



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

April 7, 2006

James M. Levine, Executive Vice
President, Generation
Arizona Public Service Company
P.O. Box 52034
Phoenix, AZ 85072-2034

SUBJECT: MEETING SUMMARY - DISCUSSION OF PALO VERDE PERFORMANCE
IMPROVEMENT PLAN

Dear Mr. Levine:

This refers to the management meeting conducted at the U.S. Nuclear Regulatory Commission (NRC) Region IV Office, Arlington, Texas, on March 30, 2006. The meeting attendance list and a copy of the presentation are included as Enclosures 1 and 2. No commitments were made by the licensee during the conference.

In accordance with Section 2.390 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and its enclosures will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

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

Sincerely,

Troy W. Pruett, Chief
Project Branch D
Division of Reactor Projects

Dockets: 50-528
50-529
50-530

Licenses: NPF-41
NPF-51
NPF-74

Arizona Public Service Company

-2-

Enclosures:

1. Attendance Lists
2. Presentation

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Electronic distribution by RIV:
 Regional Administrator (**BSM1**)
 DRP Director (**ATH**)
 DRS Director (**DDC**)
 DRS Deputy Director (**RJC1**)
 Senior Resident Inspector (**GXW2**)
 Branch Chief, DRP/D (**TWP**)
 Senior Project Engineer, DRP/D (**GEW**)
 Team Leader, DRP/TSS (**RLN1**)
 RITS Coordinator (**KEG**)

SUNSI Review Completed: *Yes* ADAMS: ☒ Yes ☐ No
☒ Publicly Available ☐ Non-Publicly Available ☐ Sensitive Initials: *Yes*
☒ Non-Sensitive

R: REACTOR\PV\2006\PV PIP 3-30-06MS.wpd

RIV/SPE\DRP\D	C:DRP\D			
GEWerner	TWPruett			
<i>Yes</i>	<i>Yes</i>			
4/6/04	4/7/04			

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F=Fax

PERFORMANCE IMPROVEMENT PLAN PUBLIC MEETING ATTENDANCE

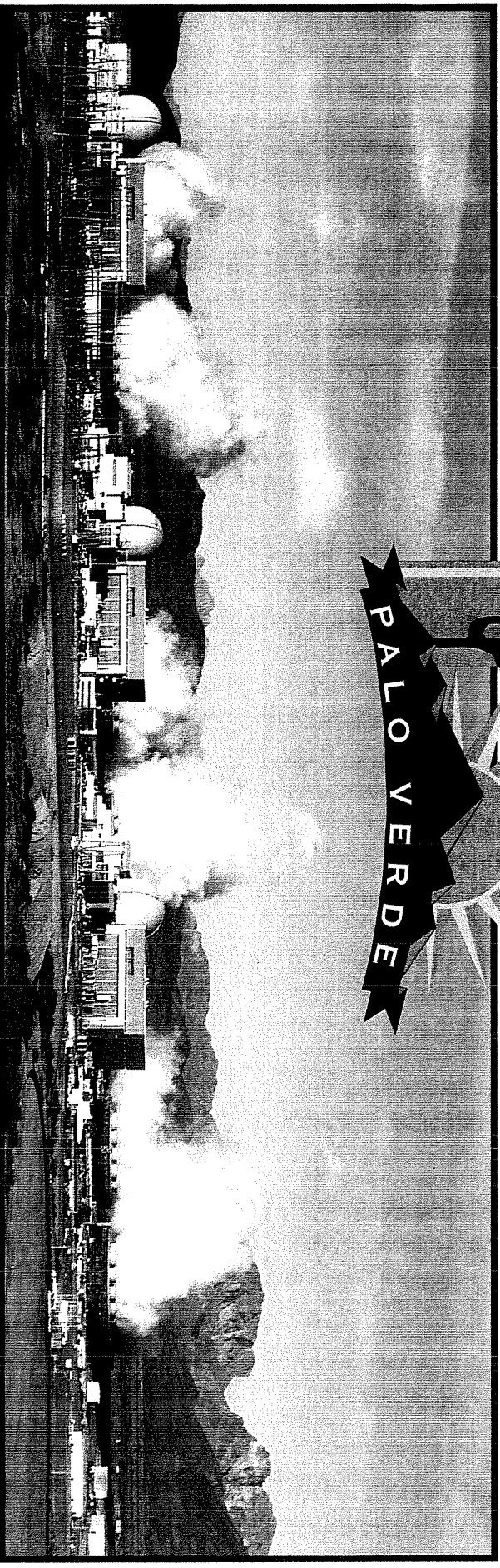
LICENSEE/FACILITY	Palo Verde Nuclear Generating Station
DATE/TIME	March 30, 2006 1:00 - 4:00 p.m. (CST)
CONFERENCE LOCATION	U.S. Nuclear Regulatory Commission Region IV, Training Conference Room 611 Ryan Plaza Drive, Suite 400 Arlington, TX 76011

NAME (PLEASE PRINT)	ORGANIZATION	TITLE
DAVID MAULDIN	APS	VP, ENGINEERING
Jim Levine	APR	Ex. VP, Gen.
Cliff Eubanks	APS	VP, Nuclear Ops
Craig Seaman	APS	GM, REG AFF / PERF IMP.
Chris Aanensen	APS	SR. COMMUNICATIONS REP
Mark Fallon	APS	Communications Consultant
Scott Bauer	APS	Dept Ldr Regulatory Affairs
Dwayne Carnes	APS	Director, Nuc. Assurance
AZL (Hutchman)	APS	Director Nuclear Engineering
Tom Hope	CPSES	Manager Regulatory Performance
Bill Jacobs	GDS Associates	Consultant
Bob Henry	Salt River Project	
John Taylor		
Prem Bahl	Arizona Corp. Comm.	Staff Engineer

PERFORMANCE IMPROVEMENT PLAN PUBLIC MEETING ATTENDANCE

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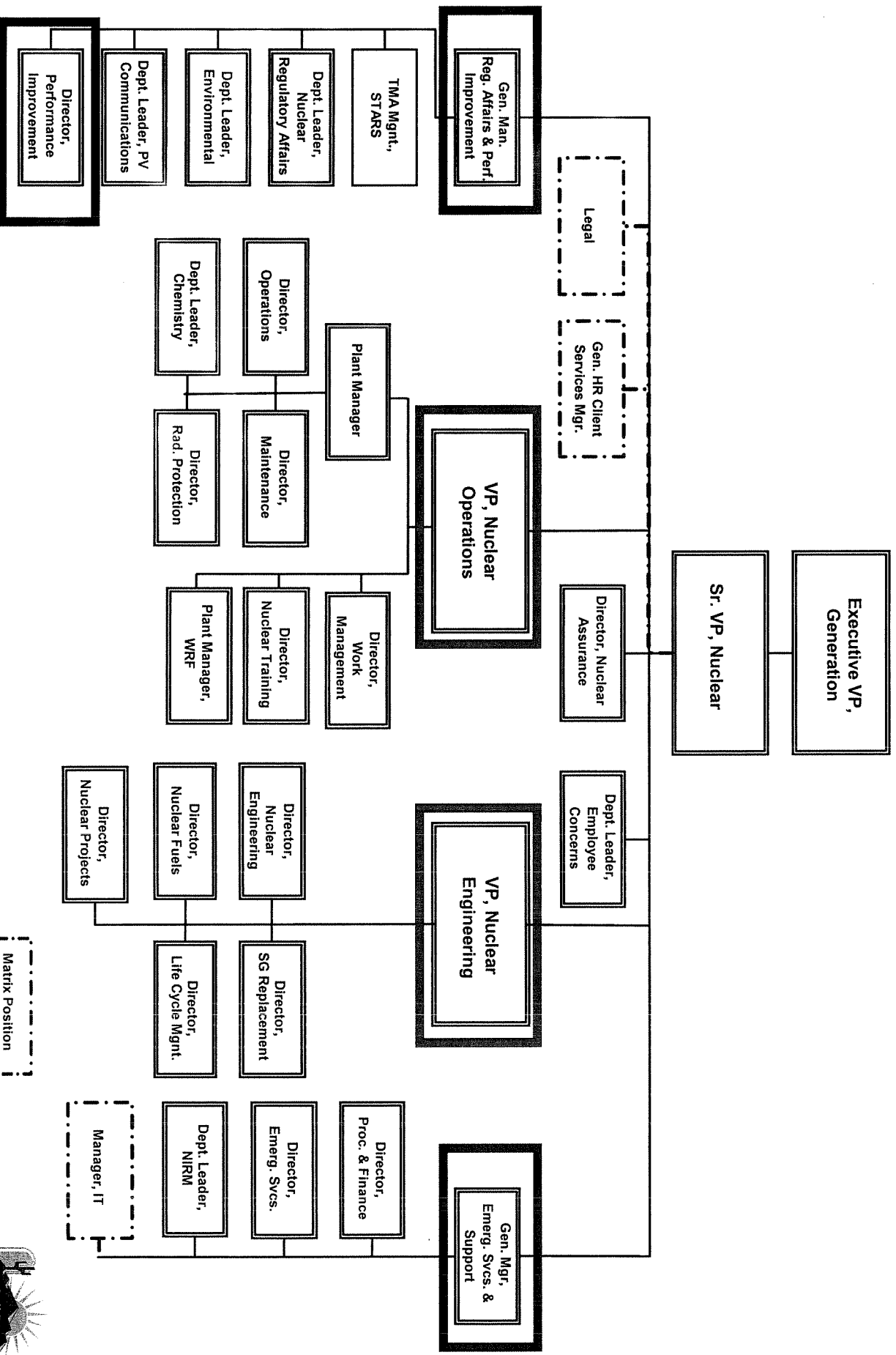
NAME (PLEASE PRINT)	ORGANIZATION	TITLE
CALE YOUNG	NRC	Project Engineer, Branch D
Greg Werner	NRC	Senior Project Engineer
TROY PRUETT	NRC	BRANCH CHIEF
Greg Warnick	NRC	SRI - Palo Verde
Art Howell	NRC	Director, DRP
Bruce Mallett	NRC	Regional Administrator
DWIGHT CHAMBERLAIN	NR	DIRECTOR, DRS
Jeff Clark	NRC	Chief, Eng. Branch 1, DRS
C.S. Paulk	NRC	Sr. Reactor Insp, EBI
J. Reynoso	NRC	Reactor Insp, EBI
V. Dricks	NRC	PAO
R. Lantz	NRC	Sr. Ops Insp/EP
E. Owen	NRC	Reactor Insp EBI
Mel Fields	NRC	Project Manager



Palo Verde / NRC Management Meeting

March 30, 2006

Leadership & Organizational Changes



Agenda

◆ Palo Verde Integrated
Improvement Plan

Cliff Eubanks

◆ Performance Improvement
Plan

Craig Seaman

◆ Engineering Improvement
Plan

David Mauldin

◆ Equipment Reliability
Improvement Plan

Carl Churchman

◆ Nuclear Assurance
Improvement Plan

Dwayne Carnes

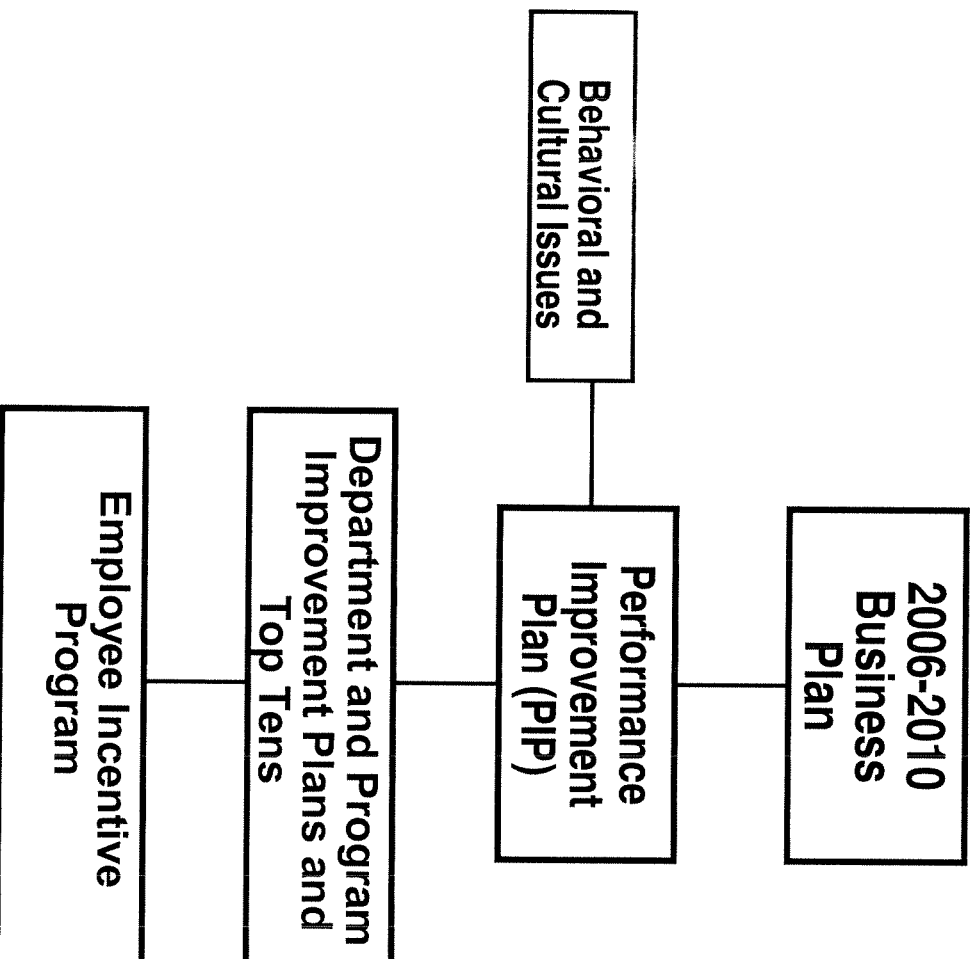


Palo Verde Integrated Improvement Plan

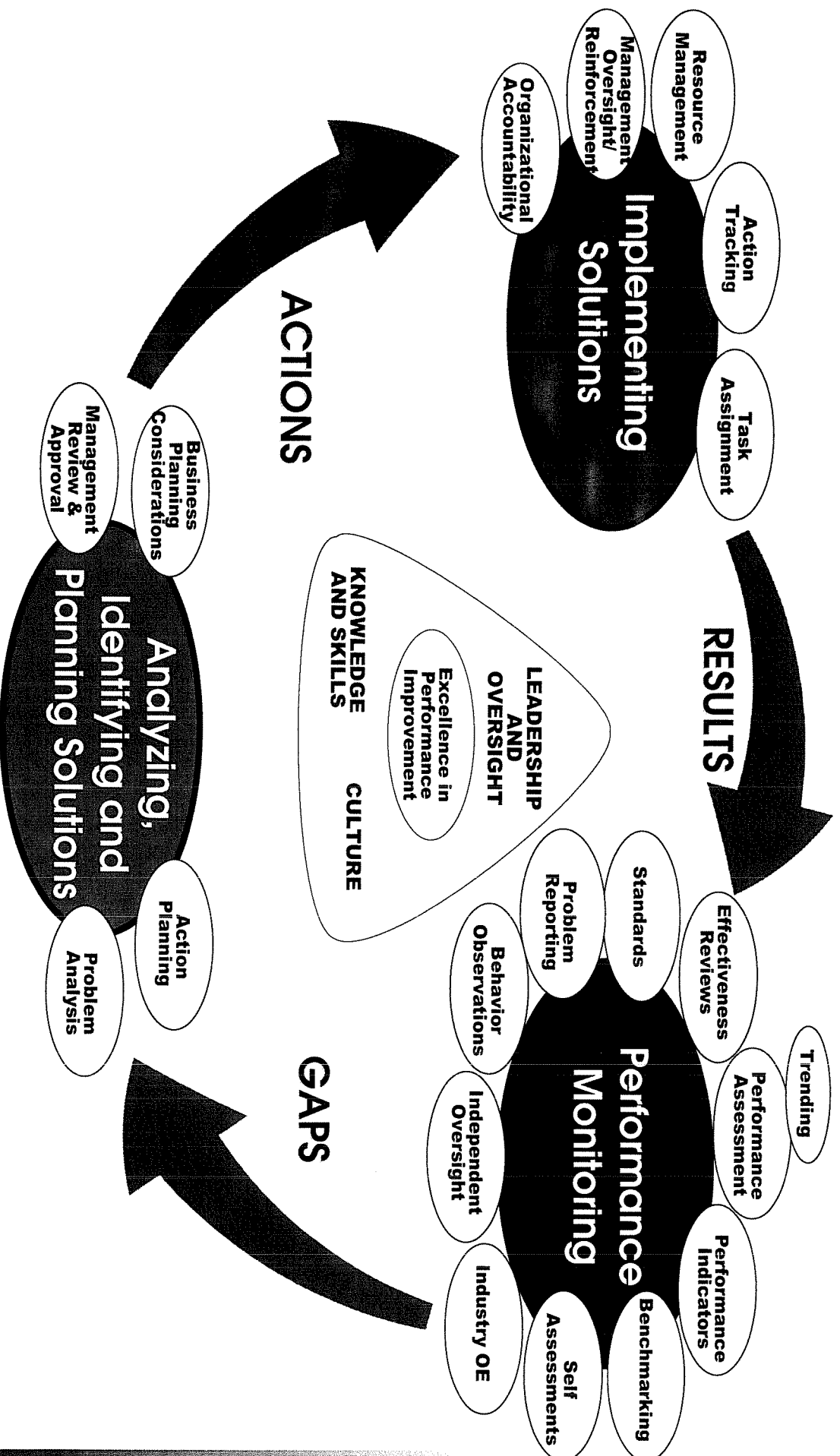
**Cliff Eubanks,
Vice President,
Operations**



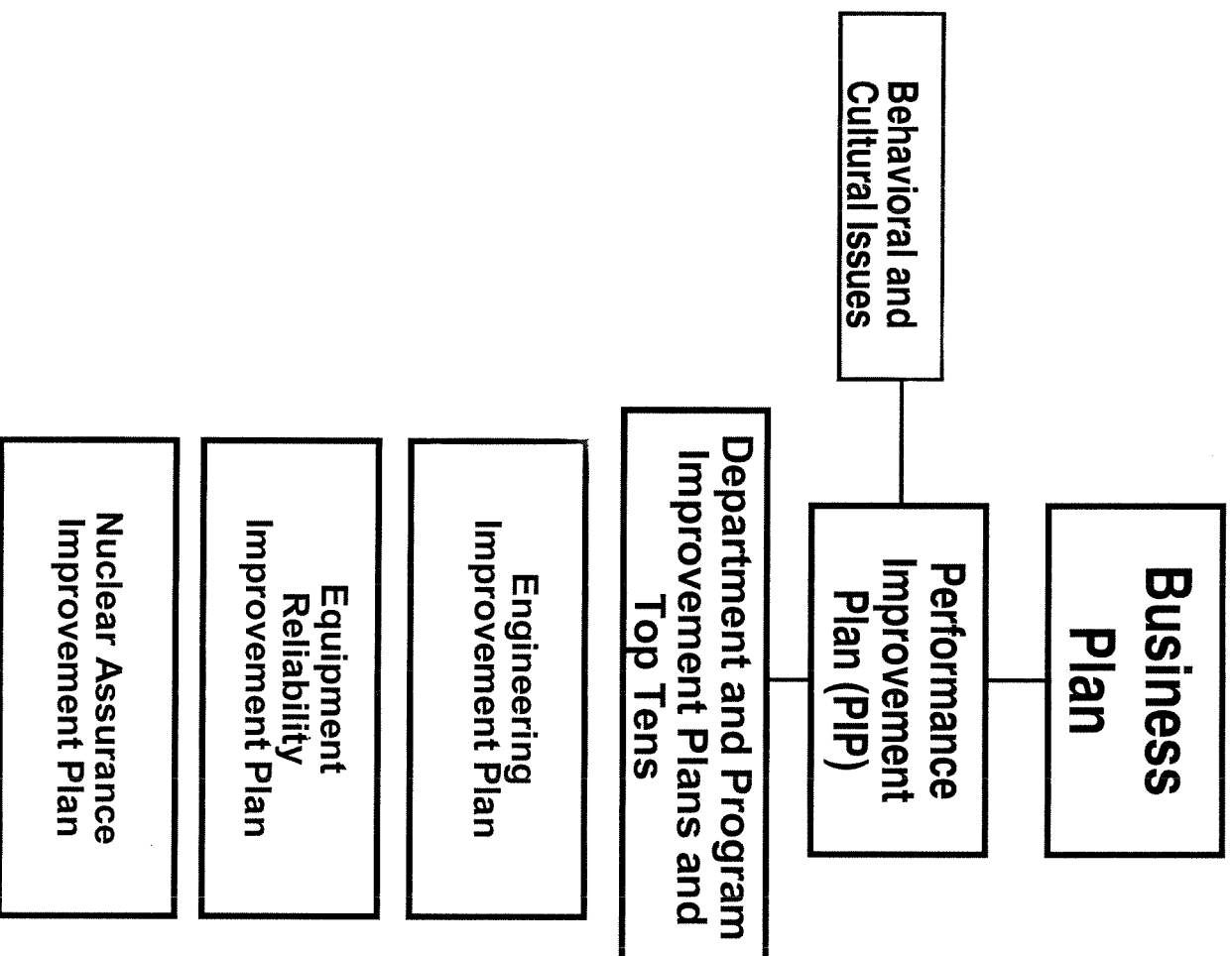
Palo Verde Integrated Improvement Plan



Performance Improvement Model



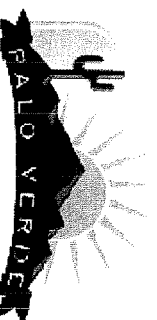
Palo Verde Integrated Improvement Plan



EXCELLENCE 2010

OWNING THE CHALLENGE

Palo Verde Business Plan
2006-2010



Palo Verde Business Plan

Mission Statement

Palo Verde Nuclear Generating Station employees will work as a team, with relentless dedication and focus, to promote high standards of performance, permanently correct problems, and maintain alignment to return Palo Verde to its position as the industry leader in the safe and efficient production of electricity. Our focus is not only on getting the job done, but getting the job done RIGHT the first time.



Palo Verde Business Plan

Six Areas of Emphasis

- 1. Safety**
- 2. Reliability/Operations**
- 3. Financial Leadership**
- 4. Programs/Processes**
- 5. Regulatory Interface**
- 6. Employee Performance and Development**



Palo Verde Business Plan

SUCCESS INDICATORS	2006 TARGET	2010 TARGET
<u>Safety</u> Reactor Trips: Number of unplanned automatic and manual reactor trips during the calendar year.	≤ 2	≤ 1
Maintenance Rule: Percentage of Maintenance Rule Systems meeting performance criteria.	98 by year-end per ramp-up curve in Monthly Trend Report (MTR)	98.5
Reactivity Management: Human performance, programs and equipment that allow for continuous reactivity monitoring and control and maintenance of fuel integrity.	White or green window in MTR	White or green window in MTR
Collective Radiation Exposure: Total external and internal whole-body dose received by all personnel including contractors and visitors.	≤ 145 person-rem	≤ 142 person-rem
Industrial Safety Accident Rate: Number of injuries for APS Palo Verde employees that result in days away from work, days of restricted work or fatalities per 200,000 hours of employee exposure.	≤ 0.2	≤ 0.1
<u>Reliability and Operations</u> Capacity Factor: Gross electrical output minus normal station services load.	90.5%	92.6%
Outage Duration: Total outage days for fall and spring outages.	73 days	68 days
Equipment Reliability: Number of high-risk significant functional failures and failures causing downpowers > 10%.	45	35
Corrective Maintenance Backlog:	≤ 60 monthly by September per work-off curve in MTR	≤ 30 monthly
Elective Maintenance Backlog:	≤ 640 monthly	≤ 570 monthly

Palo Verde Business Plan

SUCCESS INDICATORS	2006 TARGET	2010 TARGET
<u>Financial Leadership</u> O&M: Operations and Maintenance budget.	\$444.3 million	\$456.8 million
Capital:	\$166.7 million	\$55 million
Fuel:	\$157.1 million	\$191.2 million
<u>Programs/Processes</u> Program Reviews: There are 97 programs and processes being used by site personnel. Must establish owners, metrics and monitor key programs.	25 percent of programs/processes defined and reviewed for standardization, ownership, metrics, etc.	100 percent of programs/processes defined and reviewed for standardization, ownership, metrics, etc.
Procedure Simplification: Reduce the number of active procedures, simplify content and make formats consistent.	25 percent of procedures defined and reviewed for standardization, ownership, metrics, etc.	100 percent of procedures defined and reviewed for standardization, ownership, metrics, etc.
<u>Regulatory Interface</u> Number of unmilestoned CRDRs > 30 days for evaluation.	0 by year-end per work-off curve in MTR	0 monthly
Number of unmilestoned CRDRs > 180 days for closure.	0 by year-end per work-off curve in MTR	0 monthly
Percent of CRDRs that are self-initiated or have documented within the CRDR that the affected organization was contacted including the name of the agreed owner.	75 percent by end of year per ramp-up curve in MTR	Top industry quartile
Percent of adverse or review CRDRs issued closed or complete.	40 percent by end of year per ramp-up curve in MTR	Top industry quartile
Number of CRDR Pri 2 actions that do not prevent recurrence.	≤1 a year	Top industry quartile

Palo Verde Business Plan

SUCCESS INDICATORS	2006 TARGET	2010 TARGET
<u>Regulatory Interface (continued)</u> Self Assessment Time: Number of overdue assessments and reports issued >45 days after completing assessment.	0 monthly	0 monthly
NRC Performance Indicators: Plant performance in NRC's reactor oversight process.	0 > green after June 2006	0 > green
INPO Performance: INPO rating in 2007 and 2009 as a result of evaluation.	N/A	INPO 1
Environmental: Number of reportable environmental incidents.	≤ 4	≤ 2
<u>Employee Performance and Development:</u> Significant Human Performance Event: A plant event caused by inadequate human performance that results in a significant impact on nuclear or personnel safety, plant operation or regulatory position.	≤ 5 by year end	Top quartile
Procedure Non-adherence: A failure to follow a Procedure, Technical Document or Work Instruction.	≤ 5 per month by June per performance improvement curve in MTR	≤ 1 per month
Leader Observation Results: Percentage of observations in which employees are observed following site expectation and standards.	80% satisfactory by June per ramp-up curve in MTR	90% satisfactory
INPO Accreditation Renewal of Training Programs.	N/A	Renewal of programs in 2007 and 2009

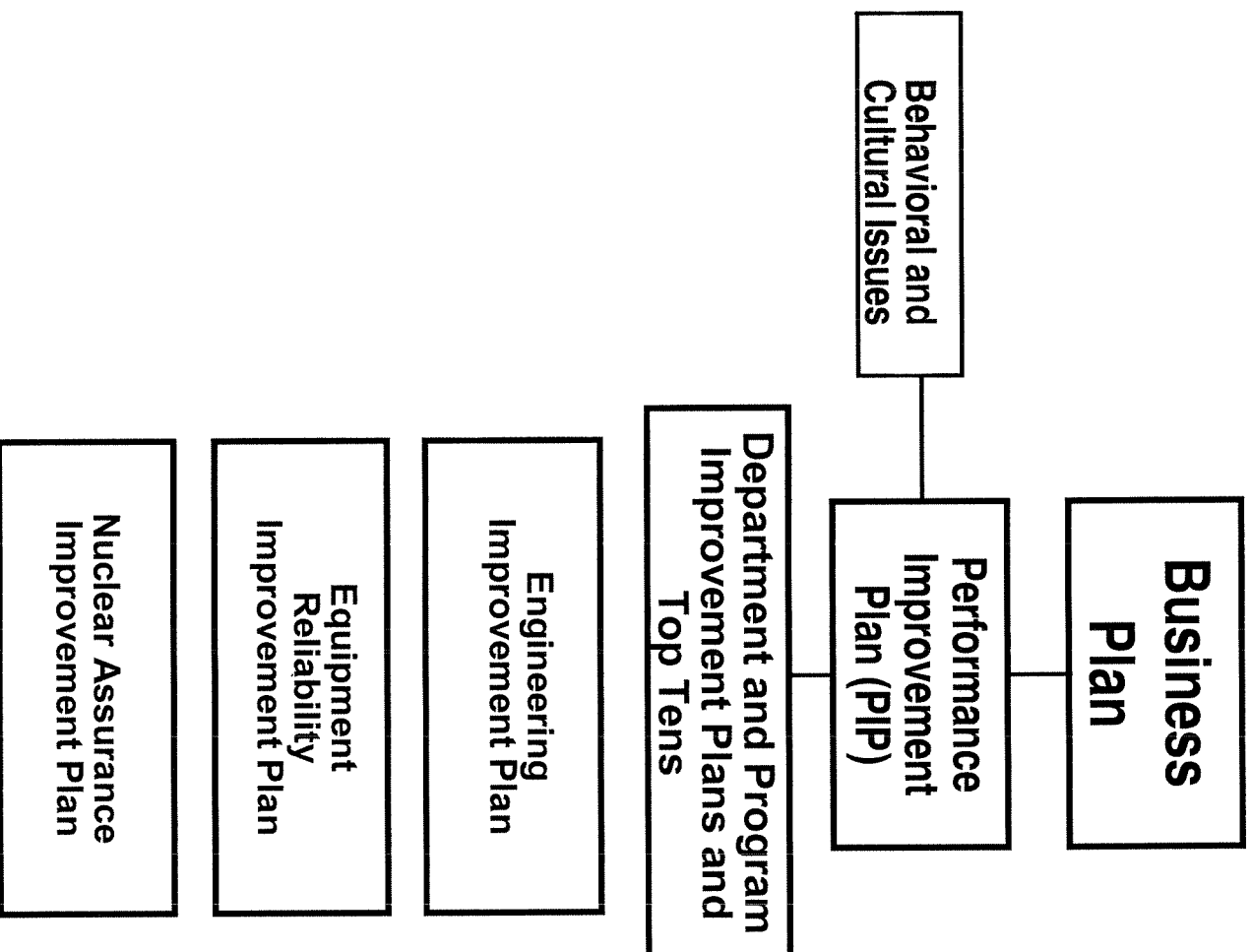


2006 PV Employee Incentive Plan

Indicator	Threshold	Threshold Incentive	Maximum	Maximum Incentive	Year-to-Date Actual / Forecast Where Noted	Incentive % Actual
Nuclear Safety <input type="checkbox"/> Reactor Trips <input type="checkbox"/> Maintenance Rule <input type="checkbox"/> Collective Radiation Exposure	1 of 3 White or Green	0.65%	3 of 3 White or Green	1.0%	2 of 3	0.8%
Safety¹ <input type="checkbox"/> Weeks w/o a Preventable Recordable <input type="checkbox"/> Lost-time/Restricted Duty (hours) ISAR	0/week ≤ .25	.01%/week 0.3%	0/week ≤ .1	.01%/week 0.75%	8 0	0.08% 0.75%
Human Performance <input type="checkbox"/> Significant Human Performance Events <input type="checkbox"/> Noteworthy Human Performance <input type="checkbox"/> Observation Results	1 of 3 White or Green	0.65%	3 of 3 White or Green	1.0%	3 of 3	1.0%
Plant Improvement Plan Performance <input type="checkbox"/> Procedure Usage CRDR Effectiveness	Per the MTR	0.4%	Per the MTR	0.75%		0.00%
<input type="checkbox"/> # of Evaluations > 30 days <input type="checkbox"/> # of Closures > 180 days <input type="checkbox"/> % Self Identified <input type="checkbox"/> % Issued Closed <input type="checkbox"/> % Preventing Recurrence	3 of 5 White or Green	0.4%	5 of 5 White or Green	0.75%	5 of 5	0.75%
Nuclear Capacity Factor	88.5%	0.65%	92.5%	1.0%	73.6%	0.00%
Equipment Reliability <input type="checkbox"/> Functional Failures & Downpowers > 10% <input type="checkbox"/> Rework (under construction) <input type="checkbox"/> Average Age of Backlog <input type="checkbox"/> Work Order Backlog	2 of 4 White or Green	0.65%	4 of 4 White or Green	1.0%	2 of 4	0.65%
Finance Performance <input type="checkbox"/> O&M Budget <input type="checkbox"/> Capital Budget	\$453M \$170M	0.32% 0.32%	\$435M \$164M	0.5% 0.5%		0.5% 0.5%
PNW Earnings (Including incentive payout) Total Company Earnings	\$265M	0.0%	\$325M	1.0%		5.03%
Incentive Total² (Maximum funding = 6% of Base Pay)						



Palo Verde Integrated Improvement Plan



Performance Improvement Plan

**Craig Seaman,
General Manager,
Regulatory Affairs and Performance
Improvement**



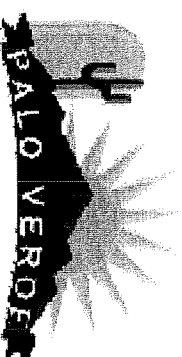
Performance Improvement Plan

- Is part of our plan to return PV to excellence
- It has 2 parts:

1. **Part 1** is a description of how we developed the plan to address cultural and cross-organizational issues.

2. **Part 2** is the “tactical” description – it contains the specific actions, timelines, and objectives to be accomplished.

Palo Verde Nuclear Generating Station
Performance Improvement Plan (“PIP”)



October 15, 2005

PIP Development

- ◆ **Eighteen major inputs**
 - Self assessments
 - NRC reports and cross-cutting issues
 - INPO evaluation report
- ◆ **Streaming analysis**
 - Cross organizational involvement

Performance Improvement Program

- ◆ **Standards**
- ◆ **Leadership**
- ◆ **Accountability**
- ◆ **Corrective Action Program**
- ◆ **Human Performance**



Standards, Leadership And Accountability

The Issue

- ◆ **Palo Verde leaders have not consistently:**
 - held the organization to high standards
 - demonstrated fundamental leadership skills
 - held themselves and the workforce accountable



Standards, Leadership And Accountability

The Plan

- ◆ **Anchor a site-wide accountability culture**
- ◆ **Establish clear standards and expectations**
- ◆ **Align department and station standards and expectations**
- ◆ **Conduct ongoing assessment**



Standards, Leadership And Accountability

The Plan

- ◆ **Define leader standards and expectations**
- ◆ **Raise leader performance through performance plans, training, development and coaching**
- ◆ **Balance strategic and tactical goals and align resources to achieve objectives**



Standards, Leadership And Accountability

Actions taken

- ◆ **Site Standards and Expectations**
 - **Multi-level team**
 - **Benchmarked**
 - **Meetings and training**
- ◆ **Leader Standards and Expectations**
 - **Based on INPO model**
 - **Tailored to each level**
 - **Reviewed, discussed and signed**
- ◆ **Added Standards and Expectations to individual PMPs**



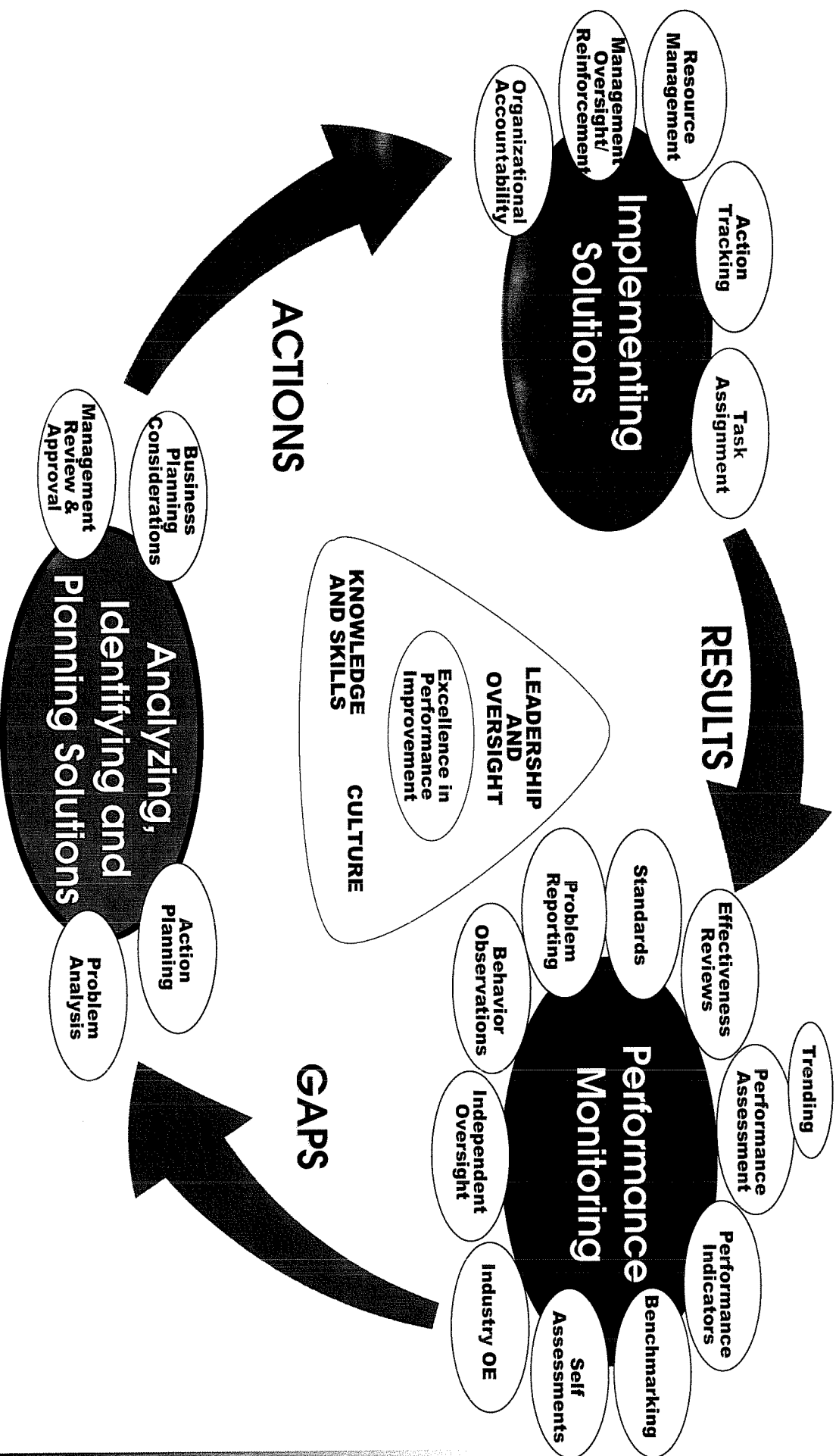
Standards, Leadership And Accountability

Actions taken

- ◆ **Leadership Observation Program**
- ◆ **Palo Verde Human Performance Guideline (under development, currently piloting)**
 - **Human Performance Review board**
 - **Conservative decision making tool**
 - **Prevent Events tools**
 - **Human Error Investigation tool**



Performance Improvement Model



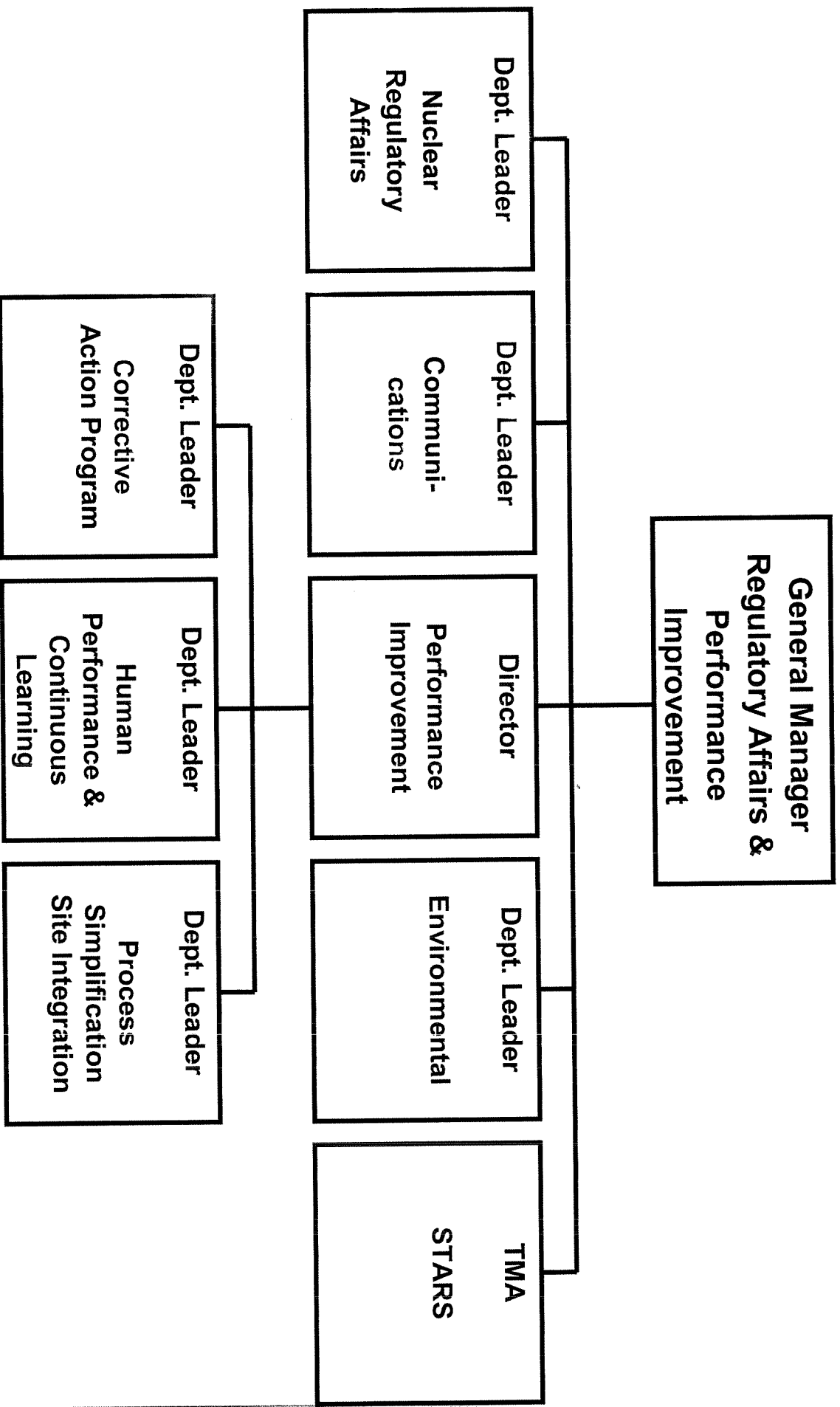
PIP Action Review and Closeout Process

- ◆ **Weekly status meetings with senior management**
- ◆ **Action step closed by responsible party**
 - Reviewed for quality and effectiveness by Process Simplification Site Integration Department
- ◆ **Action Plan closure**
 - Reviewed by PIT director
 - Reviewed by Nuclear Assurance
- ◆ **Focus area closure requires LRT review**

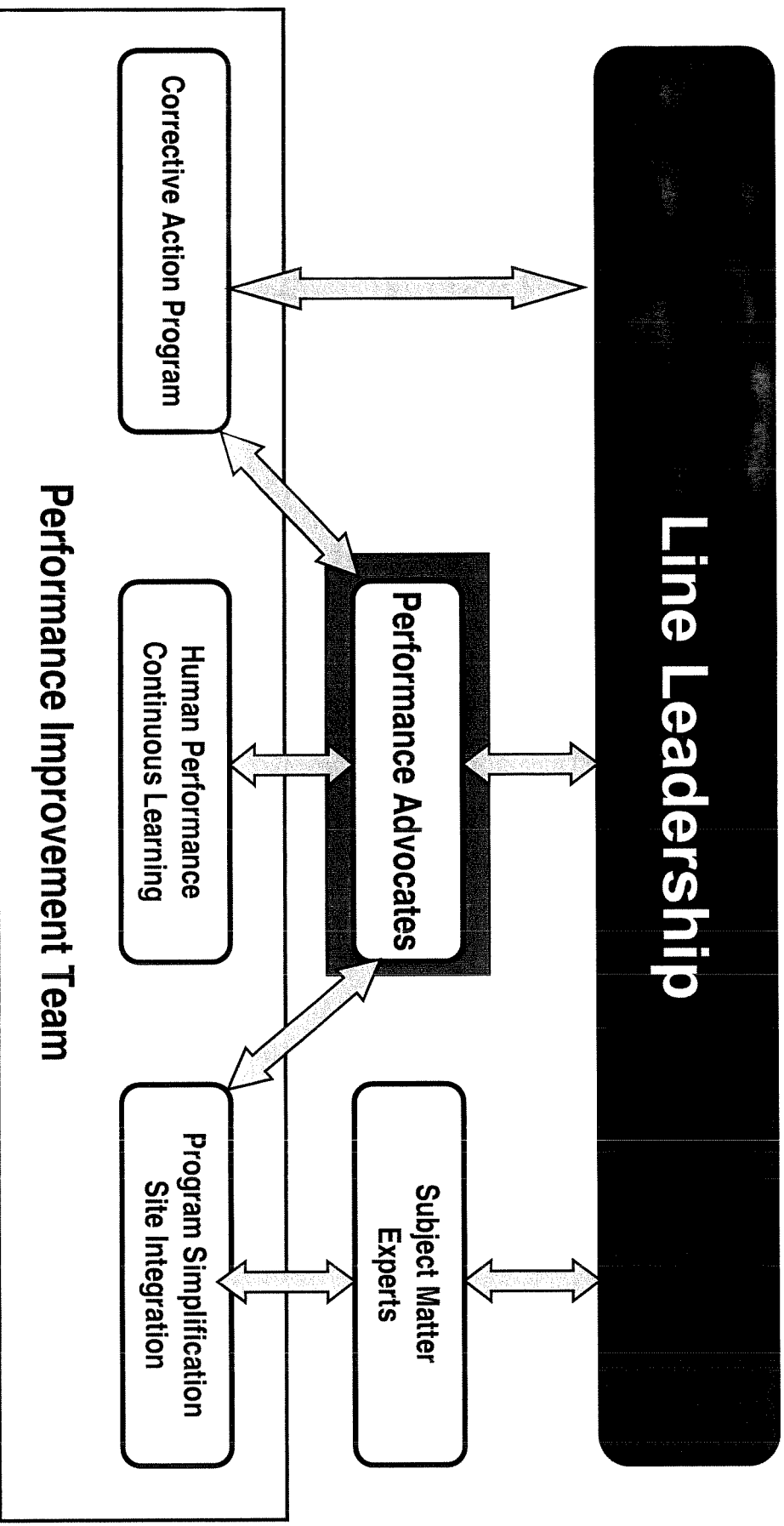
Monitor and Adjust Examples

- ◆ **Leadership Observation Program replaced with +/- log book**
 - Enhance feedback to employees
 - Anchor “leaders in the field”
- ◆ **Implemented executive review for procedure non-compliances**
 - Anchor expectations
 - Improve accountability

Regulatory Affairs and Performance Improvement



Line Management Ownership



Corrective Action Program



Corrective Action Program

The Issue

- ◆ **Palo Verde has not consistently:**
 - **Written CRDRs when required**
 - **Adequately evaluated problems**
 - **Developed, implemented and assessed effectiveness of corrective actions**
 - **Performed corrective action activities in a timely manner**



Corrective Action Program

The Plan

- ◆ **Strengthen line ownership of the Corrective Action Program**
- ◆ **Strengthen continuous improvement culture**
- ◆ **Implement Performance Advocate Program**

Corrective Action Program

Actions taken:

- ◆ **Leader and employee meetings**
- ◆ **CRDR training**
- ◆ **CRC and CARB enhancements**
- ◆ **Line-driven backlog reduction program**
- ◆ **Moved CAP to PIT**
- ◆ **CAP discussion at management meetings**
- ◆ **Performance Advocate Program implemented**

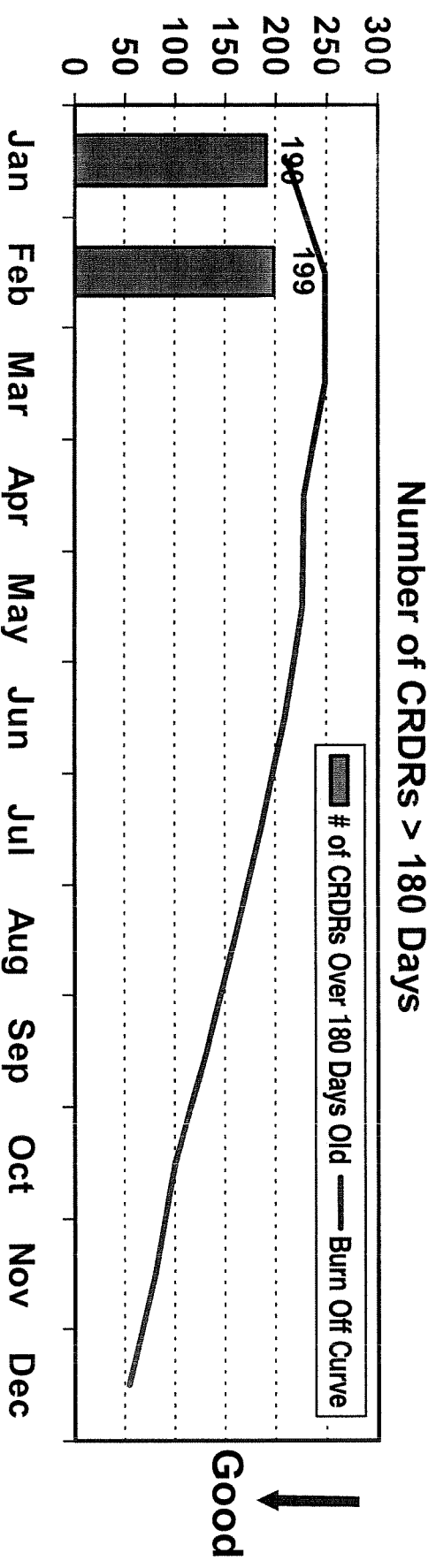
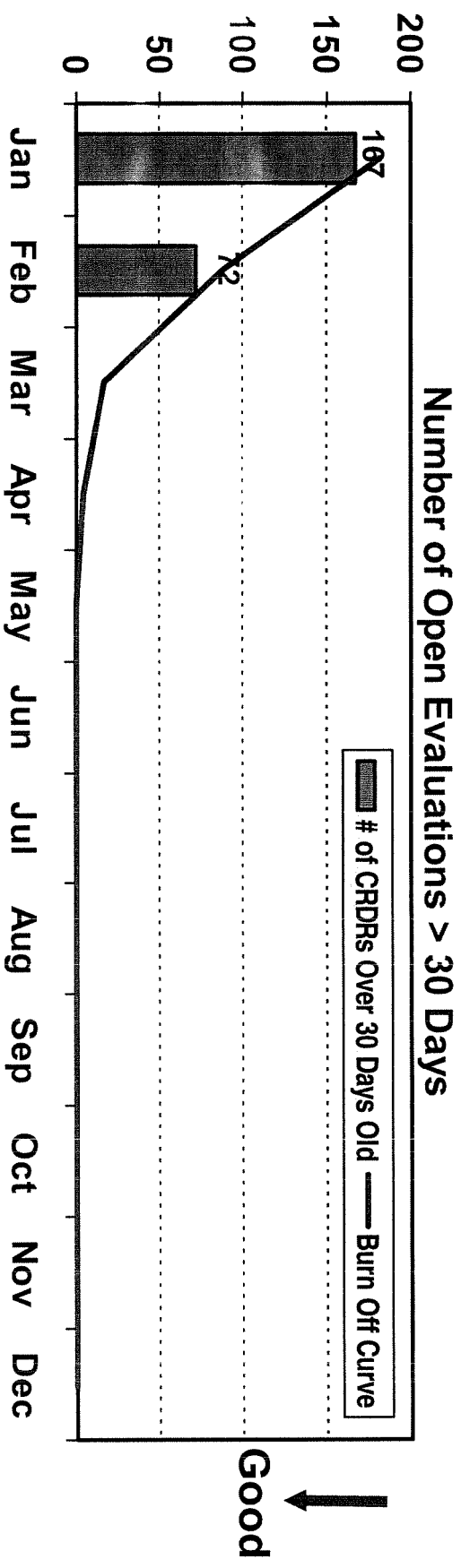


Results



Timeliness of Corrective Actions (Pre-2006)

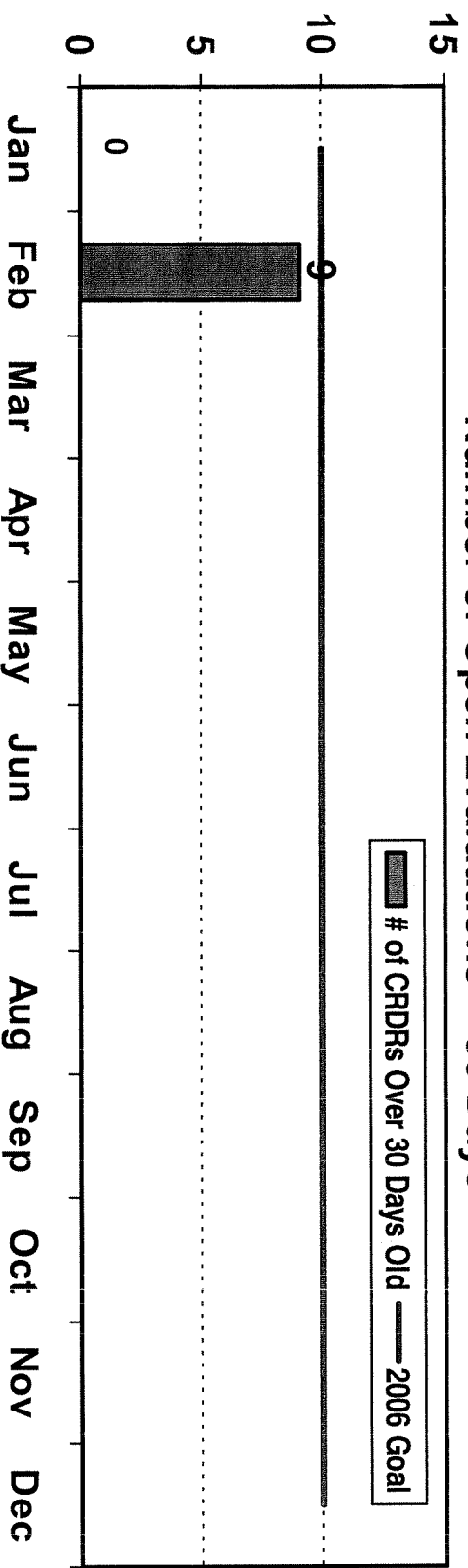
Adverse and Significant CRDRs



Timeliness of Corrective Actions (2006)

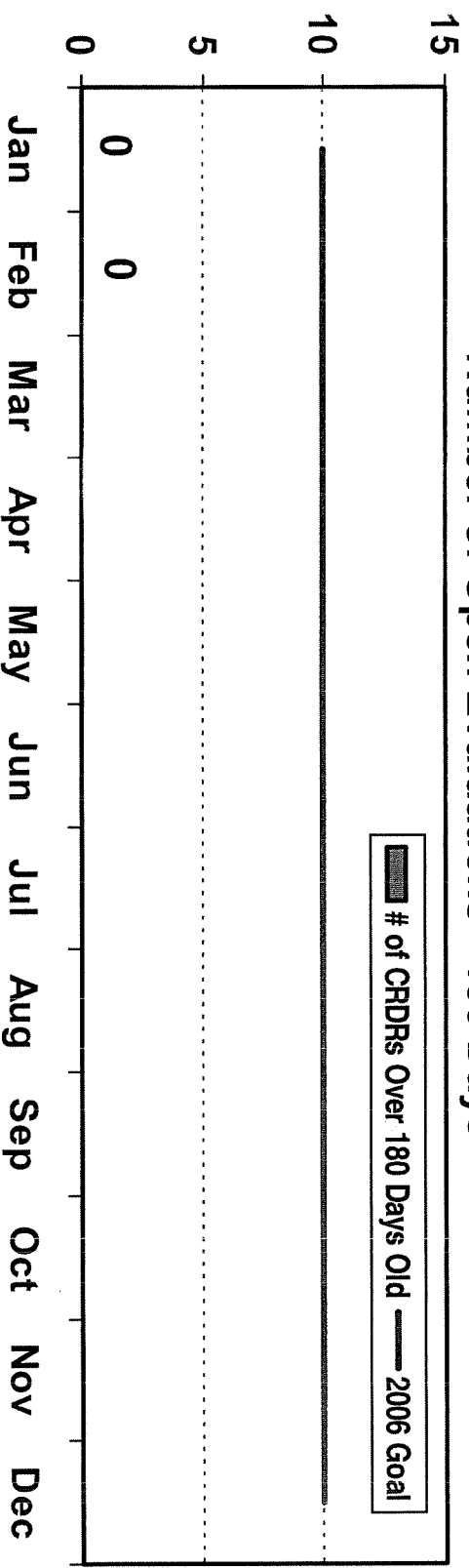
Adverse and Significant CRDRs

Number of Open Evaluations > 30 Days



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Good

CRDRs
Number of Open Evaluations > 180 Days

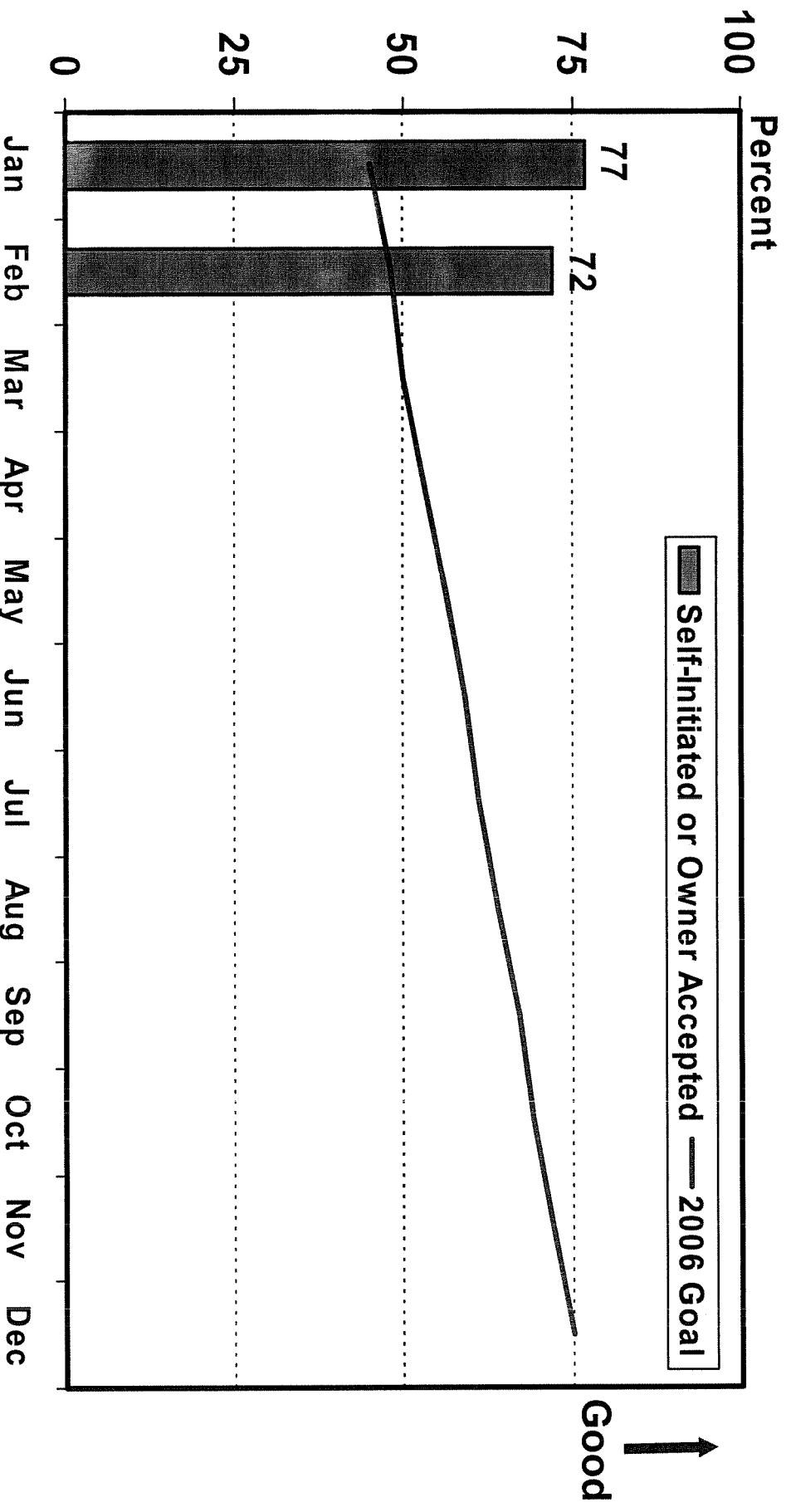


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CRDRs Self-Initiated or Owner Accepted

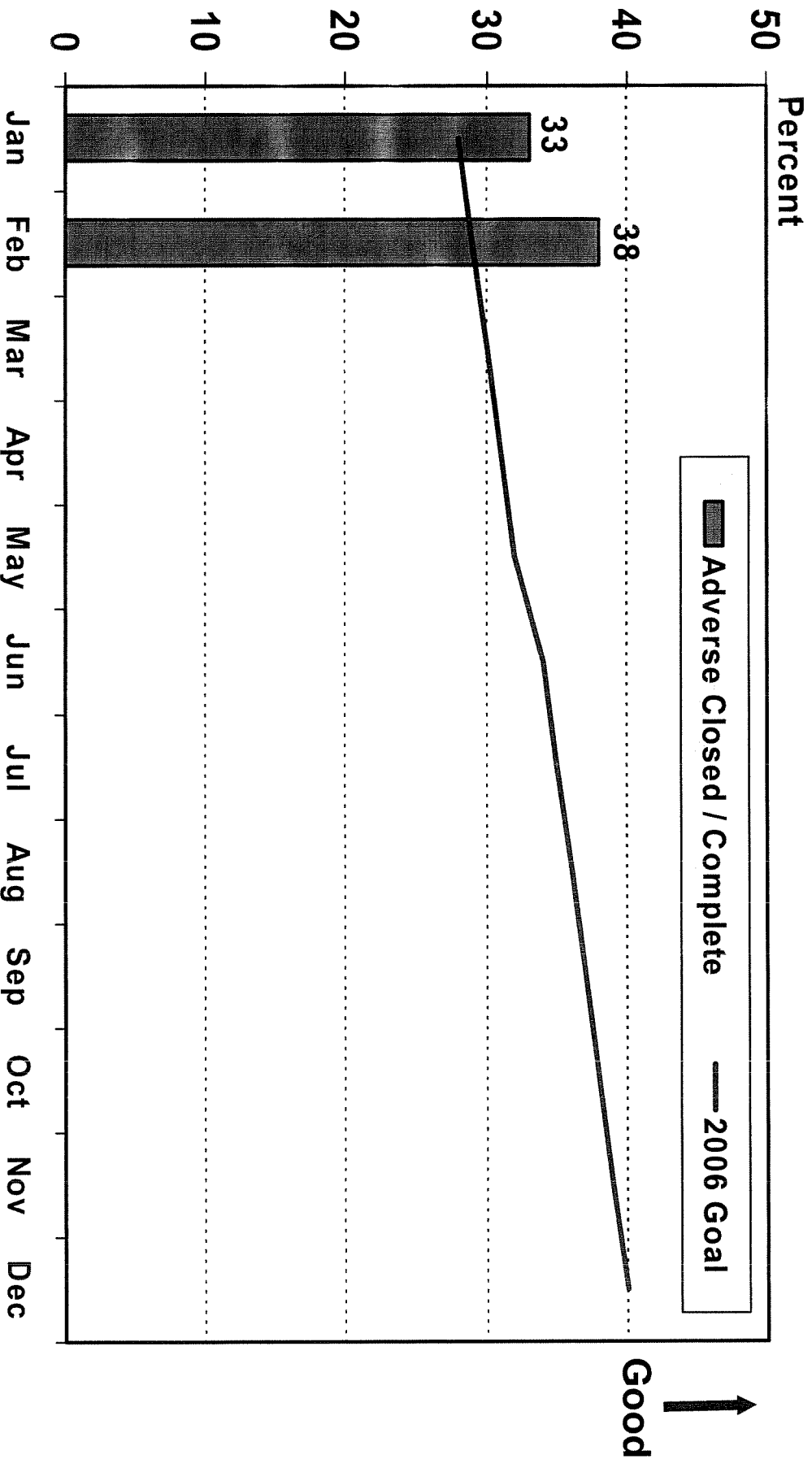
(Year-End Goal is 75%)



The number of CRDRs self-identified or states the potential owner was contacted and accepted the CRDR divided by the total issued.



Adverse CRDRs Issued Closed or Complete (Year-End Goal is 40%)

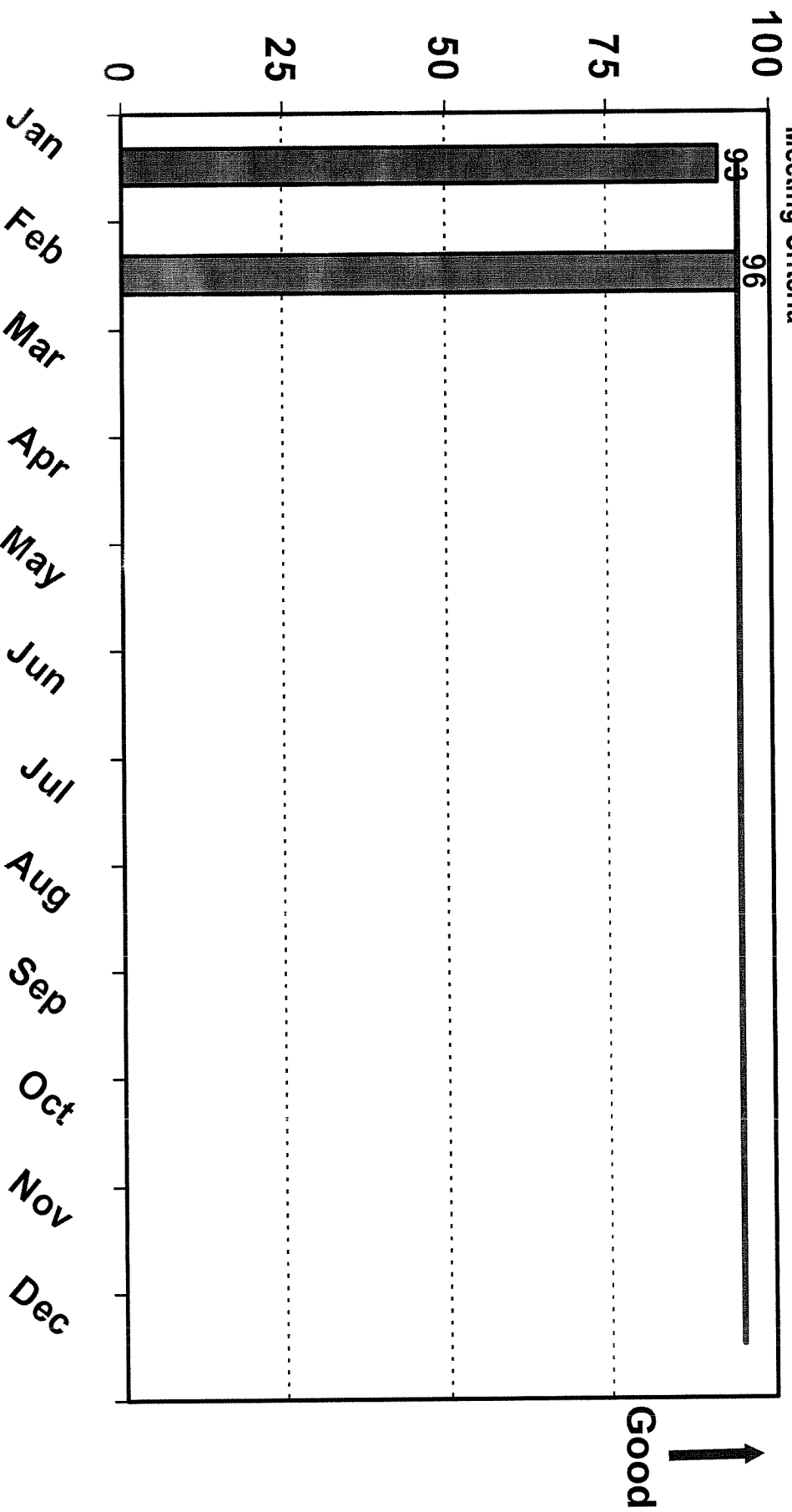


The total of Adverse CRDRs issued closed or with evaluation completed divided by the total Adverse CRDRs issued.



CRDR Monthly Quality/Effectiveness Reviews

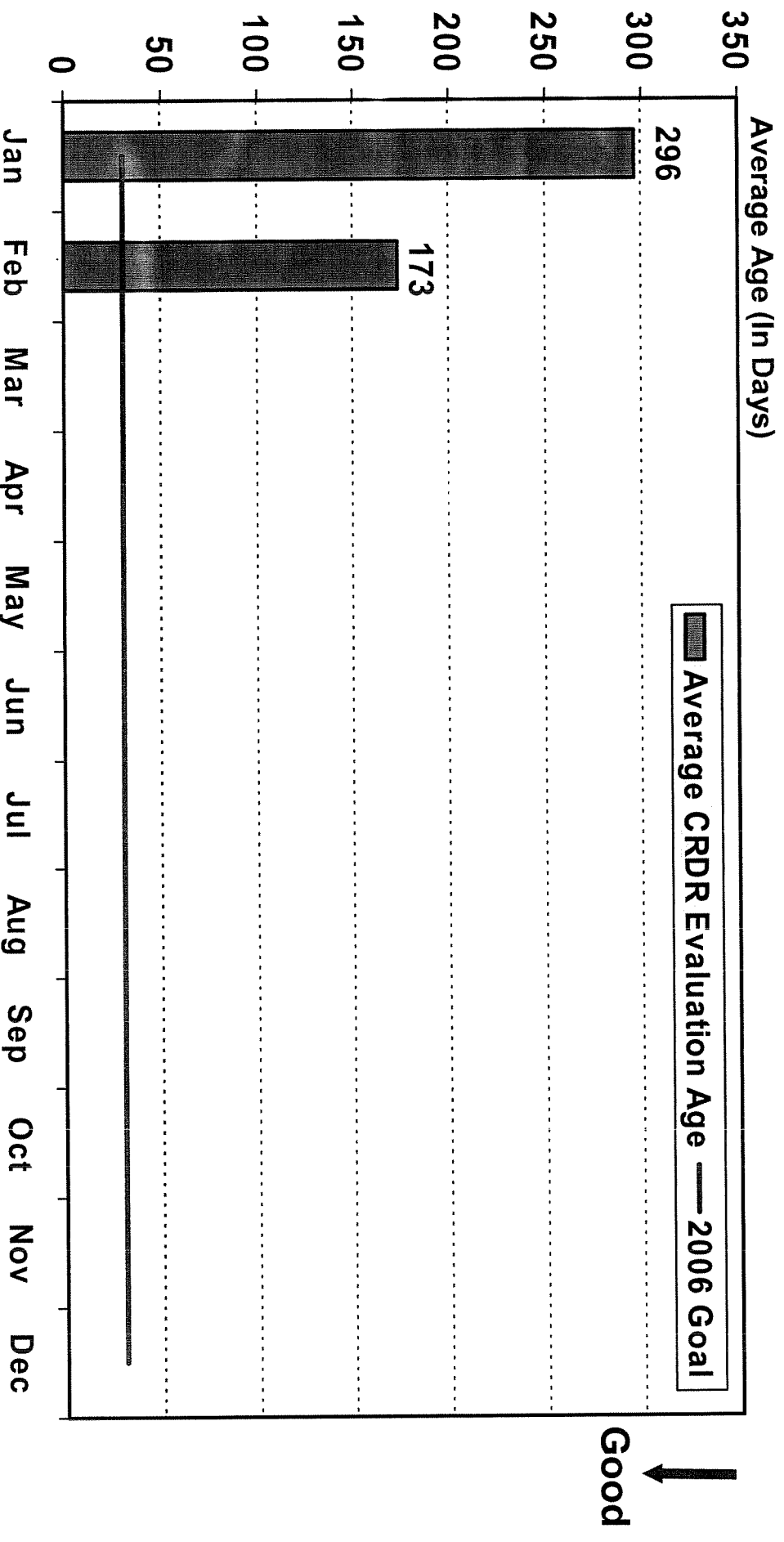
% of CRDRs Reviewed Meeting Criteria



CRDR Monthly Quality/Effectiveness Reviews — 2006 Goal



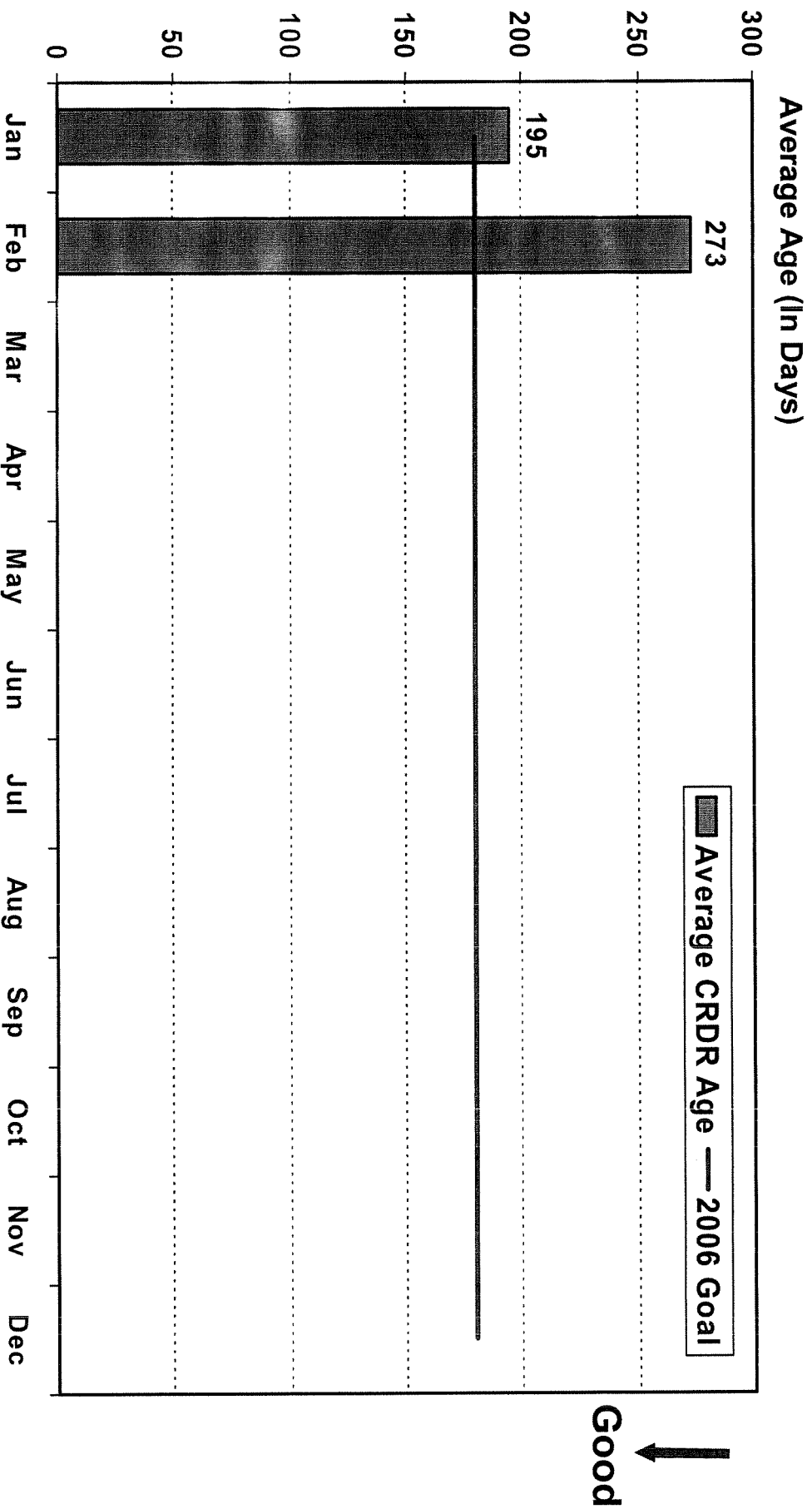
Average CRDR Evaluation Age (All Classifications)



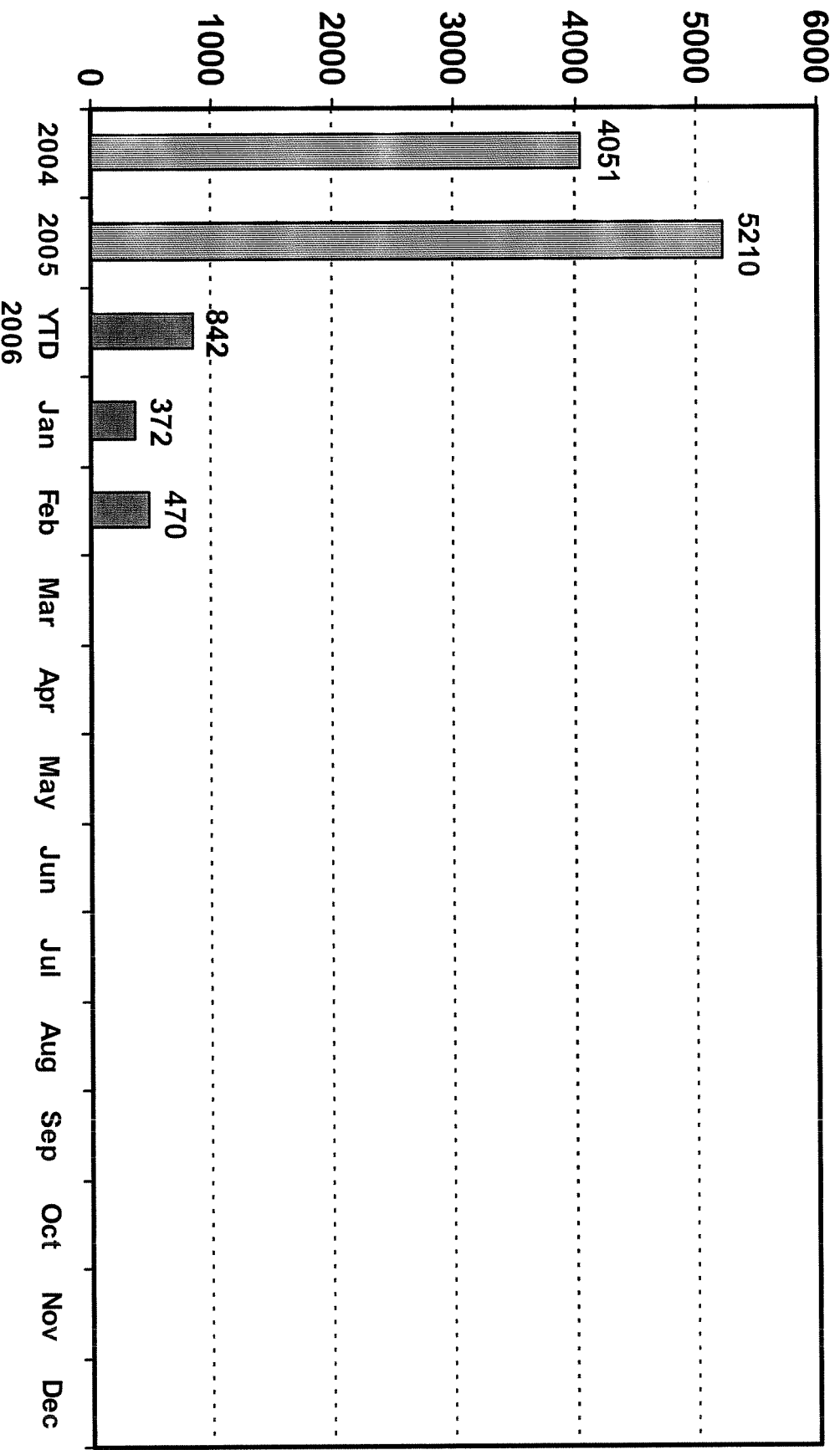
All classifications are included



Average CRDR Age (All Classifications)



Number of CRDRs Issued



Human Performance



Human Performance

The Issue

- ◆ **Increase in human performance errors between 2001 and 2004**
 - **Failure to follow procedures**
 - **Procedures inadequate**
 - **Interface between Operations and Engineering**



Human Performance

The Plan

- ◆ **Develop site-wide model to prevent errors and ingrain procedure use and adherence**
- ◆ **Create an organization to measure, monitor and mentor**
- ◆ **Establish predictive indicators for human performance**
- ◆ **Improve procedures and process**
- ◆ **Strengthen Operations and Engineering Interface**



Human Performance

Actions taken

- ◆ Procedure stand downs
- ◆ Procedure use training
- ◆ Procedure level of use designation
- ◆ Procedure improvement quick hits
- ◆ Procedure/process improvement organization developed and priorities established



Human Performance

Actions taken

- ◆ **Benchmarked for prevent events simulator**
- ◆ **Developed INPO-based site human performance clocks**
- ◆ **Trained Performance Advocates and Human Performance staff**
- ◆ **Identified “Models of Excellence” on site**



Human Performance

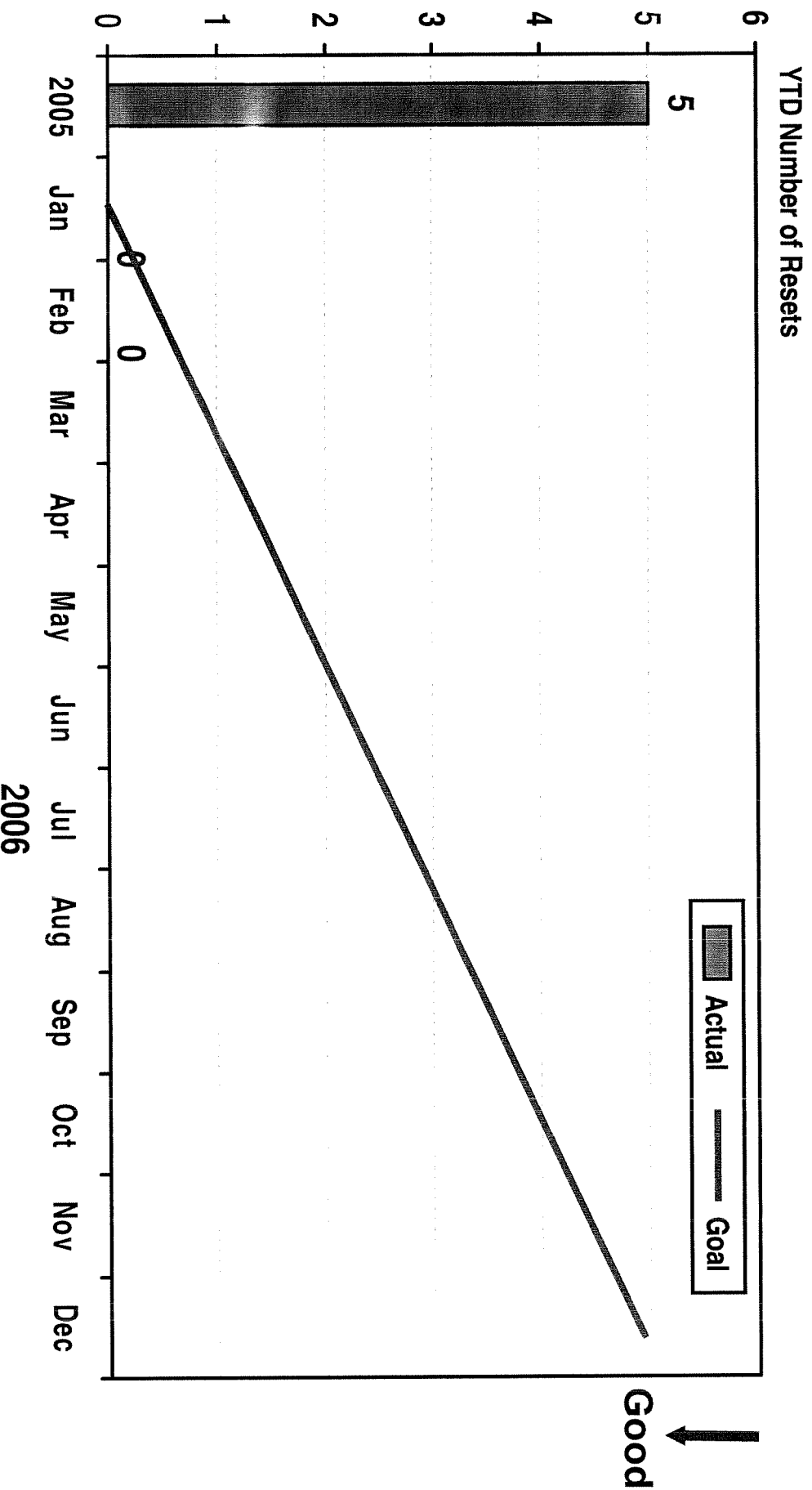
Actions taken

- ◆ **Operations/Engineering interface meeting**
- ◆ **Operations/Engineering joint tabletop training**
- ◆ **Operability Determination Program improved**
- ◆ **Discovery checklist implemented**



HP Site Clock Reset

(Goal = 5 Total for 2006)

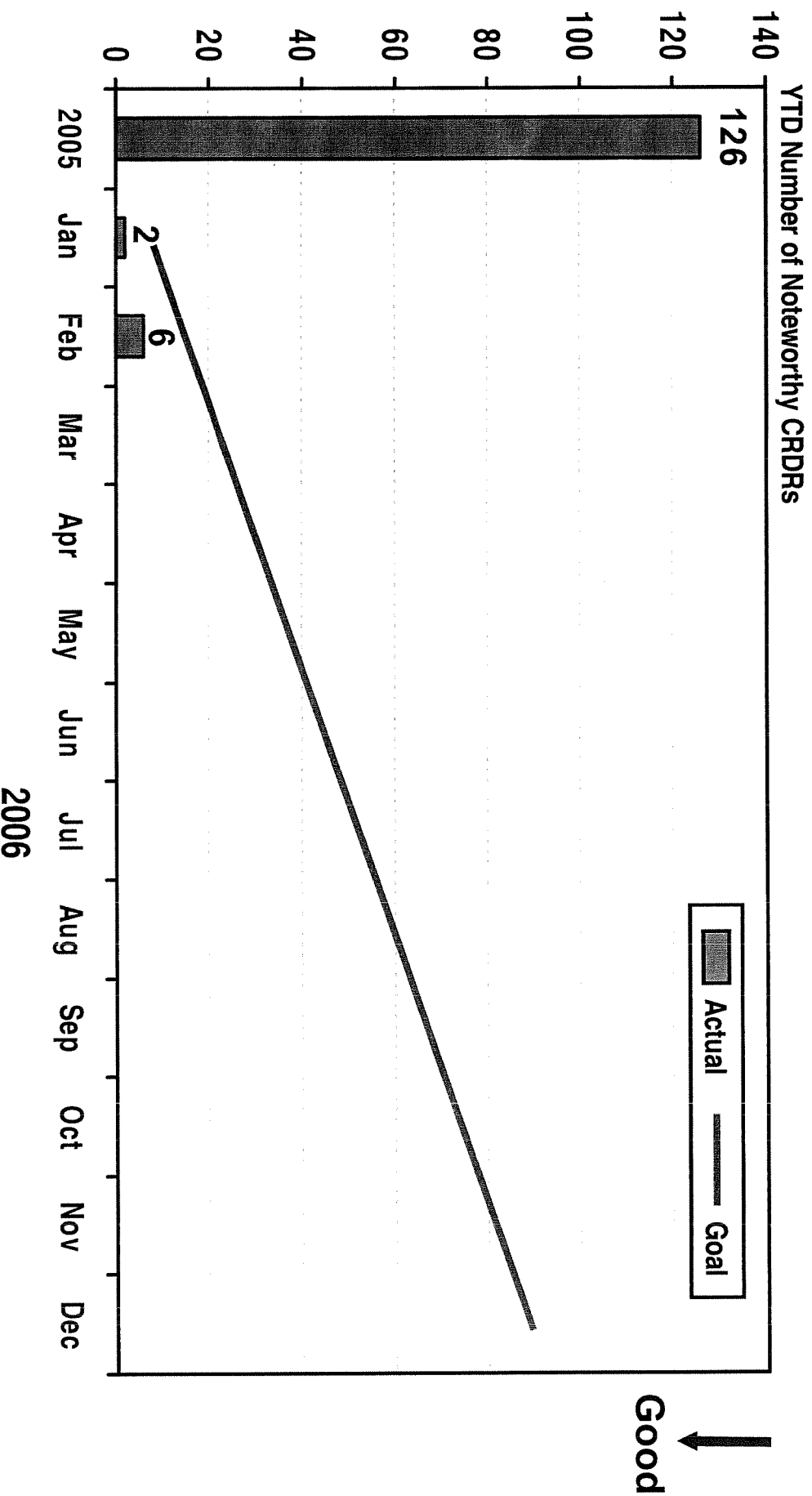


Description: A reset is a CRDR that identifies a significant event attributed to human performance



Noteworthy Event CRDRs

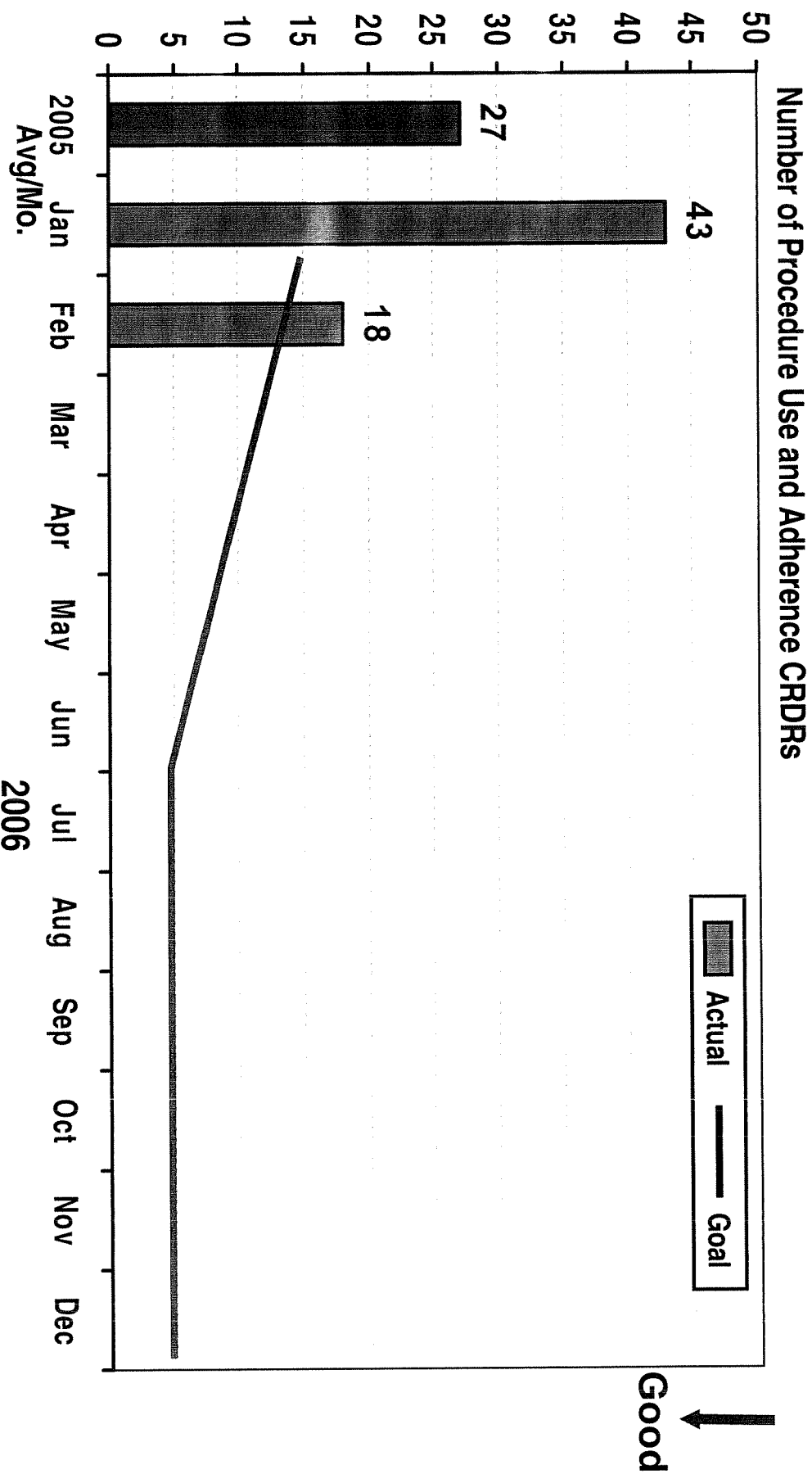
(Goal = 90 Total for Year)



Description: A human performance error that results in an undesirable consequence or condition



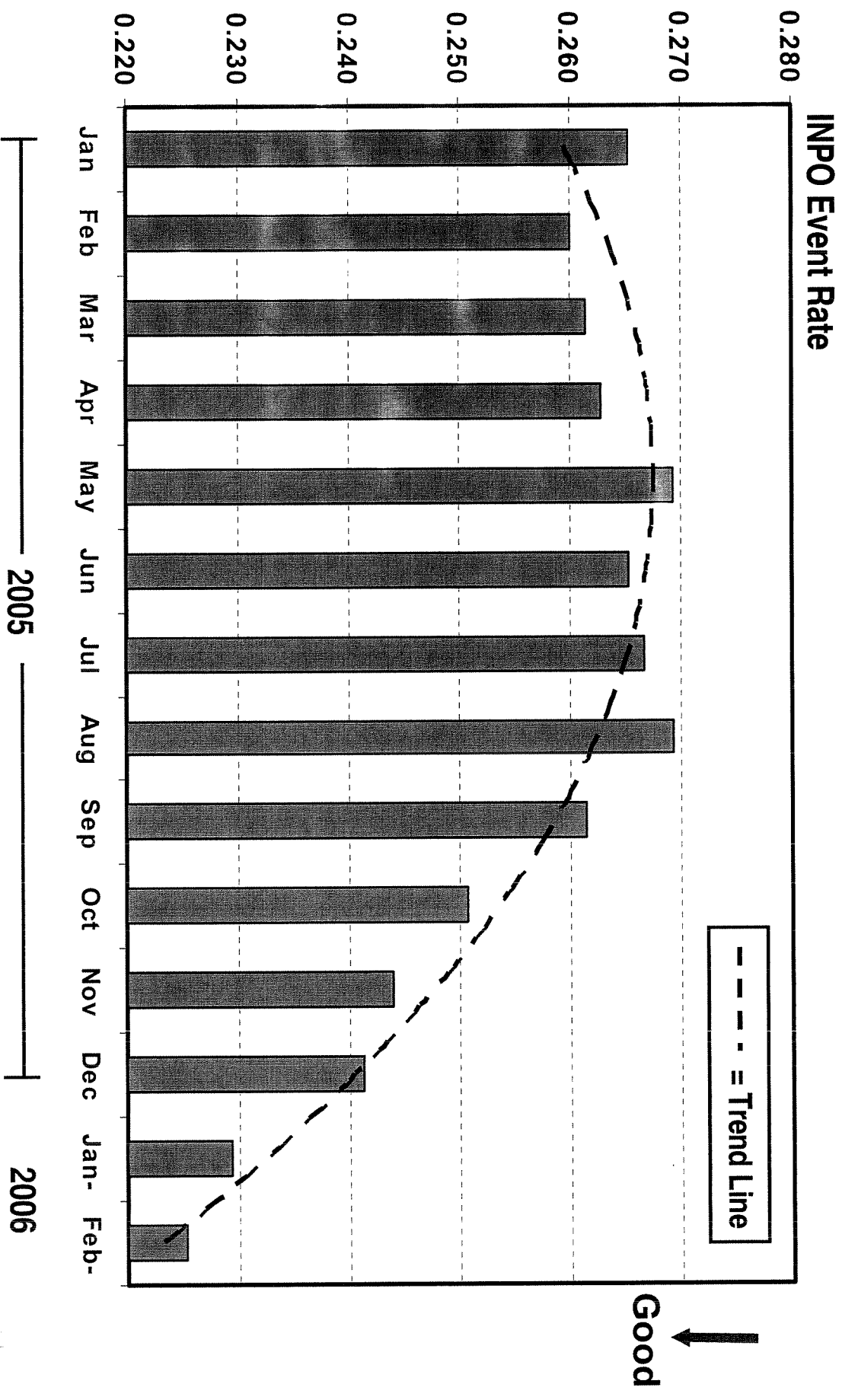
Procedure Use and Adherence



Description: These CRDRs come from the trending data and consist of all CRDRs categorized or coded as procedure non adherence. In the future, these will be identified by Human Performance-Continuous Learning and the Procedure Advisory Committee (PAC)

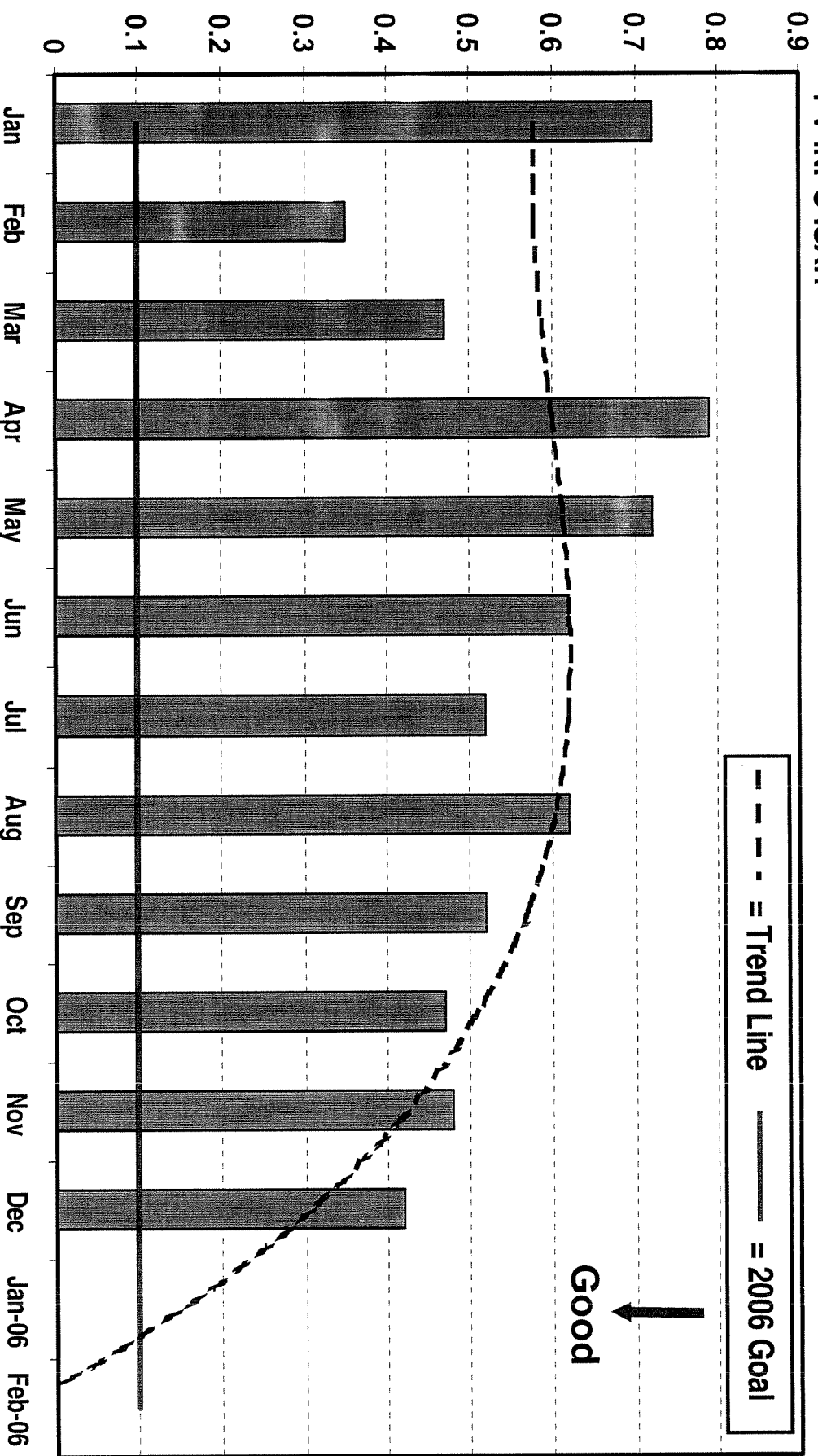


Significant and Noteworthy INPO Event Rate



Industrial Safety Rate (ISAR)

PV INPO ISAR



Description: Lost workdays + restricted duty + fatalities x 200,000 (hours of employee exposure) / total employee hours



Challenges

- ◆ **Maintain focus on the cultural and cross-organizational issues during the upcoming Unit 3 refueling outage and the Unit 1 short-notice outage**
- ◆ **Continue the recent trend on corrective action timeliness and backlog reduction**
- ◆ **Demonstrate improvement in the effectiveness of corrective actions**
- ◆ **Demonstrate improvement in procedure use**
- ◆ **Accountability is a major focus – against standards and expectations, PIP action steps and plans and implementation of human performance expectations**
- ◆ **Make sure priorities are clear and well understood particularly as new challenges emerge**



Positives

- ◆ **Progress in the Corrective Action Program**
 - Backlogs are being reduced and timeliness is improving
 - Line ownership of the program is improving
 - More CRDRs are being written
- ◆ **Standards and expectations have been clearly defined and are being reinforced**
- ◆ **Leaders are spending more time in the field and are influencing behaviors**

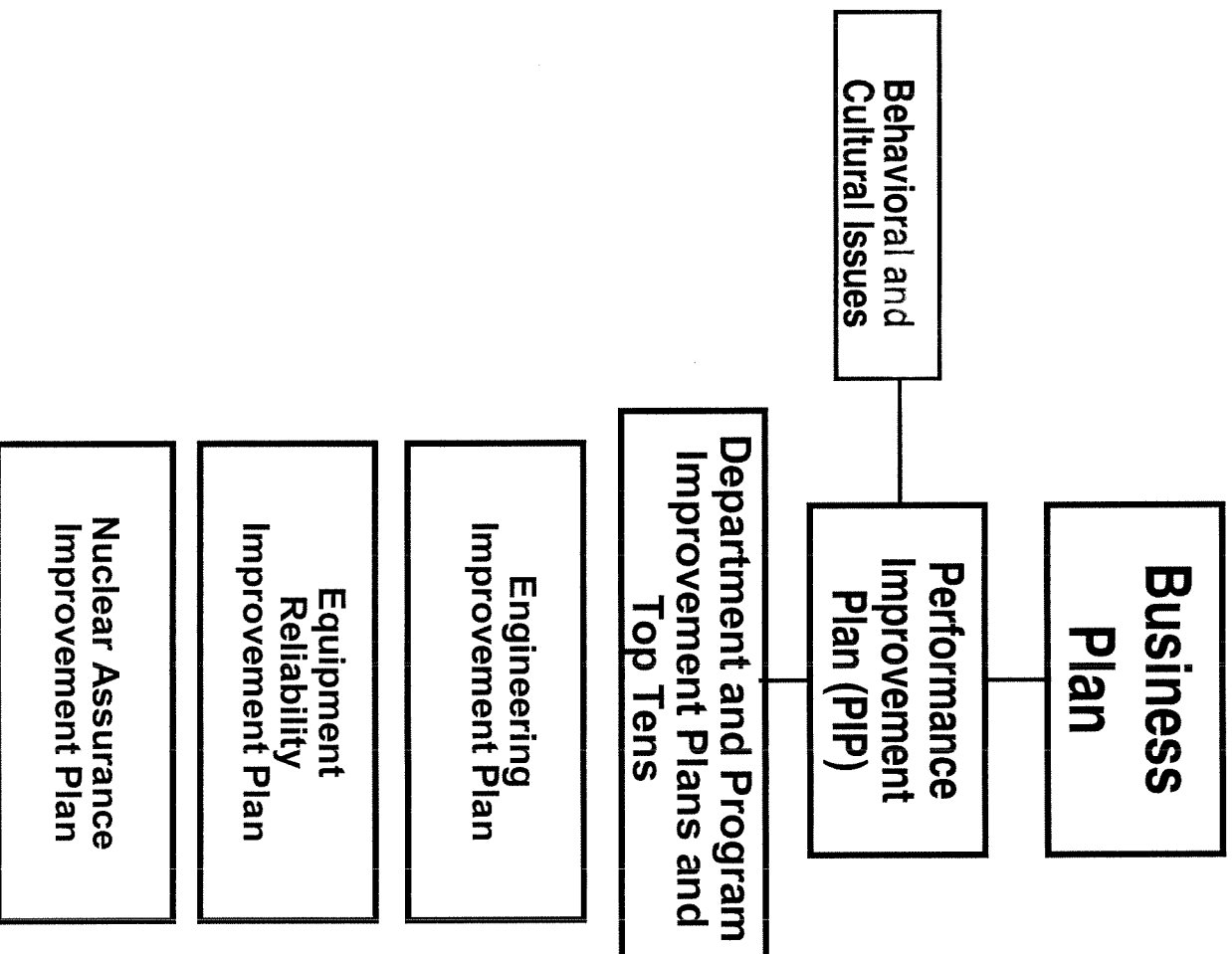


Positives

- ◆ **A shift has occurred in how we are addressing issues – we are not presuming success of our action plans – we are monitoring and adjusting if required**
- ◆ **Significant and Noteworthy Event Rate is improving**
- ◆ **Increased site focus and accountability on procedure use has been established**



Palo Verde Integrated Improvement Plan



Engineering Improvement Plan

David Mauldin,

Vice President

Nuclear Engineering



Engineering Charter

- ◆ **Engineering Organization Success Factors**
 - **Expectations, roles, responsibilities**
 - **Technical conscience**
 - **Configuration management**
 - **Learning environment**
 - **Personnel development and staffing**
 - **Communications**
 - **Project Management**

Engineering Successes At Palo Verde

- ◆ Alloy 600 management program
- ◆ Dissimilar metal welds
- ◆ SGRs in Units 1 and 2
- ◆ Dry cask storage operations, improved fuel handling
- ◆ NRR licensing submittal technical products, positive feedback
- ◆ Fuels-Operations core management interfaces



Engineering Issues

- ◆ **Quality and timeliness of work products**
- ◆ **Work prioritization, some inefficient processes**
- ◆ **Technical rigor and engineering product accuracy not always high quality**
- ◆ **Problem resolution sometimes addresses symptom, not cause and permanent fix**
- ◆ **At times, lack of accurate, consistent information to Operations for Operability Determination input**



Engineering Improvement Plan

- ◆ **Five focus areas:**
 - **Engineering leadership, organization and standards**
 - **Technical adequacy**
 - **Evaluation and resolution of adverse conditions**
 - **Process efficiencies and backlog management**
 - **Equipment reliability**
- ◆ **5 CRDRs, 65 corrective actions**



Improve Engineering Leadership, Organization and Standards

- ◆ **Assigned two new directors, four new department leaders**
- ◆ **Contracted design modifications vs. in-house**
- ◆ **Moved key engineers to strengthen Systems, Maintenance Engineering – support of Operations and Unit needs**
- ◆ **Refocused on core responsibilities – stay in roles**



Improve Engineering Leadership, Organization and Standards

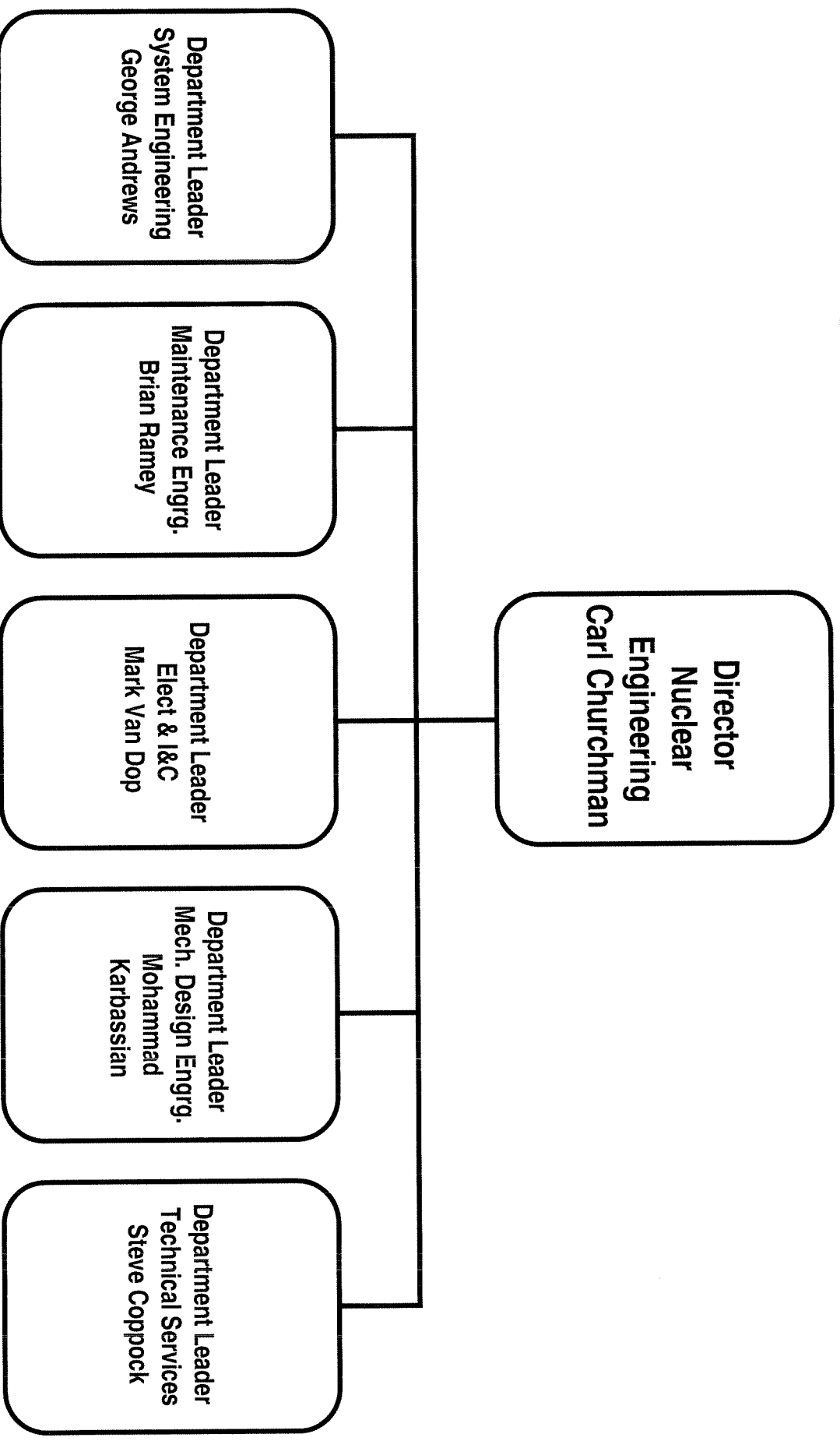
- ◆ **Improved Engineering – Operations interfaces and communications; monthly interface meetings and OD tabletop training**
- ◆ **Issuing new handbook on Engineering Standards and Expectations**
- ◆ **Use of metrics to monitor performance and establish prompt corrective actions throughout Engineering**

Nuclear Engineering Performance Indicators

<i>Nuclear Safety</i>		\$ BP	T10	T10	T10	T10	
	Personnel Safety		Reactor Trips due to Equipment Failures	LERs due to Equipment Failures	Degraded Nonconforming Conditions	Sig Equipment Reliability Events	
<i>Reliability/Operations</i>		\$ BP	T10	T10	T10	\$ BP	
	Mrule HR SSC Functional Failures		ASME Sect. XI Pump Performance	System Health Indicator	Unplanned LCD Entries	Power Reductions	
<i>Financial Leadership</i>		\$ BP	\$ BP	T10	T10		
	O & M Budget		Capital Budget	Eng. Work Management System	Long Term Planning	Recovery Plan Implementation	
<i>Programs/Processes</i>		T10	T10	T10	T10		
	Program Health Indicator		Margin Management	Impact Review Performance	Configuration Control		
<i>Regulatory Interface</i>		\$ BP	\$ BP	T10			
	Timeliness of Corrective Actions		Effectiveness of Corrective Actions	Engineering Technical Rigor			
<i>Employee Performance and Development</i>		\$ BP	\$ BP	\$ BP	T10		
	Human Performance Clock Reset		Procedure Non Adherence	Leader Observation	Engineering Training Effectiveness		



Improve Engineering Leadership, Organization and Standards



Effective 3/9/06



Improve Engineering Leadership, Organization and Standards

- ◆ **Design Basis Manuals updated – backlogs of Engineering Design Changes worked down and managed**
- ◆ **Digital information management for**
 - **Design Basis**
 - **Licensing Basis**
 - **Operating Experience**
 - **Corrective Action Program**
 - **Knowledge capture in place 2Q06 – navigation and search greatly improved**



Improve Engineering Leadership, Organization and Standards

- ◆ **1Q06 training for engineers and engineering leaders:**
 - Engineering standards and expectations
 - Departmental roles and responsibilities
 - Engineering human performance tools (INPO 05-002)
 - QV&V of information
 - Corrective Action Program
 - Effective communication
 - RIS 2005-20, OD procedure, Discovery Evaluation Checklist
 - Engineering Products Review Board
 - Improving the use of Operating Experience
- ◆ **Effectiveness assessments during 2006 to assure HP Tools anchoring and consistent use; metrics used consistently**



Improve Engineering Leadership, Organization and Standards

Engineering Products Review Board

- ◆ **Improve technical rigor, product quality and accuracy of a sample of engineering documents produced at Palo Verde or by vendors**
- ◆ **Review and grade; provide feedback to engineers, leaders and vendors to improve individual performance**
- ◆ **Reinforce use of human performance tools**

Improve Engineering Leadership, Organization and Standards

Engineering Products Review Board

- ◆ **Improve performance using input from off-site members and on-site senior consulting engineers**
- ◆ **Review results used to enhance performance through continuing training improvements**
- ◆ **Maintain performance metrics to gauge performance improvement and adjust tools and methods**



Improve Technical Adequacy

Improve Safety Margins

- ◆ Confirm interface requirements
 - Concerns with system interfaces linkage between Bechtel and CE design basis documents
 - Review team to develop system review plan, assess past SSFIs, self assessments, design basis reconstitution and calculation re-verification results; identify gaps and corrective actions – April 2006
 - Auxiliary feedwater selected as initial review system
 - Confirm CE interface requirements are accurate, complete; bases adequate and reflected in Bechtel documentation
 - Review of Safety Design Bases from UFSAR



Improve Technical Adequacy

Improve Safety Margins

- ◆ **Auxiliary Feedwater review (continued)**
 - Validation will be done that Design Bases requirements are satisfied by testing and surveillances
 - NRC, Operating Experience database reviews (Generic Letters, Information Notices)
 - Site review of analyses, design changes, Tech Specs, margins, interface requirements; how they reflected in operating procedures

Improve Technical Adequacy

Improve Safety Margins

- ◆ **Auxiliary Feedwater review (continued):**
 - **Evaluate methods to improve margin through analysis, modifications, etc.; implement margin improvements**

Improve Evaluation and Resolution of Adverse Conditions

- ◆ **Train Palo Verde engineering personnel:**
 - **Operability Determination and Functional Assessment procedure (40DP-9OP26) revised to incorporate RIS 2005-20 guidance, training completed**
 - **Benefits seen:**
 - **Consistent, accurate communication of degraded or non-conforming conditions to Operations; Discovery Evaluation Checklist (DEC) used effectively**
 - **7 DECs used recently show much improvement, timely IODs, good feedback from Operations**
 - **Information provided to support IODs clear in assessing SSC risk significance and functionality impact**



Improve Evaluation and Resolution of Adverse Conditions

- ◆ **Improve evaluation and use of OE**
 - Site-wide actions in PIP to enhance the program for OE evaluations
 - PIT monitoring OE program implementation
 - Specific guidance for OE use in routine engineering activities developed and implemented; tiered evaluations required within 90/150 days
 - Training to engineering on revised process first quarter 2006
 - Performance metrics maintained by PIT on program effectiveness



Improve Processes and Reduce Backlogs

Enhance Engineering Programs

- ◆ **Benchmarked Palo Verde programs vs. industry best practice programs, compared to INPO Program guidance documents**
 - **Air Operated Valves**
 - **ASME Section XI**
 - **Boric Acid Corrosion Control**
 - **Check Valves**
 - **Containment Leakrate Test**
 - **Design Control/Configuration Control**
 - **Equipment Environmental Qualification**



Improve Processes and Reduce Backlogs

Enhance Engineering Programs

- ◆ **Benchmarked programs (continued)**
 - **Equipment Reliability**
 - **Fire Protection**
 - **Heat Exchanger Condition Monitoring**
 - **Maintenance Rule**
 - **Motor Operated Valves**
 - **Process Software Control**
 - **Pump and Valve Inservice Test**

Improve Processes and Reduce Backlogs

Enhance Engineering Programs

- ◆ **Benchmarked programs (continued)**
 - **Service Water Reliability**
 - **Steam Generator Degradation Management**
 - **Surveillance Test**
 - **Thermal Performance Monitoring**

Improve Processes and Reduce Backlogs

Enhance Engineering Programs

- ◆ **Perform health and implementation assessments of 18 engineering programs – 12 of 18 completed, CRDRs written for program deficiencies**
- ◆ **Common cause analysis of issues identified from assessments in progress**
- ◆ **Engineering leaders assigned as program owners**
- ◆ **Program health and implementation performance metrics used to assess performance and implement corrective action plans**



Improve Processes and Reduce Backlogs

Enhance Efficiency of Engineering Processes

- ◆ Identify inefficient, low-value, time-consuming processes – benchmark to identify effective processes
- ◆ Identify processes or actions which do not require engineering participation – industry moving this direction
- ◆ Better focus of engineering resources on high-risk significant SSCs
- ◆ Revise processes as appropriate, coordinate with other station groups to prevent disconnects



Improve Processes and Reduce Backlogs

Reduce Engineering Backlogs

- ◆ Developed and implemented a backlog reduction plan for Engineering Output Documents and CRDRs (drawing changes, calc. updates, DBM updates, DFWOs, documentation changes)
- ◆ Backlogs significantly reduced through use of overtime, contract resources for 6 months; CRDRs moving in right direction
- ◆ Resolve system conditions and equipment reliability challenges that generate disproportionate share of the work – strong support of system teams



Palo Verde Engineering Backlog Reduction – Results

Backlog Document Type	Original Backlog (2 nd quarter 2005)	Current Backlog
Calculation revisions needed (per corrective action program)	70	13
Engineering specification revisions required	38	7
Design Bases Manual revisions required	53	4
Calculation change incorporations required (from markup pages)	255	43
Electronic databases updates (e.g. component design info)	831	210
Other eng. documents completed by contractor effort (mods, non-conformances)	75	0
Operating Experience corrective action documents completed by contract organization	16	0



Positives

- ◆ Improved OD process, Engineering-Operations communications, Discovery Evaluation Checklist input to IODs significantly improved
- ◆ Rigor in decision making and problem solving, HP tools being accepted and used, Engineering Products Review Board used to improve output documents and engineers' performance
- ◆ Improved Leadership behaviors, accountability; reinforcement of standards and expectations; tasks completed with attention to detail on time



Positives

- ◆ **Metrics and performance indicators used to identify where expectations not being met, prompt corrective actions by engineering leaders**
- ◆ **Aggressive refocus of System Teams Steering Committee and System Teams**
- ◆ **Resources – hiring to fill engineering critical skills needs and build depth; Legacy Program for Engineering replenishment**

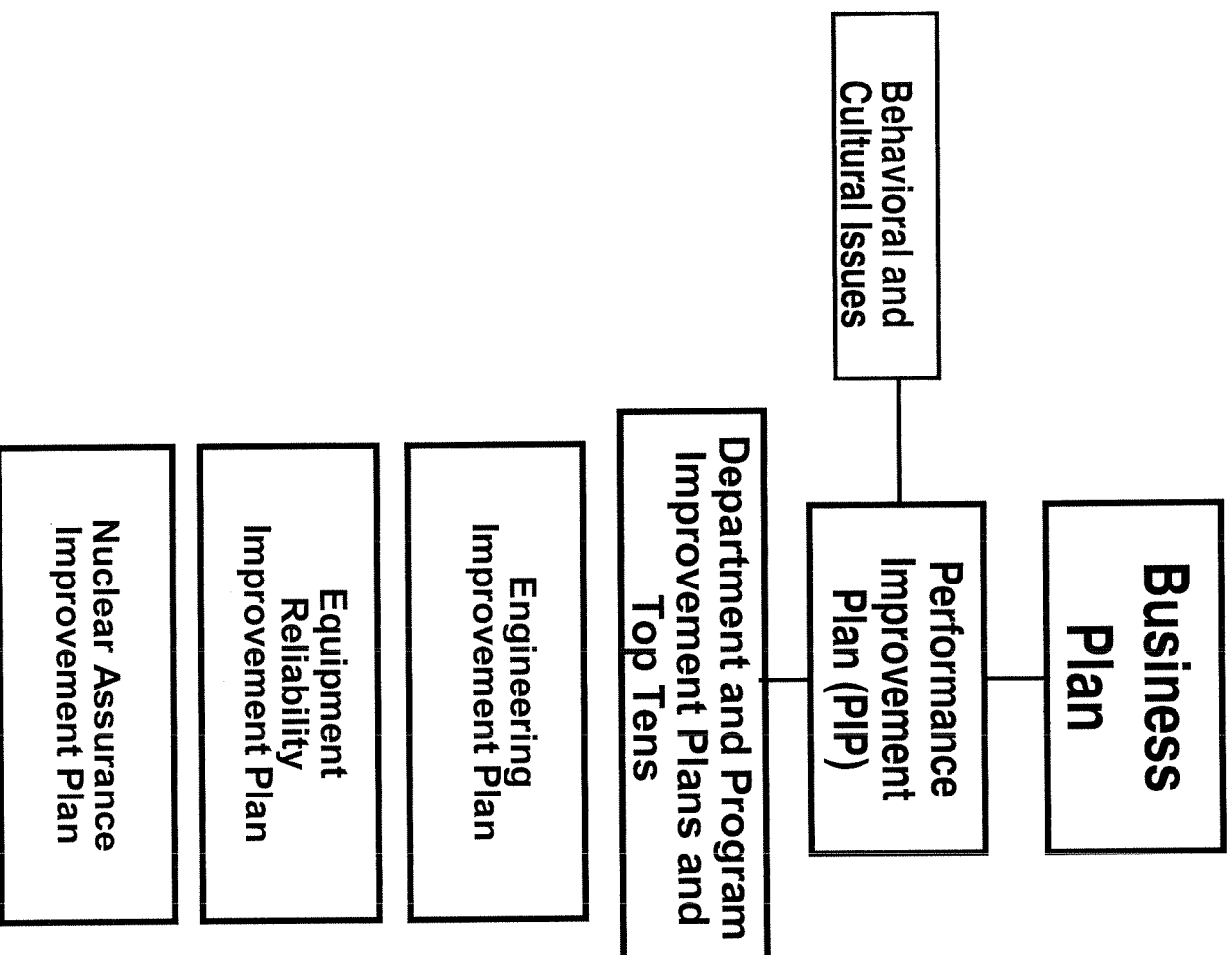


Challenges

- ◆ Anchor Human Performance tools, leaders tenacious regarding consistent use to improve performance
- ◆ Continue to monitor effectiveness of actions, metrics - adjust where needed
- ◆ AF Design Basis Review and corrective actions as reviews completed, improve design and operating margins; determine future actions
- ◆ Core responsibilities focus by engineers
- ◆ Work management and risk – based priorities to stay focused on HRSSCs and Equipment Reliability improvements, action plans



Palo Verde Integrated Improvement Plan



Equipment Reliability Improvement Plan

Carl Churchman,

Director,

Nuclear Engineering



Equipment Reliability at Palo Verde

- ◆ **Driven by system engineers/system team concept**
- ◆ **Prior to July 2004 system team involvement was considered a strength**
- ◆ **Subsequent Emergent station events impacted system engineers/teams focus on reliability**



Improve Equipment Reliability

- ◆ **Established station expectations and reinforced accountability**
 - **Strengthened the System Team Steering Committee**
 - **Reinforced the expectations of the System Teams to prioritize system issues and recommend system changes to return the system health to green**
 - **Reinforced the expectations to perform corrective, preventive and predictive maintenance on schedule**

Improve Equipment Reliability

◆ Expectations:

- The station has a strong intolerance for equipment performance issues
- Develop permanent fixes to correct adverse conditions
- Use trending tools to correct equipment challenges before producing an impact to station performance
- Corrective Action Program is the tool to improve system performance and correct equipment deficiencies
- We have reengaged with Nuclear Assurance to ensure emergent issues are identified



Improve Equipment Reliability

- ◆ **Actions to date:**
 - **Systems meet design requirements, however, some systems do not meet Palo Verde performance expectations**
 - **Action/Recovery Plans have been developed and are being implemented for all red and yellow windows in the System Health Report**
 - **These Action/Recovery Plans are intended to improve system performance to match Palo Verde's expectations**



2005 Year- End Palo Verde System Health Report

[illegible]

EXCELLENT	Performs well. No Level 1's or major improvement modes planned. Overall quality may be reduced.
ACCEPTABLE	Current performance / activities appropriate.
NEEDS IMPROVEMENT	Needs additional attention. Enhanced team activities and / or additional resources required.
NOT ACCEPTABLE	System components not meeting goals. Improved corrective action and/or resources and management support required.

System Health Reports and Recovery Plans may be viewed at <http://dynmedia.FueSys.FueReports.htm>



[illegible]

EXCELLENT	Performs well. No Level 1's or major improvement needs planned. Oversight may be required.
ACCEPTABLE	Current performance / activities appropriate.
NEEDS IMPROVEMENT	Needs additional attention. Enhanced team activities and / or additional resources required.
NOT ACCEPTABLE	System/components not meeting goals. Improved corrective action and/or resources and management support required.

System Health Reports and Recovery Plans may be viewed at <http://dynmedia/FineSys/Fine/reports.htm>



Equipment Reliability Performance Indicators



A	B	C	D
Resector Trips	Unplanned LCO Entries	Unplanned Power Reductions	LEERS due to Equipment Failures

Safety Performance	1	2	3		
	Forced Outage Rate	Significant ER Events	ER Reactivity Management Issues		
Economic Performance	4	5			
	Thermal Performance	PV Capacity Factor			
Work Management	6	7	8	9	
	Corrective Maintenance Backlog (non-outage)	Effective Maintenance Backlog (non-outage)	Major Maint. O&M tasks (>\$25K) not completed	Deferred Preventive Maintenance Requests	
PM Implementation	10	11	12		
	PMs past max Date without an Approved	PM Feedback	PMs Completed In Last 50% of Grace Period		
Intolerance	13	14	15	16	17
	Operator Work Arounds	Control Room Discrepancies	Non Conforming or Degraded Items	MRule Functional Failures	Maintenance Preventable Functional Failures
Corrective Action Effectiveness	18	19	20	21	22
	Key Equipment Failures	Mitrate SSCs in (a) (1) without Action Plans Developed	Boric Acid Leaks	Temporary Leak Repairs	ASME Section XI Pumps in Alert
Performance Monitoring	23	24	25		
	Repeat MRule Functional Failures	Repeat Maintenance	Recovery Plan Actions Completed on Schedule		
Life Cycle Management	26	27			
	Performance Monitoring Effectiveness ^s	System Health			
Chemistry Performance	28				
	Long-Term Planning				
	29				
	PV Chemistry Index				

February 2006

February 2006



Positives

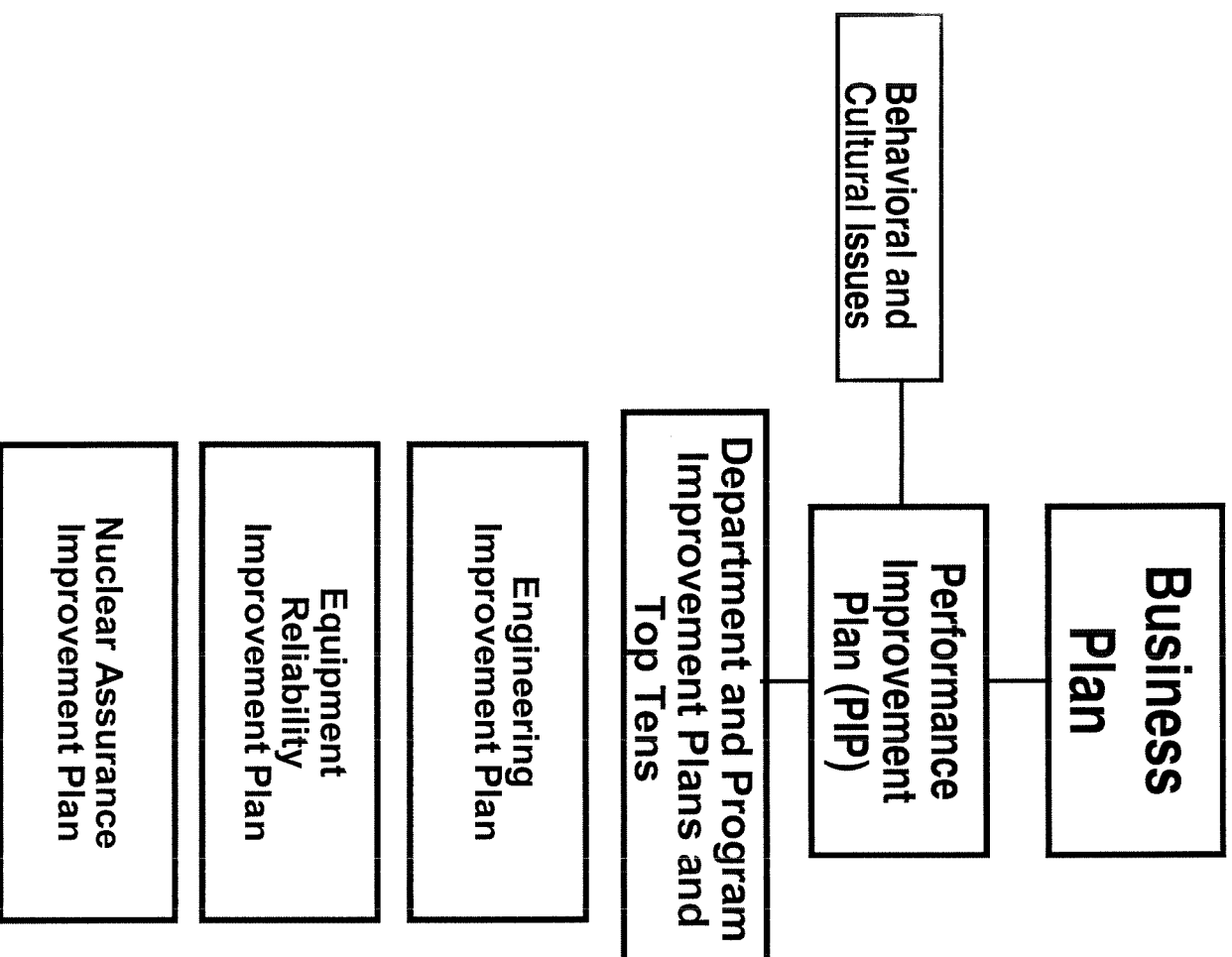
- ◆ **A strong management oversight program is in place**
- ◆ **All Red/Yellow window system health work is prioritized**
- ◆ **Modifications are being installed in the units as outage windows present themselves**



Challenges

- ◆ **Maintain an equipment reliability station focus through emergent issues (use of special focus teams to resolve emergent issues)**
- ◆ **Accountability to meet due dates, complete actions**
- ◆ **Work on priority equipment**
- ◆ **System teams participation**
- ◆ **Appetite control**

Palo Verde Integrated Improvement Plan



Nuclear Assurance Improvement Plan

Dwayne Carnes,

Director,

Nuclear Assurance



Nuclear Assurance Improvement Plan

◆ Case for action

- NA's role in Palo Verde's performance decline**
- What does NA need to do to help improve Palo Verde's performance**

Nuclear Assurance Improvement Plan

- ◆ **Ensure NA oversight (Audit and Evaluation Report) activities assess effectiveness of CAP implementation site wide**
- ◆ **Independent Safety Review and Evaluation Report (ISR/ER) quality**
- ◆ **NA Involvement in industry issues**
- ◆ **Streamline and enhance audit process**
- ◆ **NA evaluation planning and scheduling**

Nuclear Assurance Improvement Plan

- ◆ **Improve communication to line organizations**
- ◆ **Depth of resources in NA**
- ◆ **Station Quality Issues Program – ownership by line**



Nuclear Assurance Improvement Plan

◆ Evaluation program

- Focused, in-depth assessments**
 - Fewer in number; scoped areas evaluated from commitments to execution**
 - Will still have some QC and evolution-based evaluations**
- Independent Safety Reviews**
 - Scope driven from Monthly Operating Experience review**



Nuclear Assurance Improvement Plan

◆ Audit program

- Audit scope/plans**
 - Measure organization effectiveness of implementing Corrective Action Program**
- Categorization of Findings**
 - Program weakness**
 - Implementation issue**

Nuclear Assurance Improvement Plan

◆ Station Quality Issues

- Formal monthly exit meeting**
- Issues debriefed by owner**
- Management held accountable for issue resolution**

Nuclear Assurance Improvement Plan

◆ Positives

- Improved accountability for issue resolution by line management**
- Comprehensive evaluation reports**
- Focus on corrective action program implementation**
- Strong support from executive management**

Nuclear Assurance Improvement Plan

◆ Challenges

- Timeliness of issue resolution**
- Timeliness of issue identification**
- Ineffective communication with line organization**
- Escalation of issues in a timely manner**

Integrated Performance Improvement Plan Summary

- ◆ Developed and implemented an Integrated Plan
- ◆ Understand our issues
- ◆ Making progress, more needed
- ◆ Backlogs down
- ◆ Equipment reliability issues addressed
- ◆ Keep the organization focused