JAN 28 1987
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Stone & Webster Engineering Corporation
1875 Eye Street N.W., Suite 550
Washington, D.C. 20006

Dear Mr. Donoghue:

In response to your letter of January 15, 1987, enclosed are copies of the handouts used during the meeting in this office on January 8 with Consumers Power concerning the Palisades plant.

Sincerely yours,

Original signed by
Gen W. Roy

Gen W. Roy, Director
Division of Resource Management
and Administration

Enclosures: As stated

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PRESENTATION TO THE NUCLEAR REGULATORY COMMISSION ON THE PLANNED RESTART OF THE PALISADES PLANT BY CONSUMERS POWER COMPANY JANUARY 14, 1987

CONSUMERS POWER
PARTICIPANTS IN PRESENTATION

Dr William McCormick, Jr, Chairman and CEO

Dr Frederick Buckman, Vice President, Nuclear Operations

Mr Joseph Firlit, Plant General Manager

OTHER COMPANY EXECUTIVES IN ATTENDANCE

Mr Jack Reynolds, Executive Vice President, Energy Supply

Mr Gerald Slade, Executive Director, Quality Assurance

Mr Robert Rice, Plant Operations Manager

Mr Richard Orosz, Engineering and Maintenance Manager

Mr David Joos, Planning and Administrative Manager

OUTLINE OF PRESENTATION

- Introduction, Recent History and Overview

  - McCormick

- Palisades Plant Issues and Resolutions

  - Buckman

- Testing and Restart Program

  - Firlit

- Summary

  - Buckman

INTRODUCTION AND RECENT HISTORY

- Palisades Plant performance has been uneven throughout its history.

- While plant performance in 1983 was improving, severe financial difficulties of Consumers Power, beginning in 1984 with Midland Plant shutdown, resulted in certain problems.

  - Deteriorating maintenance

  - High personnel turnover

- New plant top management installed at end of 1984 began new cycle of improvement.

  90% capacity factor during 1985 operation

- New Consumers Power CEO elected in November of 1985 and new Vice President, Nuclear Operations in February 1986

INTRODUCTION AND RECENT HISTORY
(Contd)

- New management embarked upon programs to:
  - Improve safety
  - Improve reliability
  - Restore material condition
  - Improve training
  - Reduce turnover
  - Improve management
- The plant tripped on May 19, 1986 with some equipment problems during shutdown. As a result, Consumers Power Company embarked upon an accelerated effort to address:
  - Trip-related problems
  - Overall plant material condition
  - Design-related issues that emerged during the outage

INTRODUCTION AND RECENT HISTORY
(Contd)

- Consumers Power Company management believes the plant will be ready for restart soon.

  We have:

  - Resolved and tested trip-related problems
  - Extensively investigated and improved plant material condition and improved the plant Maintenance Program
  - Resolved all design-related issues

MAJOR PLANT ACCOMPLISHMENTS

- Maintenance work orders reduced from 4000 in 1984, to 2350 in 1985, to 1077 in 1986
  - Eight-week inventory
- Control Room deficiencies reduced from 161 in 1984, to 65 in 1985, to 7 at present
- Streamlined plant management while increasing maintenance personnel

OTHER MAJOR PLANT ACCOMPLISHMENTS

- Reduced radwaste production from 18,000 cubic feet in 1984, to 12,000 cubic feet in 1985, to less than 7,000 cubic feet in 1986

- INPO training / accreditation of 5 programs in December 1985, others awaiting INPO action

- Employee turnover reduced from 17% annually in 1984 to 3% in 1986

- Established Fitness for Duty Program in 1986 with unnanounced, random drug / alcohol testing, with each employee being tested at least twice a year

- Achieved the best safety record; the safest combined gas / electric utility in the United States

PALISADES PLANT ISSUES

- MATERIAL CONDITION
- MAY 19 TRIP PROBLEMS
- DESIGN-RELATED ISSUES

PLANT MATERIAL CONDITION

- Plant material condition had deteriorated because of:
  - Employee turnover and poor morale
  - Quantity and quality of maintenance performed
  - Organizational and programmatic weaknesses
- Consumers Power Company recognized need and initiated efforts to improve material condition in 1984 to:
  - Assure plant and equipment reliability
  - Minimize operator work-arounds and distractions
  - Reduce work order inventory to a desirable level

PLANT MATERIAL CONDITION
(Contd)

RESOLUTION

- Actions Initiated Prior To May 19 Event:
  - Nuclear Operations Department Reorganization
  - Maintenance Order Task Force
  - Maintenance Inventory Reduction
  - Systems Engineer Program
  - Systems Assessment Program
  - Advanced Maintenance Management System
  - Operational Readiness Assessment
  - Preventive Maintenance Program
  - Competitive Salary Program

MAY 19, 1986 TRIP

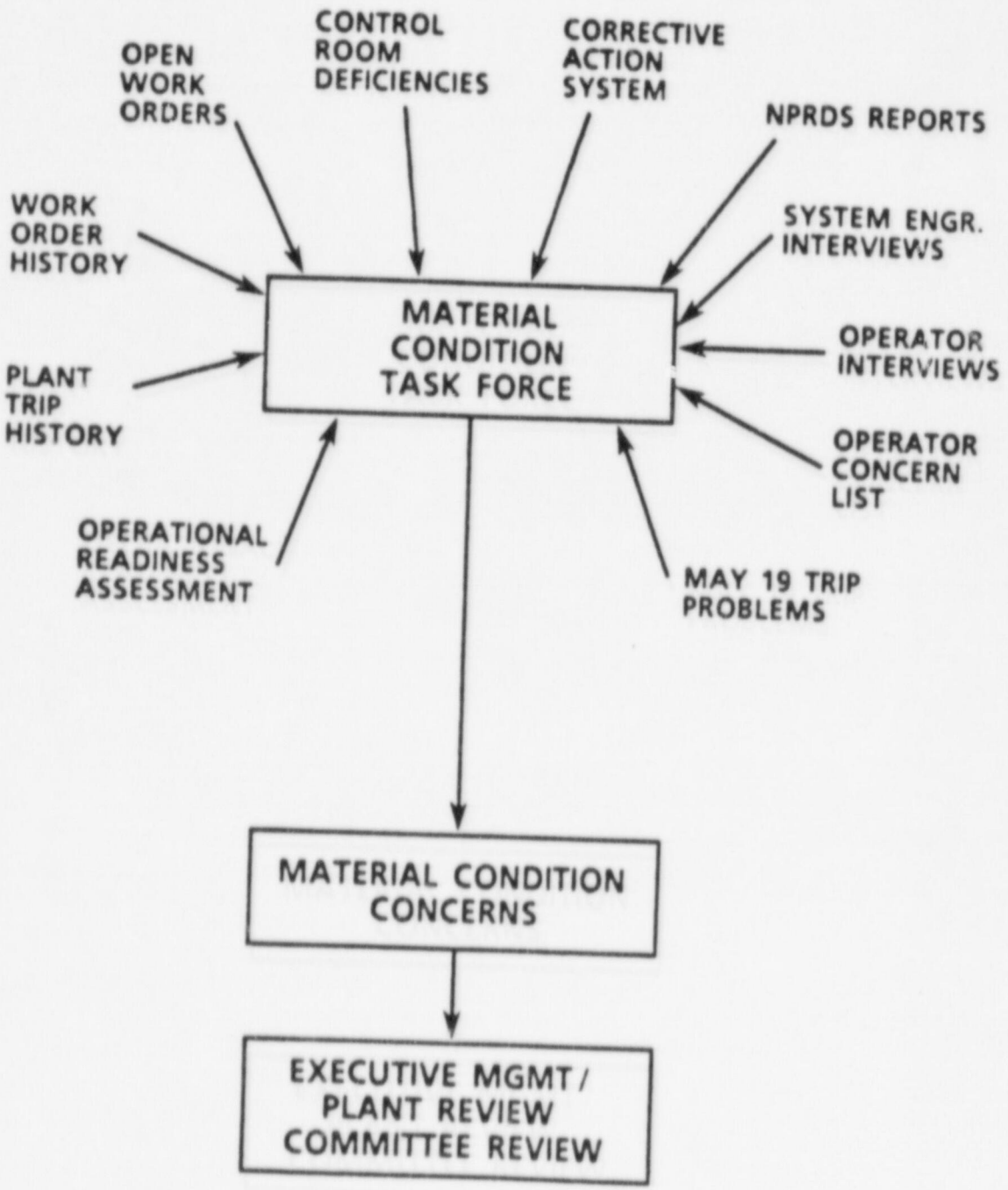
- Equipment Issues
  - EHC Power Supplies
  - Primary Coolant Charging Pump P-55A
  - Pressurizer Spray Valve CV-1059
  - Letdown Back-Pressure Regulator CV-2012
  - Turbine Bypass Valve CV-0511
  - Atmospheric Steam Dump Valve CV-0779

- May 19, 1986 plant trip emphasized need to expand and accelerate the improvement effort

ACTIONS DURING CURRENT OUTAGE

- Material Condition Task Force
- Improved Maintenance Program
- Improved Material Condition
- Extensive Testing Program
- System Functional Evaluation

MATERIAL CONDITION IMPROVEMENT PROCESS



PLANT MATERIAL CONDITION

CRITERIA FOR ACTION ITEM TIMING

- Prior To Start-Up
  - Repair all deficiencies which relate to proper system operation
  - Perform comprehensive testing program
  - Initiate accelerated inspections and preventive maintenance to enhance reliability
- Prior To End of Next Refueling Outage
  - Perform modifications or maintenance to enhance long-term reliability
- Include in Five-Year Plan
  - Reliability or maintainability enhancements which require additional evaluation for effectiveness and cost justification

PLANT MATERIAL CONDITION

(Contd)

RESULTS

- 222 Issues Identified
- 14 Issues Required No Action
- 159 Issues Resolved Prior To Start-Up
- 49 Issues To Be Addressed After Start-UP
  - 39 issues will be addressed before the end of the 1988 REFOUT
  - 10 issues will be incorporated into the Five-Year Plan

PLANT MATERIAL CONDITION
(Contd)

BREAKDOWN OF ISSUES SCHEDULED TO BE ADDRESSED AFTER PLANT START-UP

2	Modifications to improve ability to maintain or inspect
15	Modifications / equipment upgrades to decrease maintenance requirements
3	Development of contingency plans
3	Equipment replacements to improve spare parts availability
2	Development or acceleration of PM activities
2	Maintenance / modification to reduce support time / effort required of operators, security personnel, etc
12	Modifications / upgrades to improve long-term reliability
6	Evaluations of equipment performance to define possible reliability improvements
4	Equipment operability improvements
49	Total

IMPROVED MAINTENANCE PROGRAM

ACTIONS COMPLETED

- Operations Reorganization To Enhance Maintenance Diagnosis and Prioritization
- Enhanced Post Maintenance Testing
- Increased Mechanical Maintenance Work Force From 38 to 57
- Streamlined Maintenance Organization
- Increased Use of Contractors To Supplement Plant Expertise
- Instituted Plant Training Staff of 4 People for Electrical and Mechanical Repairmen

IMPROVED MAINTENANCE PROGRAM
(Contd)

ACTIONS IN PROGRESS

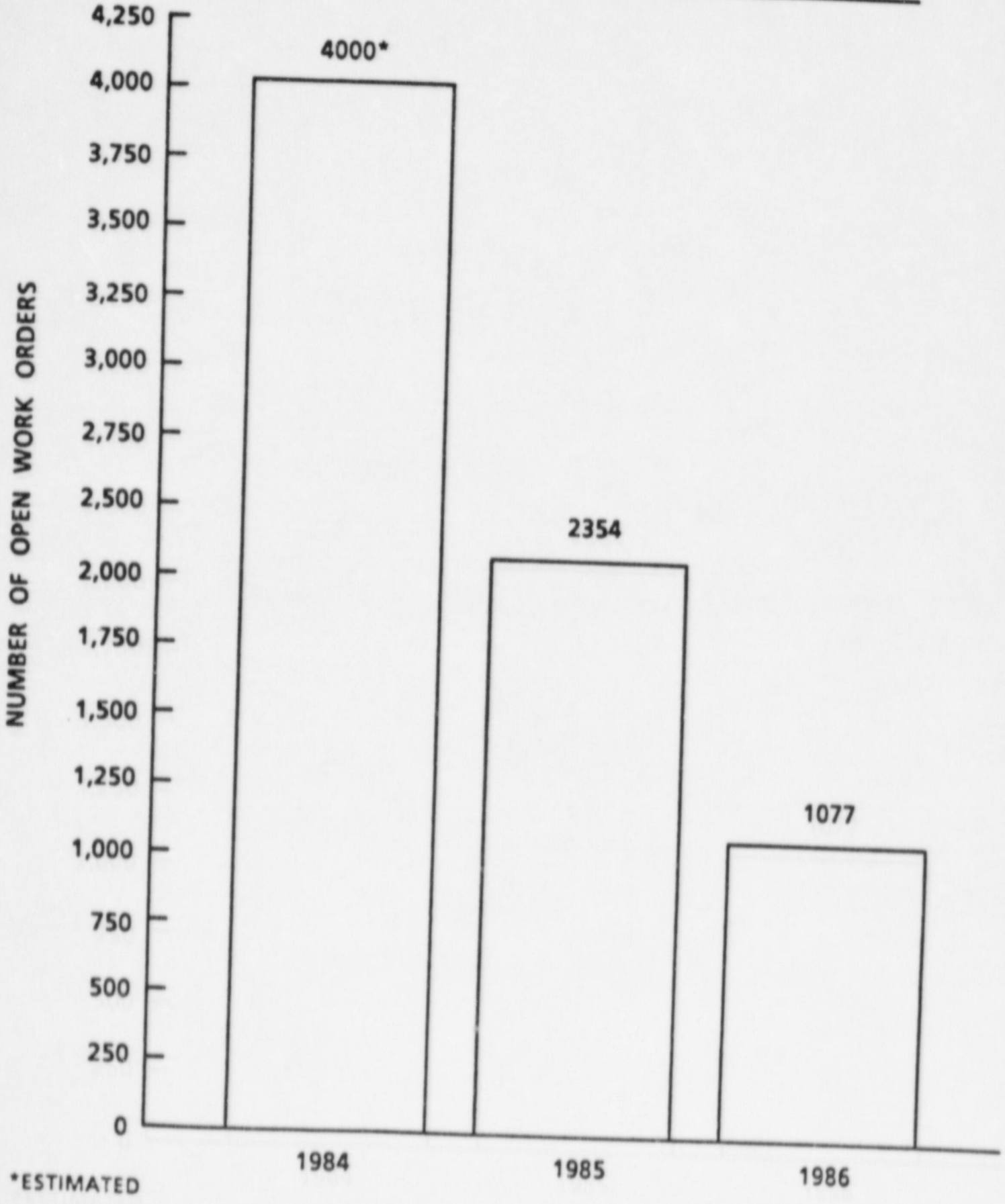
- Accelerated Preventive Maintenance Program Implementation
- Accelerated Implementation of Equipment Monitoring and Performance Trending
- Comprehensive Valve Maintenance Program
- INPO Accreditation in Electrical and Mechanical Training Programs
- System Engineer Training Program

IMPROVED MAINTENANCE PROGRAM
(Contd)

RESULTS

- Excellent Heatup in November
  - Low Primary Coolant System Leak Rate (Less Than 0.1 gpm)
  - Few Rework Requirements - 270 Work Orders Tested, 5 Required Rework
- Improved Operator Confidence
  - System Function
  - Maintenance Process
- Expected Payoff
  - Plant Availability
  - System Reliability
  - Safety System Challenges

PALISADES OPEN WORK ORDERS



*ESTIMATED

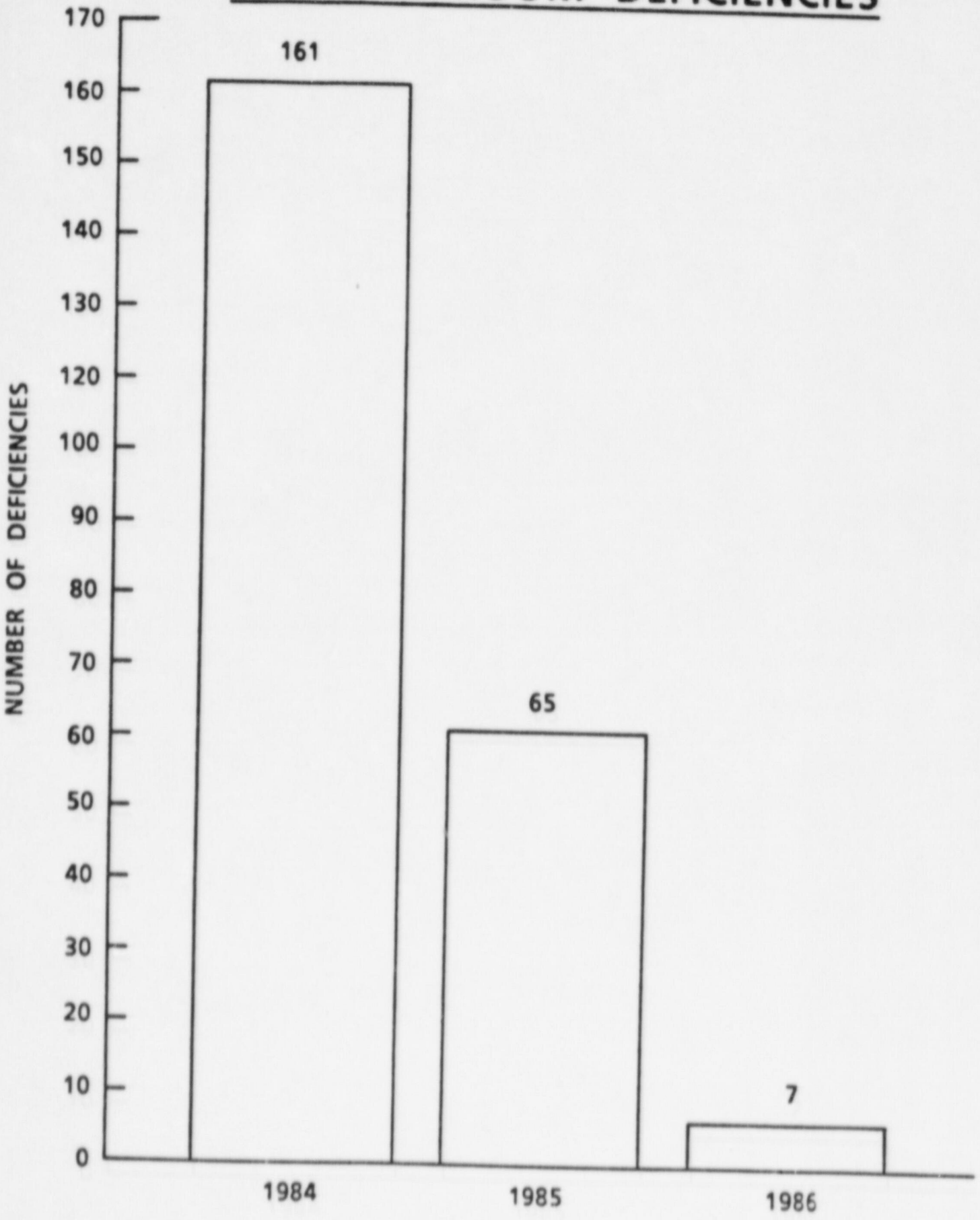
OPEN WORK ORDERS

Total open work orders		1077
Post maintenance testing	208	
Completed	53	
Total active work orders		816
Preventive maintenance	75	
Inspections	7	
Adjustments / calibrations	59	
Spare equipment	12	
Subtotal - corrective work orders		663

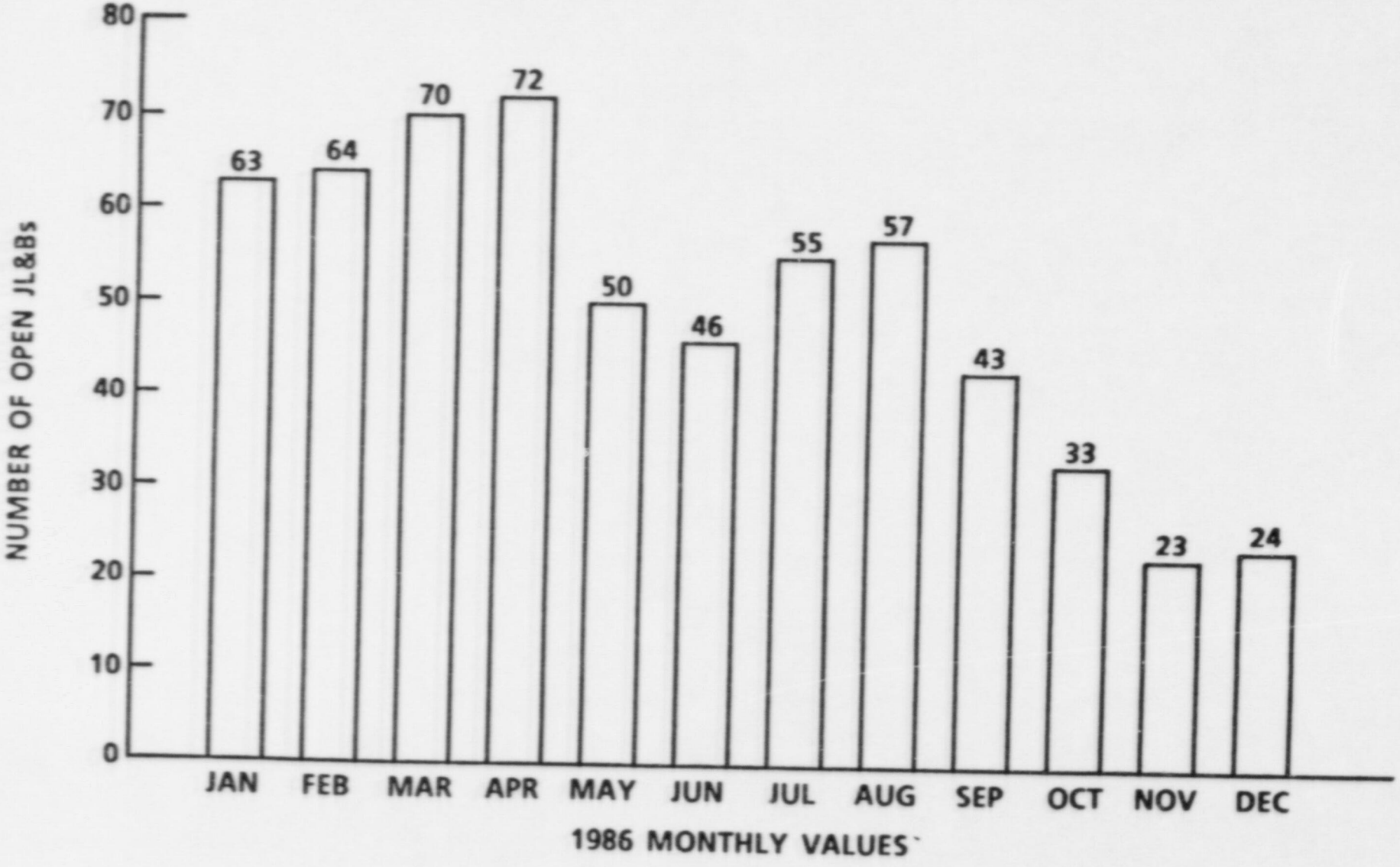
Corrective work orders

Valves / valve operators	241
Gauges / indicators / switches	140
Heaters / ventilators	69
Pumps	66
Compressors / heat exchangers	36
Motors	34
Equipment / facilities	33
Miscellaneous	26
Tanks	18

CONTROL ROOM DEFICIENCIES



JUMPER LINK AND BYPASS STATUS



DESIGN-RELATED ISSUES

CONFORMANCE TO DESIGN

- Low-Pressure Safety Injection Pump - Low Flow
- Component Cooling Water System - Undersized Heat Exchangers
- Service Water System - Low Flow

ADEQUACY OF DESIGN

- 3 Half-Capacity Service Water Pumps
- RAS Logic Failure on Loss of DC
- SSFI Identified Items
  - Recirculation Actuation System Lock-In
  - Positive Control of Valves With Dual Position Safety Function
  - High-Pressure Air / Low-Pressure Air Interface
  - Non-Q Breakers for Safety Service

RESOLUTION OF DESIGN-RELATED ISSUES

- All Known Issues Will Be Resolved Prior To Start-Up
- Multilevel Approach To Safety Assurance
  - Development and Implementation of Comprehensive Pump Testing Program
  - Development and Performance of Comprehensive System Functional Evaluation
  - Development of Integrated Test Program
  - Development of an Improved Configuration Management Program

PUMP TEST PROGRAM

OBJECTIVES

- Address generic concern following LPSI pump P-67B findings
- Verify performance of safety-related pumps to FSAR requirements
- Provide head curves to support system testing and balancing as required

SCOPE

- Service Water Pumps P-7A, B, C
- Auxiliary Feedwater Pumps P-8A, B, C
- Component Cooling Water Pumps P-52A, B, C
- Charging Pumps P-55A, B, C
- Containment Spray Pumps P-54A, B, C
- Low-Pressure Safety Injection P-67A, B
- High-Pressure Safety Injection P-66A, B

STATUS

- Complete

SYSTEM FUNCTIONAL EVALUATION

OBJECTIVE

- Verify system performance to support normal operation and critical safety function success paths

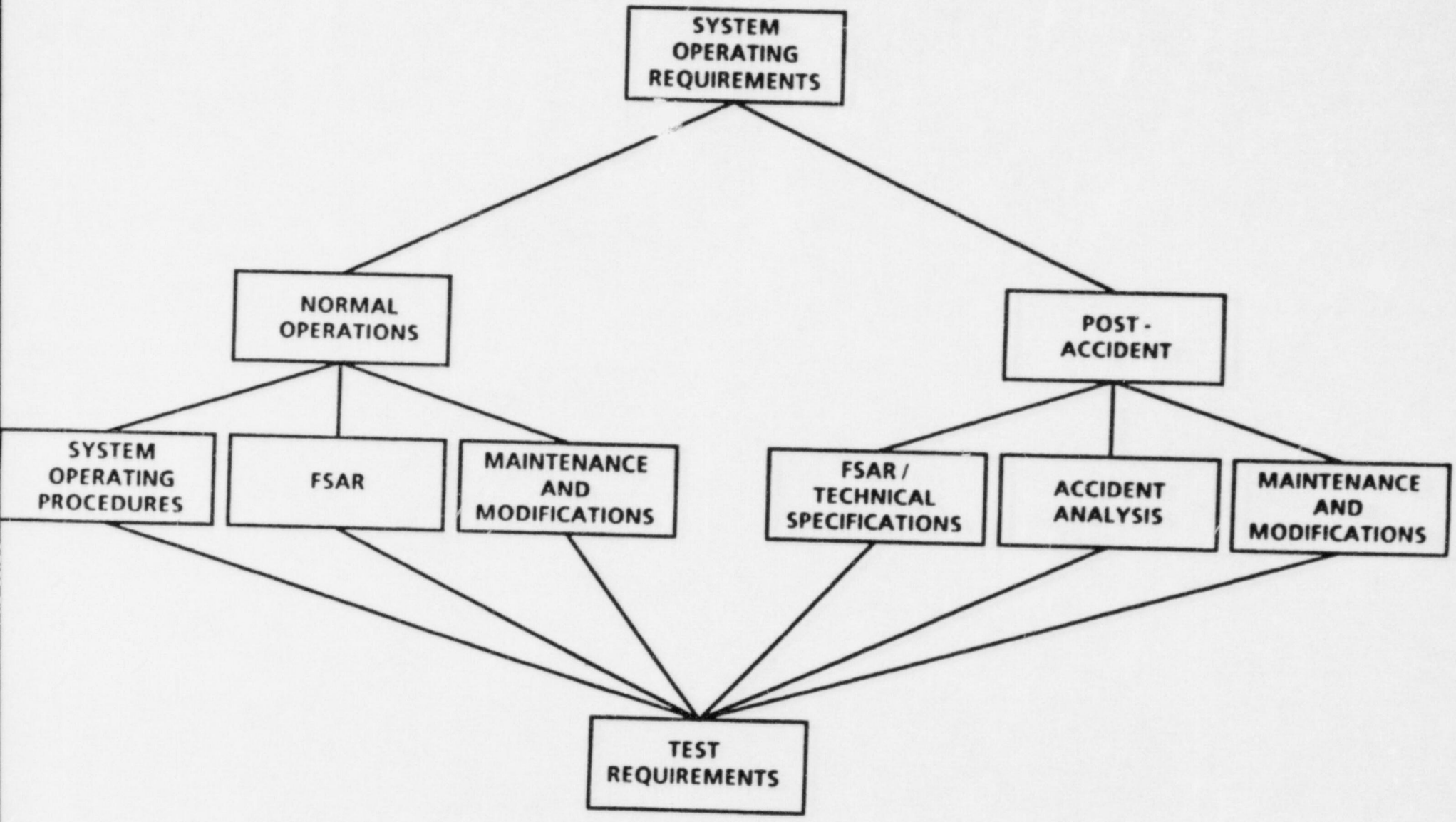
SCOPE

- All systems required for normal plant operation or critical safety function success path and their supporting systems (26 systems)

STATUS

- Evaluation is complete and exceptions have been identified. All discrepancies will be dispositioned through testing or engineering justification prior to start-up.

SYSTEM FUNCTIONAL EVALUATION



TEST PROGRAM

OBJECTIVES

Assure proper operation of safety and other important systems in normal operating and post-accident modes by:

- Verify open issues from System Functional Evaluation
- Complete Technical Specifications Surveillance Tests
- Complete Augmented Surveillance Tests
- Complete Post Maintenance Testing
- Perform integrated system testing for selected systems

TEST PROGRAM
(Contd)

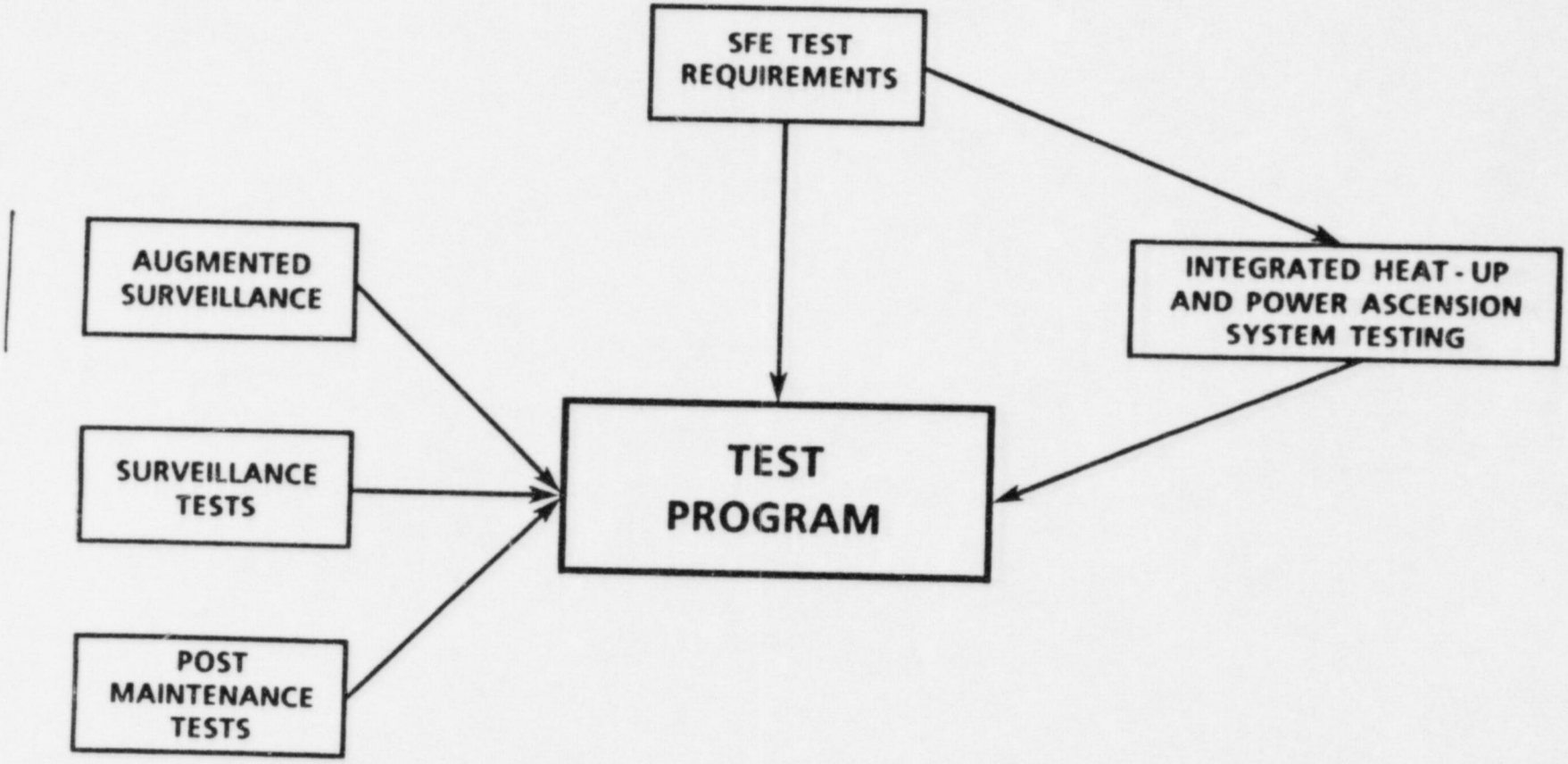
SCOPE

- Cold Shutdown Testing
- Hot Shutdown Testing
- Power Escalation Testing

STATUS

- Substantial Cold / Hot Shutdown Testing complete
- Program / Procedures to address System Functional Evaluation open items to be complete mid - January
- Post Maintenance Testing for approximately 200 work orders remains open
- Integrated System Test Plans under development for six (6) systems

TEST PROGRAM



CONFIGURATION MANAGEMENT PROGRAM

OBJECTIVES

- Reconstruct well-documented design basis
- Verify plant configuration conforms to design
- Improve administrative controls that maintain plant design
- Ensure adequacy of design basis through SSFI type reviews

SCOPE

- Still under development. Will include:
  - FSAR
  - Drawings and Procedures
  - Test Program
  - Spare Parts Program

CONFIGURATION MANAGEMENT PROGRAM
(Contd)

STATUS

Dick Eckhardt

- Project Manager assigned
- Scope, process and schedule to be developed by March 31, 1987

T. P
CM
DB
Invio

- Phased approach planned to address important systems first
- Estimated 2 - 3 years for full program

RESTART SCHEDULE

Plant Heat-Up to Hot Shutdown	Late January OR First Part of February
Heat-Up and Hot Shutdown Testing	2-1/2 Weeks
Plant On-Line	Early February ?
Power Escalation Testing	
100% Power Operation	

STATUS REVIEW

ACTIONS COMPLETED

- Repaired May 19 Equipment Problems
- Material Condition Review and Upgrade
- System Functional Evaluation (last testing portion)
- Pump Testing Program
- Increased Maintenance Work Force
- Streamlined Operations and Maintenance Departments

EXAMPLE DESIGN-RELATED ISSUES

- Low Pressure Safety Injection Pump Impellers
- Service Water System
- Component Cooling Water Heat Exchangers
- Recirculation Actuation System Seal-in
- Air-Operated Valve Design Deficiencies

EXAMPLE OF MCTF INITIATED ACTIVITY

COMPONENT COOLING WATER HEAT EXCHANGERS

ISSUE

The CCW heat exchangers are undersized by 30%. Normal system lineups during certain plant conditions result in high differential pressure across the heat exchangers.

ACTIONS

Completed:

- Independent firm was contracted to evaluate acceptability of 4500 gpm flow through heat exchanger.
- Heat exchanger tubes cleaned and eddy-current tested
- Impact of reduced CCW flow to shutdown cooling heat exchanger evaluated - new containment pressure / temperature profiles produced
- System testing and balancing completed

EXAMPLE OF MCTF INITIATED ACTIVITY

COMPONENT COOLING WATER SYSTEM
(Contd)

- Operator procedures and checklists modified; training conducted

Deferred:

- Heat exchanger replacement or capacity addition
- Deferral due to engineering and parts lead time

JUSTIFICATION FOR OPERATION

Analysis demonstrates that the system will perform its safety functions with reduced flow rates.

EXAMPLE OF SSFI INITIATED ACTIVITY

RECIRCULATION ACTUATION SIGNAL (RAS) SEAL-IN

DESCRIPTION

SIRW tank low-level recirculation actuation does not seal-in. This could result in the output signal reversing itself. There may then be insufficient air to handle the cycling valves.

ACTIONS

Completed:

- Revised Emergency Operating Procedures
- Reviewed other significant safety-related auto actuation circuits for potential seal-in problems.

Prior to Start-Up:

- Complete the RAS seal-in modification.

Long Term:

- Consider modifying the 2400-volt fast transfer circuitry.

EXAMPLE OF SSFI INITIATED ACTIVITY

RECIRCULATION ACTUATION SIGNAL (RAS) SEAL-IN
(Contd)

GENERIC

Other actuation circuits reviewed for seal-in problems.

EXAMPLE OF SSFI INITIATED ACTIVITY

RECIRCULATION ACTUATION SIGNAL (RAS) SEAL-IN
(Contd)

GENERIC

Other actuation circuits reviewed for seal-in problems.

EXAMPLE OF PUMP TESTING INITIATED ACTIVITY

SERVICE WATER SYSTEM

ISSUES

- **Service water pump performance inadequate**
- **System balancing inadequate**
- **Lake water temperature occasionally exceeds 75° F design value.**
- **Service water flow inadequate during DBA with failure of one diesel generator**

ACTIONS

Completed:

- **Service water pump impeller modifications**
- **Modifications to assure adequate flows to post-accident loads with:**
  - **failure of either diesel generator**
  - **failure of instrument air**

EXAMPLE OF PUMP TESTING INITIATED ACTIVITY

SERVICE WATER SYSTEM

(Contd)

- System testing / balancing
- Technical Specification change submittal to provide for fire water backup on loss of 1 - 2 diesel generator

Deferred:

- Addition of service water capacity above original plant design to:
  - provide adequate post-accident flow with failure of either diesel generator without operator action
  - allow for reinstatement of fourth containment air cooler
  - allow for higher lake water temperature
- Deferral due to engineering and parts lead time

EXAMPLE OF PUMP TESTING INITIATED ACTIVITY

SERVICE WATER SYSTEM

(Contd)

JUSTIFICATION FOR OPERATION

Analysis shows that the system will perform its safety functions as currently configured with administrative limits on plant operation at elevated lake water temperatures. Required operator actions have been reviewed.

PIPE WALL THINNING INSPECTION PROGRAM

- OBJECTIVES
  - Establish baseline data for a permanent program
  - Identify any areas of immediate concern
  - Address concerns related to Surry Plant incident
- SCOPE
  - Ultrasonic techniques
  - Secondary side points, most susceptible to erosion / corrosion
- STATUS
  - In progress, will be complete by January 31, 1987