wires connected to the terminals listed in Table 3, Steps 57 through 59. _____

8.39 Connect a toggle switch across each terminal. (Toggle switch in OFF position will produce a trip.) _____

8.40 Connect visicorder Channel 1 across the terminals. _____

8.41 Repeat Steps 6.7 through 6.12 for Table 3, Steps 57 through 59. (For a coincident channel trip, place the toggle switch to OFF.) _____

8.42 Remove the toggle switches from terminals of Table 3, Steps 57 through 59 and reconnect the field wires. _____

TITLE RESPONSE TIME TEST OF SOLID STATE PROTECTION SYSTEM LOGIC - Rx Trip, Train A

8.0 Instructions: (Continued) Initial

8.7 Connect Visicorder Channel 2 to UV coil terminals TB508-1 and TB508-2 (+43 VDC) in SSPS Train A Output Cabinet. _____

8.8 Place the coincident bistable switch or switches as listed in Table 2 to the TRIP position. _____

8.9 Adjust the visicorder to obtain a good quality step function trace. _____

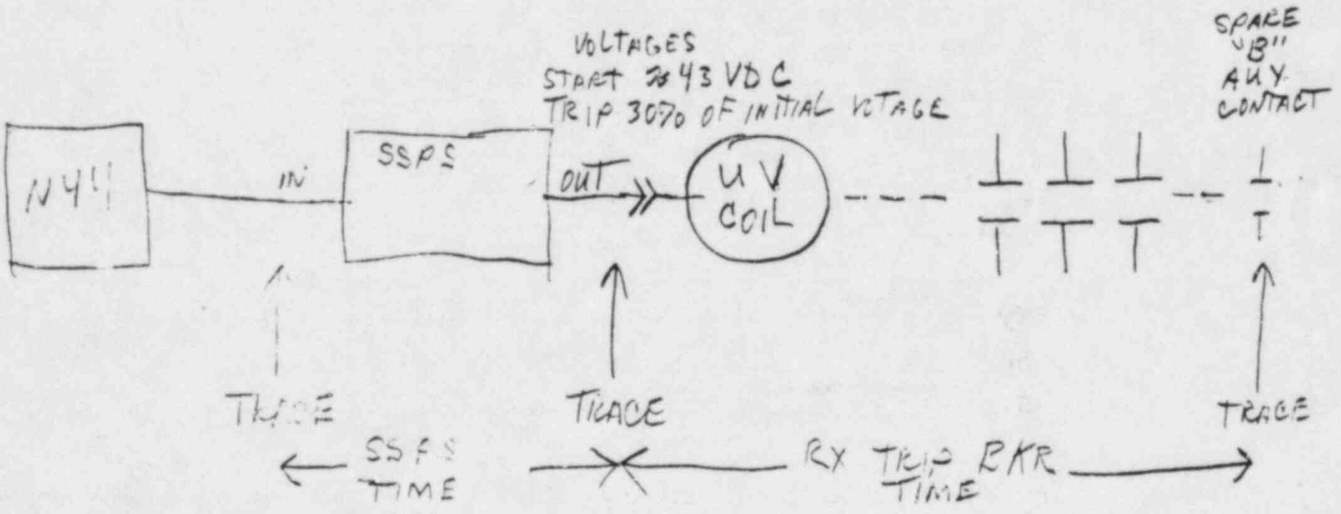
8.10 Verify the UV coil voltage at approximately 43 VDC on the LOGIC TEST PANEL meter (UV COIL VOLTAGE) in the SSPS OUTPUT LOGIC BAY. _____

8.11 Start the visicorder and immediately place the bistable switch under test to the TRIP position. _____

8.12 Stop the visicorder after the UV coils are de-energized. Record on Table 2 the elapsed time from the trip signal to the time the UV coil voltage decays to 30% of its initial value. Label all visicorder traces, and store visicorder paper for future reference. _____

8.13 Repeat Steps 8.5 through 8.12 for the bistables as indicated in Table 2, Step 1 through 4. _____

REACTOR TRIP BREAKER
TIME RESPONSE

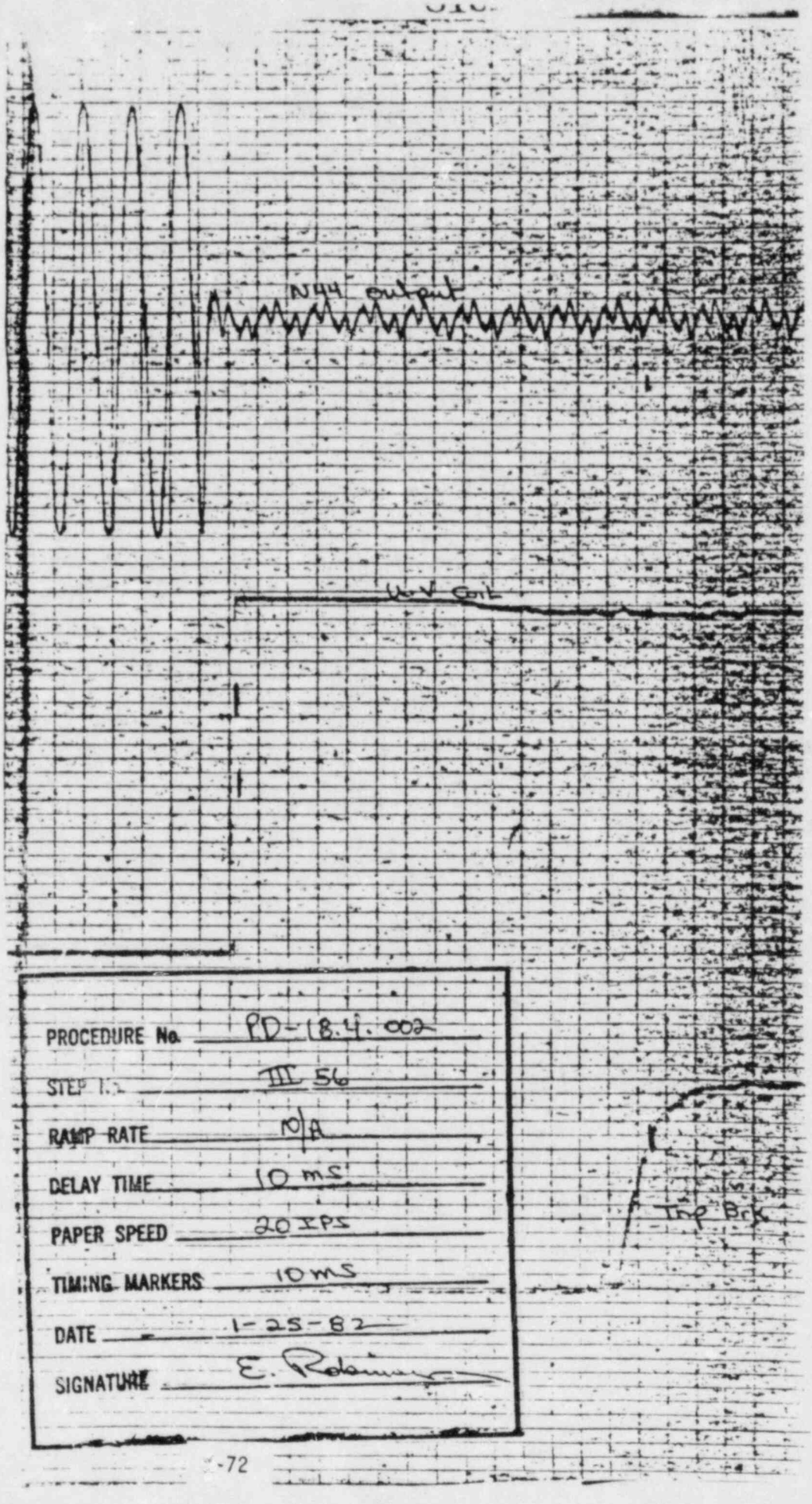


2 CPS = 33MS
10 CPS = 166MS

ACTUAL TIMES 1/14/83
A = 150MS
B = 139MS

2/1/83 RWV

EXAMPLE - NOT CURRENT PROCEDURE



CK#1

SALEM GENERATING STATION

OPERATIONS DEPARTMENT DOCUMENT APPROVAL COVER SHEET

Title: Instrumentaton - Reactor Trip Breakers

No.: SP(O)4.3.1.1.1 Unit: 1 Rev.: 0

Remarks: 2 pages of text

Safety Related Review (Ref. AD-13): S/R yes X no

Author's Checklist Completed: yes no X

Author Howard Conner Date 9-2-82

SRO* [signature] Date 9/2/82

Ops. Eng. T Gueller for Date 9/2/82

Ops. Mgr. [signature] Date 9/2/82

QA** [signature] Date 9/2/82

SORC** 82-81 [signature] Date 9/3/82

General Manager** [signature] Date 9/3/82

* required for SPM documents only

** required for safety related documents only

MASTER

SURVEILLANCE PROCEDURE
SP(O)4.3.1.1.1
INSTRUMENTATION - REACTOR TRIP BREAKERS

1.0 PURPOSE

1.1 This procedure demonstrates the operability of the Reactor Trip breakers IAW Technical Specification 4.3.1.1.1.

2.0 INITIAL CONDITIONS

2.1 The reactor is shutdown with both Reactor Trip Breakers OPEN.

3.0 PRECAUTIONS

3.1 Performance of this test during reactor operation will result in a reactor trip.

4.0 ATTACHMENTS LIST

4.1 Figures

None

4.2 Tables

None

4.3 Check Off Sheets

None

5.0 PROCEDURE

NOTE

Initial the indicated steps after completion.

5.1 Within 7 days prior to startup, DEMONSTRATE operability of the Reactor Trip Breakers by completing steps 5.2 and 5.3.

5.2 Reactor Trip Breaker A Test

5.2.1 CLOSE the Reactor Trip Breaker A

5.2.2 RACK IN and CLOSE the Reactor Bypass Breaker B.

MASTER

5.2.3 PLACE the Reactor Trip Switch on the Control Board (Group 3) to the Trip position.

5.2.4 VERIFY the following:

a. Reactor Trip Breaker A - OPEN
b. Reactor Bypass Breaker B - OPEN

5.2.5 RACK OUT the Reactor Bypass Breaker B

5.3 Reactor Trip Breaker B Test

5.3.1 CLOSE the Reactor Trip Breaker B

5.3.2 RACK IN and CLOSE the Reactor Trip Bypass Breaker A

5.3.3 PLACE the Reactor Trip Switch on the Control Board (Group 4) to the Trip position.

5.3.4 VERIFY the following:

a. Reactor Trip Breaker B - OPEN
b. Reactor Bypass Breaker A - OPEN

5.3.5 RACK OUT the Reactor Bypass Breaker A

5.4 This surveillance shall be satisfactory if the breakers trip in response to the manual trip signal.

Performed By Martin B Mahony DATE 2-22-83

Reviewed By K. Carlson / W. O'Brien DATE 2-22-83
Senior Shift Supervisor/Shift Supervisor

END OF PROCEDURE

FINAL PAGE

MASTER

Reactor Trip Breaker Surveillance

Three Preceeding Incident No. 83-034

Dates: 2/13/83 Satisfactory Results
2/14/83 Satisfactory Results
2/22/83 Satisfactory Results

CK#1

KCM

SALEM GENERATING STATION

OPERATIONS DEPARTMENT DOCUMENT APPROVAL COVER SHEET

Title: Instrumentaton - Reactor Trip Breakers

No.: SP(O)4.3.1.1.1 Unit: 1 Rev.: 0

Remarks: 2 pages of text

Safety Related Review (Ref. AD-13): S/R yes X no

Author's Checklist Completed: yes no X

Author Howard Conrad Date 9-2-82

SRO* [signature] Date 9/3/82

Ops. Eng. J Gueller Supt Date 9/2/82

Ops. Mgr. [signature] Date 9/2/82

QA** [signature] Date 9/2/82

SORC** 82-81 [signature] Date 9/3/82

General Manager** [signature] Date 9/3/82

* required for SPM documents only

** required for safety related documents only

MASTER

SURVEILLANCE PROCEDURE
SP(O)4.3.1.1.1
INSTRUMENTATION - REACTOR TRIP BREAKERS

1.0 PURPOSE

1.1 This procedure demonstrates the operability of the Reactor Trip breakers IAW Technical Specification 4.3.1.1.1.

2.0 INITIAL CONDITIONS

2.1 The reactor is shutdown with both Reactor Trip Breakers OPEN.

3.0 PRECAUTIONS

3.1 Performance of this test during reactor operation will result in a reactor trip.

4.0 ATTACHMENTS LIST

4.1 Figures

None

4.2 Tables

None

4.3 Check Off Sheets

None

5.0 PROCEDURE

NOTE

Initial the indicated steps after completion.

5.1 Within 7 days prior to startup, DEMONSTRATE operability of the Reactor Trip Breakers by completing steps 5.2 and 5.3.

5.2 Reactor Trip Breaker A Test

5.2.1 CLOSE the Reactor Trip Breaker A

5.2.2 RACK IN and CLOSE the Reactor Bypass Breaker B.

MASTER

5.2.3 PLACE the Reactor Trip Switch on the Control Board (Group 3) to the Trip position.

5.2.4 VERIFY the following:

a. Reactor Trip Breaker A - OPEN
b. Reactor Bypass Breaker B - OPEN

5.2.5 RACK OUT the Reactor Bypass Breaker B

5.3 Reactor Trip Breaker B Test

5.3.1 CLOSE the Reactor Trip Breaker B

5.3.2 RACK IN and CLOSE the Reactor Trip Bypass Breaker A

5.3.3 PLACE the Reactor Trip Switch on the Control Board (Group 4) to the Trip position.

5.3.4 VERIFY the following:

a. Reactor Trip Breaker B - OPEN
b. Reactor Bypass Breaker A - OPEN

5.3.5 RACK OUT the Reactor Bypass Breaker A

5.4 This surveillance shall be satisfactory if the breakers trip in response to the manual trip signal.

Performed By _____ DATE SAT 2/13/03

Reviewed By _____ DATE 2-17-03
Senior Shift Supervisor/Shift Supervisor

END OF PROCEDURE

FINAL PAGE

MASTER

CR#1
KCm

SALEM GENERATING STATION

OPERATIONS DEPARTMENT DOCUMENT APPROVAL COVER SHEET

Title: Instrumentaton - Reactor Trip Breakers

No. SP(O)4.3.1.1.1 Unit: 1 Rev.: 0

Remarks: 2 pages of text

Safety Related Review (Ref. AD-13): S/R yes X no

Author's Checklist Completed: yes no X

Author Howard Conaton Date 9-2-82

SRO* [signature] Date 9/2/82

Ops. Eng. J Gueller Jr. Date 9/2/82

Ops. Mgr. [signature] Date 9/2/82

QA** [signature] Date 9/2/82

SORC** 82-81 [signature] Date 9/3/82

General Manager** [signature] Date 9/3/82

* required for SPM documents only

** required for safety related documents only

MASTER

SURVEILLANCE PROCEDURE
SP(O)4.3.1.1.1
INSTRUMENTATION - REACTOR TRIP BREAKERS

1.0 PURPOSE

1.1 This procedure demonstrates the operability of the Reactor Trip breakers IAW Technical Specification 4.3.1.1.1.

2.0 INITIAL CONDITIONS

2.1 The reactor is shutdown with both Reactor Trip Breakers OPEN.

3.0 PRECAUTIONS

3.1 Performance of this test during reactor operation will result in a reactor trip.

4.0 ATTACHMENTS LIST

4.1 Figures

None

4.2 Tables

None

4.3 Check Off Sheets

None

5.0 PROCEDURE

NOTE

Initial the indicated steps after completion.

5.1 Within 7 days prior to startup, DEMONSTRATE operability of the Reactor Trip Breakers by completing steps 5.2 and 5.3.

5.2 Reactor Trip Breaker A Test

5.2.1 CLOSE the Reactor Trip Breaker A

5.2.2 RACK IN and CLOSE the Reactor Bypass Breaker B.

MASTER

5.2.3 PLACE the Reactor Trip Switch on the Control Board (Group 3) to the Trip position.

5.2.4 VERIFY the following:

a. Reactor Trip Breaker A - OPEN
b. Reactor Bypass Breaker B - OPEN

5.2.5 RACK OUT the Reactor Bypass Breaker B

5.3 Reactor Trip Breaker B Test

5.3.1 CLOSE the Reactor Trip Breaker B

5.3.2 RACK IN and CLOSE the Reactor Trip Bypass Breaker A

5.3.3 PLACE the Reactor Trip Switch on the Control Board (Group 4) to the Trip position.

5.3.4 VERIFY the following:

a. Reactor Trip Breaker B - OPEN
b. Reactor Bypass Breaker A - OPEN

5.3.5 RACK OUT the Reactor Bypass Breaker A

5.4 This surveillance shall be satisfactory if the breakers trip in response to the manual trip signal.

SAT

Performed By K R Petersen DATE 2-14-83

Reviewed By A. Sane DATE 2-14-83
Senior Shift Supervisor/Shift Supervisor

END OF PROCEDURE

FINAL PAGE

MASTER

NRC FORM 335 (11-81)

U.S. NUCLEAR REGULATORY COMMISSION

BIBLIOGRAPHIC DATA SHEET

1. REPORT NUMBER (Assigned by DDC)
NUREG-0977

4. TITLE AND SUBTITLE (Add Volume No., if appropriate)
NRC Fact-Finding Task Force Report on the ATWS Event at Salem Nuclear Generating Station, Unit 1, on February 25, 1983

2. (Leave blank)

3. RECIPIENT'S ACCESSION NO.

7. AUTHOR(S)
Region I Task Force

5. DATE REPORT COMPLETED
MONTH: March | YEAR: 1983

9. PERFORMING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)
Region I
U.S. Nuclear Regulatory Commission
King of Prussia, PA 19406

DATE REPORT ISSUED
MONTH: March | YEAR: 1983

6. (Leave blank)

8. (Leave blank)

12. SPONSORING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)
Same as 9, above.

10. PROJECT/TASK/WORK UNIT NO.

11. FIN NO.

13. TYPE OF REPORT
Task Force

PERIOD COVERED (Inclusive dates)

15. SUPPLEMENTARY NOTES

14. (Leave blank)

16. ABSTRACT (200 words or less)

An NRC Region I Task Force was established on March 1, 1983 to conduct fact finding and data collection with regard to the circumstances which led to an anticipated transient without scram (ATWS) event at the Public Service Electric and Gas Company's Salem Generating Station, Unit 1 on February 25, 1983. The charter of the Task Force was to determine the factual information pertinent to management and administrative controls which should have ensured proper operation of the Reactor Trip Circuit Breakers in the Solid State Protection System. This report documents the findings of the Task Force along with its conclusions and recommendations.

17. KEY WORDS AND DOCUMENT ANALYSIS

17a. DESCRIPTORS

17b. IDENTIFIERS/OPEN-ENDED TERMS

18. AVAILABILITY STATEMENT
Unlimited

19. SECURITY CLASS (This report)
Unclassified

21. NO. OF PAGES

20. SECURITY CLASS (This page)
Unclassified

22. PRICE
$

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