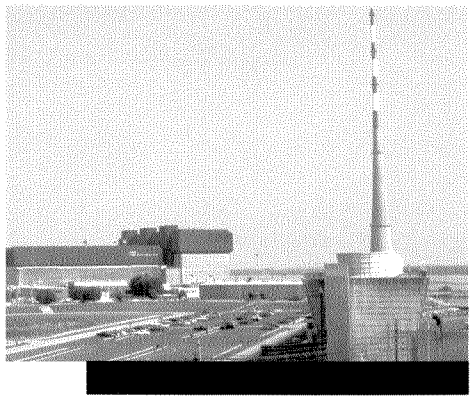
TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT
PLANT STATUS



TVA/NRC Meeting
Region II, Atlanta, GA
September 2, 2003

TVA

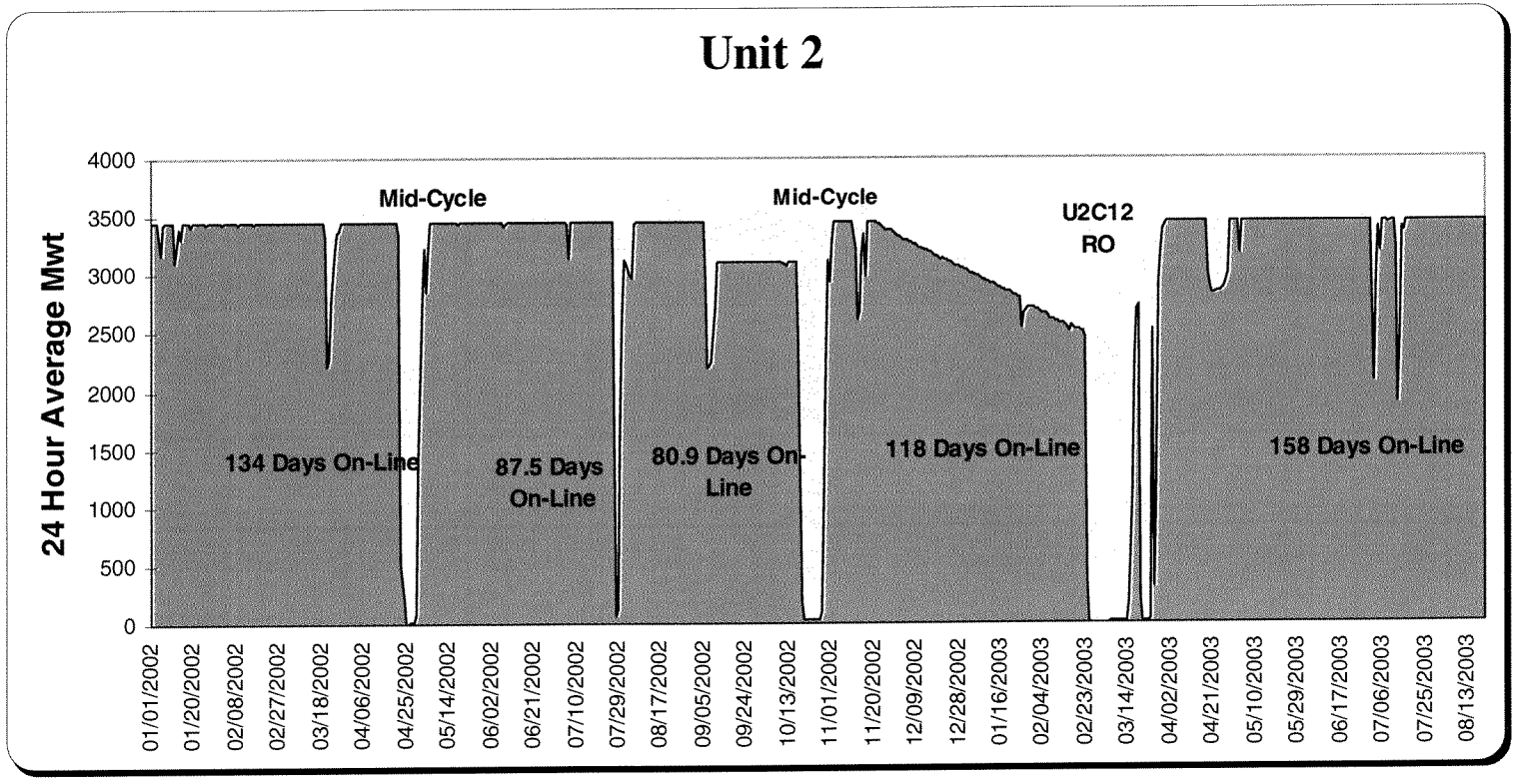
ENCLOSURE 2

Agenda

• Introduction	Ashok Bhatnagar
• Plant Performance	Mike Skaggs
• U2C12 Refueling Outage	Pete Olson
• Regulatory Issues	Tim Abney
• Plant Improvement Initiatives	Jeff Lewis
• Safety Culture Initiatives	Ashok Bhatnagar
• Closing Remarks	Ashok Bhatnagar

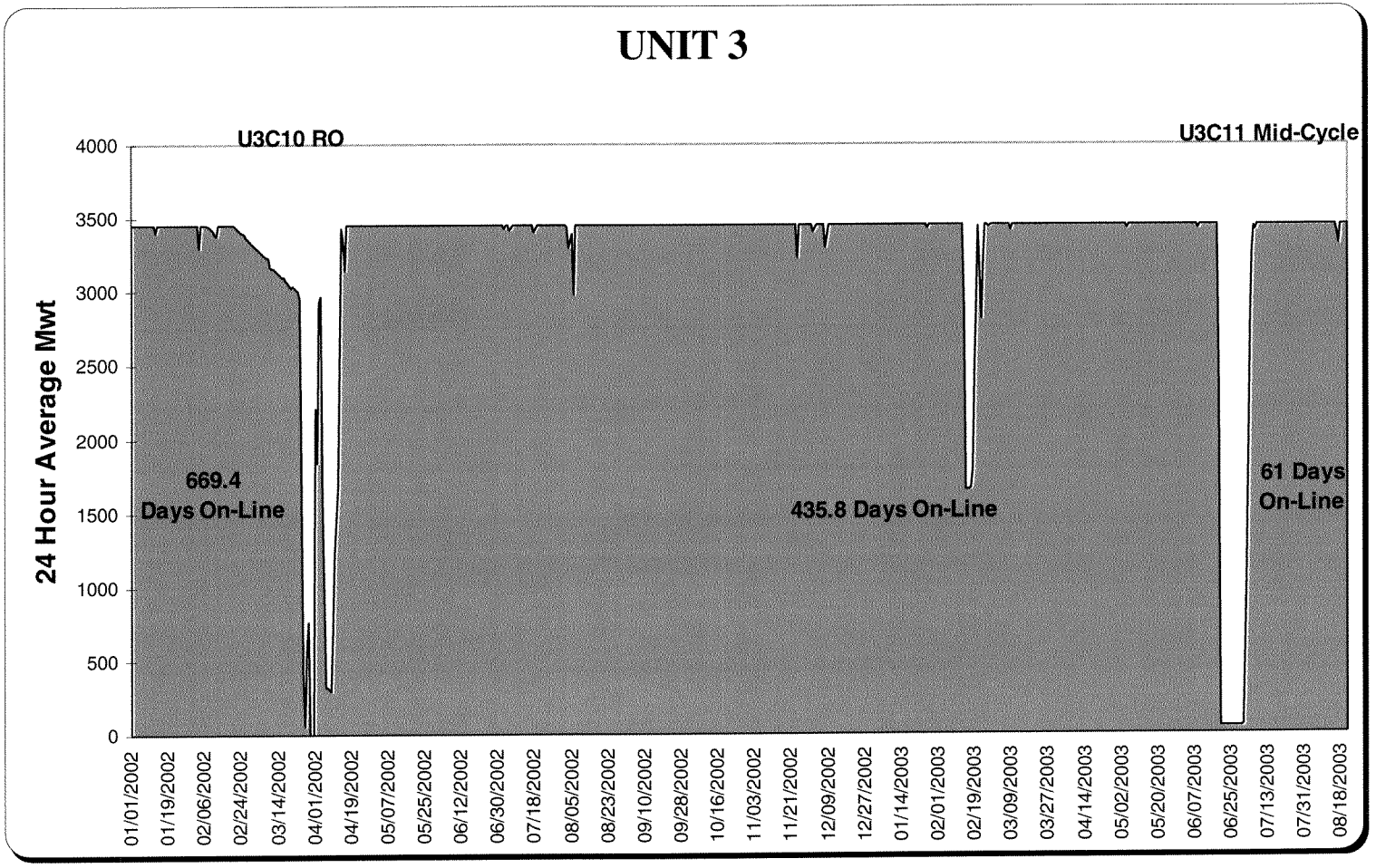
Plant Performance

Unit 2 Average Daily Power Level



Plant Performance

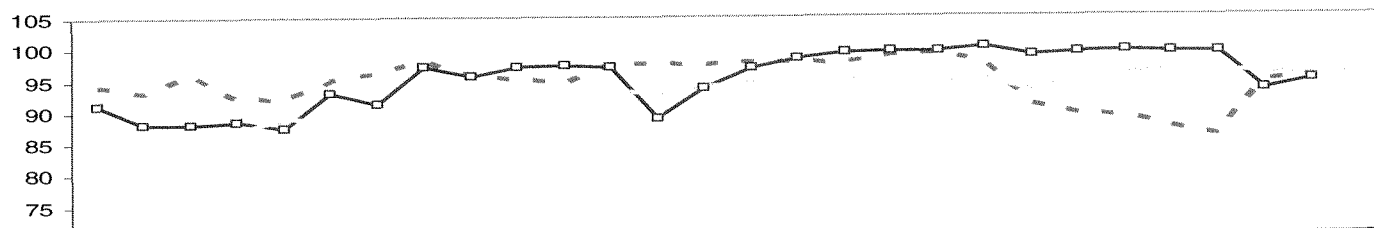
Unit 3 Average Daily Power Level



Plant Performance

INPO Performance Index

INPO INDEX



	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	1997				1998				1999				2000				2001				2002				2003			
BFN U2	94	93	96	92	92	95	96	98	95.5	95.1	94.4	97.5	97.4	97.2	97.8	97.7	97.5	98.7	99.0	97.5	90.8	89.3	89.0	87.1	85.9	94.3	95.4	
BFN U3	91	88	88	88	88	93	91	97	96	97.0	97.2	97.1	88.8	93.6	96.8	98.3	99.1	99.4	99.5	100.	98.7	99.3	99.4	99.2	99.1	93.3	94.7	
Industry Median	86	85	86	87	89	89	89	90	90	90	92.8	93.3	92.7	93.8	94.4	94.4	95.0	95.0	94.5	95.0	93.2	94.6	95.7	96.2	96.2	95.9	95.9	95.9

Station: ***Browns Ferry Nuclear Plant***	Period Included		Unit 2			Unit 3		
OVERALL PERFORMANCE INDICATOR	(months)	WEIGHT	VALUE	INDEX	PRODUCT	VALUE	INDEX	PRODUCT
Unit Capability Factor	18 or 24	0.16	90.1	94.4	15.1	94.9	100.0	16.0
Forced Loss Rate	18 or 24	0.16	2.5	94.2	15.1	0.0	100.0	16.0
Unplanned Auto Scrams	24	0.10	0.4	100.0	10.0	0.0	100.0	10.0
Safety System Performance:								
BWR H.P. Inject./Heat Removal	36	0.10	0.020	100.0	10.0	0.007	100.0	10.0
BWR Residual Heat Removal	36	0.10	0.007	100.0	10.0	0.007	100.0	10.0
Emergency AC Power	36	0.10	0.0101	100.0	10.0	0.0101	100.0	10.0
Fuel Reliability	3	0.11	27	100.0	11.0	491	92.9	10.2
Chemistry Performance Indicator	18 or 24	0.07	1.06	100.0	7.0	1.05	100.0	7.0
Collective Radiation Exposure	18 or 24	0.10	173.1	70.5	7.0	173.1	70.5	7.0
				NORM. INDEX	**95.2**		NORM. INDEX	**96.3**
				FY Forecast	95.0		FY Forecast	96.9

Unit 2 Cycle 12 Refueling Outage

- 19 Day 12 Hour Duration
- Major Work Accomplishments
  - Replaced all reload 10 fuel assemblies
  - 1482 work orders implemented during the outage
    - 318 emergent work orders
  - Corrected all Unit 2 control room deficiencies
  - Corrected all Unit 2 operator work arounds
  - Closed all outage related Generic Letter 91-18 items
  - Closed temporary alterations
  - Implemented permanent repairs for temporary leak repairs performed during the last cycle
  - Replaced piping with Chrome-Moly piping as part of the Flow Accelerated Corrosion (FAC) Program
  - Completed 494 surveillance activities
  - Implemented 36 design modifications
    - Installation of reactor recirculation pump variable frequency drives
    - Replacement of the RHRSW keep fill check valves
    - Installation of permanent drywell shielding
    - Modified scram discharge instrument volume

Unit 2 Cycle 12 Refueling Outage

- Inspections
  - Internal Vessel Visual Inspection
    - Core Spray
    - Top Guide
    - Core Plate
    - Feedwater Spargers
    - Jet Pumps
  - In Service Inspections
    - 123 Visual Examinations
    - 10 Magnetic Particle Examinations
    - 8 Liquid Penetrant Examinations
    - 48 Ultrasonic Exams
    - 8 Pre-Service Visual Examinations
  - 10 CFR 50, Appendix J
    - 175 components tested
  - Flow Accelerated Corrosion
    - 180 inspections completed

Unit 2 Cycle 12 Refueling Outage

- Challenges
  - Unplanned Automatic Scram Signal
  - Feedwater Heater Valve Repair
  - Reactor Recirculation Pump Variable Frequency Drive Trip

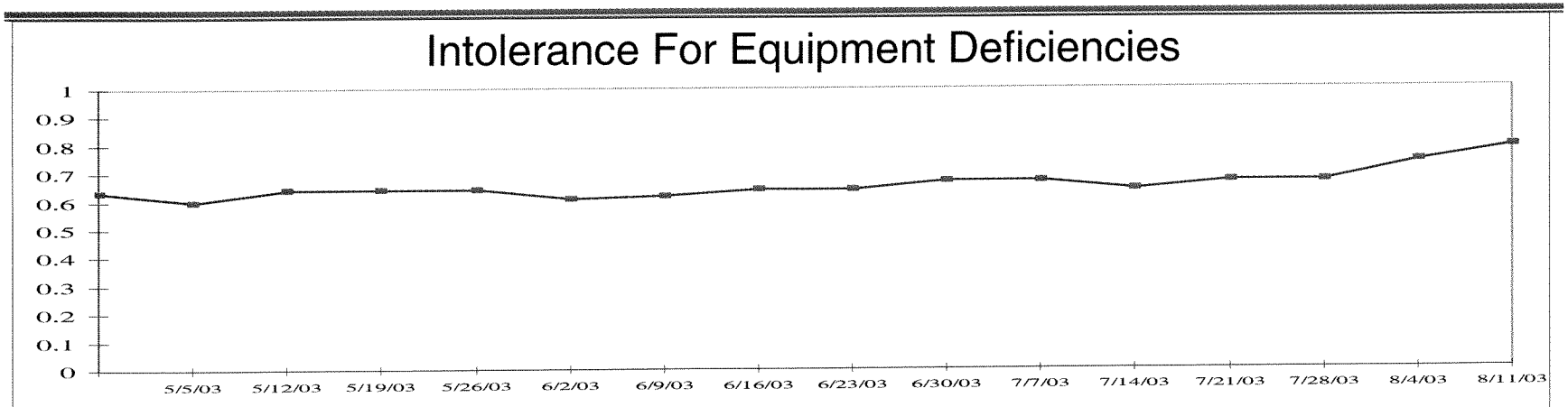
Significant Regulatory Initiatives

- Alternative Source Term
- Fuel Vendor Change
- Extended Power Uprate
- License Renewal
- Independent Spent Fuel Storage

Plant Improvement Initiatives

- Fiscal Year 2003 Focus Areas
  - Unit 1 Integration
  - Intolerance for Equipment Deficiencies
  - Excellence In Human Performance
  - Dose Reduction
  - Extended Power Uprate
  - Long Range Planning
  - Equipment Reliability
  - Personnel Safety
  - Attrition/Succession Planning
  - Innovation Suggestions and Implementation
  - Design Error Reduction
  - Unit 2 Cycle 12 Outage (Complete)

Plant Improvement Initiatives
Intolerance For Equipment Deficiencies



Index Attributes

Operational Challenges	Maintenance Backlog and Production	Engineering Support
Operator Work Arounds (non-outage)	Total Work Order Backlog (non-outage, non-DCN, plant process equipment)	Long Standing Red and Yellow System Health Windows
Control Room Deficiencies (non-outage)	Corrective Maintenance Backlog (non-outage)	GL 91-18 Issues - Average Age
Fire Protection Impairments that Require a Fire Watch (non-outage)	Corrective Maintenance Average Age (non-outage)	Temporary Alterations of Configuration Average Age (non-outage)
AUO Rounds Deficiencies Average Age	Maintenance Production Unit Rate	Number of Significant Problem Evaluation Reports (A&B Level Equipment PERs)
Unplanned Lit Annunciators (non outage) total and age	Deferred Preventive Maintenance Activities	Installation of Issued DCN (non outage)
Disabled Annunciators (non outage)	Predictive Maintenance – Components in Alert Range	
Operator Housekeeping and Materiel Condition	Planning Timeliness (non-outage, non-DCN, plant process equipment)	
	Temporary Leak Repairs (non-outage)	

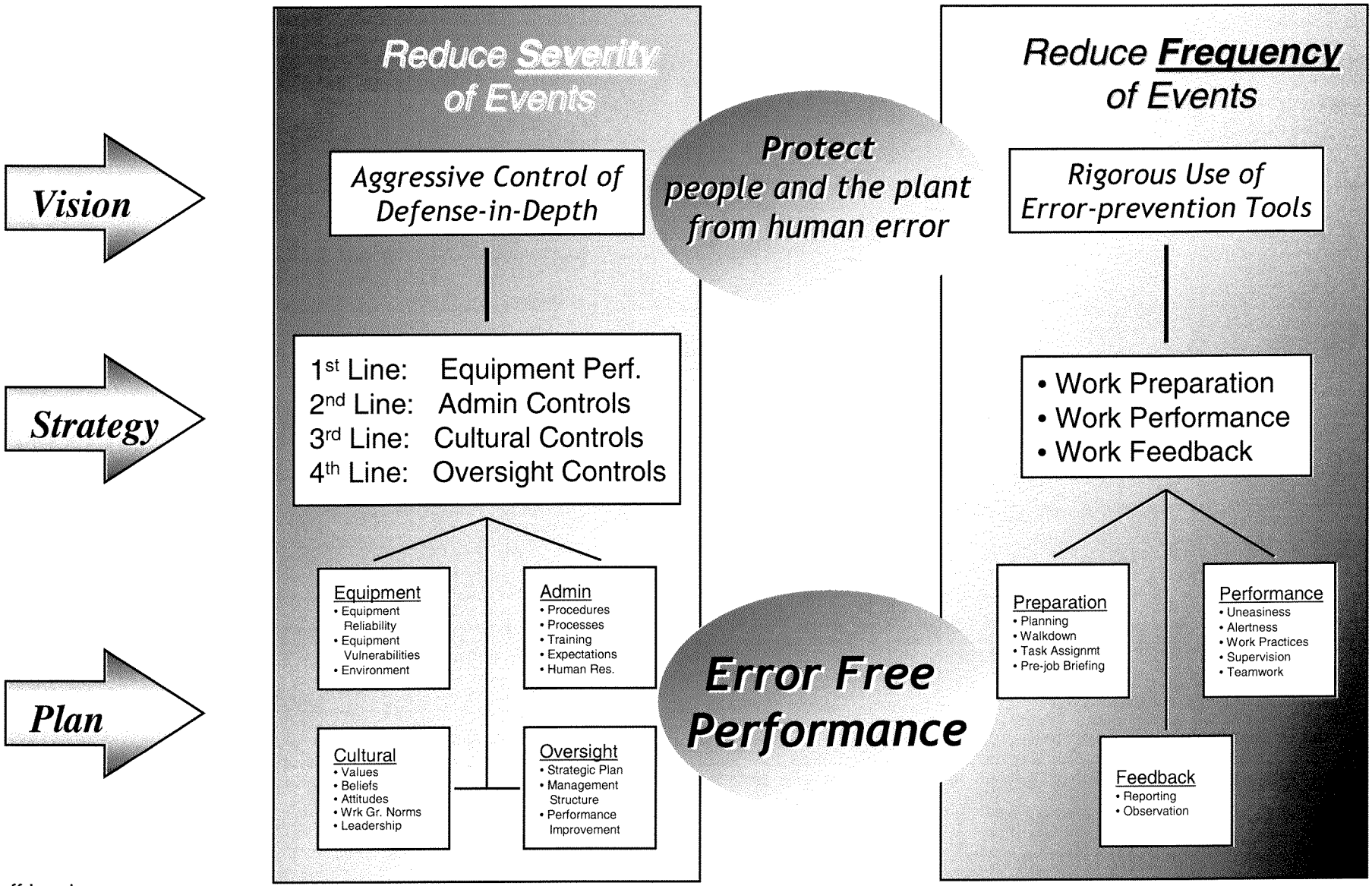
Plant Improvement Initiatives
Excellence in Human Performance

Vision Statement:

Protect people and the plant from human error through aggressive control of defense-in depth and rigorous use of error-prevention tools

Plant Improvement Initiatives

Excellence in Human Performance



Jeff Lewis

Plant Improvement Initiatives

- Fiscal Year 2004 Focus Areas
  - Equipment Reliability/Intolerance for Equipment Deficiencies Improvements
  - Human Performance/Industrial Safety Improvements
  - Project Quality
  - Dose Reduction
  - Personnel Development
  - Extended Power Uprate Planning
  - Maintenance and Technical Training Program Accreditation Renewal

Safety Culture Initiatives

- Safety Culture Monitoring
  - Inspector General Review
  - Cultural Index Survey
  - Human Resources Cultural Health Index
  - Nuclear Safety Review Board
  - Nuclear Assurance
- BFN is Implementing the Recommendations of INPO SOER 02-4 "Reactor Pressure Vessel Head Degradation at Davis-Besse Nuclear Station"
- Safety Culture Self Assessment
  - Assessment performed July 14-18, 2003
    - Assessment Team Members
      - TVA Corporate
      - Sequoyah
      - Industry Peer from Florida Power & Light
    - Assessment Activities
      - Review of the Corrective Action Program
      - Review of Work Orders
      - Review of Operator Work Arounds
      - Review of System Health Reports
      - Review of Scheduling Process
      - Plant Walkdowns
      - Personnel Interviews

Safety Culture Initiatives

- Conclusions from Assessment
  - Employees are encouraged and willing to identify degraded conditions.
  - Station personnel pursue resolution of important and long-standing equipment and materiel problems. Plant shutdowns were made, when appropriate, to affect repairs.
  - Site management is effectively involved in plant activities affecting equipment performance and exercises appropriate accountability and follow-up on performance problems.
  - Events are properly assessed for significance and appropriately addressed to determine root causes and corrective actions necessary to prevent recurrence.
  - Abnormal conditions are readily identified and investigated to assess the impact on safety and reliability.
  - Opportunities for Improvement
    - System Health Report Program
    - Timeliness of Human Performance Improvement Plan

Closing Remarks