Enclosure 3

Consolidated Edison
Indian Point 2

Recovery Plan
Revision 0, September 13, 1999

Concurrence: ______________________ 9/13/99
R. Masse, Plant Manager, Nuclear Power Generation — Date

Concurrence: ______________________ 9/13/99
M. Miele, Manager, Corrective Action Group — Date

Concurrence: ______________________ 9/13/99
J. Baumstark, Vice President, Nuclear Engineering — Date

Approval: ______________________ 9/13/99
A. Blind, Vice President, Nuclear Power — Date

Introduction and Background

The August 31st plant trip and subsequent response involved several challenges in management, human performance, processes and equipment that require follow-up assessments and improvement actions. This Recovery Plan is intended to provide structure and guidance to the organization for those issues.

The Recovery Plan includes, but is not limited to, the steps necessary to restart the plant. It is clear from the initial examination of the August 31st events that some immediate actions are needed to protect IP2 from recurrence of these or similar events, and that other longer-term corrective actions are needed to effect needed improvement in areas of weakness highlighted by the events. The Plan covers both action categories.

This Plan is a living document. It is being issued initially, based on current understanding and plans, and it will be revised frequently during the course of the recovery to reflect new information and changed or refined plans. The Recovery Plan is not intended to replace other IP2 procedures, policies or management directives.

The Plan, in Overview

Organization and Management:

A recovery management structure and organization has been established, and was communicated via the Recovery Organization Charter, dated September 7, 1999. A copy of this charter, including the organization chart, is included in Attachment A.

Several oversight and advisory organizations, both internal and external to Con Edison, are providing support in the recovery. Some of these organizations are as follows:

- Utility Assistance Team – a team comprising representatives of other nuclear utilities, INPO, and experienced consultants; as well as some Con Edison personnel who were not involved with the event. This team was called in early after the event to conduct an initial review.
- Advisory Group – a team of independent utility and consultant personnel providing ongoing evaluation, mentoring advice, and support to the recovery organization.
- The IP2 Station Nuclear Safety Committee (SNSC).
- The IP2 Nuclear Facilities Safety Committee (NFSC).
- IP2 Quality Assurance.
- The NRC Augmented Inspection Team (AIT) sent by the NRC to evaluate the events. Input from the AIT is being considered by the recovery organization.

Working Principles:

As the work proceeds, recovery management is emphasizing the following principles:

- Conservative decision making is essential. Throughout the recovery work, and particularly in the determination of readiness for restart, we will make prudent and conservative judgments.
- Event assessments are intended to have wide focus, addressing the full spectrum of equipment, human performance and process issues.
- In performing work, existing procedures and processes, to the greatest extent practical will be utilized. These will be supplemented as needed with special measures.
- Restart is a high priority effort, and work must be performed diligently to complete the identified actions – but we will restart only when we are ready.

The Recovery Process:

The recovery process is divided into the three major elements of understanding the event, assessing the issues and commencing plant recovery. Each of the three major elements can be further subdivided as follows:

- THE EVENT: Understanding the event includes identifying the initiating event (unit trip) and subsequent challenges with the event response.

- ASSESSMENTS: Once the event is understood, the assessment phase is entered in order to define and understand the issues. This includes identifying the initial issues using a utility assistance team and IP2 plant staff. Evaluations, including root cause evaluations, are then performed in order to determine the basic issues involved. Extent of Condition Assessments are performed in order to determine if similar conditions exist in other plant systems and equipment. Additionally, assessments will be performed to identify issues associated with human performance and process challenges.

- RECOVERY: The final part of the recovery process is the recovery phase itself. Once the event is understood and cause and extent of conditions are established, the resulting information is documented and classified as either restart items or non-restart items. Restart plans and schedules are prepared and implemented and upon authorization, the plant is restarted. For non-restart items, such as long-term evaluations, process enhancements, and equipment modifications, the action items are incorporated into the appropriate control process and implemented per required schedules and commitments.

The recovery logic is graphically depicted in Attachment B.

The Event

Initiating Event and Subsequent Response Failures

On Tuesday, August 31, 1999 a reactor trip occurred when the over temperature/delta temperature (OTDT) trip logic was satisfied. The trip and trip response comprised several distinct and significant events. It is important that these events, although related in time and in some respects similar, must be dealt with as discrete items each warranting assessment and prompting corrective action.

The most significant issues associated with the reactor trip event are summarized as follows:

EVENT	CONDITION REPORT	OWNER and ACCOUNTABILITY
Reactor Trip on OTDT	6643	Hinrichs/Baumstark
Undervoltage on Bus 6A	6643*	Hinrichs/Baumstark
No. 23 EDG Breaker Trip	6643*	Hinrichs/Baumstark
No. 24 Battery Discharge	6651	Hinrichs/Baumstark
Inappropriate Technical Specification Entry	6747	Hinrichs/Masse
Timeliness of NUE Declaration	6798	Ferraro/Masse
Management Oversight and Command and Control	6868	Masse/Blind

* Included in the scope of this evaluation

Other deficiencies have been identified and are being addressed in accordance with the Corrective Action Program. As investigations continue, it is expected that additional issues will be identified in Condition Reports.

The event is described in the IP2 Internal Significant Operational Experience Report, a copy of which is provided in Attachment C.

ASSESSMENT

Initial Reviews

The plant's initial response and review of events is documented in accordance with Operations Administrative Directive 23 (OAD 23), "Post Trip Review and Evaluation Procedure", and the initiating event and plant response deficiencies have been documented.

Based on the significance of the event, IP2 management formed a Utility Assistance Team on September 1, 1999 to independently review the circumstances surrounding the reactor trip and subsequent Notification of Unusual Event. The purpose of this team was to independently assess the performance of plant equipment and personnel, and provide observations and recommendations to Con Edison management. The results of this assessment are included in Attachment D.

Root Cause Assessments

SL-1 Condition Report Investigative Team.

An investigative team was charged by the Plant Manager to communicate facts, develop conclusions (root causes), and determine corrective actions to prevent recurrence. The activities and process of this team is guided by Station Administrative Order 112, "Corrective Action Program".

A copy of the team's charter is included as Attachment E.

Actions resulting from the team's investigation are included in Attachments F and G.

Nuclear Power Generation.

As a result of the observations provided by the Utility Assistance Team, the IP2 Plant Manager has assigned various managers the responsibility to assess these issues and develop actions plans in the following areas:

- Command and Control.
- Processes.
- Event Response Support.

- Emergency Planning.
- Training.
- Communications.

Actions resulting from these assessments are included in Attachment F.

Nuclear Engineering.

Under the direction of the Vice President of Nuclear Engineering, root cause evaluations relating to the equipment issues, extent of condition reviews relating to equipment issues, and any modifications to be implemented as a result of this event are being performed. As a result of these evaluations, various managers are assigned responsibility to develop actions plans in the following areas:

- Over temperature/delta temperature module anomalies.
- Loss of Bus 6A.
- No. 23 Emergency Diesel Generator breaker operation.
- No. 24 Battery discharge.

Actions resulting from these assessments are included in Attachment G. Written responses will be provided for incorporation into the OAD 23 and SL-1 reports.

Corrective Action.

The Corrective Action Group Manager has overall responsibility for developing an Extent of Condition process. These activities include conducting extent of condition reviews for administrative issues as well as reviewing and compiling extent of condition reviews from the operations and engineering groups.

Extent of Condition (EoC) Review

Objectives:

Following this event, a formal Extent of Condition Review is being conducted to uncover similar vulnerabilities in other areas.

By definition, an EoC review must be founded on thorough understanding of the root causes of the events, and must be reasonably limited in scope. Extent of Condition reviews should have clear links to the event, they must be wide enough to identify similar vulnerabilities but narrow enough to permit thorough, timely assessment.

Elements of the EoC Review:

In accordance with the Restart Organization Charter, EoC reviews are being conducted within the following areas of responsibility:

- Engineering
- Operations
- Corrective Action

The Corrective Action Group has the lead role in developing the EoC process and coordinating these EoC reviews. In addition, they will conduct an integrated review of all of the issues resulting from the EoC review.

A copy of the Extent of Condition Review process is provided in Attachment H.

Recovery

Overall Approach

Once the root cause evaluations and extent of condition reviews are completed, all corrective actions will be formally documented in the IP2 Corrective Action Program. Open actions identified in this Recovery Plan will be classified as either restart items or non-restart items. The Recovery Manager will oversee recovery actions, recommend approval for restart to the Chief Nuclear Officer, and oversee the safe and efficient restart of the plant.

Determining Restart Prerequisites

Those actions required for plant restart will be identified by the Plant Manager, Vice President Nuclear Engineering, and the Manager, Corrective Action Group based on recommendations and advice from their staffs and the SL-1 Condition Report Investigative Team, and oversight by Quality Assurance. The Recovery Manager will review and concur with the restart or non-restart classifications of those actions included in this Recovery Plan. The normal IP2 corrective action process will determine the priority of additional corrective actions resulting from the various reviews.

Plant Restart

The Recovery Manager is responsible to integrate activities and actions resulting from the initial reviews, root cause analyses, and the extent of condition reviews; recommend approval for restart to the Chief Nuclear Officer; and for overseeing the safe and efficient restart of the plant. Prior to recommending approval for restart, the Station Nuclear Safety Committee (SNSC) will review the post-trip assessment from the SL-1 Condition Report Investigative Team, root cause evaluations, and the results of the Extent of Condition reviews. SNSC will also review the restart and non-restart classifications of actions in this Recovery Plan, and recommend restart to the Recovery Manager.

Nuclear Quality Assurance continues to function in its oversight role in accordance with the IP2 Quality Assurance Program. NQA's Recovery Oversight Plan is provided in Attachment I.

Attachments:

A. Recovery Organization Charter

B. Recovery Logic Flow Chart

C. IP2 Internal Significant Operational Experience Report

D. Results of Utility Assistance Team Assessment

E. SL-1 Condition Report Investigative Team Charter

F. Nuclear Power Generation Action Plans

G. Nuclear Engineering Action Plans

H. Extent of Condition Review Process

I. NQA Recovery Oversight Plan

Attachment A

Recovery Organization Charter

UPDATE

To All Plant Personnel:

On August 31,1999, the plant tripped as a result of conditions that are currently under evaluation by our operations, engineering, maintenance and administrative staff. Assessments are underway to gauge the conditions causing the reactor trip, make sure each is clearly understood and that modifications to equipment and procedures precluding similar future occurrences are initiated to restart and support full recovery of the plant.

As I indicated in my "UPDATE" earlier this week, Al Blind is our Recovery Manager. Al and I, today, have approved a Recovery Organization Charter that provides additional direction and expectations for these important activities. He will direct the activities of Nuclear Power Generation, Nuclear Engineering, and the Corrective Action Group. These organizations will be developing restart plans in their areas which will be aggregated into one plan.

Specific objectives of the Recovery Organization are the following:

- Set the overall strategy and accountability for recovery activities that will serve as the basis for implementing departmental restart plans.
- Demonstrate that we fully understand and have ownership for the lessons learned from this event and that we are taking the necessary steps to restart and safely operate the plant.
- Communicate to the IP2 staff, and others, the overall path towards successful return to service of IP2.

Please extend your full cooperation and support to those organizations identified in the attached Recovery Organization Charter.

Remember – Always be safe, and keep the core cool, covered, properly reactive.

John Groth
Chief Nuclear Officer

9/8/99

Recovery Organization Charter

Introduction

On August 31, 1999, Indian Point Unit #2 (IP2) tripped as a result of conditions that are currently being evaluated. In response to the unit trip and the concerns that it raised, senior management is taking immediate, comprehensive and aggressive action in order to fully understand the issues involved and ensure that the plant recovery actions are effective and that the plant is restarted and operated in a safe, reliable and efficient manner.

Recovery includes all activities required to return the plant to a level of nuclear safety which meets IP2, industry and regulatory standards. Recovery includes detailed analyes for establishing and documenting lessons learned, determining root causes and examining the extent of condition. Recovery also includes developing a plan of action for restart (the Restart Plan) and restarting the plant. The Recovery Organization is dissolved when the Recovery Manager determines that recovery is complete.

This document provides top management direction regarding the structure and organization for dealing with recovery.

Objectives

The objectives of the IP2 Recovery Organization are to:

- Set the overall strategy and accountability for recovery activities with sufficient clarity to serve as a basis for implementing the departmental restart plans,
- Demonstrate to ourselves that plant personnel understand and have ownership for the lessons learned from the event and are taking necessary steps to restart and safely operate the plant,
- Communicate to the entire IP2 staff, and to others, the overall path forward to a successful restart of IP2.

The Restart Plan will provide more specific guidance and direction regarding restart activities including scope, process, priorities and schedule. Components of the Restart Plan are developed by the organizations which make up the Recovery Organization and are aggregated into a single plan by the Recovery Manager.

Recovery Manager

The Recovery Manager oversees activities directly related to understanding and correcting conditions leading to and resulting from the Reactor Trip Event and develops and implements a Restart Plan for overseeing the recovery and the safe and efficient restart of the plant. The Recovery Manager reports directly to the Chief Nuclear Officer.

The Recovery Manager is supported by other groups that provide the necessary insight, evaluations, analyses and plans on issues relating to the reactor trip event, recovery and restart planning. These groups include Nuclear Power Generation, Nuclear Engineering, Corrective Action Group, Station Nuclear Safety Committee (SNSC) and an Advisory Group. The organization for this Recovery Project and the scope of organizational components is shown on the Recovery Project Organization Chart presented in the attachment to this Charter.

The Recovery Manager has overall responsibility for the effective and efficient execution of the activities required by the Recovery Project. These activities include root cause analyses, extent of condition reviews, modifications to be implemented, and procedure development, training and implementation.

The Recovery Manager integrates analytical bases, oversees the decision process and recommends approval for restart to the Chief Nuclear Officer.

Nuclear Power Generation

The Nuclear Power Generation Group, under the direction of the Plant Manager, coordinates all phases of the Recovery Project relating to reactor safety, daily outage planning and scheduling, the operations and maintenance restart plan, restart training, extent of condition reviews for operations, and root cause evaluations for people and process related issues. The operations portion of the extent of condition reviews are one segment of multi-discipline reviews performed for operations, engineering and administration issues.

Nuclear Engineering

The Nuclear Engineering Group, under the direction of the Vice President of Nuclear Engineering, coordinates engineering activities, including the Engineering Recovery Plan, root cause evaluations relating to equipment issues, extent of condition reviews relating to equipment issues and any engineering modifications to be implemented as a result of this Restart Project. The engineering portion of the extent of condition reviews are another segment of multi-discipline reviews performed for operations, engineering and administration issues.

Corrective Action

The Corrective Action Group, under the direction of the Corrective Action Group Leader, is responsible for all phases of the Recovery Project relating to corrective action activities. These activities include conducting extent of condition reviews for administrative issues as well as reviewing and compiling extent of condition reviews from the operations group and the engineering group. The Corrective Action Group has overall responsibility for developing the extent of condition process.

Station Nuclear Safety Committee (SNSC)

The Station Nuclear Safety Committee is responsible for evaluating the studies, reviews, analyses, assessments and procedures developed for this project to ensure that they are complete and accurate. The SNSC is responsible for reviewing the post-trip assessment and the results of the extent of condition assessments. The SNSC also reviews and approves the root cause evaluations and the IP2 Restart Plans and ultimately recommends restart to the Recovery Manager.

Quality Assurance

Quality Assurance continues to function in its line management role in accordance with the Quality Assurance Program.

Nuclear Facilities Safety Committee (NFSC)

The Nuclear Facilities Safety Committee continues to report to and advise the Chief Nuclear Officer in accordance with the plant Technical Specifications.

Advisory Group

The Advisory Group provides oversight and assists in developing the Recovery Plans that are being developed to address the contributors to the August 31, 1999 reactor trip event; provides mentoring of the site groups developing the Restart Plans; and provides advice as requested by the Recovery Manager.

Indian Point Unit #2 - Recovery Organization

Consolidated Edison
Indian Point Station
Unit #2

September 8, 1999

CHIEF NUCLEAR OFFICER
J. GROTH

QUALITY ASSURANCE
H. SAGER
- Quality Assurance Oversight: Recovery and Restart Activities

RECOVERY MANAGER
A. A. BLIND

ADVISORY GROUP
G. Honma/J. Devine/B. Maguire/
C. Durkin/P. Russell/D. West
M. Ravan/J. Waal/T. Bilger/
J. Morgan/C. Johnson/M. Kelly
- Advisory Capacity: Recovery and Restart Activities

PLANT MANAGER NUCLEAR POWER GENERATION
R. MASSE
- Reactor Safety
- Daily/Outage Planning and Scheduling
- Operations/Maintenance Recovery Plan
- Independent Assessment Team Results
- Restart Training
- Extent of Condition Reviews* (Operations)
- Root Cause Evaluations for People/Process Related Issues

VP-NUCLEAR ENGINEERING
J. BAUMSTARK
- Engineering Recovery Plan
- Root Cause Evaluations for Equipment Issues
- Extent of Condition Reviews* (Equipment Issues)
- Engineering Modifications

TECHNICAL SPECIALIST CORRECTIVE ACTION
M. MIELE
- Extent of Condition Reviews* (Admin. Issues)
- Condition Reports

STATION NUCLEAR SAFETY COMMITTEE
CHAIR- M. MIELE
- Post Trip Assessment
- Review/Approval of Root Cause Evaluations
- Review/Approval of Restart Plan
- Review of Extent of Condition Assessments

NUCLEAR FACILITIES SAFETY COMMITTEE
SEC.-T. ROSE
- Oversight of Recovery and Restart Plan

* By Multi-Discipline Team

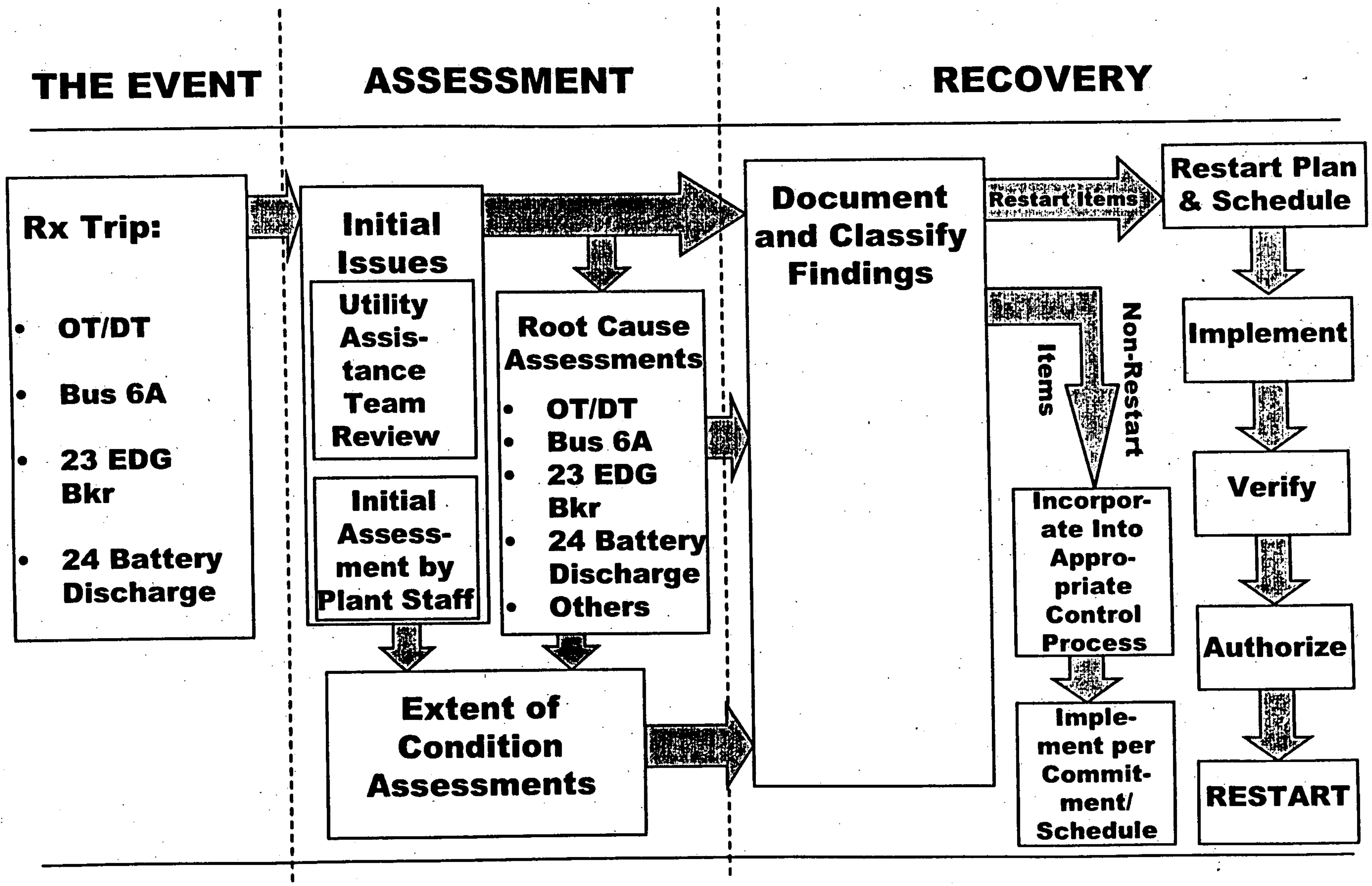
Concurrence: A. Alan Blind
Al Blind, V.P. Nuclear Power

Approval: John Groth
John Groth, CNO

Attachment B

Recovery Logic Flow Chart

INDIAN POINT UNIT #2 RECOVERY LOGIC



Attachment C

Internal Significant Operational Experience Report

Internal Significant Operational Experience Report

On 8/31/99 at 14:30, the Reactor tripped due to 2/4 OTDeltaT channel trips. Complications after the trip included a loss of Bus 6A, 3 Low Pressure steam dumps did not fully open, 1 control rod remained at 14 steps, and the Main Turbine turning gear motor did not readily engage.

Prior to the trip, on August 26, 1999, channel 4 OTDeltaT spiked into alarm (cause unknown). CR 199906545 was written to address this spike but did not specifically mention that the cause was from channel 4. This CR was closed out the morning of the trip. The Operations Crew on duty the day of the Reactor Trip was not aware of this issue and authorized work to replace a bistable for Channel 3, PT-457, Pressurizer Low Pressure which provides an input to the Channel 3 OTDeltaT setpoint calculation. After the appropriate bistables were tripped for Channel 3 OTDeltaT, a spurious spike occurred on OTDeltaT channel 4 which caused a Reactor Trip.

The following is the event chronology surrounding the reactor trip and a discussion on noted operator knowledge areas for improvement.

1. Event Chronology

8/31/99

14:30	Reactor Trip on 2/4 Overtemperature-delta temperature channels 3 and 4. During replacement of the Channel 3 Pressurizer Low Pressure trip bistables, a spurious OTDeltaT signal occurred from channel 4 which made up the 2/4 trip logic.
14:35	Bus 6A deenergized. Following the trip, 480V Bus 6A received an undervoltage trip signal causing buses 5A, 2A, 3A and 6A to transfer to their associated emergency diesel generators. Subsequently, 23 EDG output breaker tripped on amptector overcurrent, the cause of which is under investigation.
	Entered Technical Specification 3.0.1. for the loss of the 480V Bus 6A.
15:21	Exited ES0.1, transitioned to POP 3.2.
20:00	Applied Tagout to 480V Bus 6A to support meggar of Bus 6A and MCC 27/27A.
21:55	24 Instrument Bus deenergized due to degrading voltage on 125VDC bus 24.
	Unusual Event declared (EAL 7.3.1) due to Unplanned loss of most (approximately 75%) safety system annunciators or indications on CCR panels for greater than 15 minutes AND Increase surveillance required for safe plant operation.

9/1/99

00:43	Bus 6A energized from 23 EDG.
00:50	Energized MCC 27A and restored power to 24 Instrument Bus.
01:50	Energized MCC 27.
02:04	Reset 480V blackout relays in preparation for placing 480V buses on their normal feeds.
02:24	Restored 480V Bus 5A to its normal power supply.
02:50	Restored Buses 2A and 3A to the normal power supply.
03:30	Closed out NUE – all annunciators restored.
04:35	Commenced RCS Cooldown to less than 350 F.

The requirement to cooldown to less than 350 deg. F per Tech Spec 3.3.F.1.b was not performed within the required time. The Tech Spec states that if one Essential Service Water Pump (23 SW pump was inop due to loss of Bus 6A) can not be restored to operable status within 12 hours, the Reactor shall be placed in the hot shutdown condition within the next 6 hours and subsequently cooled below 350 deg. F using normal operating procedures. Since the plant was already in hot shutdown due to a reactor trip, the 6-hour time period to reach hot shutdown was not applicable. The plant cooldown was commenced at 04:30 on 9/1/99: approximately 14 hours after 23 SW pump was inop. Therefore, the cooldown was commenced 2 hours too late. This issue was identified by the Utility Assistance Team on Saturday 9/4/99.

2. Operations/Training Areas for Improvement:

a. General knowledge of plant batteries and DC electrical systems.

Attachment 1 describes the design basis of the plant DC batteries, a brief description of the DC electrical system and discharge characteristics of a loaded battery.

b. Boration/Cooldown Options without 21 and 22 Waste Gas Compressors.

21 and 22 Waste Gas compressors and Radiation Monitors R43/R44 were lost when MCC 27 and 27A were deenergized. While a large boration will cause letdown to be diverted to the CVCS Hold Up Tanks and cause a corresponding increase in waste gas header pressure, POP 3.3 "Plant Cooldown" does provide sufficient guidance to borate and cooldown in a stepwise manner that should allow operational flexibility to prevent overpressurizing the waste gas header.

c. Probabilistic Risk Analysis

With the Reactor tripped and Bus 6A deenergized, the PRA analysis yielded a value of 1.8E-3 conditional core damage frequency. In practical terms, there was an approximately 2 in a 1000 chance that additional failures, such as the loss of the remaining aux feed water pumps, could have occurred that would have resulted in core damage. For comparison, this value was 100-200 times greater that associated with normal plant operation with all 480V buses energized.

Attachment 2 provides 2 aids in evaluating the risk significance of losing a major plant piece of equipment. The first aid shows the relative importance of various systems in preventing core damage while the second aid shows the relative significance of plant systems impact on core damage frequency if the system were to degrade to a non-functional status.

d. 480V Bus Normal Supply Breaker Operation

The normal supply breakers for the 480V busses are tripped under the following conditions:

1. Blackout with Safety Injection. Will trip all normal supply breakers to buses 5A, 2A, 3A and 6A.
   -2/3 Undervoltage relays on Bus 5A OR 6A
   AND SI signal.
2. Blackout/Unit Trip with no SI. Will trip all normal supply breakers to buses 5A, 2A, 3A and 6A.
3. Sustained Undervoltage. Will trip the associated 480V normal supply breaker.
   - 87.7% of line voltage AND 9 sec delay with SI OR 180 sec delay with no SI
4. Overcurrent. Will trip the associated 480V normal supply breaker.

Following the Reactor trip, a sustained undervoltage signal most likely energized the trip coil for the 480V bus 6A supply breaker. This caused a blackout signal and all 480V busses deenergized due to a Blackout/Unit Trip/No SI. All 480V buses then transferred to their respective emergency diesel generators. However, 23 EDG output breaker then tripped on overcurrent and bus 6A remained deenergized. From drawings 9321-LL-3118 sheets 4 and 20, and 9321-LL-3117 sheet 2, the trip coil for all normal 480V supply breakers were energized due to the sustained undervoltage signal and then from a Blackout/Unit Trip/No SI signal. A Blackout/Unit Trip/No SI signal requires the following:

1. 2/3 UV devices sense loss of voltage on bus 5A OR 6A
2. No SI signal
3. 86P or 86BU device actuates from a Turbine Trip.

As can be seen from attachment 3 and drawing 9321-LL-3118 sheet 20, relays BFPB and BFPB3 when energized will close its associated contact to seal in the trip signal around the 86P and 86BU devices. Therefore, resetting the turbine trip 86 devices alone will not remove the breaker trip signal from 480V Bus 6A normal supply breaker.

e. Resetting Lighting

To reset lighting with the unit off-line, step 4.2.14 of AOI 27.1.1, "Loss of Normal Station Power", directs the operator to:

- Close the AC 480V supply breakers for the lighting transformers.
- Align the PAB lighting switchgear.

Guidance on aligning the PAB lighting switchgear is provided in sections 4.29 and 4.31 of SOP 27.1.5, "480V System". For example, to restore Lighting Bus 22, the following major actions are specified:

- Close 22 Lighting Transformer 480V breaker
- Verify 24 Lighting Transfer Switch transferred to normal.
- Place PAB lighting panel AUTO/MANUAL switch to MANUAL.
- OPEN lighting bus tie breaker.
- Close 22 Lighting Bus normal supply breaker (98 ft. El.).
- Return Auto/Manual switch to AUTO.

Please review SOP 27.1.5 for specific actions to be taken to restore lighting

ATTACHMENT 1

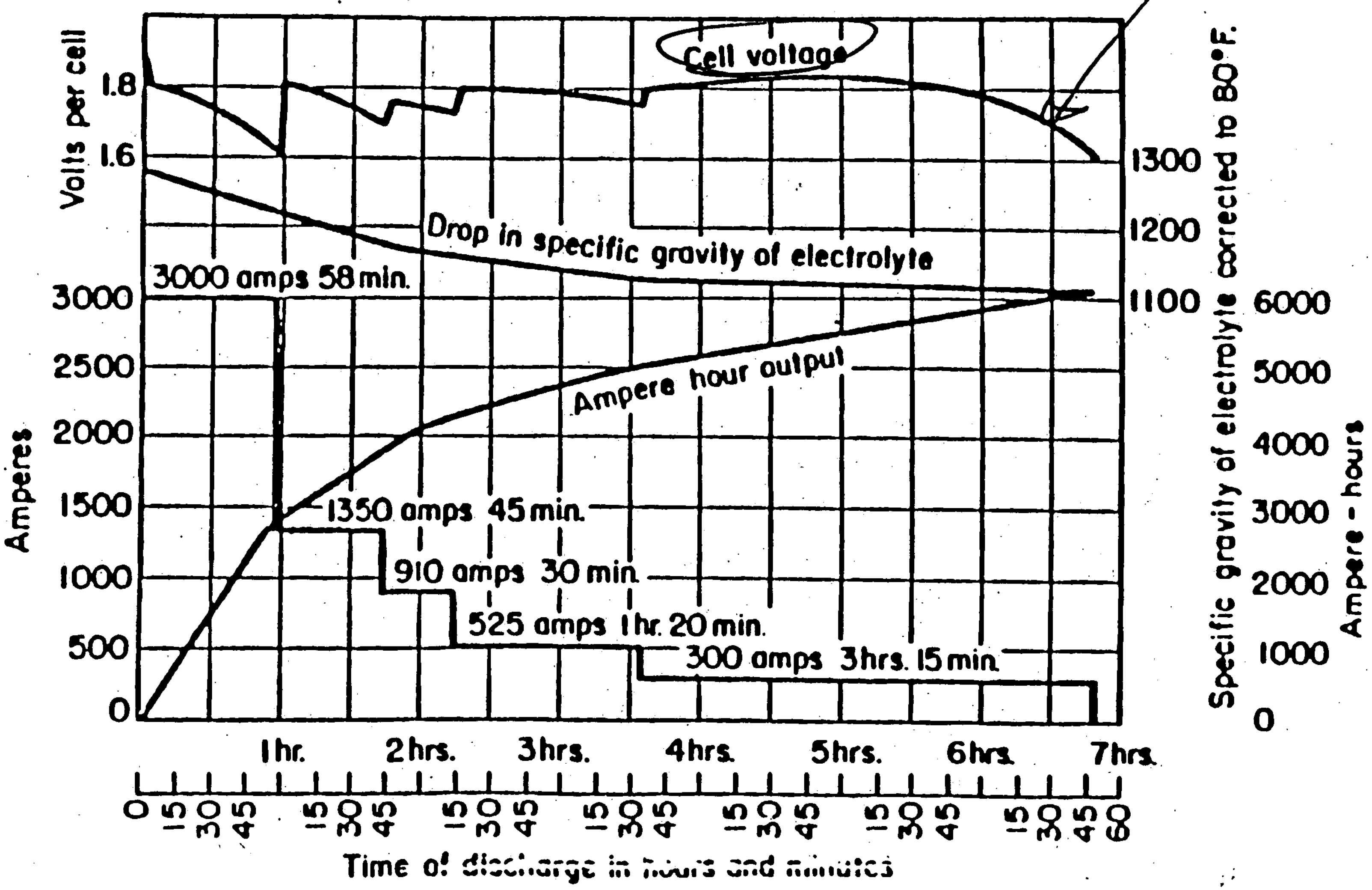
Each of the battery installations is composed of 58 individual lead calcium storage cells connected so as to provide a nominal terminal voltage of 125 VDC. Battery 21 is rated at 1500 ampere hours and Battery 22 is rated at 1800 ampere hours (both at the 8 hour discharge rate). Each of these batteries is connected to its respective power panel through an 800 ampere fuse. Batteries 23 and 24 are each rated at 425 ampere hours (at the 8 hour rate) and are connected to their panels through 800 ampere circuit breakers.

The given rates are 8 hour rates, which means you have to divide the 425 AH by 8 to see what current it will supply for the 8 hours. (i.e. 53.125amps). All of the station batteries are designed to carry their DC loads for a minimum of 2 hours. (as per UFSAR section 8.2.3.5)

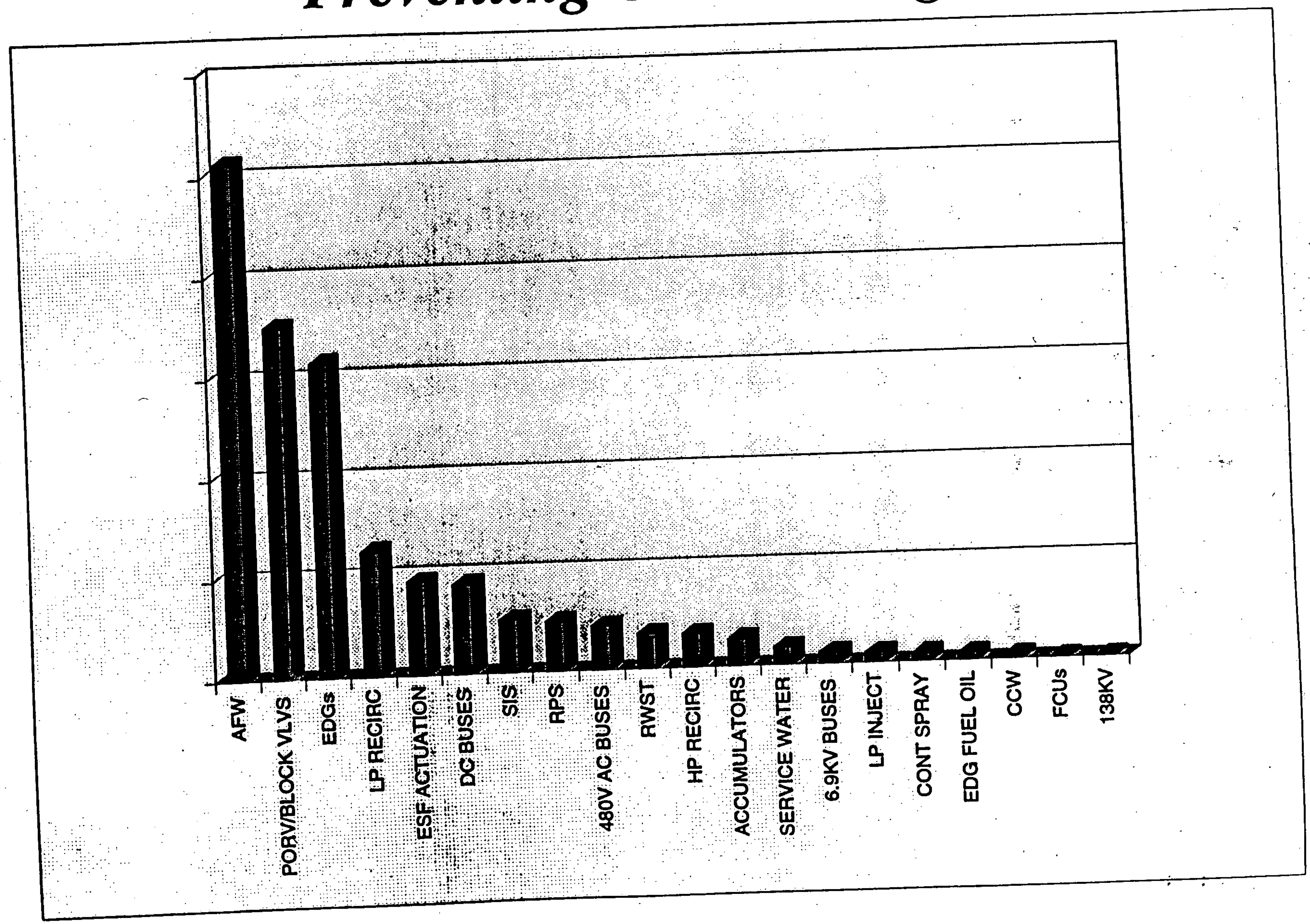
Almost all batteries when discharged reach a point where the output voltage falls off fairly quickly. They do not follow a linear discharge rate to '0' volts. See the attached drawing and notice the end of the voltage curve.

NOTICE VOLTAGE DECREASE

Curves Showing Effect of Acid Diffusion in Lead-Acid Storage Batteries on Intermittent Discharge



Relative Importance of IP2 Systems in Preventing Core Damage



Systems Ranked by Risk Achievement

ATT. 2

125 VDC Power
480VAC (Vital Buses)
Reactor Protection System
Auxiliary Feedwater System
Safeguards Actuation System
High Pressure Injection (1)
Recirculation System (2)
Service Water System
Main Steam System (3)
Reactor Coolant System (4)
Offsite Power
Emergency Diesels
EDG Ventilation
Accumulators
Component Cooling Water
Low Pressure Injection (5)
Gas Turbines
Containment Spray System**
Fan Cooler Units**

Risk Achievement Worth is the Impact on Core Damage Frequency if the System were to degrade to the point where it would not function

Notes:

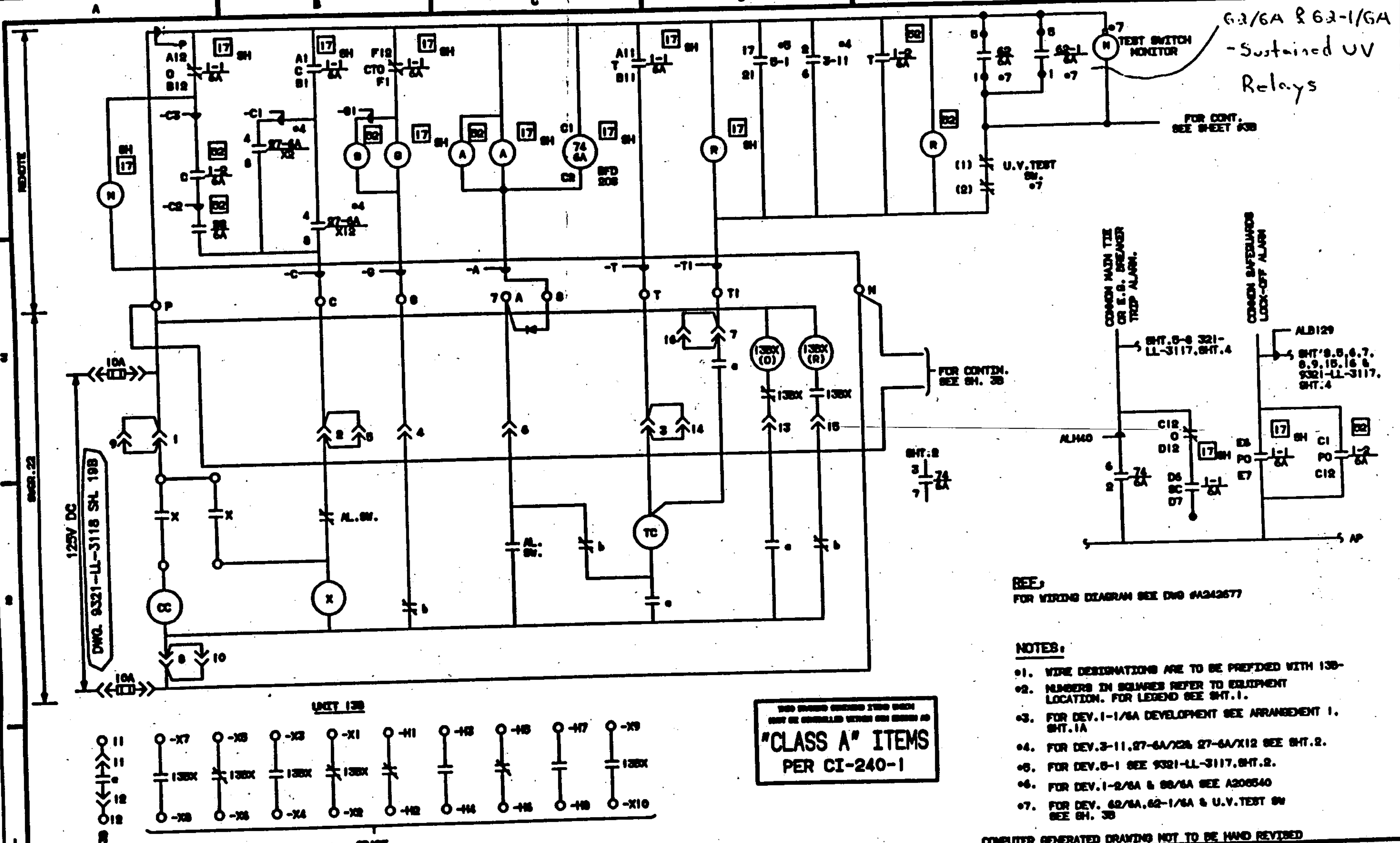
(1) High pressure injection includes the Refueling Water Storage Tank, the Safety Injection System and the Bleed & Feed Function

(2) Recirculation System includes the two low pressure recirculation paths the high pressure system components which need to be realigned for recirculation and the RHR Heat Exchangers. The operator actions to switchover to recirculation are also included.

(3) Main Steam generally represents those functions needed to respond to a Steam Generator Tube Rupture or an ATWS event

(4) Reactor Coolant System actually represents a number of specific modeling issues power level and pressure relief capability (for ATWS), consequential seal LOCA, potential for stuck open PORV and consequential SGTR.

(5) Low Pressure Injection includes the RHR injection path



SEE;
FOR WIRING DIAGRAM SEE DWG #A242677

NOTES:

- •1. WIRE DESIGNATIONS ARE TO BE PREFIXED WITH 13B-
- •2. NUMBERS IN SQUARES REFER TO EQUIPMENT LOCATION. FOR LEGEND SEE SHT.1.
- •3. FOR DEV.1-1/6A DEVELOPMENT SEE ARRANGEMENT 1. SHT.1A
- •4. FOR DEV.3-11,27-6A/X2& 27-6A/X12 SEE SHT.2.
- •5. FOR DEV.5-1 SEE 9321-LL-3117,SHT.2.
- •6. FOR DEV.1-2/6A & 5B/6A SEE A206540
- •7. FOR DEV. 62/6A,62-1/6A & U.V.TEST SW SEE SH. 3B

"CLASS A" ITEMS
PER CI-240-1

COMPUTER GENERATED DRAWING NOT TO BE HAND REVISED

REVISION	PKB	THIS REVISION IS NON-CLASS PER CI-240-1. REVISED DRAWING TO REFLECT FIELD CONDITIONS PER CITRS. ITEM 98-ED1351
	DESIGN	CRIB-11 RELEASED FOR RECORD
	ENGR	P/N 69962-0B AM/BL

DATE | REVIEW | SUPV. | DESIGN ENG | UE&C DISC. ENG. | UE&C ENG. MGR. | APPROVALS.

TITLE: BREAKER 52/6A
STATION SERVICE TRANSFORMER
6-BUS 6A TIE
SHEET NO. 4
DRAWN BY CH | SCALE NONE | REC'D

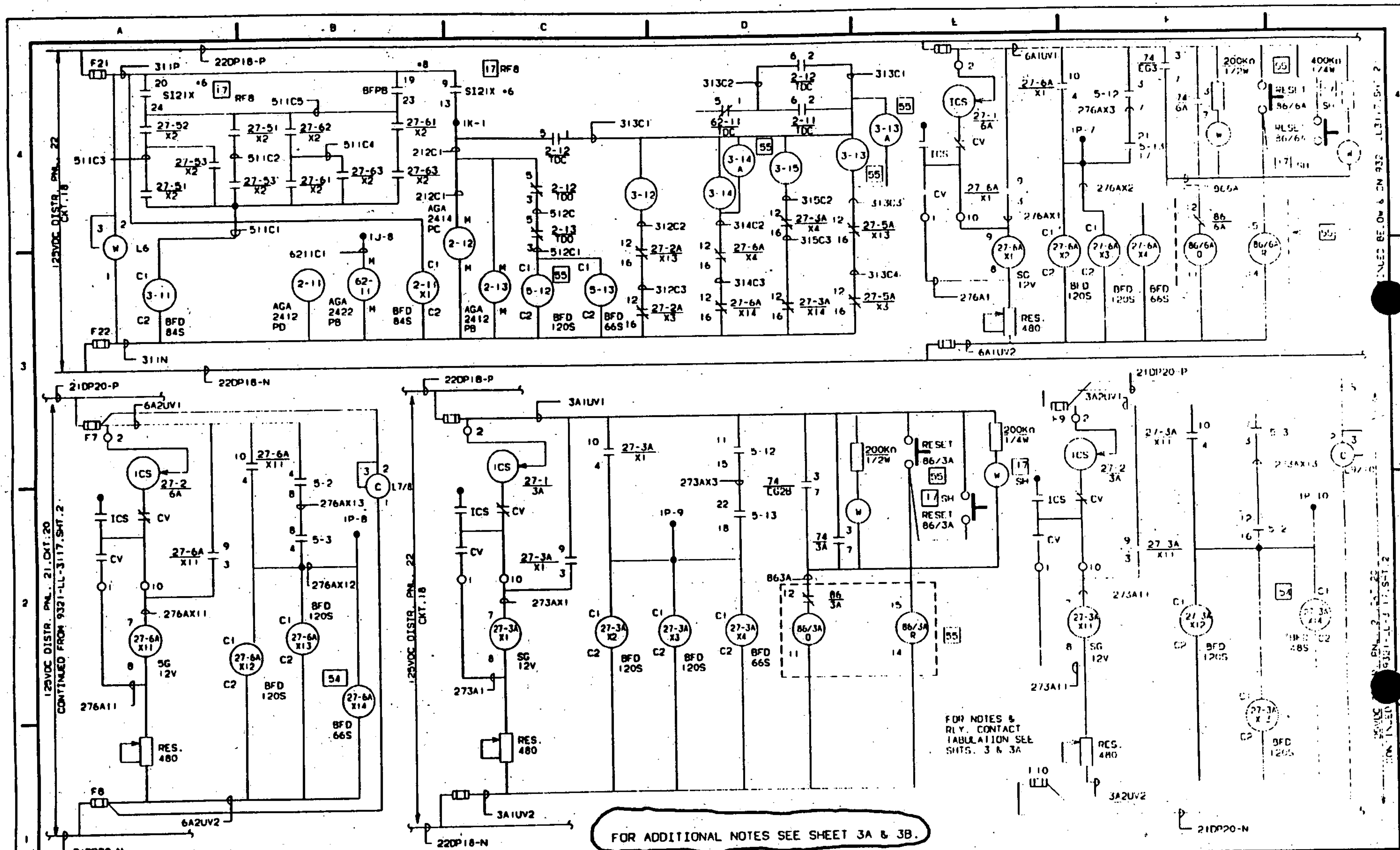
Con Edison

STATION: INDIAN POINT

DWG. NO. 9321-LL-3118-23 DB

DWG.9321118##.DGN

3 A1



THIS DRAWING CONTAINS ITEMS WHICH MUST BE CONTROLLED WITHIN CON EDISON AS

"CLASS A" ITEMS PER CI-240-1

REVISION	TDW 5/8/98 DESIGN	THIS REVISION IS CLASS "A" AS PER CI-240-1. UPDATED DWG PER CITRS 97-E01482. ISSUED FOR RECORD. P/N 69982-GS	DT/ET
	ENGR		

MS		UE&C	UE&C
VI			
CKR.	SUPV.	DESIGN ENG	DISC. ENG.	ENG. MGR.
DATE	REVIEW	APPROVALS	

TITLE: SCHEMATIC DIAGRAM
480V SWITCHGEAR 22
INTERLOCKING RELAYS
SHEET NO. 2

DRAWN BY TIBA | SCALE NONE | REC'D

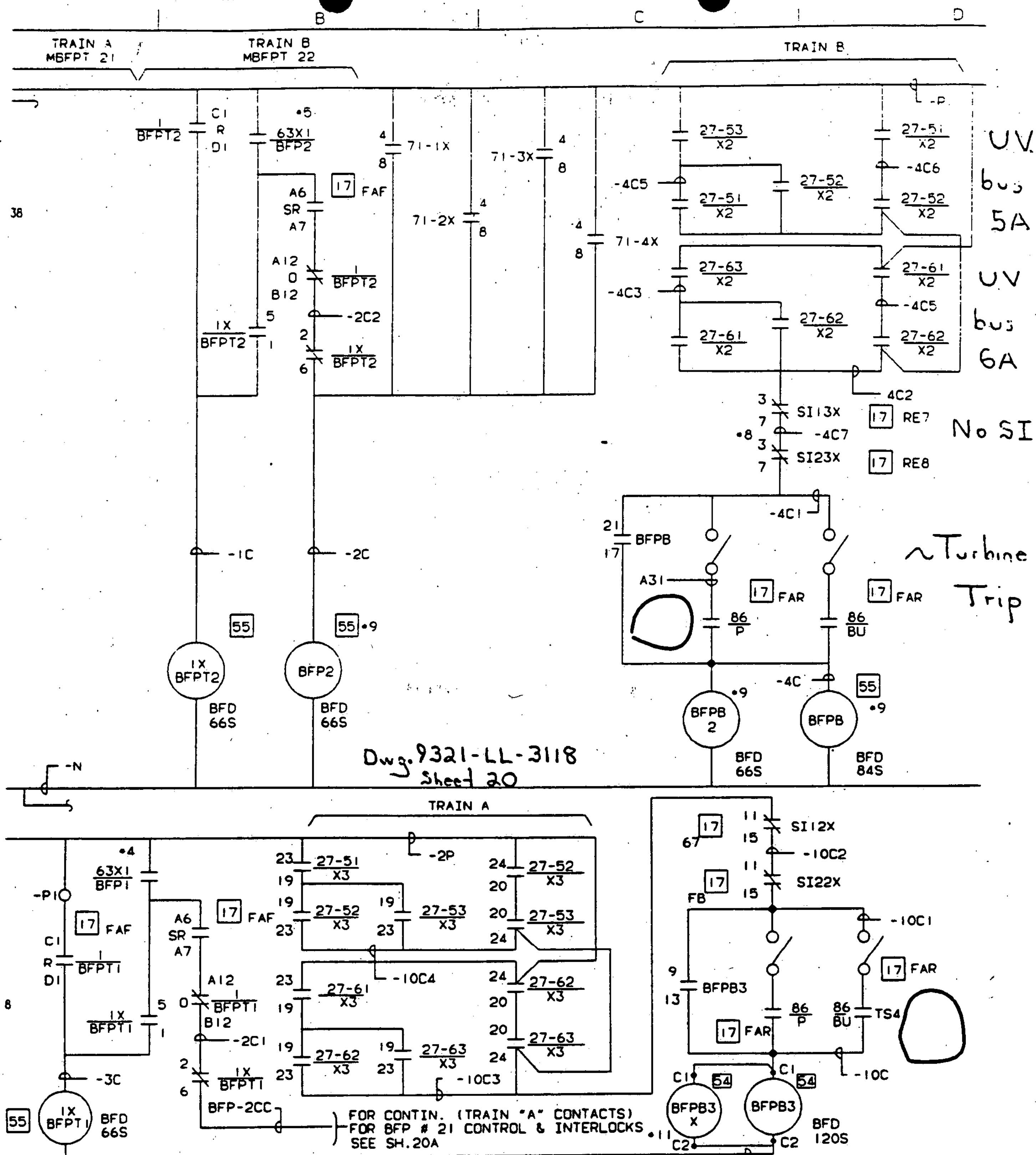
Con Edison

STATION: INDIAN POINT

DWG. NO. 9321 LL 3118 20 | 08

[240,22]3118S2.DGN

AH 3



REVISION	TQW 7/28/96 DES	THIS REV IS CLASS "A" AS PER CI-240-1. UPDATED DWG PER CITRS 97-E06461		MS			UE&C
	ENG	ISSUED FOR RECORD. P/N 69982-GS GT/ET	DATE	CKR.	SUPV. VI	DESIGN ENG	DISC. ENG.
				REVIEW		APPROVALS	

B C D

Attachment D

Results of Utility Assistance Team Assessment

Con Edison memorandum

TO: Bob Masse
Plant Manager

September 7, 1999

FROM: Pat Russell [signature] 9-8-99
Team Leader
Utility Assistance Team

SUBJECT: RESULTS OF ASSESSMENT – IP2 REACTOR TRIP AND NOTIFICATION OF UNUSUAL EVENT ON AUGUST 31, 1999

A Utility Assistance Team was formed on September 1, 1999 to review the circumstances surrounding the reactor trip and subsequent Notification of Unusual Event that occurred on August 31, 1999. The purpose of the Team review was to independently assess the performance of plant equipment and personnel, and to report to Con Edison management the Team's observations and recommendations. A charter for the Utility Assessment Team was provided and a copy of this charter is attached.

The Utility Assistance Team was composed of the following members:

Pat Russell, Con Edison – Team Leader
John Baker, Con Edison
Charlie Jackson, Con Edison (IP2 NFSC)
Lou Storz, Public Service Electric and Gas Co.
Sal Zulla, New York Power Authority (IP2 NFSC)
Bob Hathaway, INPO
Dean West, Consultant
George Honma, Consultant
Chuck Johnson, Consultant

The Team conducted interviews with Con Edison personnel associated with the trip and near term follow-up actions. Additional team activities included documentation reviews and field inspections. The Team concentrated its assessment in the areas of event precursors, management oversight, command and control, leadership, communications, and process issues including emergency plan implementation. The Team focused on the period immediately preceding the trip and the 12 to 18 hours after the trip. The Team met with Con Edison senior management on September 4, 1999, and discussed its preliminary observations.

The results of this assessment are provided in the attached Team Observations. These observations are characterized as weaknesses. In addition, one apparent non-compliance with Technical Specification 3.3.F.1.b. was identified to you during our review. The Team recommends that these observations receive consideration for safely operating the plant as you plan for the restart of IP2.

Cc: John Groth
Al Blind
Jim Baumstark

UTILITY ASSISTANCE TEAM OBSERVATIONS

1. Management exhibited a single-minded focus (Bus 6A tagout) by not fully mobilizing, and leading, the remainder of the IP2 team in evaluating the transient in progress effectively.

   - Engineering tasked, but did not fully participate, in strategy development for the stabilization of the plant.
   - Emergency Preparedness, PRA and QA personnel were not involved in recovery strategy development, or in evaluating existing or changing conditions.
   - Focus was on bus restoration as a success path, with narrow contingency planning for bus failure and for Emergency Plan entry. Minimal management follow-up was evident.
   - Outage preparation activities were initiated before plant conditions were stable.

2. Event mitigation and system restoration plans not formalized nor documented.

   - No written plan.
   - No night orders.
   - Process for infrequently performed evolutions not utilized.
   - Plant stabilization and recovery timeline was not formally developed, published, nor communicated.
   - Multidiscipline approach was not evident.
   - Station Nuclear Safety Committee (SNSC) was not formally involved. Focus of SNSC meeting after trip was on review of an outage procedure.

3. Management expectations for conservative operations appeared weak following trip.

   - Management considered plant to be stable after trip, however conditions continued to deteriorate.
   - Placing the plant in the best, safe, known condition, based on current conditions and trends, while evaluations proceeded was not emphasized.
   - Preparations for a planned entry into the Emergency Plan were not evident.

- Contingency planning for potential additional failures was not evident.

- Specific individual "in-charge" of plant recovery was not formally identified.

- Best judgement was not given to increased staffing to support Emergency Plan escalation, recovery actions, and contingency planning for alternate actions.

- Reviews of applicable Technical Specifications were insufficient to capture all required actions. A review of station logs did not show all LCO entries.

4. Senior management relied too extensively on middle level managers for evaluation and oversight of the plant following the trip.

   - Plant status updates were periodically requested, but expectations not articulated.

   - Plant conditions were not probed in detail, with the exception of Bus 6A recovery.

   - Pertinent battery information not fully researched nor communicated in a timely manner.

   - Transient response team not identified to support Operations.

5. Some knowledge deficiencies exist.

   - General knowledge of plant batteries and dc electrical systems, and the significance of these systems to the safe operation of the plant, appears weak.

   - PRA risk assessment not fully utilized during recovery planning, stabilization, and recovery to understand significance of event.

   - Boration options without waste gas compressors.

   - Senior managers need orientation on Technical Specifications, Emergency Plan, and safety systems.

6. Periodic Control Room transient briefs insufficient to keep entire team updated on plant status.

   - Narrow mind-set on job duties exhibited by some watchstanders, managers, and supervisors.

7. Prior over-temperature/differential-temperature spurious alarm(s) not well communicated to organization for timely review.

   - Organization insufficiently sensitive to spurious alarms.
   - No one on day shift aware of previous "spike".
   - Plant and Maintenance management not aware of "spike".

8. Some equipment issues were identified subsequent to the trip, such as the following:

   - The impact of the Station Auxiliary Transformer tap changer being in manual.
   - Setpoint controls associated with degraded voltage relays and the 480 Volt breaker Amptectors.

CHARTER FOR THE UTILITY ASSISTANCE TEAM

PURPOSE

The Utility Assistance Team has been formed to review the circumstances surrounding the reactor trip and subsequent Notification of Unusual Event of August 31, 1999 at Indian Point 2. The purpose of the Team review is to independently assess the performance of plant equipment and personnel, and to report to Con Edison management their observations and recommendations. Areas expected to be reviewed include event precursors, management oversight, command and control, leadership, communications, and process issues including emergency plan implementation. The team will focus on the period immediately preceding the trip and the 12 to 18 hours after the trip.

METHODOLOGY

The Team activities shall include documentation reviews, and on-site inspections, including observations of activities and interviews of Con Edison personnel associated with the trip and near term follow-up action.

TEAM COMPOSITION

The Team shall be composed of a Team Leader and members who collectively have expertise in the functional areas being evaluated. Members of the Team shall be from organizations outside of Con Edison, and Con Edison personnel that do not have specific line organization functions or involvement with the events of August 31, 1999. The Team Leader shall report to the Plant Manager of Indian Point 2.

TEAM INTERACTIONS WITH CON EDISON

In addition to its inspections and interviews, the Team (at its discretion) may submit requests for documents or information and requests for responses to questions associated with the scope as described above. As a concern or adverse finding is identified by the Team, it shall be promptly provided to the Plant Manager, and documented in the Corrective Action process as appropriate.

The Utility Assistance Team Leader shall hold regular meetings (approximately once per day) with the Plant Manager to keep Con Edison informed regarding the status of the reviews, issues and observations of the Team, and any administrative needs or difficulties. The Team shall also meet periodically with the Senior Vice President to keep him informed of the progress and more important issues and observations being identified by the Team. It is anticipated that other Officers of Con Edison will attend these meetings.

INTERACTIONS WITH THE NUCLEAR REGULATORY COMMISSION (NRC)

It is expected that NRC personnel will be inspecting or observing the team activities. The NRC shall have the freedom to observe the Team activities and to inspect documents collected by the Team. If the NRC requests copies of documents from the Team, such requests will be referred to the Con Edison Manager Nuclear Safety and Licensing to provide the documents. The Team shall also cooperate in responding to NRC questions. The NRC may also desire to attend some Team meetings. Such attendance will be granted and coordination will be with the Team Leader.

UTILITY ASSISTANCE TEAM RESULTS

The Team shall meet with Con Edison to discuss its preliminary results.

Following the review, the Team shall prepare a report which describes the results of its assessment. The report shall identify strengths, weaknesses, suggestions for improvement, and root cause analysis where appropriate.

In general, the Team will compare Indian Point performance against industry best practices. Identification of adverse findings shall clearly distinguish between deficiencies (i.e., potential noncompliances with requirements such as NRC regulations, the Updated Safety Analysis Report, or Con Edison procedures) and weaknesses (i.e., practices that do not meet industry best practices or Con Edison management expectations).

The Team shall submit a draft report to Con Edison for its review and comments. The Team shall review Con Edison's comments and, at its discretion, revise the report and issue it in final form. The report shall not include proprietary information or information affecting personnel privacy. The final report will be provided to the NRC.

SCHEDULE

The Team is expected to begin its work on September 2, 1999 and complete its activities in about one week. If more time is needed, it shall be requested of the Plant Manager.

9/2/99
Date

Robert E. Masse
Plant Manager

Attachment E

SL-1 Condition Report Investigative Team Charter

Charter for SL-1 Condition Report 199906643
OT Delta T Reactor trip

On Tuesday August 31, 1999 IP2 a reactor trip occurred when the OT Delta T trip logic was satisfied when pressurizer low-pressure trip bistable for loop 3 was placed in the trip position for maintenance and a spurious signal on loop 4 occurred. After the trip a blackout signal was initiated from an undervoltage condition. All 480v bus stripped, all EDGs started and loaded, Bus 6A was loaded to the bus for 14 seconds and tripped on over-current. Bus 6A remained de-energized for several hours.

The objectives of the investigation is to communicate facts, develop conclusions (root causes), and determine corrective actions to prevent recurrence. The team will prepare a written report in accordance with SAO 112. An SL-1 investigation team consisting of, G.Hinrichs (leader), C.Hayes, D.Mohre, R.Sutton & M.Tumicki has been assembled to review;

- The plant response to the reactor trip including operator actions,
- The cause of the plant anomalies identified after the trip,
- The cause of the OT Delta T spurious signal on channel 4,
- Any potential precursor events related to the trip circuit, and
- Industry operating experience (IP2 trip during surveillance test in 1991, IP3 event where bus 6A was lost)

An LER submittal will be required by September 30,1999. A representative from NS&L will be assigned to prepare the LER. A Corrective Action Review Board will review this event on Monday September 20, 1999.
Assistance from Mr. Sal Zula of NYPA has been afforded to the team.

References: CR 199906616, 199906643, 199906651,199906675,

You will be provided the support that is necessary to successfully complete the task. If you require additional resources please contact myself or the CAG Manager. If in the course of the investigation you determine a change of scope is required please make your request directly to me to facilitate a formal modification to the scope of your investigation.

Approved

[signature] 9/10/99

Plant Manager / Date

Attachment F

Nuclear Power Generation Action Plans

Post Trip Recovery Action Plan

ACTION ITEM	PERSON RESPONSIBLE	TARGET DATE	STATUS
Command & Control	**Ferrick**		
1. Conduct an Operations led assessment to determine lessons learned and corrective actions. Identify Start-Up Issues/Corrective Actions (if any)	Schoen	Prior to Startup	
2. Discuss lessons learned with all shift crews.	Ferrick	Prior to Startup	
3. Conduct a meeting(s) with Operations Manager, Plant Manager, and all Shift Managers to discuss expectations regarding Command & Control, and license operator expectations. Include discussion of lessons learned/corrective actions from Item 1 above.	Ferrick	Prior to Startup	
4. Establish Interim Response Team (Standing Order With Response Team Leaders Identified).	Poirier	Prior StartUp	
5. Integrate Rapid Response Team formation into Operator Training and Procedures.	Nichols/ Gorman	10/31/99	
6. Utilize Field Support Supervisor in Training as they would be used in an actual event.	Nichols	10/31/99	
7. Clarify chain of command roles and responsibilities for Operations Manager, Plant Manager, and Vice President Nuclear during plant event response scenarios.	Masse	Prior to Start up	

Post Trip Recovery Action Plan

ACTION ITEM **Processes**	PERSON RESPONSIBLE **Ferrick/Primrose**	TARGET DATE	STATUS
1. Revise the Independent Verification process to allow for dual concurrent checks for safety related equipment. This should be applied to the Tagout and COL processes. • SNSC review • Licensing requirements	A. Gorman	10/09/99	In progress
2. Review and preplan tagouts required for 480V buses and essential MCC's which may be required during a plant transient. These preplanned tagouts will include individual tagouts for all 6.9kv bus sections.	E. Primrose	Prior to Rx Startup	In progress
3. Review labeling of equipment which would be required to be tagged. In the case of 480V bus 6A, the Potential Transformer fuses that were required to be removed were not labeled and delayed the tagout until a print showing the fuses was located.	E. Primrose	Prior to Rx Startup	In progress
4. Review requirements in OAD-16, operations manual, step 2.9.3 which states that the amptectors shall be checked and agree with the Test & Performance setpoint list whenever a breaker is removed from the cubicle. If the breaker is removed and then placed on a stand during a meggar it should not require an amptector check prior to reinstallation. In other cases such as a PM of the breaker this requirement would still apply.	F. Inzirillo J. Ferrick	10/29/99	Assigned

Post Trip Recovery Action Plan

5. Preplan Temporary Facility Change (TFC) paperwork for Station identified essential equipment along with associated work orders. In addition the material should be staged on site which would be required for the TFC including the Maintenance planning package.	A. Gorman T. Poirier J. Tuohy	10/29/99	Assigned
6. Review expectations with Shift Managers in SAO-133, Procedure, Technical Specifications and License Adherence and Use Policy, & OAD-15, Policy for Conduct of Operations, Technical Specifications and License Adherence and Use Policy.	J. Ferrick		Assigned
7. Revise AOI 27.1.1, "Loss of Normal Station Power". Perform procedure with at least one watch crew to validate in the simulator.	A. Gorman J. Nichols	Prior to Rx Startup	Assigned
8. Prepare AOI 27.1.13 Loss of any 480V Bus. Run procedure through with at least one watch crew to validate in the simulator.	A. Gorman J. Nichols	Prior to Rx Startup	Assigned

Post Trip Recovery Action Plan

ACTION ITEM	PERSON RESPONSIBLE	TARGET DATE	STATUS
Event Response Support	**J. Dorn/Poirier**		
1. Benchmark the industry for good performance for event response.	Dorn	Pre-Startup	On-going
2. Develop charter for event team response.	Dorn	Pre-Startup	On-going
3. Develop procedure for event team response.	Dorn	Pre-Startup	On-going
4. Identify event team rosters (integrate with ERO roster).	Masse/Ferrick	9/30/99	Interim Team Identified
5. Integrate event response procedure into existing station procedures.	Poirier	11/30/99	
6. Train station personnel on event response.	Poirier	11/30/99	
7. Integrate reactor trip response into existing station procedures.	Miele/Gorman/Sutton	10/31/99	

Post Trip Recovery Action Plan

ACTION ITEM	PERSON RESPONSIBLE	TARGET DATE	STATUS
Emergency Planning	**A. Ferraro**		
1. Individual/ Team expectations • Review E-plan for descriptions. • Train key groups in responsibilities.	R. Burns	Dec. 31, 1999	Assigned
2. Rockland letter/sensitivity • Meet with state/counties to discuss corrective actions. • Identify corrective actions.	A. Ferraro	Completed	Assigned
3. Define emergency response organization.	R. Burns	Dec. 31, 1999	In Progress
4. Roles/responsibilities.	R. Burns	Dec. 31, 1999	In Progress
5. Distribute EAL technical basis to key locations.	A. Ferraro	Sept. 30, 1999	Assigned
6. Equipment readiness (pagers).	M. Byster	Sept. 30, 1999	Assigned
7. Review industry operating experience for applicability.	R. Burns	Sept. 30, 1999	Assigned
8. Change EAL 6.1.1 to reflect NUMARC/NESP 007 Technical Basis.	R. Burns	Sept. 30, 1999	Assigned

Post Trip Recovery Action Plan

ACTION ITEM **Training**	PERSON RESPONSIBLE **D. Murphy**	TARGET DATE	STATUS
1. Provide technical input on DC electrical discharge characteristics for formulation of a Operating Experience Report.	D. Carter	September 8	Complete
2. Develop and Publish a Operating Experience Report which includes: • Chronology • Probability Risk Assessment (PRA) • Battery Theory	J. Baker	September 8 (Draft to Operations)	Complete
3. Discuss Lessons Learned with all shift crews.	J. Ferrick	Cycle 5 (September 11-October 23)	Assigned
4. Train Facilities Support Supervisor (FSS) and Senior Reactor Operators SRO's in Shift Manager (SM) Emergency Plan (EP) duties: • Rotate all SRO's into EP roles during simulator scenarios • Provide EP training for all SRO's • Provide training on SM role during the first hour of the EP event • Utilize the FSS in simulator scenarios as they would be used in the plant	E. Libby/R. Burns	Cycle 6 (November 6 - December 25)	Assigned
5. Train Operations personnel on revisions to the EP including: • Emergency Response Teams roles & responsibilities • New Emergency Action Levels (EAL's) • Use of MEANS computer software	E. Libby/R. Burns	Cycle 6 (November 6 - December 25)	Assigned

Post Trip Recovery Action Plan

ACTION ITEM Training	PERSON RESPONSIBLE D. Murphy	TARGET DATE	STATUS
6. Train at least <u>one</u> Operating crew on the use of: • AOI 27.1.1 - Loss of Normal Station Power • AOI 27.1.13 – Loss of Any 480 Volt Bus	J. Nichols	Prior to restart	Assigned
7. Train <u>all</u> Operating crews on the use of: • AOI 27.1.1 - Loss of Normal Station Power • AOI 27.1.13 – Loss of Any 480 Volt Bus	J. Nichols	Cycle 6 (November 6 - December 25)	Assigned
8. Provide Operator training on: • Cool down without Waste Gas compressors • Battery Theory/DC Distribution System	E. Libby	Cycle 6 (November 6 - December 25)	Assigned
9. Investigate and/or correct Simulator Fidelity Issues including: • DC Distribution System modeling • Sustained Undervoltage (UV) relays modeling • Component Cooling Water (CCW) flow characteristics • Use of Autolog • Use of sequence of event printer • Use of PRA Safety Monitor • Use of MEANS computer software when in the EP	M. Rogers	Cycle 6 (November 6 - December 25)	In Progress
10. Align the simulator per the CCR during Licensed Operator Requalification (LOR) scenarios.	E. Libby	Cycle 6 (November 6 - December 25)	Assigned

Post Trip Recovery Action Plan

ACTION ITEM **Training**	PERSON RESPONSIBLE **D. Murphy**	TARGET DATE	STATUS
11. Perform a needs analysis of training needs for the senior management team. Train the Senior Management team as necessary.	J. Nichols	October 15	Assigned
12. Train applicable station personnel on Event Response Teams roles and responsibilities.	T. Poirier	Prior to restart	Assigned

Post Trip Recovery Action Plan

ACTION ITEM	PERSON RESPONSIBLE	TARGET DATE	STATUS
Communications	**G. Dean**		
1. Determine what plant conditions warrant notifications to governmental or public agencies (i.e. notifications of unit trip to the four counties of the EPZ).	J. McCann and A. Ferraro	9/30/99	
2. Review and revise SAO-124, Oral Reporting of Non-Emergency Events and Items of Interest and Significant Occurrence Reporting Notifications, to include those notifications as determined in 1 above.	J. McCann	9/30/99	
3. Review OAD-15, Policy for Conduct of Operations, to determine what conditions require communication with the various levels of senior management.	J. Ferrick and B. Masse	9/30/99	
4. Conduct an All Hands meeting for Indian Point personnel.	A. Blind	Prior to startup	
5. Reinforce with all operators the requirement to maintain adequate logs.	G. Dean	Prior to startup	
6. The operators need to train as they operate. Place a lap top computer with Autolog in the simulator.	J. Nichols and F. Aydin	Beginning of cycle 6 of LORT.	
7. Train the Shift Assistants to take notes for the CCR operators during transients and time critical evolutions to be able to reconstruct an accurate history.	G. Dean	9/30/99	
8. Perform an Extent of Condition of the EALs for the missed declaration of the 8/31/99 event.	J. Ferrick and A. Ferraro	Prior to startup	
9. Perform V&V of the Means computer program for the EALs and implement its use.	A. Ferraro	10/31/99	
10. Establish a single number available for outside phone calls so they can be directed to the correct person.	T. Weatherford	12/31/99	

Attachment G

Nuclear Engineering Action Plans

Post Trip Investigation – Action Plan

ACTION ITEM **Engineering**	PERSON RESPONSIBLE **Baumstark**	TARGET DATE	STATUS
1. Time line/sequence.	Szabo	Prior to restart	Bus 6A/%a are worst cases; if CSP 22 @ 28 sec. then > 6000amps
2. Previous trips since 1995; comparison; also did they indicate successful actions; need write-up.	Hinrichs	Prior to restart	None since 1992; need paper
3. Review of plant design and variance identification and single failure; reference FSAR, Design Basis.	Hinrichs	Prior to restart	Covered in trip report
4. Look at all data and what it means for pump effects.	Hinrichs	Complete	
5. History of changes; need review for impact.	Hinrichs	Prior to restart	Included in SL-1 report
6. Calculation – UV Buchanan to IP2.	Wong/Raytheon	Complete	

Post Trip Investigation – Action Plan

7. Simulator Scenarios.	Hayes		First run had tap changer in auto – completed; no new info on AFW timer; long-term
8. Taps on station service transformer 6.9KV/480V.	McCaffery	Complete	
9. Buchanan yard setup; different from previous trips.	Hinrichs	Prior to restart	
10. Satisfactory tap changer time 2 seconds?	McCaffery/JM	Complete	
11. "Blackout" August/September '98.	Hinrichs	Prior to restart	SL-1 report
12. Raytheon model of electrical system; how is it validated? Plant testing required?	Wong	Complete	
13. Evaluate possible RCP UV condition and include in write-up.	Hinrichs/Hayes	Prior to restart	No evidence of significant 6.9KV UV to affect RCPs per computer printout; include in reports

Post Trip Investigation – Action Plan

14. Degraded bus relays; as found recovery/reset values in field, 27's and blackouts; new sheets from protection; do we need to test/change reset? Load study values; do we need cold SD?	Wong	Prior to restart	Also see #10; modification issued
15. Recovery of bus 6A; TFCs not to licensing; need modification?	Baumstark		Long-term
16. Calculations to be done with tap changer in "auto"; (27 reset issue).	Wong	Complete	
17. Bus 6A load/trip verifications.		Prior to restart	26SWP, turbine auxiliary oil, SW23 amptector; before and after; remaining items (see list on board)
19. Amptector – hi current trace; IP3.	Brunelle	Prior to restart	Working
20. DC supply transfer switch for 23 EDG.	Mahlmeister	Prior to restart	CR# 199906701; needs SNSC and I&C to check relays

Post Trip Investigation – Action Plan

21. Starting currents/time calculations to support time line.	Eagleton	Prior to restart	Also see # 35; on hold to support #1; no work at this time
22. 23 EDG governor; HM CR# 199906681/6777.	DeDonato	Complete	
23. EDG study; starting currents, PTI study.	Maylath	Complete	
24. Modification to replace 23 AFP Agastats w/electronic, computer model, Buchanan to 480V buses.	Sheikh	Complete	
25. Timer modification.	Sheikh	Complete	
26. OD; issue or not?	Eagleton/Duggan	Complete	
27. Loads on 26B @ trip time.	Mohre	Complete	
28. Modifcation to AFW 25; 12 second start sequence changed to CCP 15 to 11 seconds.	Duggan	Complete	
29. MOV 2 current draw.	McCaffery	Complete	

Post Trip Investigation – Action Plan

30. 23 AFP recent CR# 199906210 vibration; plan to test on EDG and simulate conditions during event? Motor replacement? Motor dissection for analysis?	Murry/Destefano	Complete	
31. 22 EDG relay chatter, (2A) @ 1735 on 8/31.	Hayes	Prior to restart	

Post Trip Investigation – Action Plan

32. Discrepancy; PT-R13 data vs times measured on 9/4/99.	Duggan		21-22 CSP; 21-25 FCU
33. Check other timers (6) (4).	Tuohy/Knobbs	Complete	
34. RES; replace CP relay.	Corrective Action		Long-term
35. Calculation current profile for 3 pumps off 6A bus.	TY	Complete	
36. SI Agastat; name plate DOE form.	Tuohy		DOE; Agastat to Tempo nameplate data received; long-term.
37. PTI study re-evaluation for this case for current through breaker and EDG stall.	Wong	Complete	
38. Review previous testing for safety pumps/Agastats for start sequence (delta for containment spray pump, etc).	Sutton		Long-term
39. PT-R14; does it create similar condition for blackout logic?	Sutton		PT-R14 - safety injection/blackout; PT-R13 - blackout, no timing; no timing of AFW; long-term

Post Trip Investigation – Action Plan

40. SW pump motor difference; round vs. square, impact with new pump?	Wong	Complete	
41. EDG stall w/750HP; check with ALCO.	Wulforst/DeDenato/Inzitillo	Prior to restart	Contact Carl Woodward
42. Evaluate other Agastat/Tempo combinations/overlaps.	Szabo	Complete	
43. 24 battery cell change TFC; single cell?	Olson/White	Prior to restart	

Attachment H

Extent of Condition Review Process

Extent of Condition (EoC) Review

Objective

Following a significant event, EoC Reviews are conducted to uncover similar vulnerabilities in other areas.

By definition, EoC assessment must be founded on thorough understanding of the causes of the events (and primarily on root cause assessment), and must be reasonably limited in scope. Extent of Condition reviews should have clear links to the event, they must be wide enough to identify vulnerability to similar events but narrow enough to permit thorough, timely assessment.

Elements of the EoC Review:

In accordance with the Restart Organization Charter, EoC reviews are conducted by each of the following groups, within their respective areas of responsibility:

- Engineering
- Operations
- Corrective Action

The Corrective Action Group has the lead role in coordinating these EoC reviews

Engineering EoC

Approach

As an extension of their overall event evaluation and root cause assessment, Engineering will evaluate other plant systems and other plausible event scenarios for potentially similar outcomes.

Scope

- Evaluate timing of D/G loading and emergency bus loading controlled by timers; consider the variability and imprecision of older timing components (Agastat or similar) and evaluate loading sequences under various event scenarios (e.g., black out with and without safety injection), under various plant and system grid electrical power configurations.

- Evaluate starting currents for various components in the loading sequence discussed above including in situ data gathering of starting current amplitude and duration.
- Evaluate performance of amptectors associated with DB-75 and DB-50 breakers, including obtaining in situ primary and secondary breaker operation current values.
- Support Corrective Action Group, as needed, in evaluating technical aspects of the document reviews described below.

Responsibility

VP Nuclear Engineering

Action

Develop work scope and conduct detailed reviews; report results.

Operations EoC

Approach

Conduct a review of procedures and directives to assess extent of guidance provided for operation of equipment in manual, actions taken in response to spurious alarms, LCO management, and Emergency Plan implementation.

Scope

1. Review Operations Department Standards and Expectations, and other directives, to confirm clear guidance provided for the following:
    - Operation of equipment in 'manual' mode when designed to operate in 'automatic'.
    - Identification and communication of spurious alarm actuations.
    - Identifying and tracking appropriate LCO's.
2. Solicit from selected operating shift crews any knowledge regarding operation of equipment in 'manual' mode when designed to operate in 'automatic'.
3. Review Emergency Plan to confirm clear guidance provided for declaring appropriate emergency action levels based on loss of electrical power to plant equipment.

Responsibility

Operations Manager (1 and 2)
Emergency Planning Manager (3)

Action

Revise policies and procedures, and provide training, as appropriate.

Corrective Action EoC

Approach

Review selected documents to determine that appropriate corrective actions have been taken for control room alarms, 480 Volt bus and motor control center (MCC) loading concerns, and operation of equipment in 'manual' when designed to operate in 'automatic'. Review a sample of change documents to confirm that the current plant configuration supports the design and licensing basis.

Scope

- Review CR's and work orders (WO) for Reactor Protection System (RPS), and other systems which provide input to RPS alarms, to determine if they individually or collectively identify an uncorrected problem.
- Review CR's, Temporary Facility Changes (TFC), Caution Tags, and WO's to determine if they were written because of a bus/MCC loading issue, and require further Engineering review.
- Review TFC's, active Caution Tags, active Operator Work Arounds (OWA), and Temporary Procedure Changes (TPC) to determine if there is equipment operated in manual when an automatic capability exists.
- Review a sample of electrical change documents, including CR's, modifications, license amendments, and NRC Safety Evaluation Reports (SER) to confirm that the current plant configuration supports the IP2 design and licensing bases.

Responsibility

Multi-Disciplinary team, under the direction of Manager, Corrective Action.

Actions

Develop detailed criteria and conduct reviews.

Attachment I

NQA Recovery Oversight Plan

NQA Recovery Oversight Plan

Purpose

This document describes NQA's Recovery Oversight Plan. It provides the structure by which NQA will assess the quality of the line and recovery organizations in maintaining safe plant conditions and performing activities necessary to restart the plant.

Measures of Effectiveness

The following are the measures of effectiveness against which NQA will assess performance:

- assessments of initiating and subsequent events (root cause evaluations, extent of condition reviews, etc.) are conducted with rigor and in accordance with documented processes/procedures
- all equipment, process, and human performance problems associated with the initiating and subsequent events have been identified, with root causes and extents of condition determined
- corrective actions address all root causes, are sufficiently broad to address extents of condition, and are appropriately tied to mode restraints, where appropriate
- clear owners with reasonable due dates (based on safety and risk significance) are assigned for corrective actions, and methods are in place to verify effectiveness of implementation
- during the shutdown condition, reactor safety is maintained, with appropriate risk assessments performed for changing plant conditions/work

Conduct of NQA Recovery Oversight

There are various phases associated with recovery, of which restart is but one element. These include (1) assessment (performed in parallel with maintaining the plant in a safe condition pending readiness for restart), (2) corrective action, (3) plant restart, and (4) post-restart actions. This plan provides for NQA oversight during each of these phases.

Assessment

The IP2 Recovery Organization is described in the Recovery Organization Charter of 9/8/99. Four managers are assigned responsibility for specific areas (henceforth referred to as "area leads") and report to the Recovery Manager. Area leads and their assigned areas include (1) R. Masse, Nuclear Power Generation, (2) J. Baumstark, Nuclear Engineering, (3) M. Miele, Technical Specialist Corrective Action, and (4) M. Miele, SNSC. An Advisory Group also reports to the Recovery Manager. In light of this group being in an advisory/mentoring role to the Recovery Manager and his area leads, as opposed to having line responsibility, NQA will not provide oversight of Advisory Group activities. Key tasks/responsibilities are enumerated under each area lead. Some of these tasks/responsibilities are associated with assessment of the events, while others pertain to maintaining the plant in a safe condition during recovery (primarily under R. Masse).

NQA will assign QA leads for oversight of the four areas of the Recovery Organization. QA leads will be responsible for developing assessment plans specific to QA oversight in their assigned areas. Although each assessment plan may have common attributes against which performance is assessed (pursuant to 10 CFR 50, Appendix B), the specific items to be evaluated and the means by which this will be done will be unique to each plan, depending on the activities involved. Generic considerations for assessment plan development are as follows:

- NQA's review/assessment activities should include a "mix" of document reviews, interviews/discussions with key individuals, and observations of activities (group sessions, meetings, etc.).
- Reviews should not focus solely on the internal workings of specific recovery areas, but should also focus on the interactions/handoffs between and among the several recovery areas.
- Alignment of priorities within and among the groups assigned recovery area responsibilities with that of the Recovery Manager and the area leads should be evaluated.
- The extent to which individuals/groups are documenting deficiencies that are identified through their assessment activities (root cause evaluations, extent of condition reviews, etc.) should be evaluated.

Maintaining the Plant in a Safe Condition

- Question and evaluate whether the plant mode being maintained is the safest relative to the scope of ongoing activities, current data on root causes and the projected length of the outage. As the outage lengthens, question whether layup of key components is necessary to prevent long-term degradation from a chemistry standpoint.
- The impact that the assignment of key plant staff and managers to recovery efforts is having on effectively maintaining and supporting safe plant conditions, and conducting routine plant business should be evaluated.
- Control of work as it impacts mode-related risk should be evaluated.
- Adequacy of initiation of CR's for "near miss" events should be evaluated (e.g., poor work control allowed an emergent work item to get to the Control Room for implementation, but was not approved for work due to its putting the plant into an other-than-green risk envelope - a challenge to Operations that should not have occurred)
- The extent to which management is reviewing the multitude of scheduled activities and making informed decisions to defer or cancel ones that would compete with

recovery and safe plant operation should be evaluated. Some of these activities unnecessarily stress/challenge plant staff at a time when this cannot be afforded.

- Personnel Safety in performance of all activities.

Corrective Action

Corrective actions to identified deficiencies/weaknesses should be documented in related CR's (e.g., ICA's). Some of these will be required for restart, while others will be scheduled for post-restart completion. Corrective actions required for restart should also be "tagged" with mode constraints, as warranted. Criteria for determining corrective actions required for restart will have been developed, described in the Restart Plan, and used by plant decision-makers. It will be important for NQA to assess the adequacy and consistency of decision-making relative to CR's requiring resolution for restart, as well as the effectiveness of the plant in correcting these issues in advance of restart. Considerations for assessment plan development in this area are as follows:

- Depending on the number and complexity of issues involved in recovery assessment, there may be too many corrective actions required for restart for QA to review all of them. In this case, QA should select a "smart sample" based on safety and risk significance. If problems are identified in this review, a decision will be made either to expand the sample to validate the extent of the problems, or a to issue a CR for the line organization to pursue resolution of the problems

- Review the CR's generated as a result of the initiating and subsequent events, open CR's previously written on equipment, processes, and human performance problems that relate to the event, as well as those that were written as a result of assessments of the event that were performed by the Recovery organization. Independently review these against the restart criteria to determine which should be corrected prior to restart. Compare this outcome with the CR's designated for restart by the plant, and acquire an explanation for the "delta." Where CR's are closed to another CR assure that the nature of the problem defined in each CR is adequately addressed in the resolution and action of the "collecting" CR

- Corrective actions address all root causes, are sufficiently broad to address extents of condition, and are appropriately tied to mode restraints, where appropriate

- Clear owners with reasonable due dates (based on safety and risk significance) are assigned for corrective actions, and methods are in place to verify effectiveness of implementation

- Frequent followup on CR responses that do not meet the time frame imposed in CRS occurs

- Evaluate whether pressure to restart results in corrective actions that do not rigorously follow appropriate processes/procedures

NQA has discretion under this Plan to either assign a "corrective action" lead to perform the above recovery oversight, or to incorporate this corrective action element into the scope of the QA leads assigned to the different Recovery areas.

Plant Restart

The Recovery Plan defines the process that will be used to restart the plant. Depending on the length and complexity of the outage, the initiating and subsequent events, and the corrective actions necessary to be completed prior to restart, restart management may be accomplished via normal or augmented processes. If the plant event and subsequent assessments resulted in major equipment, program, and human performance weaknesses, it is likely that the Recovery Plan will insert various steps and barriers in the restart process that would not normally be used. These could take the form of

(1) special reviews of various work/condition backlogs to identify issues needing resolution prior to restart;
(2) Department Managers implementing specific recovery plans for their departments and vouching for having implemented them satisfactorily;
(3) SNSC review, recommendation, and attesting to the plant's readiness for restart;
(4) specific signatures of the Plant Manager, the Recovery Manager, Nuclear VP's, and the CNO attesting to the readiness of the plant to restart; and
(5) Possibly others.

On occasion, hold points at various power levels may be stipulated, with specific actions required during the "hold" periods.

NQA will develop a restart oversight plan that is "customized" to the specific circumstances and scope of the restart management activities. As a minimum, NQA will provide oversight of restart activities that involve operation/testing of significant equipment that had failed or operated improperly during the event. Post modification testing of design changes installed to correct deficient conditions will also be witnessed and assessed. Additionally, NQA will monitor organizational performance in the field in areas in which human performance problems were previously found to exist. Finally, implementation of processes and programs that were significantly revised as a result of the events will be monitored and evaluated.

Post-restart actions

Normal NQA oversight of these actions will be applied via the audit and surveillance programs from a corrective actions standpoint.

Documentation

The QA leads will submit their assessment plans to the Manager, QA for review and approval. This Plan may take advantage of ongoing NQA audits to provide recovery oversight in related areas (e.g., EP, Training).

Results of NQA oversight activities will be documented on "observation forms." These will be uniquely numbered, annotated with the recovery areas to which they apply, and "rolled up" into one or more surveillance reports that will draw conclusions about performance of the Recovery organization and readiness for restart.

NQA Coordination of Recovery Oversight

During the assessment phase, NQA will conduct a daily meeting to discuss the ongoing findings and insights from its oversight activities. The Manager, QA will chair the meeting, which will be attended by QA leads assigned to the recovery areas. Other NQA staff may attend, as warranted (e.g., lead auditors who are performing oversight of specific areas involved with the recovery). These meetings are designed to provide a synergistic forum in which potential and actual issues can be discussed and validated by the broader group. NQA concerns from this meeting will be communicated by the Manager, NQA to the Recovery Manager at his daily Recovery meeting.

Approved:

H. R. Sager
Manager, Nuclear Quality Assurance and Oversight

Date: September 11, 1999

NRC Indian Point Unit Two Augmented Inspection Team Exit Meeting

Inspection Report 50-247/99-08

September 27, 1999

Agenda

- Introduction and Background - W. Ruland, Team Manager
- Preliminary Findings - J. Yerokun, Team Leader
- Consolidated Edison Comments - J. Groth, Chief Nuclear Officer, ConEd.
- Concluding Remarks - H. Miller, Regional Administrator, USNRC, Region I

Introduction and Background

- Establishment of the Augmented Inspection Team (AIT)
- Purpose of an AIT
- Review of Team Charter, Including Team Membership

AIT FINDINGS

Sequence of Events.

Safety Significance.

Personnel Performance.

Root Cause Areas.

SEQUENCE OF EVENTS

- Reactor Trip - Aug. 31, 1999, 2:31 P.M.
- 6.9 kv Buses 1, 2, 3, and 4 transfer from unit to station auxiliary transformer.
- Offsite power lost to 480 volt vital buses.
- All three emergency diesel generators start.

SEQUENCE OF EVENTS (continued)

- EDG 23 output breaker opens, vital bus 6A without power.
- Battery charger 24 de-energized.
- Battery 24 low voltage - 9:55 P.M.
  - Loss of instrument bus 24 and most control room alarms.
- Declared Unusual Event - 9:55 P.M.

SEQUENCE OF EVENTS (continued)

- Emergency power restored to Bus 6A -9/1/99, 12:43 A.M.
- Instrument bus 24 and the control room alarms restored.
- Unusual Event terminated - 3:30 A.M.
- Offsite power restored to vital bus 6A - 9:08P.M.

SAFETY SIGNIFICANCE

- Degraded Systems:
  - Auxiliary feedwater system
  - Emergency diesel generator
  - Pressurizer power operated relief valve

SAFETY SIGNIFICANCE (continued)

- Loss of bus 6A resulted in loss of power to:
  - Some emergency core cooling equipment.
  - One motor-driven auxiliary feedwater pump.
  - One normally closed PORV block valve.
  - Automatic control of one auxiliary feedwater flow control valve.

SAFETY SIGNIFICANCE (continued)

- Risk Significance.
  - Risk increased due to the loss of power to redundant equipment.
- Safety Consequences:
  - There were no consequences to public health and safety.

PERSONNEL PERFORMANCE

- Operator performance was mixed. They were also challenged in some areas.
  - Accomplished Emergency Operating Procedures well.
  - Cycled the turbine-driven auxiliary feedwater pump.
  - Did not recognize entry into service water technical specification.
  - Slow in getting Bus 6A tagged out.

PERSONNEL PERFORMANCE (continued)

- The support provided to operators for recovery was weak in some important respects:
  - Use of of plant risk insights to prioritize and expedite actions was not properly communicated.
  - Weak coordination of temporary facility changes.
  - Slow development of appropriate contingencies for impending equipment losses.
  - Untimely restoration of power supplies.

ROOT CAUSE AREAS

- Contributing to the event and complicating the response to it were problems in the following areas:
  - Configuration Control
  - Management Oversight
  - Corrective Actions
  - Technical Support

CONFIGURATION CONTROL

- Deficiencies in configuration control:
  - Station auxiliary transformer load tap changer was not maintained in the "AUTO" position.
  - The 23 EDG output breaker over-current trip setting was not properly set.
  - The 480 volt bus degraded voltage relay reset setting was not verified.

MANAGEMENT OVERSIGHT

- Management oversight and response to the event were weak in several respects:
  - Focus on shutdown work plans and schedules rather than event response.
  - Weak coordination and use of resources for plant recovery.
- The utility assessment team reviews were thorough in evaluating the organization's response and identifying weaknesses.

CORRECTIVE ACTIONS

- Important corrective action problems:
  - Root causes for prior anomalies and deficient conditions associated with the reactor protection system had not been established.
  - Untimely repair of load tap changer malfunction that was identified in September 1998.

TECHNICAL SUPPORT

- Weak technical support before and during the event:
  - Prior RPS anomalies were not properly communicated within and across organizational boundaries.
  - Degraded voltage relay setting was not periodically tested.

TECHNICAL SUPPORT (continued)

- Weak technical support (continued)
  - Conflicting procedures existed for load tap changer control.
  - Lack of a recovery procedure for the loss of an individual 480 Volt emergency bus.
  - Emergency Preparedness procedure missed Unusual Event declaration.