

Action Item Number _____

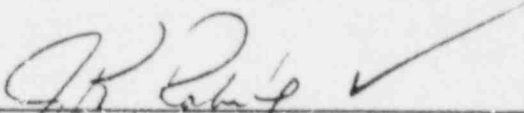
SYSTEM ENGINEERING ACTION PLAN
FOR
RANCHO SECO NUCLEAR GENERATING STATION
SACRAMENTO MUNICIPAL UTILITY DISTRICT

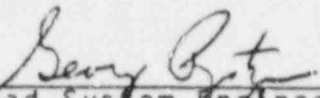
REPORT No. SYSTEM-009


REVISION No. 0


DATE 3-29-88

SUBJECT: LETDOWN COOLER THERMAL AND
HYDRAULIC SHOCK PREVENTION


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Lead System Engineer


System Engineering
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 3/31/88
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LETDOWN COOLERS RELIEF VALVE
ACTUATION ACTION PLAN

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LETDOWN COOLER THERMAL AND HYDRAULIC SHOCK PREVENTION

1.0 PURPOSE AND SCOPE

1.1 PURPOSE

- ° To minimize letdown cooler thermal and hydraulic shock.
- ° To eliminate letdown cooler relief valve lifts.

1.2 SCOPE

- ° Incident analysis
- ° Design changes
- ° Testing
- ° Operating changes
- ° Letdown System design evaluation
- ° Root cause investigation

2.0 ACTION PLAN

2.1 Background

Two recent incidents have occurred; each was initiated by stroking a letdown valve and resulted in a thermal hydraulic shock to a letdown cooler, followed by the cooler relief valve lifting.

- ° March 15, 1988: While performing a move's test on the 'A' Letdown Cooler Inlet Valve (SFV-22005), the cooler relief valve lifted, discharging approximately 700 gallons to the reactor building.
- ° March 22, 1988: While stroking the common letdown isolation valve (SFV-22025), after resetting its torque switch, the 'C' Letdown Cooler Relief Valve lifted. This incident resulted in discharging approximately 100 gallons to the reactor building.

Both of these incidents are covered in greater detail in the incident analysis report generated as part of this action plan.

2.2 INCIDENT ANALYSIS

The incident analysis will be accomplished by the Independent Investigation/Review Group (IIRG). The IIRG has conducted in-depth interviews with key personnel involved with both incidents and participates in all meetings germane to these incidents.

The IIRG report (Incident Analysis 88-03) titled Thermal Hydraulic Shock of Letdown Coolers will provide a detailed account of the incidents in the following format:

- ° Description of the event
- ° Detailed chronology
- ° Conclusions
- ° Underlying causes

2.3 DESIGN CHANGES

2.3.1 Short term - These changes, along with administrative procedural control, will resolve the difficulties associated with cycling letdown flow and swapping coolers; they will be completed prior to criticality.

SFV-22025 - The letdown isolation valve control circuit will be modified to allow the operator to "jog" the valve open. This will facilitate filling and pressurizing the piping up to the letdown cooler inlet isolation valves (SFV-22005 & SFV-22006).

SFV-22006 - The 'B/C' Letdown Cooler Inlet Isolation Valve control circuit will be modified to allow the operator to "jog" the valve open. This will allow the operator to fill/pressurize the letdown coolers and establish letdown flow in a controlled manner.

PLS-131 & PLS-132 - The 'A' and 'B/C' letdown cooler outlet check valve internals will be removed. This will ensure that an 'out of service' cooler remains filled and pressurized; this also allows an isolated cooler to be returned to service by back filling/pressurizing using cooled letdown fluid.

2.3.2 Long term - The ultimate design changes, to address the letdown system thermal hydraulic concerns, will be determined during a detailed system design evaluation by Nuclear Engineering.

2.4 TESTING

The design changes (Section 2.3.1) and the operating philosophy (Section 2.5) will be tested by performing a special test procedure (STP.1156). This test will demonstrate the following:

The ability to restore the letdown system in service, following a safety features actuation, without imposing an unacceptable thermal hydraulic shock on the letdown coolers.

The ability to swap the in-service letdown cooler without imposing an unacceptable thermal hydraulic shock on the letdown coolers.

2.5 OPERATING CHANGES

The operating procedures will be modified to reflect the design changes (Section 2.3.1) and a new philosophy as follows:

- ° The standby letdown cooler will be maintained full and pressurized rather than isolated. This will be accomplished by maintaining the cooler outlet valve open; removal of the internals of the outlet check valve makes this possible.
- ° When establishing or restoring letdown flow thru the letdown coolers; SFV-22006 (B/C cooler inlet valve) will always be used irrespective of which cooler will be placed in service. This is because SFV-22006 is a globe valve and will be modified to have 'jog' capability.

2.6 LETDOWN SYSTEM DESIGN EVALUATION

A detailed engineering evaluation of the letdown system has been mandated by senior plant management. This evaluation will be accomplished after criticality and will form the basis for any long term design changes or changes in operating philosophy. This activity will be completed prior to the end of this fuel cycle.

2.7 ROOT CAUSE INVESTIGATION

root The [↑]Independent Investigation/Review Group will perform a "~~route~~ cause investigation" (Re: IIRG I88-0155). This investigation will follow the detailed letdown system design evaluation.

3.0 SCHEDULE

See Attachment 1

4.0 RESOURCES

4.1 Plant Performance will have overall responsibility for implementation of this action plan. The following departments are responsible for completion of their respective actions.

4.1.1 Nuclear Engineering:

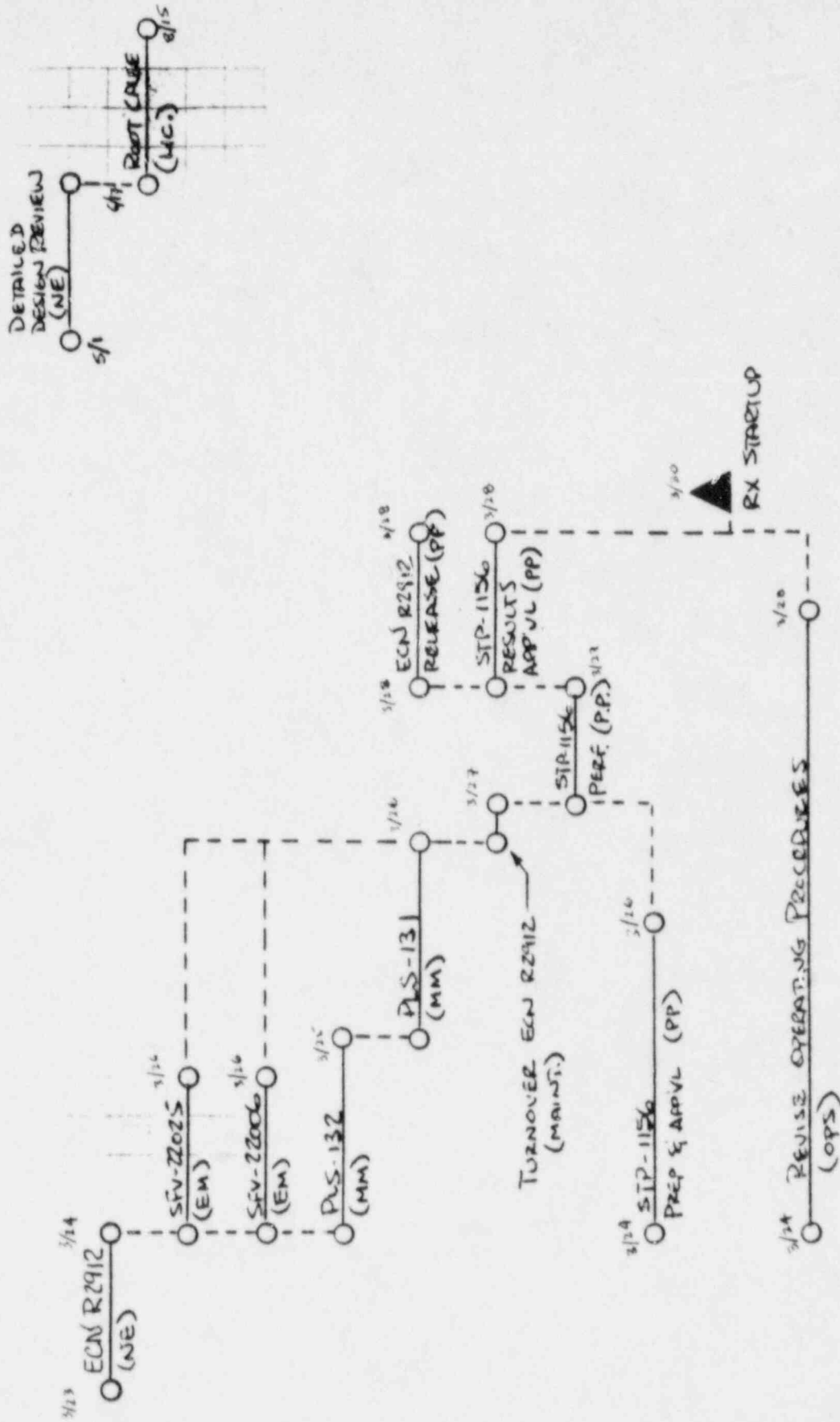
- ° Issue ECN R-2912
- ° Perform detailed engineering evaluation of the letdown system.

4.1.2 Operations:

- ° Revise applicable procedures
- ° Perform STP.1156
- ° Accept ECN R-2912

- 4.1.3 Licensing:
 - Issue Incident Analysis 88-03
 - Perform root cause investigation
- 4.1.4 Plant Performance:
 - Implement action plan
 - Develop and perform STP.1156
 - Turnover and release ECN R-2912
 - Submit long range schedule change request
- 4.1.5 Maintenance:
 - Install and turnover ECN R-2912
 - Support STP.1156 performance

ATTACHMENT 1





CALCULATION SHEET

SACRAMENTO MUNICIPAL UTILITY DISTRICT □ 6201 S Street, P.O. Box 15830, Sacramento CA 95852-1830 (916) 452-3211

ORIGINATOR _____ DATE _____

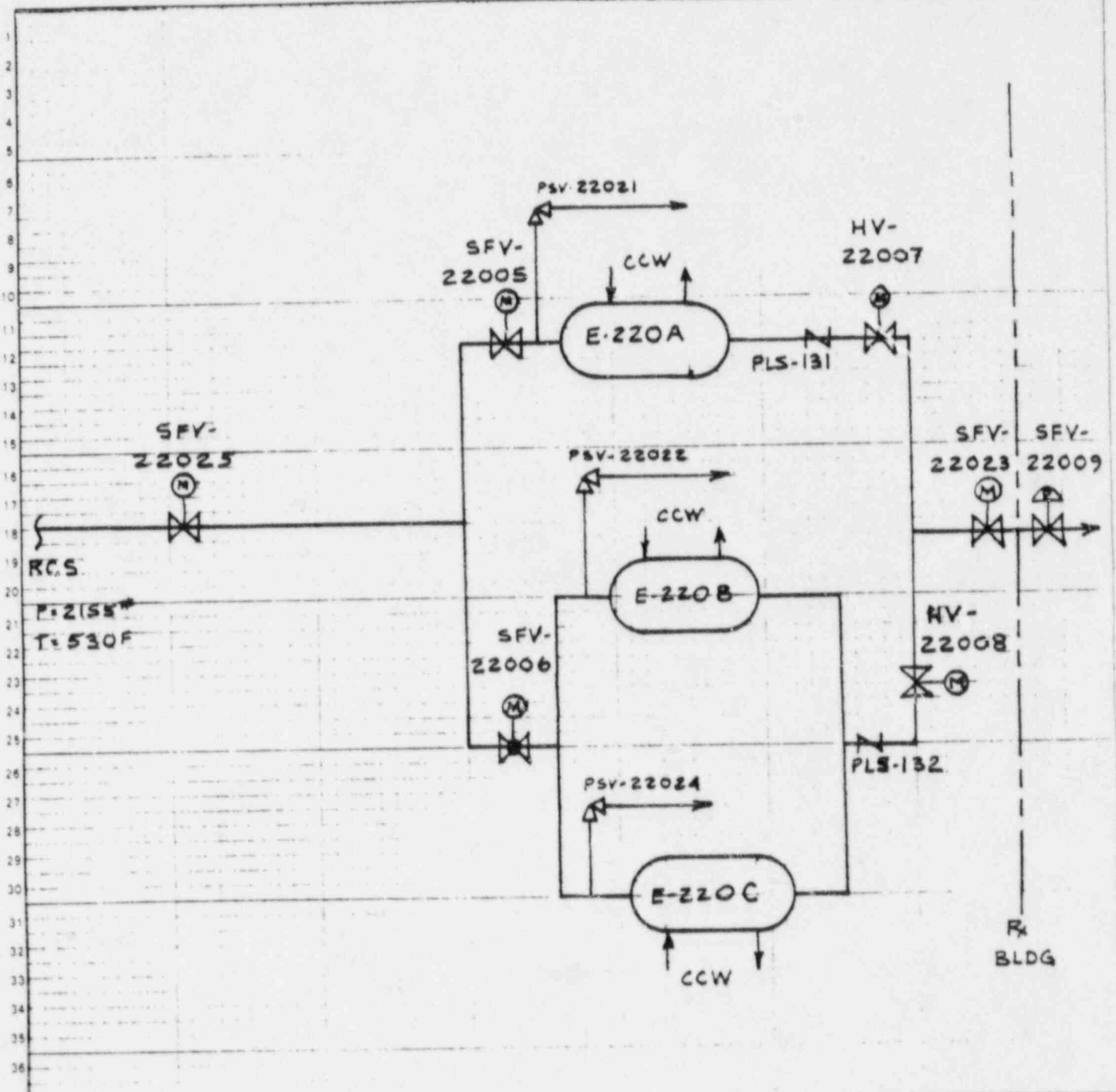
SUBJECT LETDOWN COOLER SCHEMATIC

FIGURE 1

CALC. NO. _____

CHECKED _____

SHEET _____ OF _____



ATTACHMENT IV

GCA 88-258

NRC
Observation:

Letdown Cooler Modifications: Operations commitment to issue appropriate instructions to plant operators regarding lineup of letdown coolers in a timely manner was not implemented.

Rancho Seco
Response:

The Director, Nuclear Operations & Maintenance was tasked by the AGM-Nuclear Power Production to investigate why Operations personnel were not made aware of the new letdown cooler philosophy. Specifically, he is to determine the cause of the breakdown in communication which resulted in the failure to issue a shift order indicating that only one cooler should be in service and installing labels indicating the same.

This investigation revealed that the failure to meet the commitment was caused by a momentary breakdown in routine management short term job assignment and followup. Contributing factors were the high level of activities associated with reactor startup, the change in shift schedule to the night shift for the assigned individual, and the lack of a specific due date. This breakdown is not indicative of a programmatic failure within the department as indicated by the timely completion of all other letdown cooler modification tasks, including six procedure changes.

Corrective actions included a review of the incident with Operations management staff stressing the need to establish firm due dates for all activities.

The Director, Nuclear Operations and Maintenance discussed this issue in detail with J. Crews, NRC Team Leader, and resolve all concerns. This issue is considered closed.

ATTACHMENT V

GCA 88-258

NRC
Observation: Work Planning/Work Control Packages/Independent Verification.

Rancho Seco
Response: Work planning - the NRC witnessed a maintenance activity, removal of insulation on the Terry turbine governor. During the work a spark was drawn when a work-knife penetrated a heat trace circuit. The Maintenance department conducted a root cause investigation of this incident in accordance with MAP-0017. The report of that investigation, Root Cause Evaluation No. 88-022, has been approved and is attached.

NRC also observed evidence that in some instances Work Control Packages had not been walked down prior to issuance to the field. An Action Plan is being developed by the Maintenance Department to address several areas of concern identified in work planning activities. This Action Plan is currently in the review cycle and scheduled for approval on April 20, 1988. The Action Plan addresses findings of the Rancho Seco Management Observation Program, prior INPO findings as well as the current NRC Team's observations.

The NRC Team observed the potential for surveillance test, maintenance or other activities to be conducted on the "wrong train" of redundant systems, and questioned the adequacy of Rancho Seco administrative controls to prevent such circumstances from occurring. All work packages on plant equipment now include an independent "verification of proper train" form to be filled out by cognizant personnel conducting the work. In addition, blanket work requests also include a step that requires this independent verification form to be filled out for each "component" worked under that particular blanket work package.

ROOT CAUSE EVALUATION FORM

ROOT CAUSE EVAL NO: 88-022

ASSIGNED MAINTENANCE
ENGINEER/SUPERVISOR:

Dwight Fanning

DATE: 4-7-88

EQUIPMENT

IDENTIFICATION(S): K-308 Terry Turbine Governor

EQUIPMENT

DESCRIPTION(S): Woodward Governor

SYSTEM ID(S)/DESC(S): AFW

WORK REQUEST NO(S): 137966B-0

DESCRIPTION OF PROBLEM:

During the removal of insulation on water supply to lube oil cooler, one lead on the heat tracing was damaged.

FINDINGS:

See attached

CONCLUSION(S):

See attached

CORRECTIVE ACTION(S) REQUIRED:

See attached

COMPLETED BY Dwight Fanning DATE 4/14/88

CORRECTIVE ACTION COMPLETED

APPROVED BY LEP

DATE: 4-14-88

COMPLETED BY:

DATE:

APPROVED BY:

DATE:

FINDINGS:

- 1) The work request (137966B-0) did not specifically address the removal of insulation.
- 2) The work request did not address the presence of heat tracing for the cooling water lines.
- 3) The insulation on the cooling water lines did not have any markings to indicate that there was heat tracing.
- 4) Upon "nicking" the heat tracing and producing a spark, the mechanics realized that there was heat tracing involved. At this point, they carefully laid back the heat tracing and moved to continue work on the other side of the lube oil cooler. At this time, the foreman called the Control Room to advise them of this problem and seek further clearance tags on the heat tracing. Once the work had proceeded as far as safely possible, work was suspended in order to rectify the heat tracing problem prior to continuing with the work on the Woodward governor.
- 5) The clearance was modified, the work package had a step added to address the removal of the heat tracing and a work request was written to repair the damaged heat tracing.

CONCLUSIONS:

- 1) The work package should have addressed the need to remove insulation and subsequently address the fact that there was heat tracing to contend with.
- 2) The outside covering on the insulation should be marked appropriately to indicate the presence of heat tracing.
- 3) The mechanics continued work - apparently in a safe manner - while the foreman followed up on the problem concerning the heat tracing.
- 4) The mechanics should have immediately stopped work when the spark occurred and notified their foreman.

CORRECTIVE ACTIONS REQUIRED:

- 1) Initiate a work request to appropriately mark all heat traced lines for easy identification.
- 2) Insure that work request problems are being walked down by Planning in the field so things of this nature are addressed in the work plan. Additional work items need to be addressed in the work package.
- 3) Address the issue of safety with the Mechanical Maintenance Department in the proper respect to schedule (In this case an LCO.).
- 4) Discuss incident with the individuals involved to insure they understand the importance of safety and quality versus schedule.

 WORK REQUEST # 0137966C-0 EQUIPMENT ID K-305 TRAIN SYSTEM FWS
 WK SAFETY CLASS 1 PROJ CLASS 1 RESP DEPT AM WORK TYPE R

STEP/HOLD

WORK/QC INSPECTOR INSTRUCTIONS

2

FILL AND VENTING OF THE GOVERNOR WILL BE PERFORMED ON W/R #137966C-0 AFTER THIS WORK REQUEST IS COMPLETED.

STEP OR STEPS MAY BE PERFORMED OUT OF SEQUENCE WITH THE CONCURRENCE OF THE RESPONSIBLE CRAFT OR MAINTENANCE FOREMAN AND SO LONG AS ANY Q/C INSPECTION OR HOLD POINTS ARE NOT BYPASSED OR COMPROMISED.

IF A STEP IS NOT PERFORMED, AN N/A MUST BE ENTERED IN THE SIGNOFF BLOCK OF THE WORK INSTRUCTIONS OR PROCEDURE, WITH A BRIEF EXPLANATION, INITIALS, AND DATE.

FOR ANY ABNORMAL CONDITIONS OR NON-COMFORMANCES THAT EXIST, WHICH HAVE NOT BEEN PREVIOUSLY ADDRESSED, (IN OR OUTSIDE THE SCOPE OF THIS WORK PLAN) NOTIFY THE FOREMAN OR PLANNING DEPARTMENT, AND DOCUMENT THEM IN THE WORK PERFORMED SECTION OF THIS WORK REQUEST.

- 1 OBTAIN RWP AS REQUIRED TO PERFORM THIS WORK PLAN FROM RP'S OFFICE, AND HAVE RP'S SUPERVISOR SIGN FOR ANY ADDITIONAL SUPPORT IF REQUIRED.
 RP REVIEW: H. MORGAN 4/7/88 @ 0015 REV 0
 ALARA REVIEW: G. PEDERSON 4/7/88 @ 0025, REV-0
 RP SUPERVISOR _____ DATE _____

PERFORMED BY N/A /DATE 4-6-88
 COMMENTS: No Rwp Required Ad

- 2 OBTAIN ELECT. SUPPORT FOR DISCONNECTING GOVERNOR AS REQUIRED. THIS
 WILL INCLUDE LAYING BACK HEAT TRACING. IN 4/6/88
 TO SUPPORT MECH. MAINT. (WILL NOT REQUIRE DETERMINATION)
 REMOVE INSULATION AS REQUIRED *RG/SS 478

PERFORMED BY Bruce R. Low /DATE 4/7/87
 COMMENTS: *SEE WORK PERFORMED

- 3 ESTABLISH CLEANLINESS CONTROLS I.A.W. M.114.

CIRCLED DATES ARE INCORRECT. SHOULD BE 4/7/88.

for Rwp 4/8/88

OE per
 J. N. H.
 4/6/88

ATTACHMENT VI

GCA 88-258

NRC
Observation: Need for the incorporation of interim and/or temporary procedure changes into permanent changes to procedures.

Rancho Seco
Response: A large number of temporary and interim changes to Station Procedures, made per RSAP-0507, Change Notices to Procedures, have been generated as a result of the recent outage and initial plant operation. In order to preclude confusion in the performance of procedures, management has developed an Action Plan, Procedure Development Project Action Plan for Temporary and Interim Procedure Change Incorporation as Procedure Revision, Revision 1, dated April 6, 1988 (attached).

This Action Plan provides the method used to ensure applicable changes to procedures are incorporated as procedure revisions. It should be noted that interim and temporary changes are approved methods for temporarily changing procedures (for a period up to 90 days prior to incorporation as a revision).