

PUBLIC 15-01  
1045

June 17, 1997

Mr. M. Wadley, Vice President  
Nuclear Generation  
Northern States Power Company  
414 Nicollet Mall  
Minneapolis, MN 55401

SUBJECT: PRAIRIE ISLAND MANAGEMENT MEETING

Dear Mr. Wadley:

On May 20, 1997, the NRC met with Northern States Power (NSP) management at the Region III Office in Lisle, Illinois.

The purpose of the meeting was to discuss the declining operations performance at Prairie Island Nuclear Generating Plant. Enclosed are copies of the agenda and handout provided by NSP staff at the meeting.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosures will be placed in the NRC's Public Document Room.

We appreciate NSP's cooperation in this matter.

Sincerely,

Orig. signed by Ronald N. Gardner for

Geoffrey E. Grant, Director  
Division of Reactor Projects

Docket No. 50-282  
Docket No. 50-306

Enclosure: Agenda and Handouts from  
May 20, 1997, meeting



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M. Wadley

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Plant Manager, Prairie Island

John W. Ferman, Ph.D.,

Nuclear Engineer, MPCA

State Liaison Officer, State  
of Minnesota

State Liaison Officer, State  
of Wisconsin

Tribal Council

Prairie Island Dakota Community

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# **NSP-NRC MANAGEMENT MEETING**

**May 20, 1997**

## **Agenda**

### Conduct of Operations Issues

Dick Lindsey, General Superintendent Safety Assessment

### Operations Human Performance Improvement Initiatives

Terry Silverberg, General Superintendent Plant Operations

### Operations Self Assessments

Joel Sorensen, Plant Manager

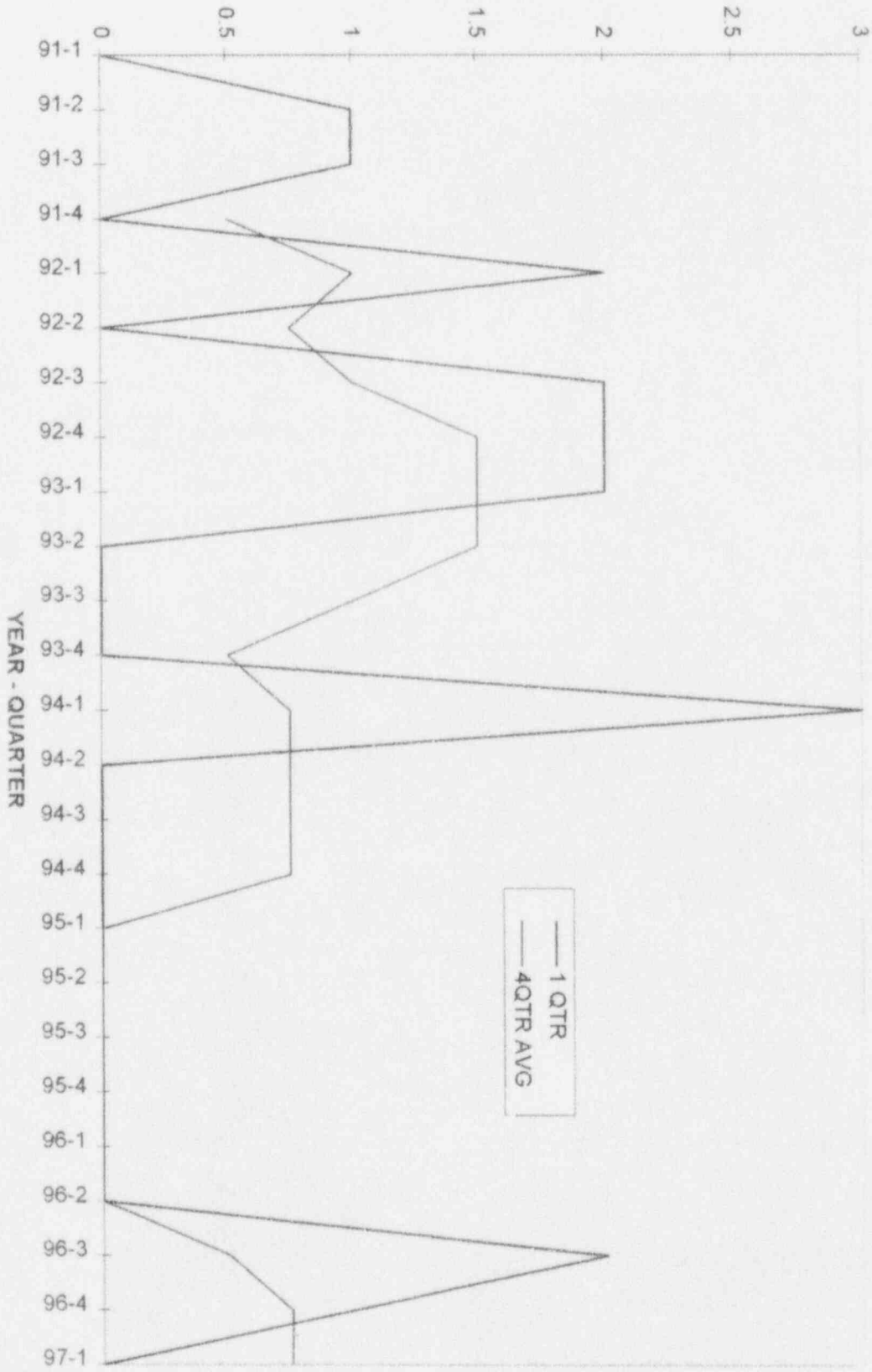
### PII Report

Dick Lindsey, General Superintendent Safety Assessment

# **CONDUCT OF OPERATIONS ISSUES**

- ESF ACTUATIONS IN 1996
- INTENTIONAL ENTRY INTO TECHNICAL SPECIFICATION 3.0.C
- EXCESSIVE DRAINING OF THE REACTOR COOLANT
- UNINTENTIONAL DILUTION OR POSITIVE REACTIVITY ADDITIONS

NUMBER OF ACTUATIONS



ESF ACTUATIONS DUE TO PERSONNEL ERROR

# ESF ACTUATIONS IN 1996

- TWO IN THE THIRD QUARTER,  
ONE IN THE LAST QUARTER
- ERROR TYPE -  
SKILL BASED ERRORS - INADEQUATE SELF  
CHECKING
- CORRECTIVE ACTION -  
SELF CHECKING CULTURE IMPROVEMENT  
SURVEILLANCE PROCEDURE UPGRADE  
PROGRAM

# **INTENTIONAL ENTRY INTO TECHNICAL SPECIFICATION 3.0.C**

- **ERROR TYPE -  
RULE BASED ERROR**
- **CORRECTIVE ACTION -  
SUPERVISOR TRAINING**

# EXCESSIVE DRAINING OF THE REACTOR COOLANT

- ERROR TYPES -
  - RULE BASED ERROR - PROCEDURE COMPLIANCE
  - SKILL BASED ERROR - VALVE MISPOSITIONED
- CORRECTIVE ACTION -
  - COMPREHENSIVE ASSESSMENT OF PROCEDURE COMPLIANCE ISSUE & IMPLEMENT RESULTING IMPROVEMENTS
  - PROCEDURE IMPROVEMENT
  - INDIVIDUAL COACHING AND COUNSELING



# UNINTENTIONAL DILUTION OR POSITIVE REACTIVITY ADDITIONS

- ERROR TYPE -  
RULE BASED - PROCEDURE COMPLIANCE
- CORRECTIVE ACTION -  
IMPROVE PROCEDURES  
COMPREHENSIVE ASSESSMENT OF PROCEDURE  
COMPLIANCE ISSUE & IMPLEMENT RESULTING  
IMPROVEMENTS  
EVALUATE SWI-O-10, OPERATIONS MANUAL USAGE,  
for 'PROCEDURE IN HAND' REQUIREMENTS

**PI OPERATIONS  
HUMAN PERFORMANCE  
IMPROVEMENT INITIATIVES**

# PRE-JOB BRIEFS 1994

- INSTITUTED AS A SPECIAL PROCEDURE
- INCORPORATED INTO STANDING PROCEDURES
- STRESSED IN TRAINING
- SUPERVISION BELIEVE IN IT
  - DEMAND IT
- BECOME OUR CULTURE

# COMMUNICATIONS

## 1995

- OLD STANDARD CONFUSING
  - NOT ENFORCED
- DEVELOPED NEW STANDARD
  - COMMUNICATION TRIANGLE
- TRAINED AND PROMOTION
  - FILM
- SUPERVISION BUY-IN
  - SUPERVISION DEMAND IT
- BECOME PART OF OUR CULTURE

# **SELF-CHECKING**

## **1996**

- HUMAN PERFORMANCE DECLINE
  - SKILL BASED ERRORS
- STRESS OF MANAGEMENT EXPECTATIONS
- DROP IN SKILL BASED LER'S
- MORE TO DO--PII RECOMMENDATIONS
- BECOMING CULTURE

# PROCEDURAL COMPLIANCE 1997

- ERTF
- CREW
- SOLUTION MUST BE
  - PRACTICAL
  - EASILY UNDERSTOOD
  - BELIEVED IN
- MUST BECOME PART OF OUR CULTURE!

# OPERATIONS TACTICS

- CREW SIMULATOR LISTS
  - STARTING POINT FOR MANY INITIATIVES
- REDUCE OPERATOR STRESS
  - GSPO VISION MEETINGS
  - OUTAGE WORKING HOURS
- PROMOTING E&A VISITS

# OPERATIONS TACTICS

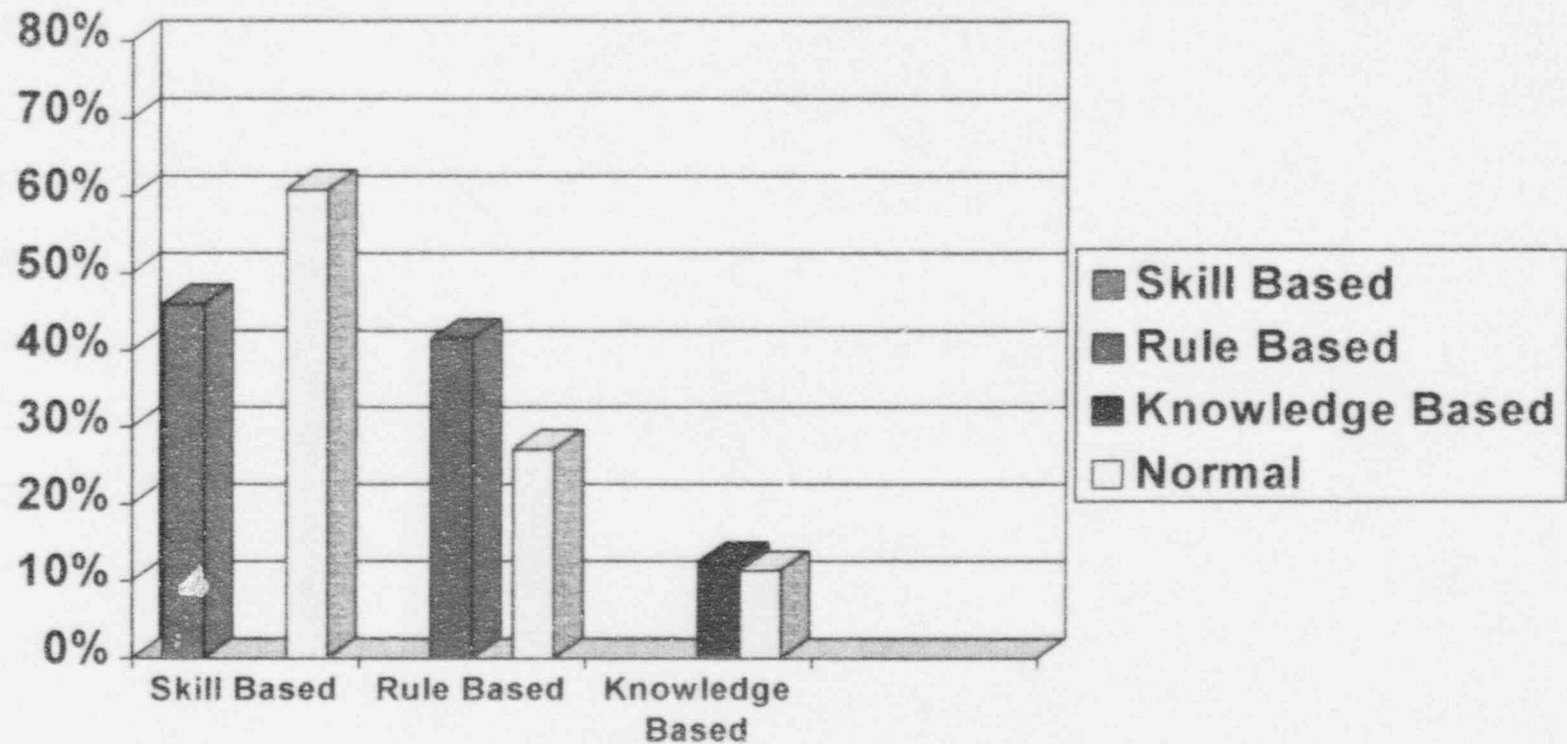
- DEPARTMENT STAFFING
  - YEAR ROUND WORK CONTROL CENTER
  - SRO'S TO TRAINING
- UTILIZATION OF CREWS FOR PERFORMANCE ISSUES
- ISSUES RESPONSE COORDINATOR



# Operations Self Assessments

- “Assessment of Operations Outage Implementation and Related Human Errors”
  - Requested by GSPO
  - Organizational and Programmatic Study
  - Completed 4th Quarter of 1995 by NSP ERTF
  - Looked at Operator Inappropriate Actions from 1989 to mid 1995
  - CCA, survey, and interviews

# Percentage of Inappropriate Actions by Human Error Type from 1989 to mid 1995 by NSP



# **“Assessment of Operations Outage Implementation and Related Human Errors”**

- Corrective Actions Taken
  - Outage Shift Manager (Shift Outage Coordinator)
  - SRO on floor for critical outage evolutions
  - Management expectation for supervisors’ responsibility for causes of operator inattention to detail (alertness, reduce time pressures, distractions, etc.)
  - Individual Status Report (ISR) used to prioritize SM/Crew work commitments

# **NSP Nuclear Generation Excellence in Human Performance Survey**

- Completed in August, 1996
- Survey of employee work place attitudes and perceptions
- First attempt at leading indicators
- Surveyed all departments including Ops
- Surveyed areas of
  - Individual Behaviors
  - Leadership Behaviors
  - Organizational Behaviors

# **Excellence in Human Performance Survey Areas for Improvement**

- Individual Behaviors
  - Methods to check co-workers
- Leadership Behaviors
  - Address personality conflict to minimize impact
- Organizational Behaviors
  - Eliminate jury rigs

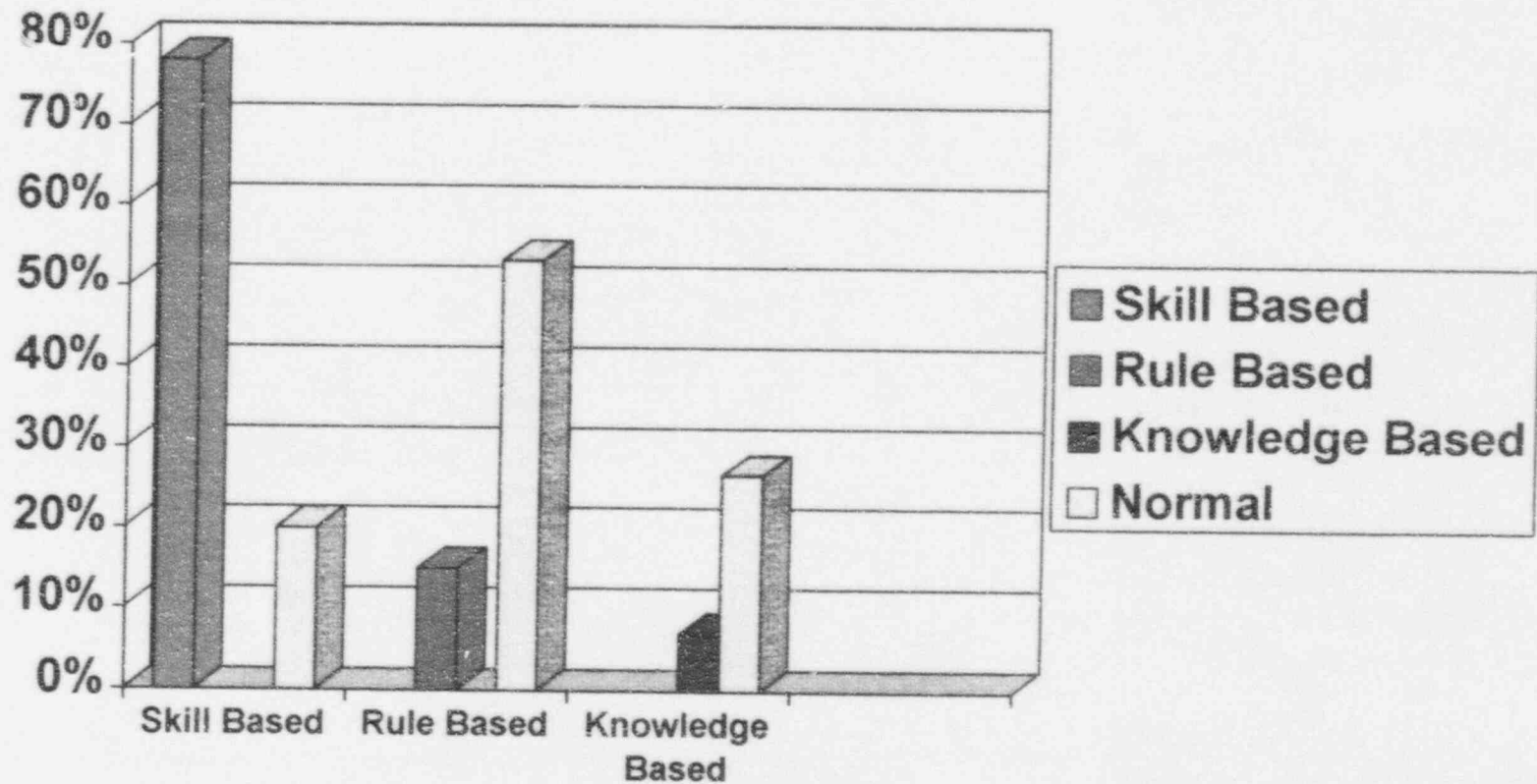
## **Why did PI need outside opinion ?**

- Study done by NSP in 1995 showed excessive rule based errors
  - Yet events in 1996 showing excessive skill based
  - Were inappropriate actions being categorized correctly ?
  - SAC recommended outside look similar to Monticello
- Validate Human Performance Survey

# **FPI/PII Common Cause Analysis of Operations Human Performance Concerns**

- Requested by GSPO, GSSA, PM
- Organizational and Programmatic Study
- Looked at Operator Inappropriate Actions in 1995 and 1996
- CCA, survey, and interviews

# Percentage of Inappropriate Actions by Human Error Type from 1995 & 1996 data by PII

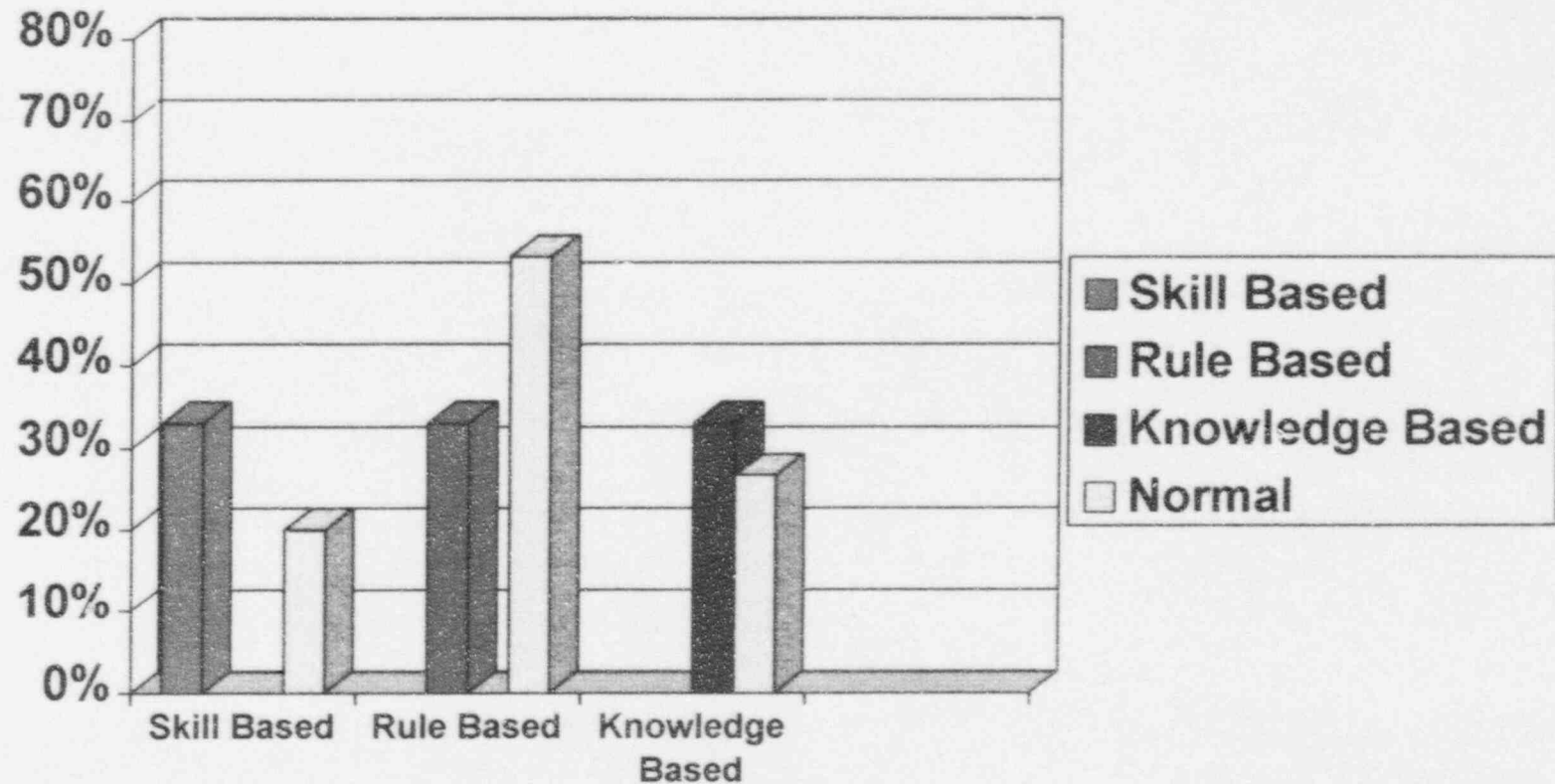




# **PII Common Cause Analysis of Operations Human Performance Concerns**

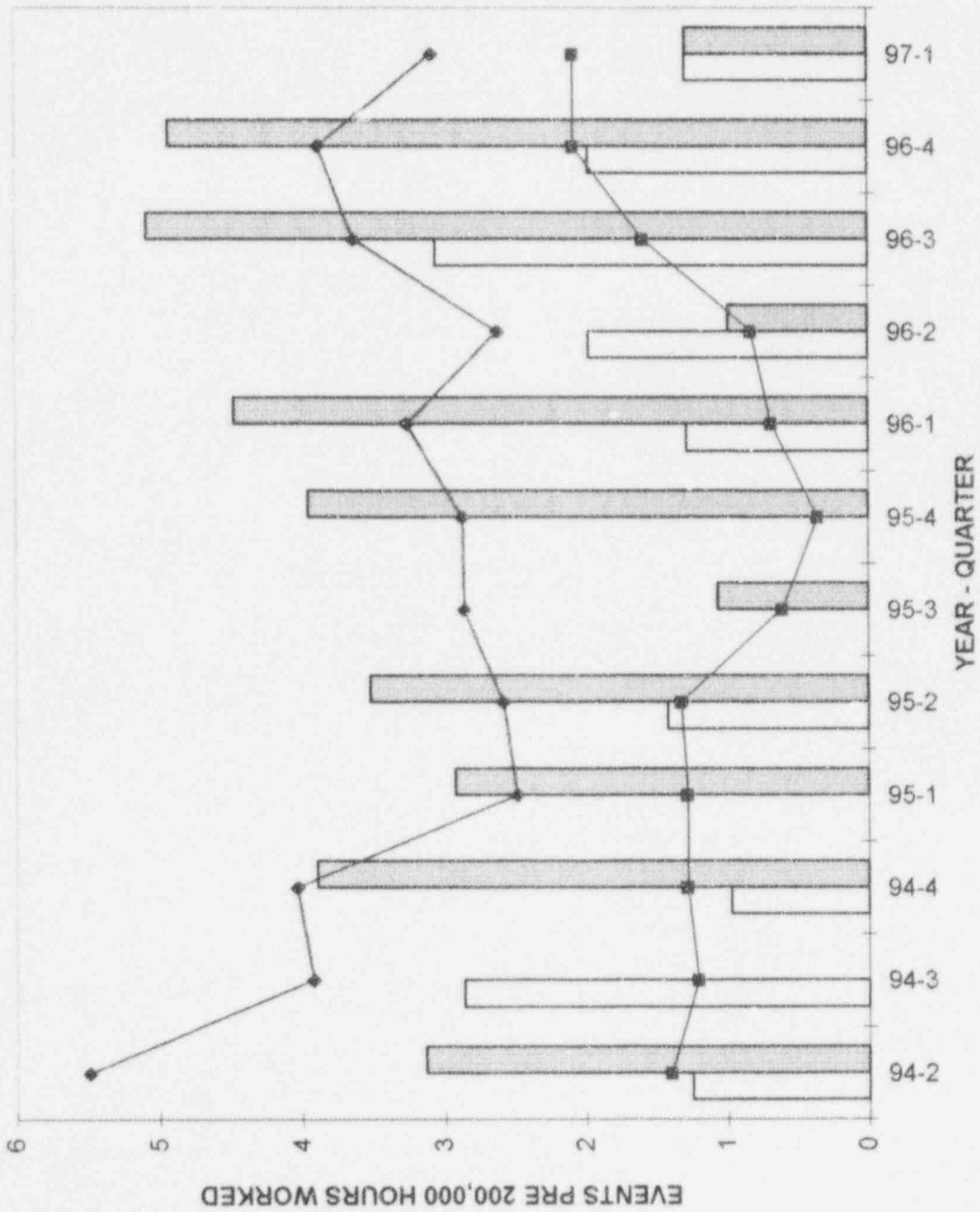
- **General Conclusions**
  - Inappropriate actions were being categorized correctly
  - But, industry “norms” were incorrect in our 1995 study
  - Further comparison of leading indicator surveys needed

# Percentage of Inappropriate Actions by Human Error Type 1st Quarter 1997 by NSP



# PRAIRIE ISLAND PERSONNEL ERROR RATES

Data through 3/31/97



# WHAT WERE PII's CONCLUSIONS?

- HUMAN PERFORMANCE IN THE OPERATIONS GROUP IS DECLINING
- THE DECLINE IS NOT ISOLATED TO OPERATIONS
- SEVERAL FACTORS EXTERNAL TO THE OPERATIONS GROUP HAVE COMBINED TO INCREASE THE BASE ERROR RATE, WHILE AN EFFECTIVE MANAGEMENT CONTROL LOOP (CONTINUOUS IMPROVEMENT LOOP) IS NOT IN PLACE
- THE EXTERNAL FACTORS CAN BE COLLECTIVELY CONSIDERED AS "WORK STRESS"

- “Changes in the industry due to utility deregulation have led to NSP initiatives to reduce cost. The department experiences some of these in the form of; staff reduction via attrition and hiring freezes, changes in work hours to reduce overtime, increased work load due to the same (or fewer) Operators performing more work, increasingly unpopular bargaining unit contract proposals, etc.”
- “The Nuclear Industry continuously focuses more attention on human performance, with less tolerance for errors, increasing the “fear of failure”.”

- “Several management changes have occurred. The new management is perceived by the staff as being very technically competent, though less humanistic than previous management teams. This induces work stress, while limiting the ability of the staff to deal with the existing stress.”
- “Prairie Island has a long history of recognition as a top performer by the NRC and INPO. This adds further to the “fear of failure” factor in work stress, as no operator wants to be the one whose error leads to ending this recognition.”

“The first symptom of long-term work stress is a high rate of “inattention-to-detail” human errors.” We had this symptom.

# PII conclusions, cont.

“..... the following conclusions can be made

## **Prevention**

- Human error prevention/avoidance skills of workers and supervisors are not comprehensive in nature.
- Weaknesses exist in implementing the accountability program for human error reduction.

## **Detection**

- Trending and Monitoring capabilities for the department's human performance are weak.
- Only “Lagging” indicators for human performance are used. “Leading” and “Real-Time” indicators are not utilized.

## **Correction**

- Root cause analyses do not always address the organizational and programmatic contributors to the events.”

Note the similarity to the Continuous Improvement model - of Plan, Do, Check, Adjust

# PII's RECOMMENDATIONS

- ENHANCE SELF-ASSESSMENT, ROOT CAUSE ANALYSIS AND PERFORMANCE MONITORING & TRENDING.
- PROVIDE INTEGRATED HUMAN ERROR PREVENTION TRAINING
- IMPROVE SHIFT SUPERVISION

ACCOUNTABILITY FOR CREW ERROR  
PREVENTION/REDUCTION

VERTICAL COMMUNICATION

- SHARE THE RESULTS OF THE REPORT WITH OPERATORS



# **PLANS FOR IMPLEMENTING HUMAN PERFORMANCE IMPROVEMENT BASED ON PII ANALYSIS**

## **PROMPT ACTION**

- **IMPROVE WORKER ERROR PREVENTION SKILLS**  
PII 1 day course  
Optional PI Instructor certification
- **IMPROVE SUPERVISOR ERROR REDUCTION SKILLS**  
PII 2 day course  
Optional PI Instructor certification
- **IMPROVE MANAGEMENT ERROR REDUCTION SKILLS**  
PII 1 day course  
PII has been asked to submit a new proposal that includes Monticello and Prairie Island
- **ASSESS ADMINISTRATIVE LOAD ON LPERO, SS, SM and OTHERS**

## **INTERMEDIATE TERM ACTIONS**

- UTILIZE LEADING INDICATORS AS A PREDICTOR OF PERFORMANCE

Option A - Have PII do their Culture Assessment on a yearly basis

Option B - Develop our own Leading Indicator based on the Human Performance Initiative survey - to be done on a yearly basis

Compare and contrast the HPI survey with the one given by PII

Compare and contrast the HPI survey results with PII results

See if an integrated (HPI, new INPO fundamentals course & PII) approach to corrective actions is feasible

- REFINE OUR LAGGING AND REAL-TIME PERFORMANCE INDICATOR PROCESSES

Refine Employee Observation Report (EOR) system to provide the needed information

Increase the use of the EOR process for problem reporting -

Ops, Maint, I&C, RP, etc.

- IMPLEMENT SUPERVISORY TRAINING PLANS

THESE PLANS WERE DERIVED FROM THE HPI SURVEY CONCLUSIONS

## LONG TERM ACTIONS

- CONTINUING (REFRESHER) TRAINING OF THE ITEMS IN THE 'PROMPT ACTION' SECTION
- DEVELOP AND USE CONTINUOUS IMPROVEMENT MODELS FOR PLANT WORK GROUPS
- TRAIN PLANT PERSONNEL IN HUMAN PERFORMANCE FUNDAMENTALS

This is a new INPO course. Monticello and Prairie Island are sending two people each to 'Train the Trainer' courses this year - Monti in May and PI in August

- CONTINUE SUPERVISORY TRAINING PLANS