



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-8064

OCT 22 1998

S. K. Gambhir, Division Manager  
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Omaha Public Power District  
Fort Calhoun Station FC-2-4 Adm.  
P.O. Box 399  
Hwy. 75 - North of Fort Calhoun  
Fort Calhoun, Nebraska 68023-0399

**SUBJECT: MANAGEMENT MEETING TO DISCUSS FORT CALHOUN STATION  
COMMON CAUSE ANALYSIS**

Dear Mr. Gambhir:

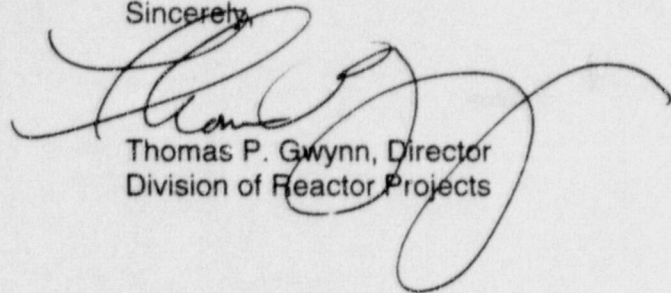
This refers to the meeting conducted in the Region IV office on October 20, 1998. This meeting related to the common cause analysis conducted by your staff at the Fort Calhoun Station.

This meeting was beneficial in providing information directly to the Regional Administrator. Most of the information had been previously presented in a public meeting conducted on October 6, 1998, at the Fort Calhoun Station.

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 will be placed in the NRC's Public Document Room.

Should you have any questions concerning this matter, we will be pleased to discuss them with you.

Sincerely,



Thomas P. Gwynn, Director  
Division of Reactor Projects

Docket No.: 50-285  
License No.: DPR-40

Enclosures:

1. Attendance List
2. Licensee Presentation

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OCT 22 1998

bcc to DCD (IE45)

bcc distrib. by RIV:

Regional Administrator

DRP Director

Branch Chief (DRP/B)

Project Engineer (DRP/B)

Resident Inspector

DRS-PSB

MIS System

RIV File

Branch Chief (DRP/TSS)

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ENCLOSURE 1

**Attendance List**

Licensee

W. G. Gates, Vice President  
S. K. Gambhir, Division Manager - Nuclear Operations  
J. M. Solymosy, Manager - Fort Calhoun Station  
K. Rackley, Director, Performance Improvement International

NRC

E. W. Merschoff, Regional Administrator  
T. P. Gwynn, Director, Division of Reactor Projects  
W. B. Jones, Senior Reactor Analyst  
D. N. Graves, Acting Branch Chief, Project Branch B

## **Agenda**

- Introductions
- Process
- Corrective Actions
- Summary
- Open Discussion

## **Human Error Analysis**

- Phase 1
  - Common Cause Analysis
- Phase 2
  - Underlying or Root Cause Analysis

## **Phase 1**

### **Common Cause Analysis of Fort Calhoun events**

## **Phase 1 Analysis**

- Purpose:
  - Identify underlying organizational and programmatic issues
  - Identify focus areas for further investigation
- Completed July 1998
- Used Condition Reports Beginning 1/1/97
  - Levels 1, 2, 3 and selected Level 4

## **Phase 1 Analysis**

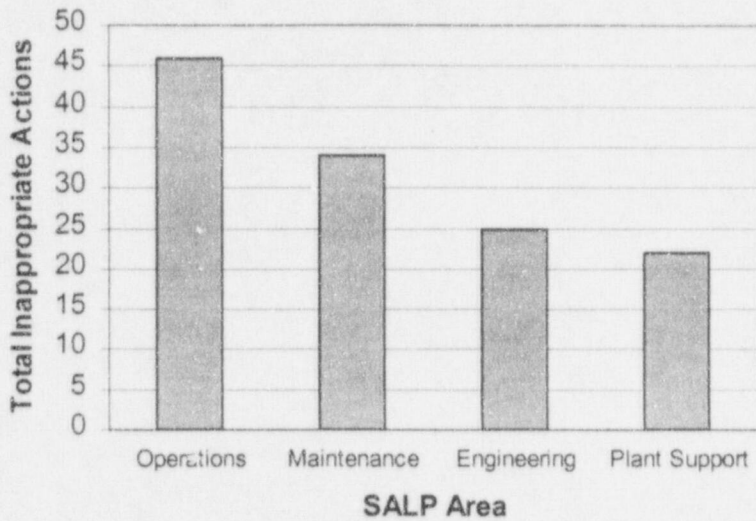
- Selected events involving human errors occurring since 1/1/97
  - Excluded
    - | Errors occurring before 1/1/97
    - | Equipment failures
- Data base of 140 inappropriate actions
  - 80% confidence level
  - 5% expected random error

## **Phase 1 Analysis Process**

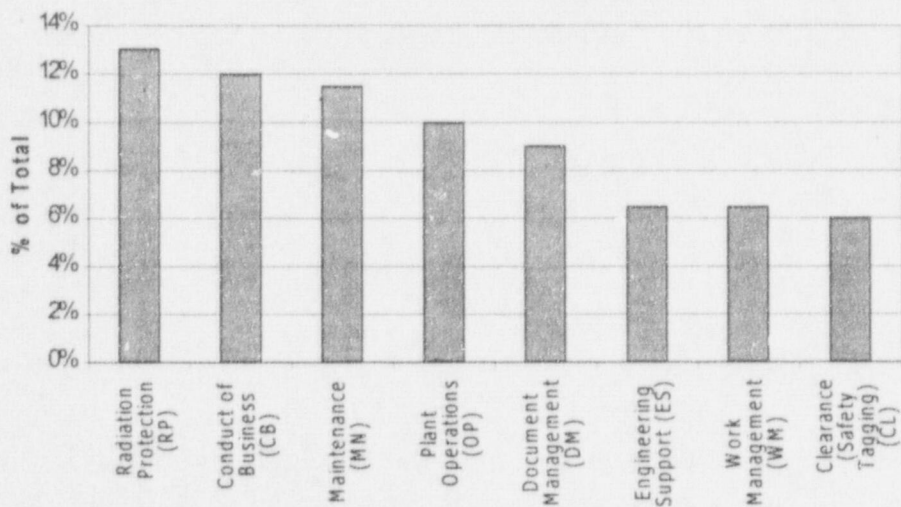
- Review Condition Reports, Root Cause Analyses and HPES investigations
- Identify "Inappropriate Actions"
- Categorize "Inappropriate Actions"



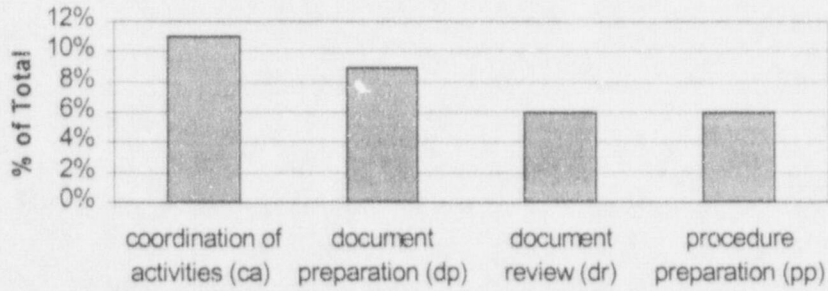
**Total Inappropriate Actions versus SALP Area**



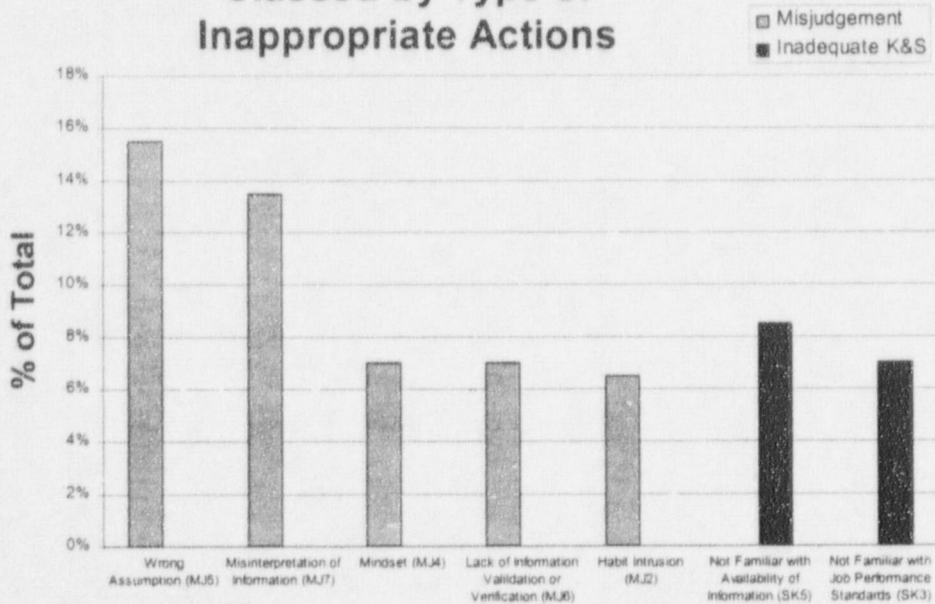
**Inappropriate Action by Work Process**



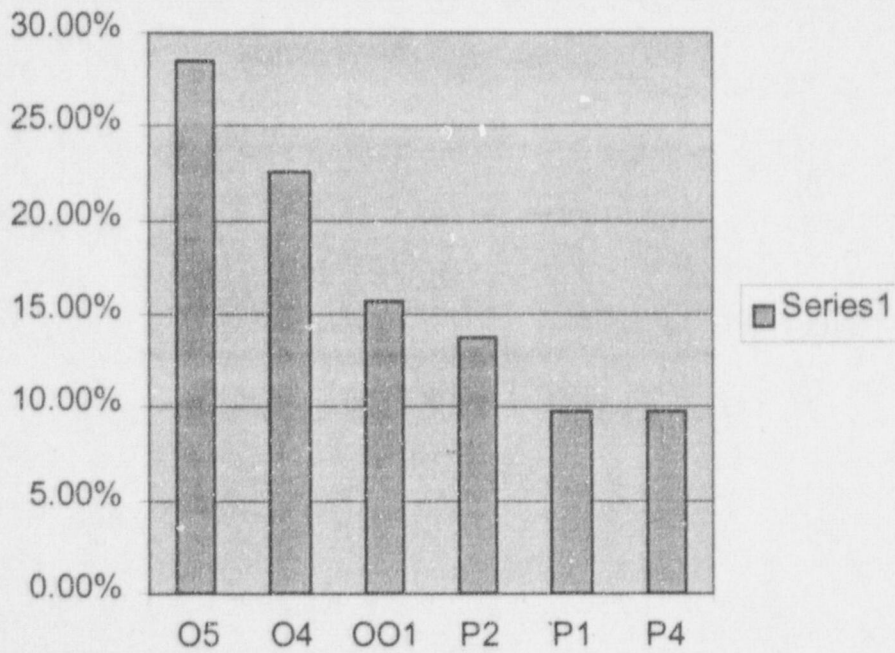
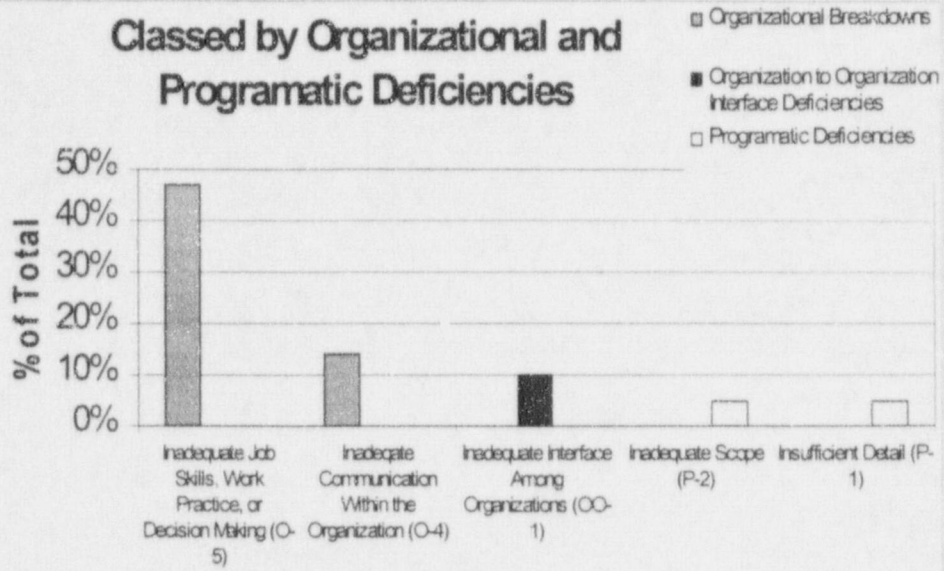
### Inappropriate Action by Key Activity (exceed 5% threshold)



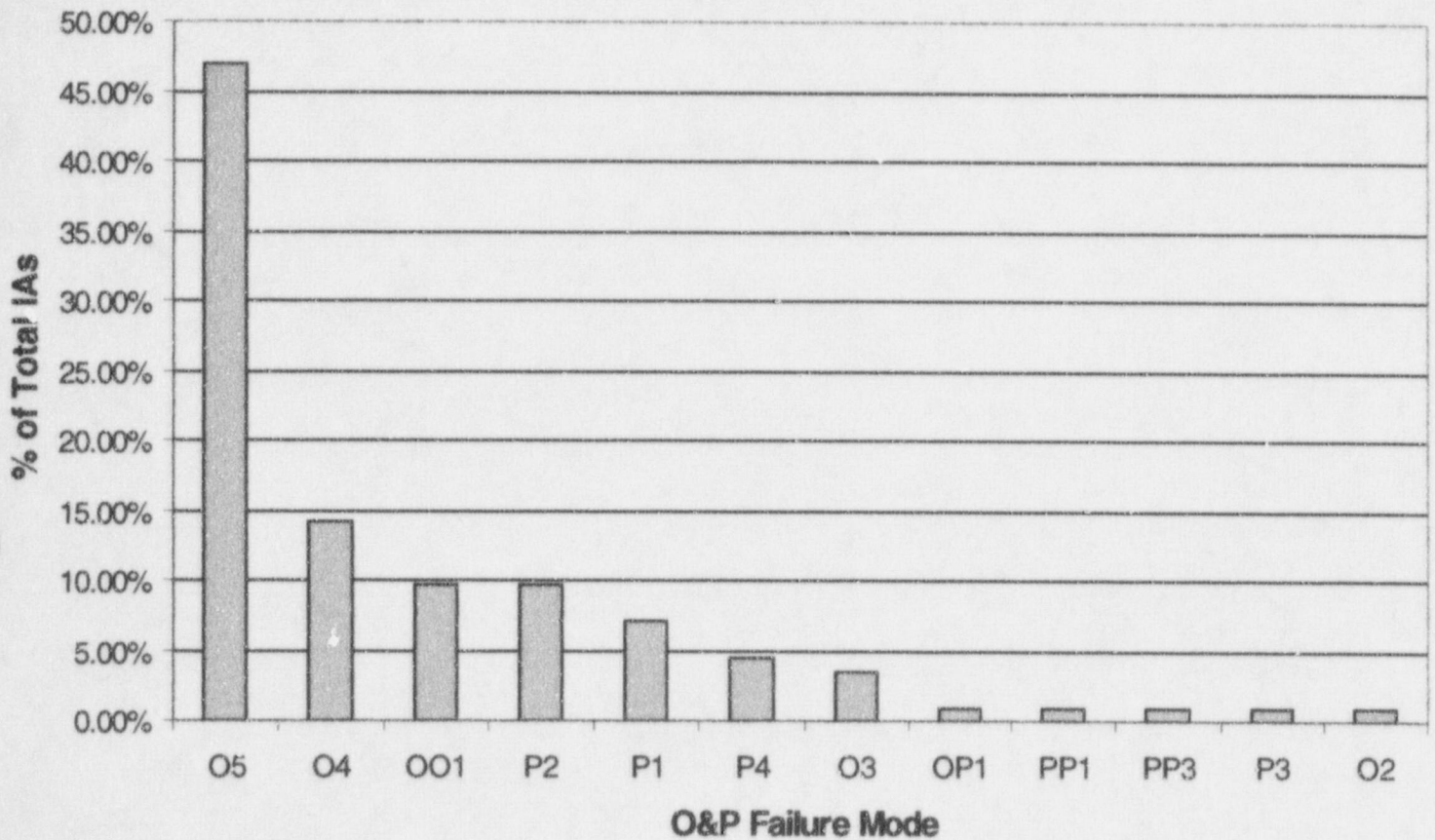
### Classed by Type of Inappropriate Actions



### Classed by Organizational and Programmatic Deficiencies



### IAs versus O&P Failure Mode (Expected Error of 5%)

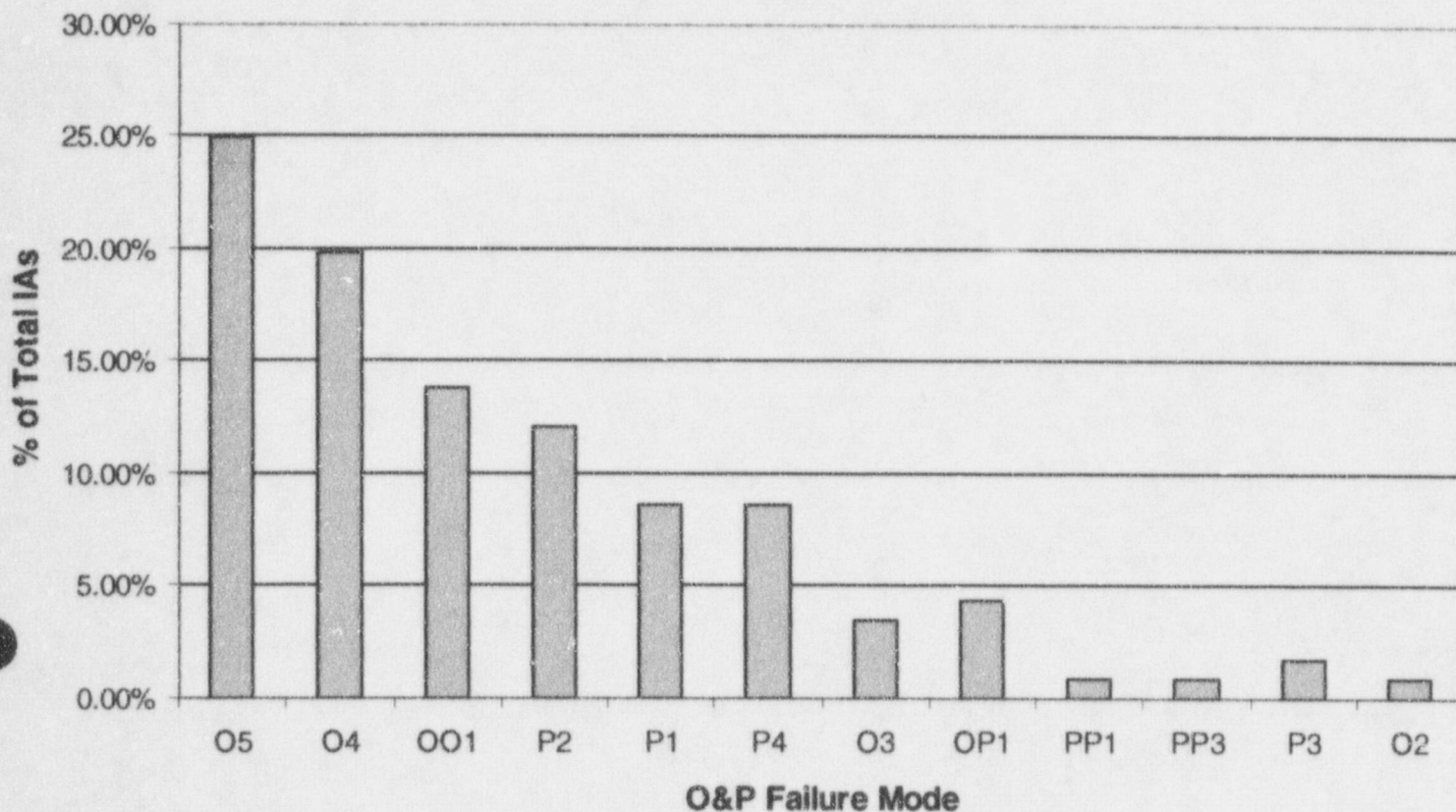


This can be compared to the following graph from the draft report.

The only significant difference between the two graphs is that the P4 failure mode is greater than the 5% threshold value for the latest analysis. This change does not impact the focus of the Phase 2 analysis.

Secondly I looked at the Inappropriate Action categories for the items classified as an Inadequate Job Skills, Work Practices, or Decision-Making deficiency. The following graph shows the breakdown between job skills, work practices and decision making.

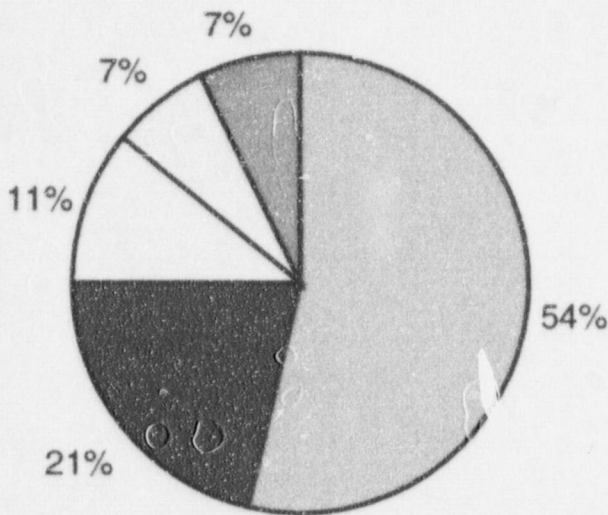
### IAs versus O&P Failure Mode (Expected Error of 5%)



Category	Description
O5	Inadequate Job Skills, Work Practices, or Decision Making
O4	Inadequate Communication within the Organization
OO1	Inadequate Interface Among Organizations
P2	Inadequate Scope
P1	Insufficient Detail
P4	Inadequate Self Verification Process

The PII CCA identified a large number of Organization and Programmatic Deficiencies in the category of "Inadequate Job Skills, Work Practice, or Decision Making." Kevin Rackley stated he defaulted to this category when he did not have enough information to allow further categorization. Based on my understanding of the events and the PII categorization I have re-categorized a number of these items into other categories. The following graph shows the result of this reclassification.

### Inappropriate Actions for O&P Deficiency O-5 (Inadequate Job Skills, Work Practice or Decision Making)



- Misjudgement (Decision Making)
- Committed Actions Not Carried Out
- Inadequate Job Skills or Knowledge
- Inattention to Detail
- Inadequate Mental State

The graph shows that only 11% of the inappropriate actions are due to inadequate job skills or knowledge while 54% are due to inadequate decision making. This is consistent with the CCA conclusion that the dominant failure mode is misjudgment. The inadequate work practice deficiency is captured by the inappropriate actions of "committed actions not carried out" and "inattention to detail." Inadequate work practices account for 28% of the inappropriate actions. The remaining 7% of the inappropriate actions are categorized as "inadequate mental state" and are assigned to the "fear of failure", "fatigue" or "overconfidence" subcategories. These inappropriate actions are due to internal states the worker brings to the task and reveal themselves through work practices.

## **Phase 1 Conclusions**

- Inappropriate actions causing FCS events *are organizational in nature vice being associated with particular processes or activities*
- No difference in characteristics of inappropriate actions between 1997, 1998, and the '98' refueling outage

## **Phase 1 Conclusions**

- 83% Decision-making (Rule and Knowledge-based) Errors
- Predominant Internal Failure Mode Category Was "Misjudgment"
  - errors were *application of incorrect rules or the misapplication of rules.*
- 80% "Administrative", Vice "Technical", Tasks or Expectations
  - performance of simple activities

## **Focus of further investigation**

- Communication within departments
- Lateral integration between departments
- Supervisory effectiveness and culture.

## **Phase 2**

**Determination of  
Underlying Causes**



## **Phase 2 Methodology**

- Site Wide Surveys (322 Responses)
  - Administrative Procedural Compliance
  - Accountability and Self-Motivation
  - Supervisory Effectiveness
- Formal interviews and informal discussions

## **Administrative Procedure Compliance Survey Results**

- High perceived mental burden associated with administrative procedure compliance
- Low probability of receiving consequences when not complying with an administrative requirement
- Low probability of receiving positive feedback when observed complying with management expectations/administrative requirements

## **Accountability System Survey Results**

- *The current accountability system does not have a positive impact on human performance, especially in the area of administrative procedure compliance.*

## **Survey Results for Supervisory Error Reduction Effectiveness**

- Not helping to reduce, or induce, human errors
- Supervisory Skill Weaknesses
  - communication & coordination
  - field surveillance
  - standards reinforcement

## **Conclusions of Lateral Integration and Communication Analysis**

- Breakdowns are occurring in the lateral integration and vertical communication at FCS
  - ┆ The lateral communication mechanisms are in place
  - ┆ The breakdowns are occurring due to a lack of teamwork

## **Underlying Causes**

- Most fundamental are cultural issues
  - ┆ Poor and Inconsistent Teamwork
  - ┆ Ineffective vertical communication
- The existing accountability system does not have a significant, positive effect on human performance

## **Underlying Causes**

- A higher than desired potential error rate for noncompliance with administrative requirements exists.

## **Contributing Cause**

- Supervisors not effective in applying human error reduction skills

## **Corrective Actions**

- Based on review of CCA completed by NRC and Performance Improvement International
- Review of initiatives in progress

## **Corrective Actions**

- Initiatives in progress
  - "CHOICE" Program
  - Organization Changes
  - Alignment Initiative
  - Leadership Development Training
  - Resolution of INPO Findings
  - Development of Business Plans

## **Corrective Actions**

- Additional/continued emphasis is needed in the following areas:
  - Improving Lateral and Vertical Integration/Communications
  - Implementation of an Effective Accountability System and Follow-up

## **Corrective Actions**

- Areas for Additional/Continued Emphasis (Cont.):
  - Administrative Burden Reduction
  - Procedure/Program Quality Improvement
  - Human Error Reduction Tools and Training
  - Supervisory Effectiveness in Human Error Reduction Skills

## **Corrective Actions**

### **Improve Lateral Integration**

- Integrated Business Planning Process
  - 1999 Resource Loaded Business Plan
    - | Departmental Business Plans Completed
    - | Division Manager review to assure integration and consistency with "CHOICE" Program Initiatives (in progress)
    - | Review by Division Managers on at least a quarterly basis in 1999

## **Corrective Actions**

### **Improve Lateral Integration**

- Site-wide work prioritization system (in progress)
- Behavior-Based Performance Expectations
  - FCS Values identified by Management (complete)
    - | Safety Conscious, Individual Respect
    - | Integrity, Accountability, Teamwork
    - | Simplicity

## **Corrective Actions**

### **Improve Lateral Integration**

- Behavior-Based Performance Expectations
  - | Behaviors to support values developed by management team (complete)
  - | Sought additional input during Nuclear Performance Meeting
  - | Behaviors being communicated (in progress)
  - | Using Multi-discipline teams to resolve problems and improve buy-in (e.g. CHOICE teams)
- Next Step Is Adoption of These Behaviors at the Work Group Level

## **Corrective Actions**

### **Vertical Communication Loop**

- Started with "Team Building" Meetings at the top
- Several Process Team Building Sessions scheduled over next three months
- Additional New Leadership Training for Managers will focus on:
  - | Alignment - Creating a Common Reality
  - | Integration - Helping people connect
  - | Commitment - Franchising high performance
  - | Culture - Passenger, Navigator, or Architect



## **Corrective Actions Vertical Communication Loop**

- FCS Leadership Meetings to Go Over Training & Leadership Issues - scheduled for Mondays
- Expectations for Face-to-Face Communication Up & Down the Chain
- More Frequent use of FCS On-Line
- Better Use of 3N
- Nuclear Performance Meetings

## **Corrective Actions Accountability System**

- Management Changes/Reorganization
  - Four Division Managers
  - Plant Manager from INPO
  - New Training Manager
  - Two Assistant Plant Managers
  - Two Operations Supervisors

## **Corrective Actions Accountability System**

- Holding People Accountable for Management's Expectations
- Motivating Work Force to Maintain Desired Behavior
- Coaching & Counseling Process
- Developed a New Disciplinary Policy
  - Requires peer review

## **Corrective Action Implement a Burden Reduction Strategy**

- Focus on Most Burdensome Procedures/  
Processes

## **Corrective Action Improve Procedure Quality**

- SO-G-30 revised to implement procedure "owner" concept and facilitate procedure revision process (complete)
- Evaluate further improvement to procedure revision process
- Eliminate, downgrade and simplify current administrative procedures and policies
  - Operations Standards Handbook

## **Corrective Actions Improve Procedure Quality**

- Address Procedure/Program Quality Issue
  - Line Management Oversight
  - Functional Group Ownership
  - Production Quality (I.E. Writer Training)
  - Process Simplification

## **Corrective Actions**

### **Improve Procedure Quality**

- Operations Procedures
  - Emphasize Operating crew procedure ownership
  - Operator training on the Writer's Guide
  - All operating procedures will be reviewed to meet the Writer's Guide

## **Corrective Actions**

**Provide Personnel at All Levels With Human Error Reduction Tools**

- Exemplary Human Performance (CHOICE)
- C - Critical Self Assessments
- H - Human Performance is Exemplary
- O - Operations are Event Free
- I - Initiatives in High Visibility Areas  
Have Strong Performance
- C - Corrective Actions are Broad & Lasting
- E - Excellence in Materiel Condition

## **Corrective Actions**

### **Provide Personnel at All Levels With Human Error Reduction Tools**

- INPO Human Performance Assist Visit
- Developed Human Performance Plan
- Training is Being Provided to Improve Human Error Reduction
  - Human Performance Fundamentals Course
  - "Titanic" Training

## **Corrective Actions**

### **Supervisory Effectiveness in Reducing Human Error**

- Improving Supervisory Effectiveness in Reducing Human Errors
  - Organizational Changes in the Operations Area
    - Additional Supervisor in Operations Group
    - Additional Assistant Plant Manager
    - Plant Manager focused on day-to-day operation, leadership skills improvement and communication of management expectations

## **Corrective Actions**

### **Supervisory Effectiveness in Reducing Human Error**

- Improving Supervisory Effectiveness in Reducing Human Errors
  - Supervisors will receive human performance training
  - Pre-job briefings have improved
  - Scorecard concept introduced
  - Improvements discussed previously will have major impact
  - Additional training needs are being evaluated

## **Summary**

- The Majority of the Issues Identified Through the CCA Are Being Addressed Through Initiatives Started Prior to the Last Refueling Outage
- Additional Corrective Actions Are Being Identified to Address Some of the Newer Insights

## **Summary Next Steps**

- Build on Successes to Date in Operations Area
- Factor Corrective Actions Into Business Plan
- Repeat CCA