

official

AUG 14 1990

Docket Nos. 50-325, 50-324
License Nos. DPR-71, DPR-62

Carolina Power and Light Company
ATTN: Mr. Lynn W. Eury
Executive Vice President
Power Supply
P. O. Box 1551
Raleigh, NC 27602

Gentlemen:

SUBJECT: ENFORCEMENT CONFERENCE SUMMARY

This letter refers to the Enforcement Conference held at our request on August 6, 1990. This meeting concerned activities authorized for your Brunswick facility. The issues discussed at this conference related to an event associated with a Traversing In-Core Probe (TIP) system modification that had the potential for significant personnel radiation exposures. A summary, a list of attendees, and a copy of your handout are enclosed. This meeting provided a better understanding of the TIP system, pertinent details of modification work, the enforcement issues, and the status of your corrective actions. We are continuing our review of these issues to determine the appropriate enforcement action.

In accordance with 10 CFR 2.790(a), a copy of this letter and its enclosures will be placed in the NRC Public Document Room.

Should you have any questions concerning this matter, please contact us.

Sincerely,
*original signed
by J. Milhous
for*
Stewart D. Ebnetter
Regional Administrator

- Enclosures:
1. List of Attendees
2. Meeting Summary
3. Visual Aids

cc w/encls: (See page 2)

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PDR ADUCK 05000324
Q PDC

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bcc w/encls: (See page 3)

Carolina Power and Light Company

3

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for
RII:DRSS

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8/12/90

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8/13/90

ENCLOSURE 1

List of Attendees

Carolina Power and Light

R. A. Watson, Senior Vice President-Nuclear
R. B. Starkey, Vice President-Brunswick Nuclear Project
J. L. Harness, General Manager-Brunswick Nuclear Project
K. B. Altman, Manager-Regulatory Compliance
L. I. Loflin, Manager-Nuclear Licensing
J. R. Holder, Manager-Outage Management-Brunswick Nuclear Project
L. S. Rowell, Senior Engineer-Nuclear Licensing

NRC Region II

J. L. Milhoan, Deputy Regional Administrator, Region II (RII)
E. G. Adensam, Director, Project Directorate II-1, Nuclear Reactor Regulation (NRR)
J. P. Stohr, Director, Division of Radiation Safety and Safeguards (DRSS), RII
G. R. Jenkins, Director, Enforcement and Investigation Coordination Staff, RII
E. W. Merschhoff, Acting Director, Division of Reactor Safety, RII
M. V. Sinkule, Acting Deputy Director, Division of Reactor Projects (DRP), RII
D. M. Verrelli, Chief, Projects Branch 1, DRP, RII
D. M. Collins, Chief, Emergency Preparedness and Radiological Protection Branch (EPRP), DRSS, RII
J. P. Potter, Chief, Facilities Radiation Protection Section (FRP), EPRP, DRSS, RII
F. N. Wright, Radiation Specialist, FRP, EPRP, DRSS, RII
M. M. Glasman, Project Engineer, DRP, RII
J. C. Wang, Health Physicist, NRR
L. Eckert, Health Physics Intern, FRP, EPRP, DRSS, RII

ENCLOSURE 2

Enforcement Conference Summary

The Deputy Regional Administrator opened the meeting by stating the seriousness with which the NRC views radiological events, and the importance of work controls relative to prevention of excessive exposure to personnel. Following an introduction by the Senior Vice President-Nuclear, licensee personnel presented an overview of the event, the response and corrective actions, a sequence of events, and the dose determined for the individuals involved. In addition, the licensee performed a Human Performance Evaluation System investigation, which identified three inappropriate actions, and associated causal factors. The licensee then presented their immediate corrective actions and long-term corrective actions to preclude recurrence. The Deputy Regional Administrator closed the meeting by stating his concerns that the corrective action should be applied to all CP&L facilities, and also indicated the information was well-presented and informative. Questions from NRC staff were answered satisfactorily by licensee representatives.

An error was identified in the details section of the inspection report issued by the NRC on July 26, 1990. The fourth paragraph of Section 2.e erroneously reported an extremity dose of 1,637 rem. The extremity dose should have been 1.637 rem.

BRUNSWICK NUCLEAR PROJECT
ENFORCEMENT CONFERENCE RELATED TO
UNPLANNED PERSONNEL RADIATION EXPOSURE

AUGUST 6, 1990

INTRODUCTION

AL WATSON
SENIOR VICE PRESIDENT
NUCLEAR

OVERVIEW

RUSS STARKEY
VICE PRESIDENT
BRUNSWICK NUCLEAR PROJECT

DESCRIPTION OF EVENTS

BRUCE ALTMAN
MANAGER-REGULATORY COMPLIANCE

RADIOLOGICAL EXPOSURE
DETERMINATION/SAFETY SIGNIFICANCE

JOE HARNESS
PLANT GENERAL MANAGER

CAUSAL FACTORS/ROOT CAUSE

BRUCE ALTMAN

CORRECTIVE ACTIONS/CONCLUSIONS

RUSS STARKEY

CLOSING REMARKS

AL WATSON

OVERVIEW

DESCRIPTION OF EVENT

- 0 INADVERTENT WITHDRAWAL OF TRANSVERSING IN-CORE PROBE GAMMA DETECTOR

- 0 UNPLANNED PERSONNEL RADIATION EXPOSURE TO WHOLE BODY AND EXTREMITIES

RADIOLOGICAL EXPOSURE DETERMINATION/ SAFETY SIGNIFICANCE

- 0 NO RADIOLOGICAL DOSE LIMITS EXCEEDED

- 0 EVENT HAD NO IMPACT ON THE NUCLEAR SAFETY OF THE BRUNSWICK PLANT.

CAUSAL FACTORS/ROOT CAUSE

- 0 CAUSAL FACTORS IDENTIFIED

- 0 ROOT CAUSES DETERMINED AND UNDERSTOOD
 - INADEQUATE WORK CONTROL RESULTING FROM INADEQUATE SUPERVISION

OVERVIEW

IDENTIFICATION AND REPORTING

- 0 SELF IDENTIFIED
- 0 PROMPTLY REPORTED
- 0 IMMEDIATE CORRECTIVE ACTIONS TAKEN
- 0 NO 10CFR20 DOSE LIMITS EXCEEDED

CORRECTIVE ACTION TO PRECLUDE RECURRENCE

- 0 PROMPT
- 0 COMPREHENSIVE
- 0 SELF INITIATED
- 0 APPLIED ON A GENERIC BASIS

PRIOR NOTICE OF SIMILAR EVENTS

- 0 IE INFORMATION NOTICE 88-63
 - REVIEWED FOR APPLICABILITY
 - PREVENTIVE ACTIONS IDENTIFIED
 - ISOLATED FAILURE TO PROPERLY IMPLEMENT THE IDENTIFIED PREVENTIVE ACTIONS

PAST PERFORMANCE

- 0 ISOLATED OCCURRENCE
- 0 PERFORMANCE TRENDS SHOW IMPROVEMENT

CP&L REVIEW

OF

IEN 88-63

"HIGH RADIATION HAZARDS FROM IRRADIATED
INCORE DETECTORS AND CABLES"

CONCLUDED "...BACKBONE OF THE PROGRAM
TO PRECLUDE AN EVENT...IS THE PREJOB
BRIEFING AND TRAINING OF WORKERS..."

DESCRIPTION OF EVENT

BACKGROUND

- 0 EVENT OCCURRED DURING INSTALLATION OF PLANT MODIFICATION ON UNIT 1 TRANSVERSING IN-CORE PROBE (TIP) SYSTEM.

- 0 PLANT MODIFICATION TO REPLACE THE TIP NEUTRON DETECTORS WITH GAMMA DETECTORS.

- 0 GAMMA DETECTORS NEEDED TO SUPPORT NEW FUEL DESIGN SCHEDULED TO BE INSTALLED AT NEXT REFUELING (SEPTEMBER 1990).

- 0 GAMMA DETECTOR INSTALLATION REQUIRED DURING THIS FUEL CYCLE FOR COMPARISON OF NEUTRON-TIP AND GAMMA-TIP RESPONSE DATA, TEST SOFTWARE AND GAIN OPERATIONAL EXPERIENCE.

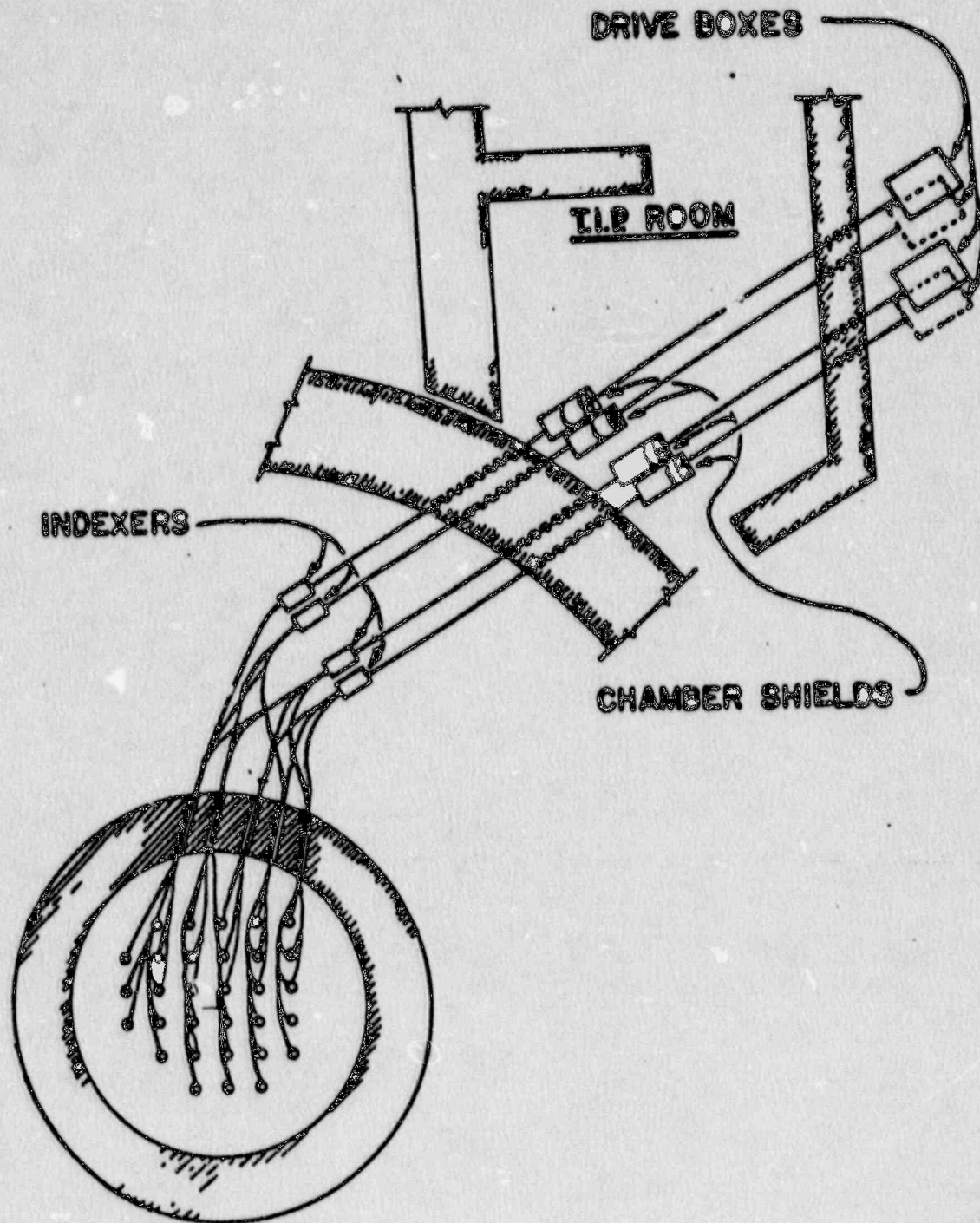
DESCRIPTION OF EVENT

BACKGROUND

0 TRANSVERSING IN-CORE PROBE (TIP) SYSTEM

- MEASURES AXIAL THERMAL NEUTRON FLUX PROFILE
IN THE REACTOR CORE.

- USED TO CALIBRATE THE LOCAL POWER RANGE
MONITORING DETECTORS.



DESCRIPTION OF EVENT

SEQUENCE OF ACTIVITIES

MONDAY, JULY 2 - NEUTRON TIP REMOVAL

- RECOGNIZED RADIOLOGICAL CONCERNS
- CONTINUOUS HEALTH PHYSICS COVERAGE
- AUGMENTED ENGINEERING COVERAGE
- PREJOB BRIEFING
- COMMUNICATIONS ESTABLISHED BETWEEN DRIVE UNITS AND TIP ROOM.
- NEUTRON TIP DETECTORS AND CABLES REMOVED FOR DISPOSAL IN ACCORDANCE WITH PLAN AND PROCEDURE.
- DOSE RECEIVED WAS 46% LESS THAN ESTIMATED (.054 VS .100 MAN-REM).

SEQUENCE OF ACTIVITIES (CONT.)

TUESDAY, JULY 3 - GAMMA TIP INSTALLATION

- PREJOB BRIEFING
- ENGINEERING COVERAGE
- INTERMITTENT HEALTH PHYSICS COVERAGE
- GAMMA TIP DETECTORS AND ASSOCIATED CABLES INSTALLED IN EACH DRIVE UNIT.
- GAMMA TIP A
 - COMMUNICATIONS ESTABLISHED BETWEEN DRIVE UNITS AND CONTROL ROOM.
 - DETECTOR INSTALLATION COMPLETED IN ACCORDANCE WITH PLAN AND PROCEDURES.

THURSDAY, JULY 5 - GAMMA TIP INSTALLATION

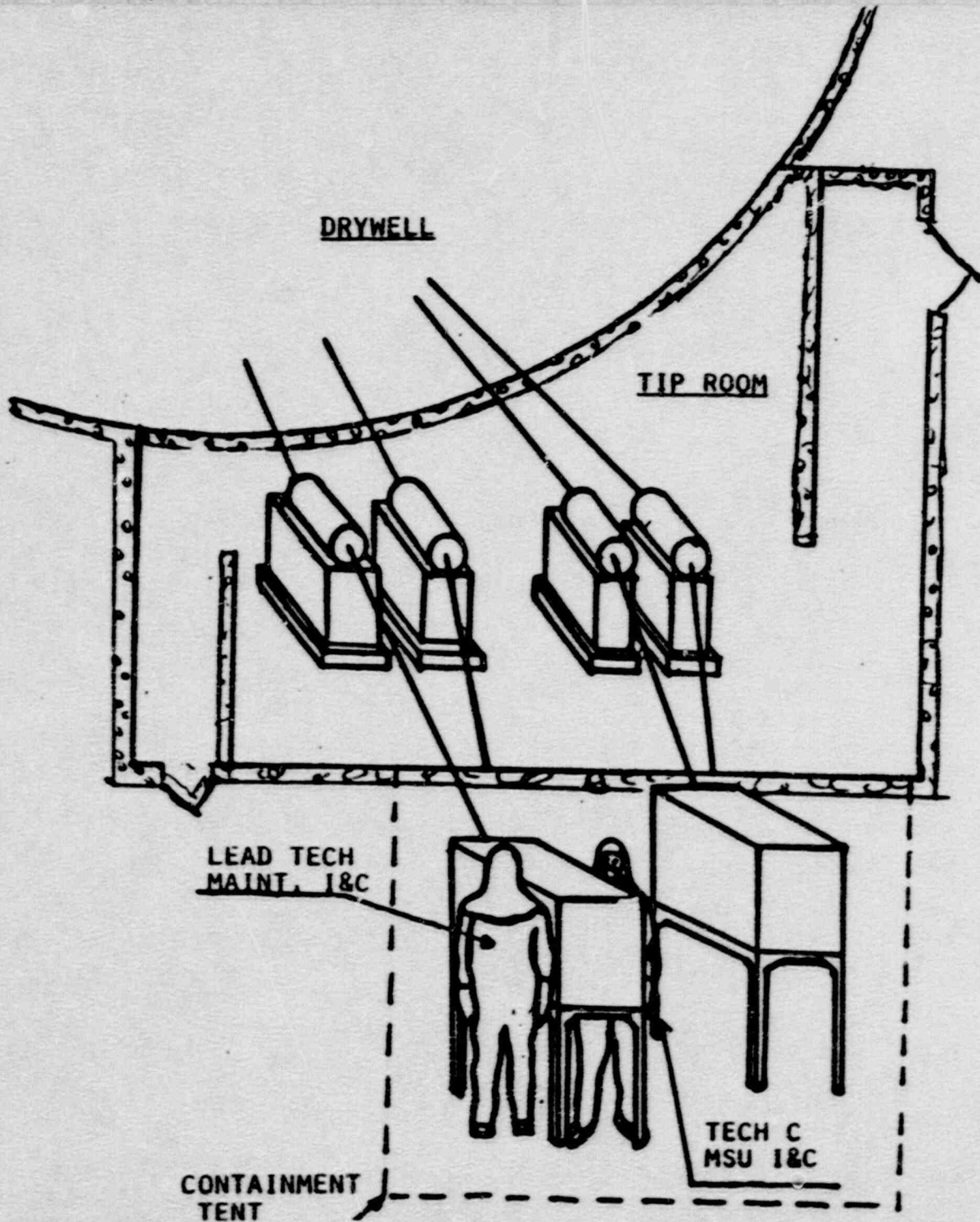
- PREJOB BRIEFING
- ENGINEERING COVERAGE
- INTERMITTENT HEALTH PHYSICS COVERAGE
- COMMUNICATIONS ESTABLISHED BETWEEN DRIVE UNITS AND CONTROL ROOM.
- GAMMA TIP B
 - DETECTOR INSTALLATION COMPLETED IN ACCORDANCE WITH PLAN AND PROCEDURES.
- GAMMA TIP C
 - DETECTOR INSTALLATION COMPLETED IN ACCORDANCE WITH PLAN AND PROCEDURES.

SEQUENCE OF ACTIVITIES (CONT.)

THURSDAY, JULY 5 - GAMMA TIP INSTALLATION (CONT.)

- GAMMA TIP D

- COMMUNICATIONS MAINTAINED BETWEEN I&C TECHNICIANS AT DRIVE UNIT AND IN CONTROL ROOM.
- DETECTOR MANUALLY INSERTED TO CORE TOP IN FIRST GUIDE TUBE AND CORE TOP LIMIT ADJUSTED.
- CLUTCH BINDING PROBLEM NOTED DURING INSERTION.
- DETECTOR MANUALLY RETRACTED FROM CORE TOP.
- DETECTOR INADVERTENTLY RETRACTED INTO DRIVE UNIT.
- PERSONAL DOSIMETRY AND AREA RADIATION MONITOR ALARMED.
- DETECTOR IMMEDIATELY REINSERTED.
- TECHNICIANS CHECKED PERSONAL DOSIMETRY, NOTIFIED ENGINEERS, EXITED AREA AND REPORTED TO HEALTH PHYSICS.



DRYWELL

TIP ROOM

LEAD TECH
MAINT. I&C

TECH C
MSU I&C

CONTAINMENT
TENT

RADIOLOGICAL DETERMINATION

0 RADIOLOGICAL CONDITIONS

- 5-7 MR/HR GENERAL AREA
- 50 MR/HR ON CONTACT WITH CABLE
- 16-56 MRAD BETA INSIDE TIP BOX
- 2,000-32,000 D/M/100CM² INSIDE TENT
- 5.1 E-11 UCI/CC AIRBORNE ACTIVITY
- 2000 CFM HEPA RUNNING FOR TENT

0 RADIOLOGICAL PROTECTION (RWP 90-1680)

- TLD & 500 MREM SPRD
- DOUBLE ANTI-C'S
- DOUBLE RUBBER GLOVES
- DOUBLE CLOTH HOODS
- FULL FACE RESPIRATOR
- ALARMING DOSIMETER
- CONTINUOUS AIR SAMPLING

RADIOLOGICAL DETERMINATION

0 CRITICAL PARAMETERS

- FROM INTERVIEWS AND MOCKUPS
 - TIP IN CORE 3 MINUTES
 - CABLE GRABBED 7 INCHES FROM TIP
 - CABLE HELD FOR 4 SECONDS

0 FROM CALCULATIONS

- ACTIVATION OF CABLE 0.59 CI/FT
 - 98.6% MN-56 - $T_{1/2} = 2.58$ HRS.
- ACTIVATION OF TIP 1.241 CI
 - 81.5% AL-28 $T_{1/2} = 2.24$ MIN.

RADIOLOGICAL DETERMINATION

0 RADIATION EXPOSURE

- WHOLE BODY DOSE 0.405 REM TLD

- GAMMA EXTREMITY DOSE (MICROSHIELD)
 - FROM TIP 0.042 REM
 - FROM CABLE 1.353 REM

- BETA DOSE (HINE & BROWNELL, CHAPTER 16)
 - FROM TIP N/A
 - FROM CABLE 8.8 REM

- TOTAL DOSE TO HAND 10.6 REM

SIGNIFICANT RADIOLOGICAL CHALLENGES

- 0 REACTOR RECIRCULATION PIPE REPLACEMENT

- 0 CHEMICAL DECONTAMINATION OF REACTOR RECIRCULATION PIPING

- 0 DECHANNELING OF SPENT FUEL AND SHIPPING OF CHANNELS IN PREPARATION OF FUEL SHIPPING

- 0 SHIPPING SPENT FUEL TO HARRIS PLANT

- 0 DRAINING OF REACTOR VESSEL FOR INVESSEL WORK

- 0 HOT PARTICLE PROGRAM

- 0 HYDROGEN WATER CHEMISTRY

- 0 MIXED WASTE PROGRAM

SIGNIFICANT RADIOLOGICAL ISSUES

0 LOCKED HIGH RADIATION AREA EVENTS

- SIX EVENTS OCCURRED DURING THE LAST HALF OF 1989 AND EARLY 1990 (NINE MONTH PERIOD) IN WHICH LOCKED HIGH RADIATION DOORS WERE FOUND UNLOCKED.

- SEVERAL CORRECTIVE ACTIONS HAVE BEEN SUCCESSFULLY IMPLEMENTED TO PREVENT RECURRENCE.
 - MANAGEMENT INVOLVEMENT
 - TRAINING
 - PLANT POSTING
 - KEY CONTROL TO E&RC
 - SIGNATURE FORM DOCUMENTING KEY USE

SIGNIFICANT RADIOLOGICAL ISSUES

0 INTERNAL CONTAMINATION EVENTS

- IN 1988, THREE INCIDENTS OCCURRED WHERE A TOTAL OF FIVE PEOPLE RECEIVED MINOR UPTAKES (LESS THAN 6.6% MPOB).
- IN 1989, SIX INCIDENTS OCCURRED WHERE A TOTAL OF TEN PEOPLE RECEIVED MINOR UPTAKES (LESS THAN 8.2% MPOB).
- IN 1990, THERE HAVE BEEN TWO INCIDENTS WHERE A TOTAL OF SEVEN PEOPLE RECEIVED MINOR UPTAKES (LESS THAN 5.3% MPOB).
- SEVERAL CORRECTIVE ACTIONS HAVE BEEN SUCCESSFULLY IMPLEMENTED TO PREVENT RECURRENCE.
 - CONTAMINATION EVENT INVESTIGATION REPORT
 - IMPLEMENTATION OF RETRAINING PROGRAM FOR REPEAT OFFENDERS OR SPECIAL NEEDS
 - INCREASED EMPLOYEE AND MANAGEMENT AWARENESS
 - IMMEDIATE AND SECOND LINE SUPERVISOR NOTIFIED ON EVERY CONTAMINATION EVENT
 - USE OF COMMUNICATION MEDIA (VIDEO, WEEKLY MEMO)
 - GOAL STATUSED BY PLANT AND OUTAGE MANAGEMENT

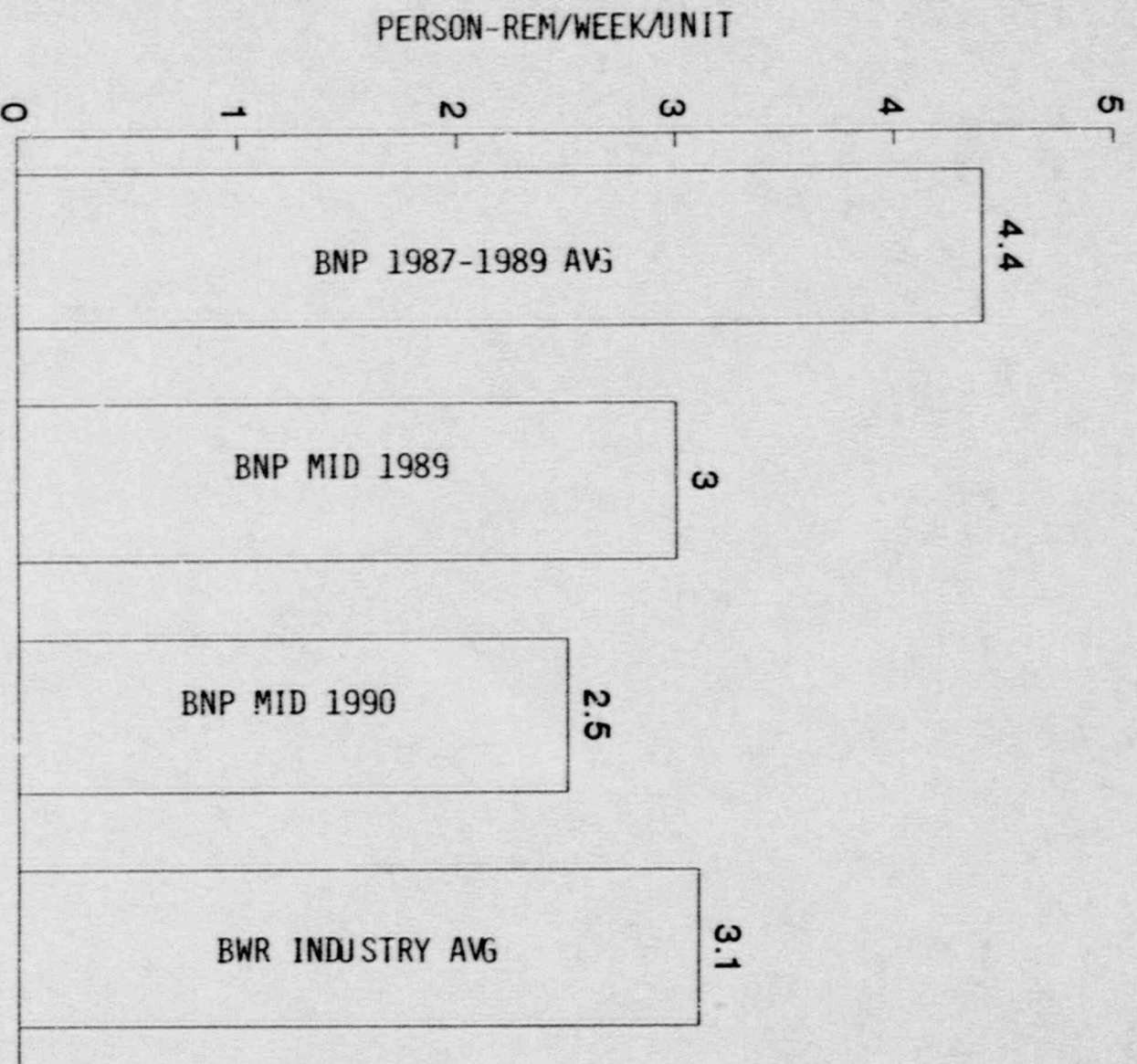
HEALTH PHYSICS PROGRAM IMPROVEMENTS

- 0 LOCKED HIGH RADIATION AREA KEY CONTROL
- 0 ALARMING DOSIMETER
- 0 COUNTING ROOM EQUIPMENT
- 0 EXPERIENCE LEVEL OF STAFF - VERY LITTLE TURNOVER
- 0 RADIOACTIVE WASTE MINIMIZATION
- 0 RADIOACTIVE SHIPPING PROGRAM
- 0 WHOLE BODY CONTAMINATION MONITORS
- 0 SINGLE EGRESS POINT
- 0 HIGH SENSITIVITY PORTAL MONITORS AT EACH EXIT FROM THE SITE
- 0 SIGNIFICANT REDUCTION IN CONTAMINATED SQUARE FOOTAGE - APPROXIMATELY 35,000 SQUARE FEET OR 6%
- 0 SINGLE POINT ACCESS POINT (UNDER CONSTRUCTION)
- 0 NEW HEALTH PHYSICS WORK SPACE (UNDER CONSTRUCTION)

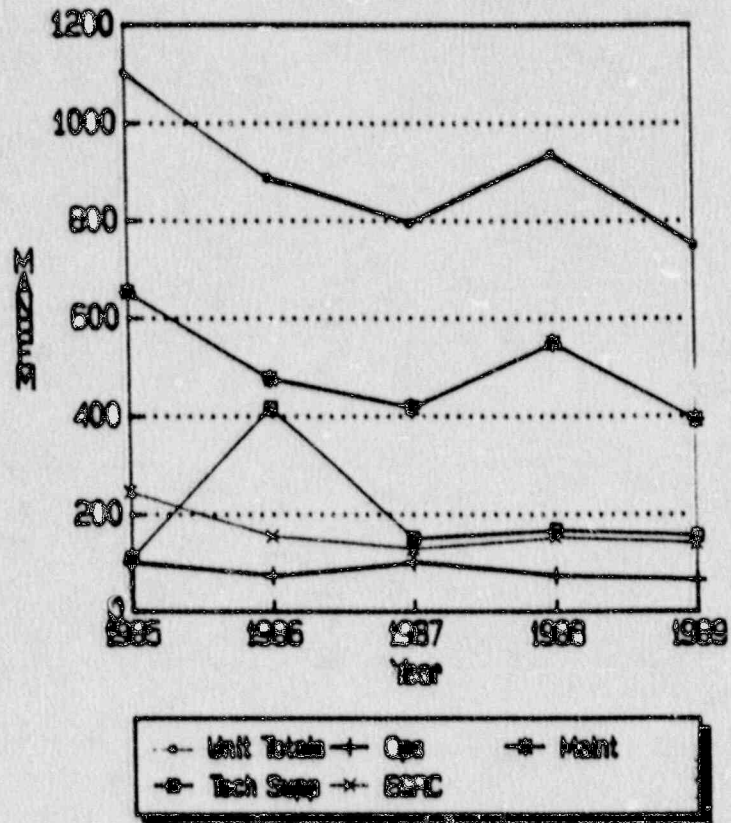
ALARA/DOSE REDUCTION EFFORTS

- 0 CORPORATE DOSE REDUCTION PROGRAM
- 0 ALARA INCENTIVES AND PENALTIES INCLUDED IN MAJOR OUTAGE CONTRACTS
- 0 REWORK DEFINITION AND IMPROVED ACCOUNTABILITY
- 0 IMPROVED HOT SPOT CONTROL PROGRAM
- 0 ACTIVE ALARA COMMITTEE WITH THREE WORKING SUBCOMMITTEES
- 0 USE OF VIDEO CAMERAS IN DRYWELL, RWCU, TURBINE BUILDINGS AND ON REFUELING FLOOR
- 0 IMPROVED REMOTE RADIATION MONITORING IN REACTOR BUILDINGS, TURBINE BUILDINGS AND RADWASTE BUILDING
- 0 IMPROVEMENTS TO BSP-8, BNP RADIATION EXPOSURE BUDGETING
- 0 ROUTINE MANAGER ALARA MEETINGS WITH UNIT AND SECTION MANAGERS
- 0 POST VALVE MAINTENANCE CLEANUP (COBALT REDUCTION)
- 0 BRUNSWICK TEAM VISITED HATCH PLANT ON DOSE REDUCTION FACT FINDING MISSION.
- 0 MANAGEMENT COMMITMENT TO REDUCE OUTAGE LENGTH
- 0 IMPROVEMENTS FOR ALARA IN OUTAGE SCOPE CHANGE REQUESTS
- 0 IMPROVED STATUSING OF PLANT EXPOSURES

NON-OUTAGE EXPOSURE RATE BNP VS BWR



Plant Manrem Trend



22

NUCLEAR SAFETY SIGNIFICANCE

- 0 NO IMPACT ON NUCLEAR SAFETY BOTH DURING AND SUBSEQUENT TO THE EVENT.

- 0 NO DEGRADATION OF REACTOR COOLANT PRESSURE BOUNDARY.

- 0 NO CORE THERMAL LIMITS EXCEEDED.

- 0 NO INCREASE IN THE PROBABILITY OF OCCURRENCE OR CONSEQUENCES OF ANY PREVIOUSLY EVALUATED ACCIDENT.

- 0 NO REDUCTION IN THE MARGIN OF SAFETY AS DEFINED IN THE TECHNICAL SPECIFICATION BASES.

INVESTIGATIONS PERFORMED

0 PLANT INCIDENT REPORT

- INVESTIGATED BY RESPONSIBLE ORGANIZATION
- MANAGEMENT OVERSIGHT

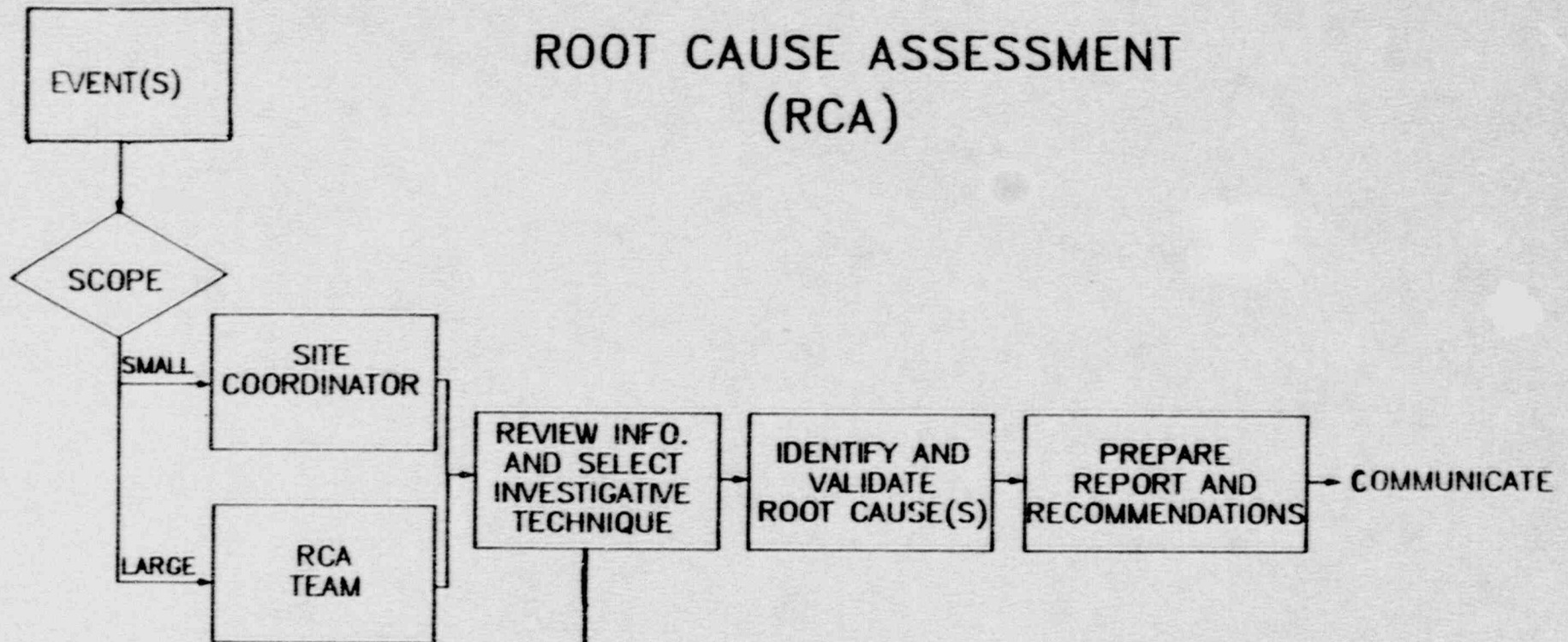
0 ENVIRONMENTAL AND RADIATION CONTROL (E&RC) EXPERIENCE REPORT

- DETAILED RADIOLOGICAL INVESTIGATION
- BASIS AND CALCULATIONS FOR DOSE ASSESSMENT
- PERFORMED BY E&RC SUPERVISORY PERSONNEL

0 HUMAN PERFORMANCE EVALUATION SYSTEM (HPES) INVESTIGATION

- PERFORMED BY:
 - HPES EVALUATOR FROM THE RESPONSIBLE ORGANIZATION
 - HPES COORDINATOR FROM REGULATORY COMPLIANCE
- BASED UPON:
 - WRITTEN STATEMENTS BY PARTICIPANTS TAKEN IMMEDIATELY AFTER THE EVENT
 - PERSONNEL INTERVIEWS
 - EVENT AND CAUSAL FACTORS CHART

ROOT CAUSE ASSESSMENT (RCA)

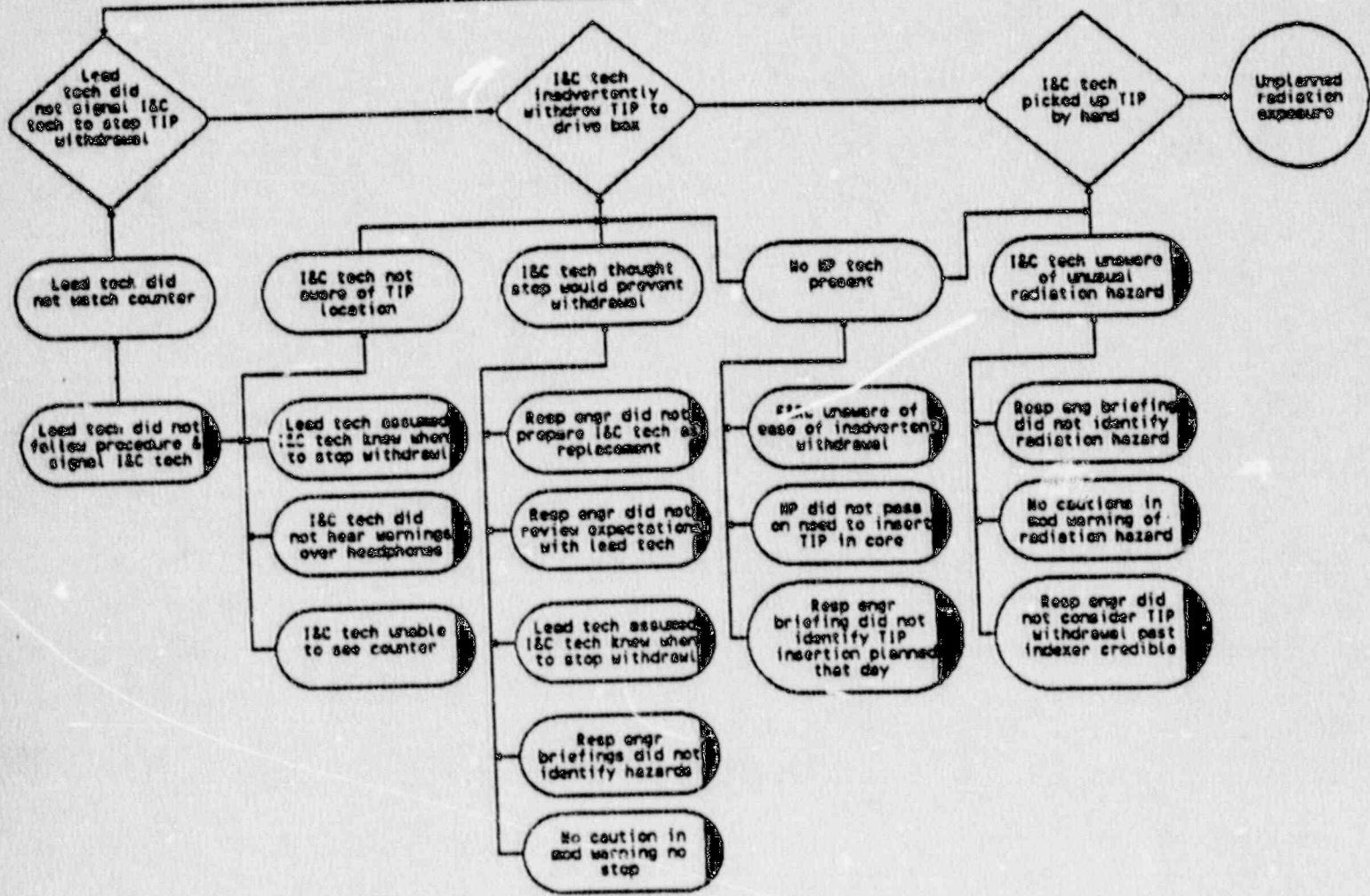
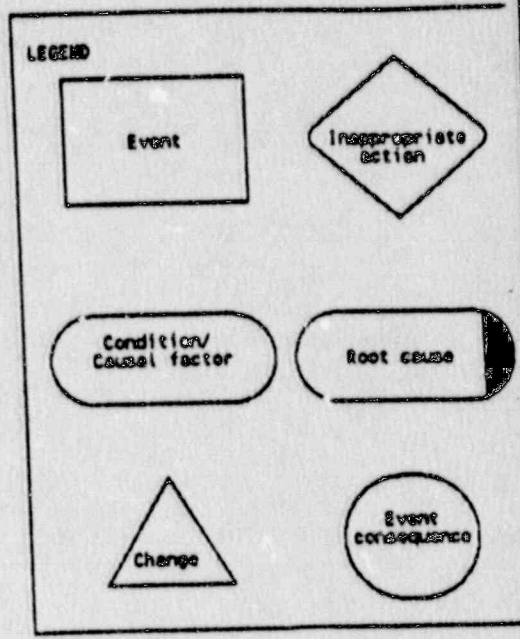
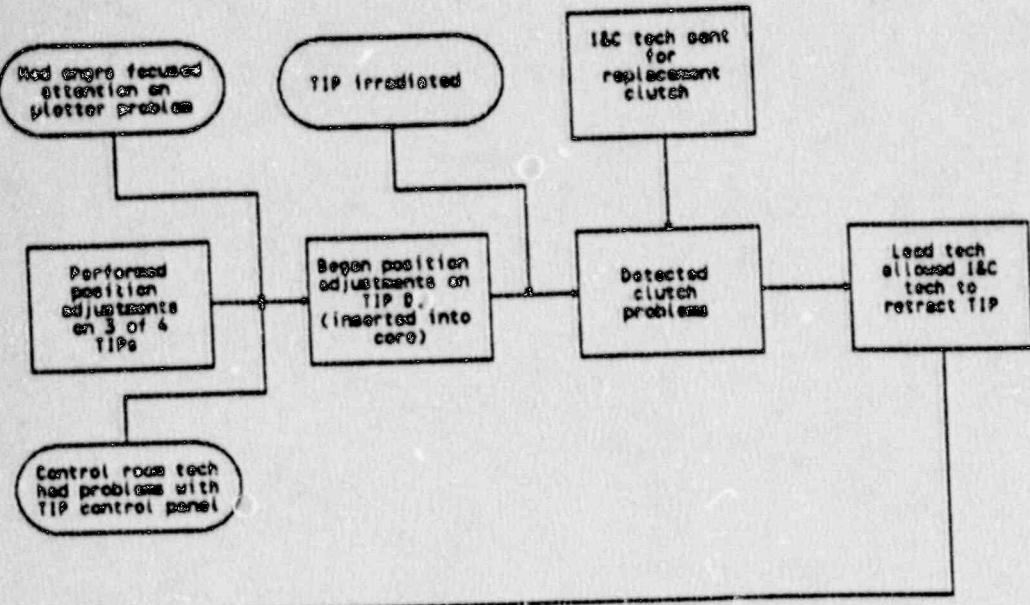


BENEFITS

- * FOCUS ON INAPPROPRIATE ACT(S)
- * STANDARDIZED APPROACH
- * COMPREHENSIVE

- INTERVIEWS/DATA GATHERING
- EVENT & CAUSAL FACTOR CHART
- HUMAN PERFORMANCE ENHANCEMENT SYSTEM
 - BEHAVIORAL ANALYSIS
 - CAUSAL ANALYSIS
 - SITUATIONAL ANALYSIS

Some TIP 'D' Retracted to Drive Box
Simplified Event and Causal Factor Chart



ROOT CAUSE ANALYSIS

0 THREE INAPPROPRIATE ACTIONS IDENTIFIED WHICH DIRECTLY RESULTED IN THE UNPLANNED EXPOSURE:

I. LEAD I&C TECHNICIAN DID NOT SIGNAL I&C TECHNICIAN ON HAND-CRANK TO STOP TIP DETECTOR WITHDRAWAL.

II. I&C TECHNICIAN INADVERTENTLY WITHDREW TIP DETECTOR PAST INDEXER AND INTO THE DRIVE UNIT.

III. I&C TECHNICIAN PICKED UP IRRADIATED TIP DETECTOR CABLE WITH HIS HAND AND REINSERTED IT INTO THE DRIVE TUBE.

INAPPROPRIATE ACTION I

0 ACTION

- LEAD I&C TECHNICIAN DID NOT SIGNAL I&C TECHNICIAN ON HAND-CRANK TO STOP TIP DETECTOR WITHDRAWAL.

0 CAUSAL FACTORS

- DISCOVERED PROBLEM WITH CLUTCH THAT REQUIRED CORRECTION.
- LEAD I&C TECHNICIAN FOCUSED ATTENTION ON CLUTCH OPERATION INSTEAD OF POSITION INDICATION.
- LEAD I&C TECHNICIAN PRESUMED I&C TECHNICIAN ON HAND-CRANK KNEW WHEN TO STOP TIP DETECTOR WITHDRAWAL.

0 ROOT CAUSE

- PERSONNEL
 - LEAD I&C TECHNICIAN DID NOT FOLLOW PROCEDURE AND SIGNAL I&C TECHNICIAN ON HAND-CRANK TO STOP.

INAPPROPRIATE ACTION II

0 ACTION

- I&C TECHNICIAN INADVERTENTLY WITHDREW TIP DETECTOR PAST INDEXER AND INTO THE DRIVE UNIT.

0 CAUSAL FACTORS

- I&C TECHNICIAN ON HAND-CRANK WAS NOT AWARE OF THE EXACT LOCATION OF THE DETECTOR.
- I&C TECHNICIAN ON HAND-CRANK THOUGHT STOPS WOULD AUTOMATICALLY HALT WITHDRAWAL.
- INCREASING RADIATION LEVELS FROM THE APPROACHING TIP DETECTOR WERE NOT DETECTED.

INAPPROPRIATE ACTION II (CONT.)

0 ROOT CAUSES

- PERSONNEL

- LEAD I&C TECHNICIAN DID NOT FOLLOW PROCEDURE AND SIGNAL THE TECHNICIAN ON HAND-CRANK TO STOP.
- LEAD I&C TECHNICIAN PRESUMED I&C TECHNICIAN ON HAND CRANK KNEW WHEN TO STOP.
- I&C TECHNICIAN ON HAND-CRANK DID NOT HEAR THE WARNING TO STOP FROM THE CONTROL ROOM OVER THE HEADPHONES.

- WORK CONTROL

- RESPONSIBLE ENGINEER ASSIGNED AN INADEQUATELY PREPARED I&C TECHNICIAN TO THE JOB.
- THE RADIATION WORK PERMIT WAS REVISED TO DELETE CONTINUOUS HEALTH PHYSICS COVERAGE BECAUSE HEALTH PHYSICS PERSONNEL DID NOT UNDERSTAND THAT TIP DETECTOR INSERTION INTO THE CORE WAS NECESSARY.
- RESPONSIBLE ENGINEER DID NOT DISCUSS TIP WORK HAZARDS OR CONSEQUENCES WITH THE I&C TECHNICIAN DURING PRE-JOB BRIEFINGS.

INAPPROPRIATE ACTION II (CONT.)

0 ROOT CAUSES (CONT.)

- PROCEDURES

- PROCEDURE DID NOT CONTAIN CAUTIONS/
WARNING THERE WERE NO STOPS TO PREVENT
DETECTOR WITHDRAWAL.

- INTERMITTENT HEALTH PHYSICS COVERAGE FOR
WORK AT DRIVE UNIT WAS SPECIFIED BECAUSE
HEALTH PHYSICS PERSONNEL WERE UNAWARE
THAT INSERTION INTO THE CORE WAS NEEDED.

- DESIGN

- AN OBSTRUCTION PREVENTED THE I&C
TECHNICIAN AT THE HAND-CRANK FROM
OBSERVING THE POSITION INDICATOR.

INAPPROPRIATE ACTION III

0 ACTION

- I&C TECHNICIAN PICKED UP IRRADIATED TIP DETECTOR CABLE WITH HIS HAND AND REINSERTED IT INTO THE DRIVE TUBE.

0 CAUSAL FACTORS

- I&C TECHNICIAN WAS NOT AWARE OF THE UNUSUAL RADIATION HAZARD PRESENTED BY THE NEWLY IRRADIATED TIP DETECTOR AND CABLE.
- HEALTH PHYSICS PERSONNEL WERE NOT PRESENT WHEN THE TIP DETECTOR WAS BEING RETRACTED.

INAPPROPRIATE ACTION III (CONT).

0 ROOT CAUSE

- WORK CONTROL

- RESPONSIBLE ENGINEER DID NOT DISCUSS POTENTIAL HAZARDS ASSOCIATED WITH TIP DETECTOR RETRACTION OR ITS PLANNED INSERTION INTO THE CORE DURING THE JOB BRIEFINGS.
- THE RADIATION WORK PERMIT WAS REVISED TO DELETE CONTINUOUS HEALTH PHYSICS COVERAGE BECAUSE HEALTH PHYSICS PERSONNEL DID NOT UNDERSTAND THAT TIP DETECTOR INSERTION INTO THE CORE WAS NECESSARY.

- PROCEDURES

- INTERMITTENT HEALTH PHYSICS COVERAGE FOR DRIVE UNIT WORK WAS SPECIFIED BECAUSE HEALTH PHYSICS PERSONNEL WERE UNAWARE THAT TIP DETECTOR INSERTION INTO THE CORE WAS NECESSARY.
- PLANT MODIFICATION PROCEDURE DID NOT CONTAIN CAUTIONS/WARNING OF THE POTENTIAL RADIATION HAZARD.

SUMMARY

- 0 PROJECT RECOGNIZED SIGNIFICANT RADIOLOGICAL HAZARDS ASSOCIATED WITH TIP WORK.
- EXTENSIVE PLANNING AND PREPARATIONS
 - FOCUSED ON REMOVAL OF OLD TIP DETECTORS WHICH WERE THE GREATEST HAZARD
 - STEP-BY-STEP REVIEW PERFORMED
 - REMOVAL ACTIVITY VERY SUCCESSFUL; HALF OF PLANNED RADIATION EXPOSURE INCURRED
- 0 INSTALLATION OF NEW TIP DETECTORS INAPPROPRIATELY ASSESSED AS A NORMAL MAINTENANCE ACTIVITY. JOB PLANNING DID NOT RECOGNIZE:
- EASE OF TIP DETECTOR RETRACTION TO DRIVE UNIT
 - NEED FOR EXPERIENCED PERSONNEL.
 - SIGNIFICANCE OF TIP DETECTOR INSERTION INTO CORE DURING INSTALLATION
- RESULTED IN:
- INADEQUATE SUPERVISION
 - INADEQUATE PROCEDURES
 - INADEQUATE PREJOB BRIEFINGS
 - ASSIGNMENT OF INEXPERIENCED PERSONNEL

CORRECTIVE ACTIONS

IMMEDIATE ACTIONS

ACTIONS TO PRECLUDE RECURRENCE

IMMEDIATE CORRECTIVE ACTIONS

- 0 STOPPED WORK

- 0 NOTIFICATIONS - MANAGEMENT INVOLVEMENT

- 0 DETERMINED PRELIMINARY CAUSES

- 0 ESTABLISHED SPECIAL CONTROLS TO PERMIT WORK COMPLETION

- 0 MANAGEMENT REVIEW OF OTHER ONGOING MODIFICATION ACTIVITIES TO IDENTIFY POTENTIAL PROBLEMS.

- 0 SHARED WITH INDUSTRY VIA NUCLEAR NETWORK

CORRECTIVE ACTIONS TO PRECLUDE RECURRENCE

0 PROCEDURES

0 TRAINING

0 MANAGEMENT RESPONSIBILITIES/ACCOUNTABILITIES

0 DISCIPLINARY ACTION

CORRECTIVE ACTION TO PRECLUDE RECURRENCE

PROCEDURES

- 0 POSTED WARNING SIGNS ON TIP MACHINES.

- 0 REVISED APPLICABLE TIP WORK PROCEDURES TO INCLUDE ADDITIONAL HEALTH PHYSICS REQUIREMENTS, STRONG PRECAUTIONS AND PREJOB BRIEFINGS.

- 0 REVISED PROCEDURES WHICH CONTAIN "CONDUCT OF OPERATIONS" PHILOSOPHY STATEMENTS TO EMPHASIZE THAT RESEARCH OF INDUSTRY EVENTS IS AN IMPORTANT PART OF JOB PLANNING.
 - MAINTENANCE
 - TECHNICAL SUPPORT
 - OPERATIONS
 - OUTAGE MANAGEMENT AND MODIFICATIONS SECTION

CORRECTIVE ACTIONS TO PRECLUDE RECURRENCE

TRAINING

0 EVENT SPECIFIC

- PLANT INCIDENT REPORT HAS BEEN REVIEWED BY APPROPRIATE PERSONNEL AT ALL THREE NUCLEAR SITES AND THE CORPORATE NUCLEAR ENGINEERING DEPARTMENT TO SENSITIZE THEM TO THE POTENTIAL RADIOLOGICAL HAZARDS ASSOCIATED WITH THE TIP SYSTEM.

0 GENERIC

- APPROPRIATE PERSONNEL HAVE BEEN TRAINED TO ENSURE THEY REMAIN SENSITIZED TO THE IMPORTANCE OF PROPER PROCEDURES, QUALIFIED PERSONNEL AND COMPLETE TASK REVIEWS TO ANTICIPATE ABNORMAL OCCURRENCES ALONG WITH BRIEFINGS PRIOR TO TASK INITIATION.

0 CORPORATE

- NUCLEAR ENGINEERING DEPARTMENT WILL IMPLEMENT AN ONGOING PROGRAM TO TRAIN ENGINEERS AND DESIGNERS ON INDUSTRY EVENTS WHICH ARE APPLICABLE TO DESIGN BY OCTOBER 1, 1990.

CORRECTIVE ACTIONS TO PRECLUDE RECURRENCE

0 MANAGEMENT RESPONSIBILITIES/ACCOUNTABILITIES

- PLANT GENERAL MANAGER AND OUTAGE MANAGER - PROJECTS HAS MET WITH SUPERVISION TO REAFFIRM:
 - 1) LINE MANAGEMENT'S RESPONSIBILITIES AND ACCOUNTABILITIES REGARDING WORK CONTROL.
 - 2) CONSEQUENCES OF FAILING TO FULFILL THESE RESPONSIBILITIES.

CORRECTIVE ACTION

DISCIPLINARY ACTION

0 INSTRUMENT AND CONTROL TECHNICIANS

0 HEALTH PHYSICS PERSONNEL

0 RESPONSIBLE ENGINEER

0 PROJECT MANAGER

CONCLUSIONS

IDENTIFICATION AND REPORTING

- 0 SELF IDENTIFIED
- 0 PROMPTLY REPORTED
- 0 IMMEDIATE CORRECTIVE ACTIONS TAKEN
- 0 No 10CFR20 DOSE LIMITS EXCEEDED

CORRECTIVE ACTION TO PRECLUDE RECURRENCE

- 0 PROMPT
- 0 COMPREHENSIVE
- 0 SELF INITIATED
- 0 APPLIED ON A GENERIC BASIS

PRIOR NOTICE OF SIMILAR EVENTS

- 0 IE INFORMATION NOTICE 88-63
 - REVIEWED FOR APPLICABILITY
 - PREVENTIVE ACTIONS IDENTIFIED
 - ISOLATED FAILURE TO PROPERLY IMPLEMENT THE IDENTIFIED PREVENTIVE ACTIONS

PAST PERFORMANCE

- 0 ISOLATED OCCURRENCE
- 0 PERFORMANCE TRENDS SHOW IMPROVEMENT