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National Operator Licensing Workshop

February 17-18, 2000

NEI

National Operator Licensing Workshop
Grosvenor, Lake Buena Vista
February 17-18, 2000

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NATIONAL OPERATOR LICENSING WORKSHOP

FEBRUARY 17-18, 2000 ❖ THE GROSVENOR ❖ ORLANDO, FL

PROGRAM

Thursday, February 17, 2000

7:30 – Registration
(continental breakfast available)

8:30 – Welcome (C1)
Jim Davis
Director, Operations
Nuclear Energy Institute

8:45 – Industry Opening (C2)
Clay Warren
Vice President Operations Support
Wolf Creek Nuclear Operating Corp.

9:00 – NRC Opening (C3)
Bruce Boger
Director, Division of Inspection
Nuclear Regulatory Commission

9:15 – History of the Process, "How did we get here?" (C4)
Bob Post
Senior Project Manager
Nuclear Energy Institute

9:30 – NRC: Recent changes in Operator Licensing (C5)
Dave Trimble
Chief, Operator Licensing and Human Performance Section
Nuclear Regulatory Commission

10:30 – Break

10:45 – Importance of the Licensing Exam (C6)
George Usova
Training Assessment Specialist
Nuclear Regulatory Commission

11:00 – Exam Development Process Overview (C7)
Paul DiGiovanna
NGG Operator Licensing
Superintendent, Commonwealth Edison
John Munro
Senior Reactor Engineer Examiner
Nuclear Regulatory Commission

Performance Indicators (C8)
Bob Post
NEI
Gregg Ludlam
Operator Continuing Training
Carolina Power & Light

12:00 – Lunch

1:00 – Keynote Speaker (Return to Ballroom) (D1)
Samuel Collins
Director, Nuclear Reactor Regulation
Nuclear Regulatory Commission

1:30 – Lessons Learned Panel Discussion
Don Jackson, PSE&G (D2)
Clay Warren, Wolf Creek (D3)
David Rogers, Consumers Energy (D4)

2:45 – Break

3:00 – To Write or Not to Write (Industry perspective) (D5)
Don Jackson, PSE&G
Frank Maciuska, Rochester Gas & Electric Corp.

3:30 – To Write or Not to Write (NRC perspective) (D6)
Rich Conte
Chief, Operational Support Branch
Nuclear Regulatory Commission

4:00 – Breakout for Q&A's Facilitators:
(DiGiovanna/Ludlam/Riedel/Fitch/Guenther/Dennis/Bielby/Stetka)

6:00 – Welcoming Reception

Friday, February 18, 2000

7:30 – Registration
(continental breakfast available)

8:30 – Industry Success Stories
Charles Sawyer, Duke Power Co. (E1)
Fred Riedel, Arizona Public Service Co. (E2)
Keith Link, Virginia Power (E3)

9:30 – Q&A Panel Discussion
John Pellet
David Hills
Chris Christensen
Rich Conte
George Hopper
(Others as applicable)

10:45 – Break

11:00 – RO/SRO Eligibility (E4)
Bill Fitzpatrick
Department Manager
INPO

11:30 – National Question Bank Discussion (E5)
Bill Fitzpatrick
Jim Makucin
INPO

12:00 – Lunch

1:00 – Senior Management Issues Session (F1)
Sam Collins, NRC
Jon Johnson, NRC
Bruce Boger, NRC
Phil McCullough, INPO
Jim Davis, NEI

2:00 – Break

2:15 –Where do we go from here? (F2)
Bruce Boger, NRC

2:45 –Closing Remarks

Welcome

(C1)

Jim Davis
Director, Operations
Nuclear Energy Institute

Industry Opening

(C2)

Clay Warren

Vice President Operations Support

Wolf Creek Nuclear Operating Corp.

NRC Opening

(C3)

Bruce Boger

Director, Division of Inspection

Nuclear Regulatory Commission

History of the Process...

"How did we get here?"

(C4)

Bob Post

Senior Project Manager

Nuclear Energy Institute

History of the Process

"How did we get here?"

Bob Post

Senior Project Manager, Operations
Nuclear Generation Division

NEI

Atomic Energy Act of 1954

Required the NRC to determine the qualifications of individuals applying for an operator's license, to prescribe uniform conditions for licensing those individuals, and to issue licenses as appropriate.

The act is implemented by the NRC's regulations located in 10 CFR Part 55, "Operators' Licenses."

NEI

- 4/79 Accident at TMI-2
- Subsequent Action Plan

NEI

3/80 Denton Letter

- **Initial Operator Licenses:**
  - Experience (three months on shift)
  - New written categories on heat transfer and fluid flow and thermodynamics
  - Passing grade raised to 80% overall
- **Requal programs:**
  - Include heat transfer and fluid flow, thermodynamics and mitigating core damage
  - Passing grade raised to 80%
  - Control manipulations requirements

NEI

11/80 NUREG-0737

- Incorporated the Denton letter requirements.
- Required instructors who teach systems, integrated response, transient and simulator courses to be SRO Certified and enrolled in requalification programs.
- Licensing examinations after 9/81 to include simulator exams.

NEI

10/89 Generic Fundamentals Exam was implemented by GL 89-17

NEI

2/93 NUREG-1021, Revision 7 issued (effective 8/93)

- Crew critical tasks for simulator evaluations
- Walk-through was reduced to 5 JPMs with no prescripted follow-up questions
- Written exam was reduced to one static scenario plus administrative controls/procedural limits.

NEI

1993 Efforts were underway to change the requalification rule to delete the term "NRC administered" and provide a basis for licensee conducted requalification examinations

NEI

12/93 SECY-93-333 deletes the requirement to pass an NRC-conducted requalification exam as a condition for license renewal

Commission approved 1/94

Rule became effective on 3/94

NEI

6/94 NUREG-1021, Revision 7, Supplement 1, (effective 8/94)

- Recognizes the shift from requalification oversight by examination to oversight by inspection.

NEI

8/94 Virginia Power letter requests authority for industry prepared ILO exams as a CBLA

Proposal is rejected:

"NRC staff considers independence and objectivity to be critical factors"

NEI

11/94 10 CFR 55 rule change eliminates words on who administers the requalification examination

Rule is silent and facilities are allowed to conduct requalification exams

NEI

3/95 SECY-95-075 announces pilot program changes to ILO process

"Facility licensees will draft and in part conduct initial licensing examinations with NRC oversight."

NEI

3/95 Commission briefing indicates no change will be required to the rule

"I think it is also important because it puts them back where they are in fact making the judgments with our oversight of those activities. It really puts the burden back on them squarely as it relates to safety of their activities."

NEI

6/95 There was extended discussion on how the process should be modified.

- **NRC was interested in reducing their resource commitment**
- **NRC felt they needed to observe each candidate, to form a basis for the Commission issued license. They felt this could be accomplished by conducting the operating test**

NEI

- **The rule did not dictate who would conduct the various pieces of the exam (rulemaking was not required)**
- **Chief Nuclear Officers felt strongly that a Commission issued license was important from a legal perspective**

NEI

8/95 GL 95-06 issues pilot guidance.

(Twenty plants had volunteered before the guidance was issued)

10/95 Pilot exam program commences (22 exams to be given)

2/96 Draft NUREG 1021 (Rev. 8) issued for public comment

NEI

3/96 Comments on NUREG 1021:

"With inclusion of these industry recommended changes, we support the implementation of Revision 8 to NUREG-1021. In a stable examination environment, with a clearer understanding of requirements, the effort to prepare an examination can be reduced without affecting examination quality."

NEI

6/96 Commission brief on Rev 8.

Authorized continued use of pilot guidance

First public mention that rulemaking would be required

NEI

The rule change would implement the intent of the pilot program and would add:

"...licensees shall prepare the required site-specific written examinations and operating tests.

... licensees shall submit the written examinations and operating tests to the Commission for review and approval.

... the Commission may elect to perform those tasks."

NEI

NEI collected comments on the proposed rule, had a Task Force meeting and prepared a response to the NRC.

In industry comments to NEI, no utility opposed the rule change, although there were comments on the implementation of the NUREG 1021 process.

NEI

"We believe that the shift to licensee prepared initial licensed operator examinations has improved the examination process and should be continued. The industry would prefer to continue the voluntary process that has worked well for the past year. A voluntary process would allow flexibility for a few licensees with small training staffs. Requiring that all licensees prepare the examination package is preferable to the previous practice of using contractor prepared examinations."

NEI

Initial Licensed Operator Task Force (ILOTF)

Preliminary meeting 2/22/99

- All regional training associations represented

ILOTF meeting 3/10 and 3/11

- Consistency was identified as a key issue
- Items to be addressed could be categorized into three groups:
  - **NUREG 1021 Content**
  - **NUREG 1021 Implementation**
  - **Process Feedback**

NEI

Initial Licensed Operator Task Force (ILOTF)

"Provide feedback and input to the NRC with the ultimate goal of administering fair, effective, consistent, resource-efficient ILO Exams across the industry."

NEI

Initial Licensed Operator Task Force (ILOTF)

ILOTF met with the NRC staff 3/11

NRC Staff was encouraged to see that all training associations and INPO are represented by the task force

- ⇨ Expressed desire to work with the industry on implementation issues
- ⇨ Insights provided on ILO rule and NUREG revision

NEI

The final rule (10 CFR 55.40) was published in the Federal Register on April 23, 1999 (effective October 20, 1999).

> *"..the NRC prepared the final regulations that allow, but do not require, utilities to prepare their own initial operator licensing examinations. Facilities, particularly those with small training staffs, may continue to have the examinations prepared and administered by the NRC staff."*

NUREG 1021 Final Rev. 8 released for distribution and is made available on the NRC's website.

NEI

Initial Licensed Operator Task Force (ILOTF)

ILOTF meeting 6/1-2/99

Content and implementation of NUREG and new rule was reviewed

PI Focus Group formed

ILOTF Focus Group formed

NEI

Initial Licensed Operator Task Force (ILOTF)

Focus Group meeting 6/4 with NRC staff

- Regional Workshops (HQ/ILOTF participation)
- Formal Q&A's
- Collect PI's from industry/NRC
- Reconvene Focus Group in Fall '99
- NEI Sponsored National Workshop in 2000

NEI

Initial Licensed Operator Task Force (ILOTF)

ILOTF meeting 11/3

- Regional workshop open items/lessons learned
- Formal Q&A's
- Collect PI's from industry
- Solidified plans for NEI Sponsored National Workshop Feb. 17-18, 2000

NEI

Initial Licensed Operator Task Force (ILOTF)

Focus Group meeting 11/4 with NRC staff

- Regional workshop open items/lessons learned
- Formal Q&A's
- National Workshop

NEI

Recent changes in Operator Licensing

(C5)

Dave Trimble

Chief, Operator Licensing and Human Performance Section

Nuclear Regulatory Commission

Operator Licensing

Issues and NRC Action

NEI Operator Licensing Conference
February 17-18, 2000

Overview: High Resource Burden to Prepare Exams

- Time for NRC examiners to *write* and *prepare* an exam ~500 hours. Licensees often take more hours to write an exam (*Detail 3*).
- Additional burden on licensee exam authors: checking that NRC question usage restrictions are being met (from audit exams, training classes, past NRC exams).
- Licensee Exam Developers are under unique pressures - exam cannot be too hard (may lead to exam failures) or too easy (may lead to negative comments in NRC exam report).

Overview on High Resource Burden to Prepare Exams: Changes and Actions

- New NRC exam report policy on documenting the quality of licensee-authored exams (*Detail 1*).
- New NRC exam pilot sampling process. Eliminate NRC question reuse restrictions, if exam topics randomly selected (*Detail 2*).
- NRC supporting the National Exam Question Bank. As the bank grows, NRC envisions allowing more of an exam to come straight from the bank.
- Restrictions reduced on the participation of licensee personnel during the exam writing process.
- JPM questions eliminated.
- As question banks grow, exams should take less time to write.

Detail 1: New NRC Exam Report Policy on Documenting the Quality of Licensee-Authored Exams

- 20% "licensee control band" established. For exams inside this band, the NRC exam report will state that the exam was within the acceptable range. Similar to ideas of the new oversight process.
- For exams outside this band, the NRC exam report will document the deficiencies, and state that the exam was outside the acceptable range. This is the policy for the *first* exam outside the acceptable range.
- Further negative comments occur *only* on the *second* and *subsequent* exams found outside the acceptable range.
- Written exam questions and operating test items will be counted separately.

Detail 2: New Pilot Exam Sampling Process

Question reuse restrictions will be eliminated, if exam topics are randomly selected.

- Selection must occur down to the *specific* K/A statement (e.g., K1.03 or A1.11). The Pilot guidance will provide an example method for developing a systematic and random sample.
- Licensees will have to describe, in writing, the systematic and random sampling process used. Pilot guidance will state acceptable methods and required documentation.
- If exam topics are randomly selected, restrictions on the reuse of questions (from quizzes, past two NRC exams, audit exams) will be eliminated.
- This does NOT eliminate the 50/40/10 (Bank/Mod/New) guideline.

Detail 3: 500 Hours to Write an Exam

- 500 hour average based on 12 exams authored by the NRC (1998-1999). This included prep week time.
- Four of the twelve exams written by NRC examiners in training. Trainee hours were included in the 500 hour average.
- Eight of the twelve exams also contained JPM questions, which have since been eliminated (Rev. 8 of NUREG-1021).

Overview: Exam Level of Difficulty Concerns

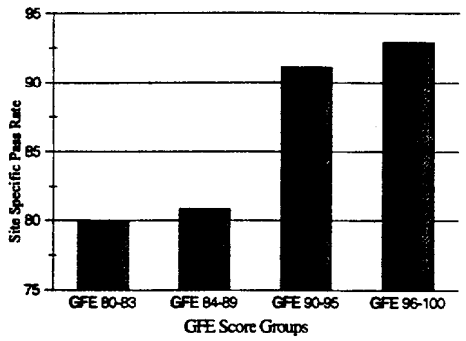
- Since licensees began writing exams, RO written exam failure rate has increased from 6% to 11%. Possible causes: licensees more familiar with their plant, NRC examiners focusing more on question psychometrics.
- 70-80% of site specific exams have a 100% pass rate. The other 20-30% of exams primarily have isolated failures. There are some exams with multiple failures (*Detail 4*).
- For exams with multiple failures, deficiencies in training programs were typically identified.
- Strong correlation between GFE scores and site specific scores (*Details 5 and 6*).

Detail 4: RO Site Specific Exam Results

RO WRITTEN EXAMINATION FAILURE SUMMARY

Fiscal Year	1994	1995	1996	1997	1998	1999
# of Exams	46	40	45	31	29	48
# of Applicants	211	178	160	105	117	198
# of Applicant Failures	10	12	7	10	11	19
Exams w/ 0 Failure	38 (83%)	30 (75%)	40 (89%)	25 (81%)	21 (72%)	38 (79%)
Exams w/ 1 Failure	7	8	3	3	7	5
Exams w/ 2 Failures		2	2	2		4
Exams w/ 3 Failures	1			1		
Exams w/ 4 Failures					1	
Exams w/ 5 Failures						
Exams w/ 6 Failures						1

Detail 5: GFE Scores and Site Pass Rates: 1998-1999



Detail 6: GFE Performance and Site-Specific Exam Performance

- Individuals with a 80-89 on the GFE had a site specific failure rate 3 times that of individuals with a 96-100 on the GFE.
- Individuals with a 96-100 on the GFE were 2.5 times more likely to go on to take a site exam, compared to those with a 80-83 on the GFE.
- GFE performance can be used as a predictor of how individuals will perform on the site specific exam.

Overview: Exam Level of Difficulty Concerns

- Regional variation in average site exam scores. NRC trying to understand why. One observation: Regional GFE score variation (*Details 7 and 8*).
- NRC compared the level of difficulty of two Region II exams and a Region I exam. Metrics were used to attempt to *quantify* level of difficulty (*Detail 9*).
  - The operating tests for all three exams appeared similar in difficulty.
  - One of the Region II written exams appeared more difficult than the other two exams, but still appeared acceptable.
  - Changes made by NRC during the review process appeared justified, and did not increase exam level of difficulty.

Detail 7: PWR/GFE FAILURES1992-1999

Region	No. of Examinees	No. of Failures
1	384	09
2	598	31
3	296	09
4	428	11
National	1,706	60

Detail 8: Regional GFE Failure Rates, PWRs

- Chart based on 8 years of data (2/92-10/99) and 19 GFEs.
- Three times as many PWR GFE failures in Region II compared to other regions.
- Chi Square analysis of GFE data shows that there is a 95% probability that the Region II data is NOT due to chance alone-something else is responsible.
- Speculative causes: (1) population demographics, (2) training program effectiveness, (3) organizational culture.

Detail 9: Metrics Used for Exam Level of Difficulty Reviews

- Number of SRO-only questions.
- % of Questions at comprehensive/analysis level (slightly subjective).
- Difficulty of individual questions/exam as a whole (fairly subjective).
- Scenarios: Events which complicate EOP usage, total number of malfunctions.
- JPMs: Number of critical steps, time to complete JPMs.
- Changes made to licensee exams by NRC. Concern is that NRC unnecessarily increases exam level of difficulty during the review process. Metrics used:
  - Total number of questions or op. test items replaced/modified
  - Number of these changes that seem justified (fairly subjective)
  - Effect of exam changes on level of difficulty (fairly subjective)

Exam Level of Difficulty Concerns

- Level of difficulty determinations are somewhat subjective. NUREG-1021 has quantitative rules in place (e.g., # of higher knowledge questions, # of malfunctions in a scenario), but a fair amount of human judgement is still required.
- Both NRC and licensees are responsible for exam level of difficulty. Fairness is the goal.

Continuing Actions and Future Changes

- Continue to look at exam level of difficulty, metrics, and regional variations.
- Continue to closely monitor NRC changes to licensee-authored exams.
- As exam banks grow, look at allowing more of each written exam to come straight from a bank. This could moderate regional exam differences.

Continuing Actions and Future Changes

- Possibly revise NRC K/A catalogs, with industry participation.
- NRC OL resources: added a third annual GFE exam, added NRC examiners. Will continue to monitor, and will establish metrics for meeting licensee exam needs.
- Other upcoming changes: simulator rule, licensed operator eligibility (INPO developing new ACAD guidance).

Importance of the Licensing Exam

(C6)

George Usova

Training Assessment Specialist

Nuclear Regulatory Commission

IMPORTANCE OF THE LICENSING EXAM

George M. Usova
Test and Measurement Specialist
Operator Licensing
NRR

EXAM STRUCTURE

Written Exam	Operating Exam
100 items	Administrative JPMs Scenarios

COMPONENTS OF EXAMINATION INTEGRITY

- Validity
- Exam Sample Plan (unbiased)
- Psychometric quality
- Technical accuracy
- Test Bank Use (50-40-10)
- Operational and higher cognitive questions (50-60%)

Exam Development Process Overview

(C7)

Paul DiGiovanna

NGG Operator Licensing Superintendent, Commonwealth Edison

John Munro

Senior Reactor Engineer Examiner

Nuclear Regulatory Commission

ComEd
A Unicom Company

The Initial Licensed Operator
Examination Development Process

Paul DiGiovanna
ComEd Nuclear Generation Group
Operator Licensing Superintendent

What are we going to talk about?

How to develop an NRC exam - a project view

- Why it's not an easy task
- Planning
- Staffing process (resources)
- Outline
- Exam

Why is it important to me?

Being successful has its cost

Being unsuccessful can cost significantly more

- Ability to staff operations
- Reputation / increase scrutiny
- Stress on our candidates
- Overall cost

What do I want you to bring home?

- Appreciation for complexity
- An overview of exam development process
- Tips to increase the efficiency

What's all the fuss ?????

Common questions from Sr. Management

- Why does it cost so much/take so long?
- Why do you want my best trainer/operator?
- Why can't the exam bank just spit out an exam?

What's all the fuss ?????

Complex Process

- Many requirements in the NUREG
- Moving target over last 4 years

Written Exam Example

100 Question RO, 100 Question SRO ?
What's the big deal?

- Systematically prepared outline
- No more than 75 common questions
- No more than 25% from program exams/quizzes*
- No more than 25% from previous 2 NRC exams*
- No overlap from Certification/audit exam

Written Exam Example

There's more!

- 50% from bank, 40% modified, 10% new
- 10% new at a high cognitive level
- 50-60% high cognitive level overall
- Psychometric quality meet guidelines

Written Exam Example

Additionally... On the SRO exam.....

- 17% Generic Knowledge Questions (Admin...)
  - ...in 4 categories
- 40% Plant Systems Questions
  - 23 Group 1 systems
  - 13 Group 2 systems
  - 4 Group 3 systems
- 43% Abnormal/Emergency Questions
  - 26 Group 1evolutions
  - 17 Group 2 evolutions

Written Exam Example

And...

- Different percentages on the RO exam
- In addition to the percentage requirements...
  - each group should be spread evenly over 6 knowledge categories, 4 ability categories, and 1 generic category.

What is NUREG 1021

Operator Licensing Examiners Standard Instructions covering:

- 100 Series - Admin / References
- 200 Series - Exam Process / GFE
- 300 Series - Initial Operating Tests
- 400 Series - Initial Written Examinations
- 500 Series - Post Exam Activities
- 600 Series - Requal Examination
- 700 Series - SROL Examinations

Project view of exam process

Need a comprehensive plan

Components of a good exam plan

- Who - resources
- What - deliverables
- When - milestones/timelines
- Where - Secure environment

Planning - Who

Consider:

- Kickoff
- Select author(s), facility representative
- Operations and training personnel needs
- Support Personnel

Planning - What

Plan should incorporate the entire process

- Interface with the NRC
- Interface with plant staff
- Exam development and submittal
- Exam administration and post exam activities

Planning - When

Plan should direct the development sequence to meet NUREG 1021 submittal requirements.

- Integrated Outline (Sample Plan)
- Exam Materials
- Exam Administration
- Post Exam Activities

Planning - Where

Each site required to control examination security and integrity.

Consideration should be given to the following physical characteristics:

- Limited access
- Out of the way
- Large
- Combinations not keys
- Hardware requirements

Personnel Selection (Author)

Consideration should be given to the following characteristics:

- Experience in operations / training
- Previous experience developing exams.
- Experience in developing simulator materials
- Consider a **team** with complementary strengths

Personnel Selection (Facility Rep)

This person approves the examination for the site

Consideration should be given to the following characteristics:

- Senior SRO
- Currently or recently on shift
- Strong technically

The Exam

- Integrated Outline (Sample Plan)
- Draft Material and Review
- Validation
- Approval
- Submittal
- Administration

Exam Components

- Four Sections
  - Written Exam
  - Operating Test
    - Part A - Admin Walkthrough
    - Part B - JPM Walkthrough
    - Part C - Dynamic Simulator

The Integrated Outline - Written

- The goal is to create an examination that is free of bias and adheres to the model.
- How to achieve a bias free outline?
  - Systematic process
  - ES 401, Att. 1 provides a sampling methodology
  - Software solutions available
  - Form ES 401-1/2/3/4

The Integrated Outline - Admin

- The administrative section of the exam
  - RO's and SRO's have different administrative roles
  - Failure of one admin JPM could result in denial of license.
  - Form ES-301-1
- Tips
  - Run all JPM's to ensure they work.
  - Whenever possible, integrate with other exam elements.

The Integrated Outline - JPM

- Very specific requirements to select JPM's
  - 10 JPM's in two subcategories, nine safety functions
  - Two new/modified, four alternate path.....
  - Form ES-301-2
- Tips
  - Large classes can avoid needing multiple JPM sets with proper (creative) scheduling.
  - Group simulator JPM's for efficiency.
  - Run the JPM's to ensure they work

The Integrated Outline - Simulator

- Specific quantitative and qualitative requirements
  - In general, requal scenarios will need augmentation
  - To get credit, operator "Action" required
  - ES-301-4/5
- Tips
  - Creative scheduling can reduce the number of scenarios needed.
  - Provide optional events to ensure requirements met
  - Scenarios should be run in the simulator to ensure they work.

Draft and Review Material

Maximize available resources

- Facility written, dynamic, and JPM banks
- Facility requalification program banks
- Similar facility examinations and banks
- INPO question bank (coming soon)

Make necessary modifications -Draft new material

Technical/Construction Reviews

Dry run of all operating test material saves time in the long run

Validation

Resource intensive but directly tied to quality

Effectiveness increases with diversity

- Technical knowledge
- Operating experience
- Exam construction expertise

Validation should exercise the material <u>under exam conditions</u>

- Vital that validation personnel understand their role
- Critical for proper time validation

Approval

- Approval is the role of the facility rep
  - Ensure NUREG requirements are met
  - Utilize the QA Checklists
    - ES-301-3 - 6, ES-401-7
  - Ensure test items are operationally valid
    - Is it the right thing to test on an NRC exam?

Submittal

- Agree on process with the chief examiner.
- Recommend delivery in person whenever practical.
- Verify process/schedule for comment receipt and incorporation.
- Start of NRC review and approval process

Prep Week Activities

- Work out schedule with the Chief Examiner.
- Depending on scope, recommend review of written prior to on-site week.
- Final Operator / surrogate groupings and rotations should be determined and agreed to.
- Sequestering plan should be reviewed and agreed upon.
- Operations SRO plays a key role

Exam Administration

- ES-302 and 402 contain exam administration instructions
- Tips
  - Ensure site personnel aware that NRC is on site
  - Brief proctors / sequestering personnel on their roles and responsibilities
    - Have a few backup resources ready
  - Written exam proctor should be the facility author
    - Must document ALL questions and responses

Post Exam Activities

- ES-501 contains requirements for post exam activities.
  - Facility Roles
  - Examiner Roles
  - NRC Management Review and Licensing Action

Summary

Keys to success:

- Take care in selecting the people you assign
- Review industry lessons learned
- Early and frequent communications with the Chief Examiner
- Checks and Balances - Line and Training roles.

It comes down to executing a good plan!

Performance Indicators

(C8)

Bob Post

Senior Project Manager

Nuclear Energy Institute

Gregg Ludlam

Operator Continuing Training

Carolina Power & Light

Performance Indicators

Bob Post

Senior Project Manager, Operations
Nuclear Generation Division

NEI

Initial Licensed Operator Task Force (ILOTF)

PI Focus Group formed

Regional Representatives from all four training associations

Developed "Metrics" that would assist in evaluating stability of the process and help determine resources needed to develop a utility written exam.

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Performance Indicators

- ⇨ Candidate throughput
- ⇨ Audit/NRC exam averages
- ⇨ Schedule adherence
- ⇨ "Normalized" resource requirements
- ⇨ Changes to questions, JPMs, simulator scenarios
- ⇨ Number of questions all/no candidates answered correctly

NEI

Performance Indicators

- ⇨ Revision 8 became effective 10/20/99
- ⇨ ~ 29 exams have been written and administered since revision 8 released
- ⇨ Some utilities voluntarily implemented NUREG-1021 prior to effective date

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Performance Indicators

- ~10 exams have been written/administered since revision 8 became effective
- PI Data has been collected on 9 exams
- Numbers not statistically significant

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Results

- ~ 100 hours to develop exam outline
- ~ 465 hours to develop written exam
- ~ 116 hours to validate written exam
- ~16 hours to develop/validate one JPM

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Results

- ~153 hours to develop/validate one simulator scenario
- ~115 hours incorporating NRC changes
- ~195 hours implementing the exam
- ~1428 hours to generate one "exam" (written exam, 10 JPMs, 3 scenarios)

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Initial License Examination Performance Data:

Utility:_____ NRC Region:_____

Plant:_____

Point of Contact for information/phone number: _____

Was the exam prepared by the utility? Yes No

Date Exam Administered:_____

	RO	SROI	SROU
1. Number of candidates which entered program:	_____	_____	_____
Number of candidates which took audit	_____	_____	_____
Number of candidates which passed audit:	_____	_____	_____
Number of candidates which took license exam:	_____	_____	_____
Number of candidates which passed written exam.	_____	_____	_____
Number of candidates which passed JPM Admin exam	_____	_____	_____
Number of candidates which passed simulator exam	_____	_____	_____

2. Average score for audit and NRC written exams:

Audit:	**NRC:**
RO_____	RO_____
SROI_____	SROI_____
SROU_____	SROU_____

3. Exam development & Administrative Timeline:
Was the timeline as described in NUREG 1021 met for the following milestones:

Yes	No	
☐	☐	120 letter receipt
☐	☐	Exam outline submittal (≥ 75 days)
☐	☐	NRC review of outline (≤ 5 days)
☐	☐	Exam material submittal (≥ 45 days)
☐	☐	NRC review of proposed exam (≥ 14 days)
☐	☐	NRC final exam approval (≥ 7 days)

4. How many changes in NRC lead examiners did you experience during your exam process? _____. Please state in the comment section any impact the changes had on the examination development process.

5. Please estimate the amount of man hours required to complete the following:

Develop exam outline:	_____
Develop written exam:	_____
Validate written exam:	_____
Average time to develop 1 JPM:	_____
Average time to validate 1 JPM:	_____
Average time to develop 1 Scenario:	_____
Average time to validate 1 Scenario:	_____
Support NRC validation week activities:	_____
Incorporation of NRC requested changes:	_____
Review/revision of NRC written exam:	_____
Implementation of the exam:	_____
Total Man Hours:	_____

6. For utility developed exams, how many written exam questions were modified or removed by the NRC for the following criteria:

Questions did not comply with NUREG 1021 (ES 401-9) requirements:	_____
NRC examiner request:	_____
Increase level of difficulty:	_____

7. For utility developed examination, how many scenarios, JPMs, and admin items were modified by the NRC for the following criteria:

	Sim	JPMs	Admin
Did not comply with NUREG 1021 requirements:	_____	_____	_____
NRC examiner request:	_____	_____	_____
Increase level of difficulty:	_____	_____	_____

8. For NRC developed exams, how many written exam questions were modified or removed at the request of the utility for the following criteria:

Questions did not comply with NUREG 1021 requirements:	_____
Increase/decrease in level of difficulty:	_____
Question was technically inaccurate:	_____

9. For NRC developed examinations, how many scenarios, JPMs, and Admin items were modified by the Utility for the following criteria:

	Sim	JPMs	Admin
Did not comply with NUREG 1021 requirements:	_____	_____	_____
Increase/decrease level of difficulty:	_____	_____	_____
Material technically inaccurate:	_____	_____	_____

10. A) How many questions on your written exam did ≥ 30% of the candidates answer incorrectly?_____

    B) How many questions did all candidates answer correctly?_____

    C) During the post exam analysis how many questions did your utility identify as needing modification (i.e. accept two answers, inaccurate etc)? _____

    D) How many of the post exam recommended changes were accepted by the NRC?_____

11. How many questions were challenged by the utility after the exam was administered?_____

12. Please provide any information which you feel may help us understand the information you provided:

    _____

    _____

    _____

    _____

    _____

    _____

13. Please provide any other comments that you think the task force needs to be aware of regarding your examination effort.

    _____

    _____

    _____

    _____

    _____

    _____

14. Thank you for taking the time to answer this survey. If you have any questions, please contact Bob Post at 202-739-8115 or mailto:rep@nei.org.

Keynote Speaker

(Return to Ballroom)

(D1)

Samuel Collins

Director, Nuclear Reactor Regulation

Nuclear Regulatory Commission

NATIONAL OPERATOR LICENSING WORKSHOP

REGULATORY TRENDS & CURRENT NRR INITIATIVES

JON R. JOHNSON
Associate Director for Inspection and Programs
Office of Nuclear Reactor Regulation
February 17, 2000

Nuclear Regulatory Commission

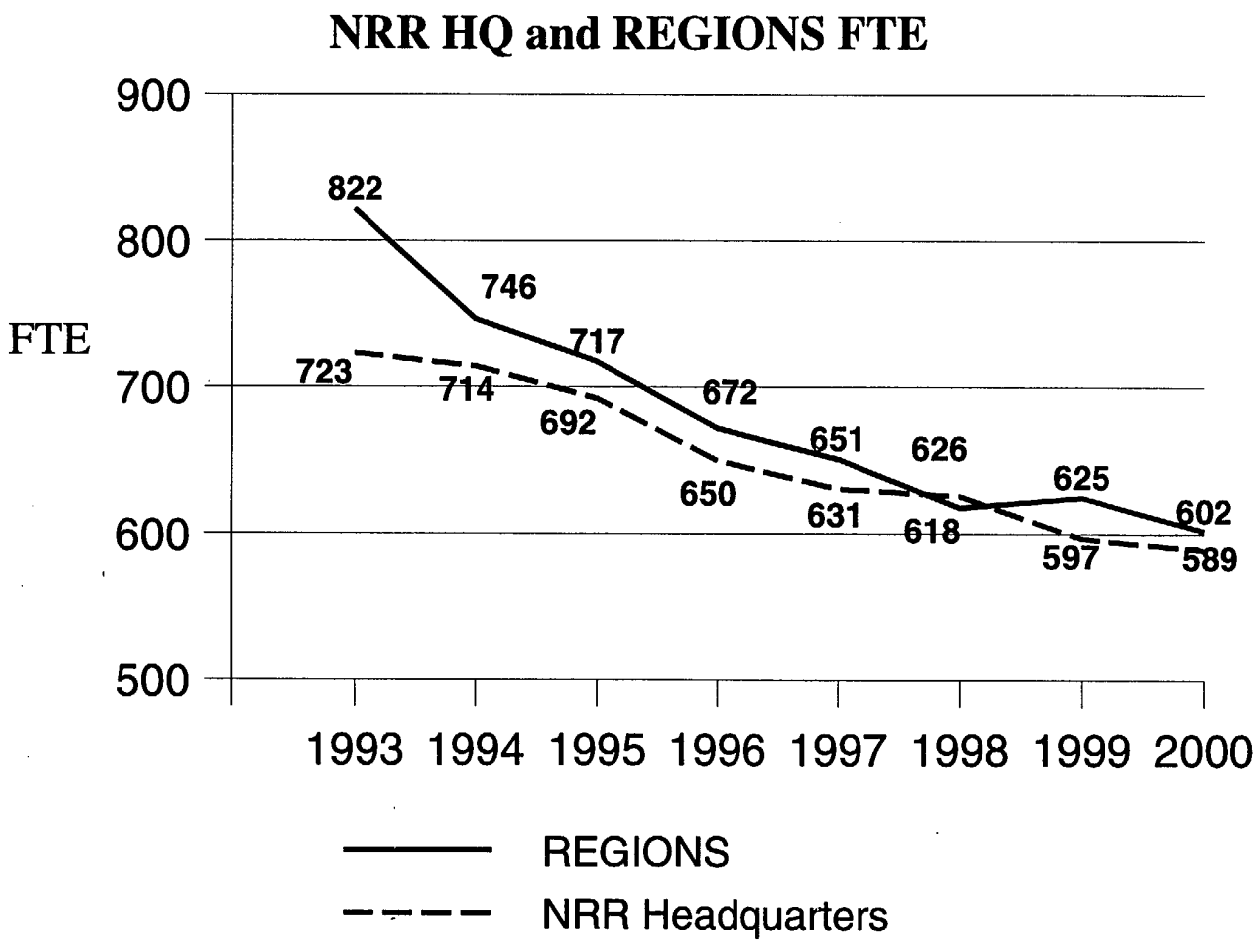
Performance Goals

1. Maintain Safety
2. Increase Public Confidence
3. Reduce Unnecessary Regulatory Burden
4. Make NRC Activities and Decisions more Effective, Efficient, and Realistic

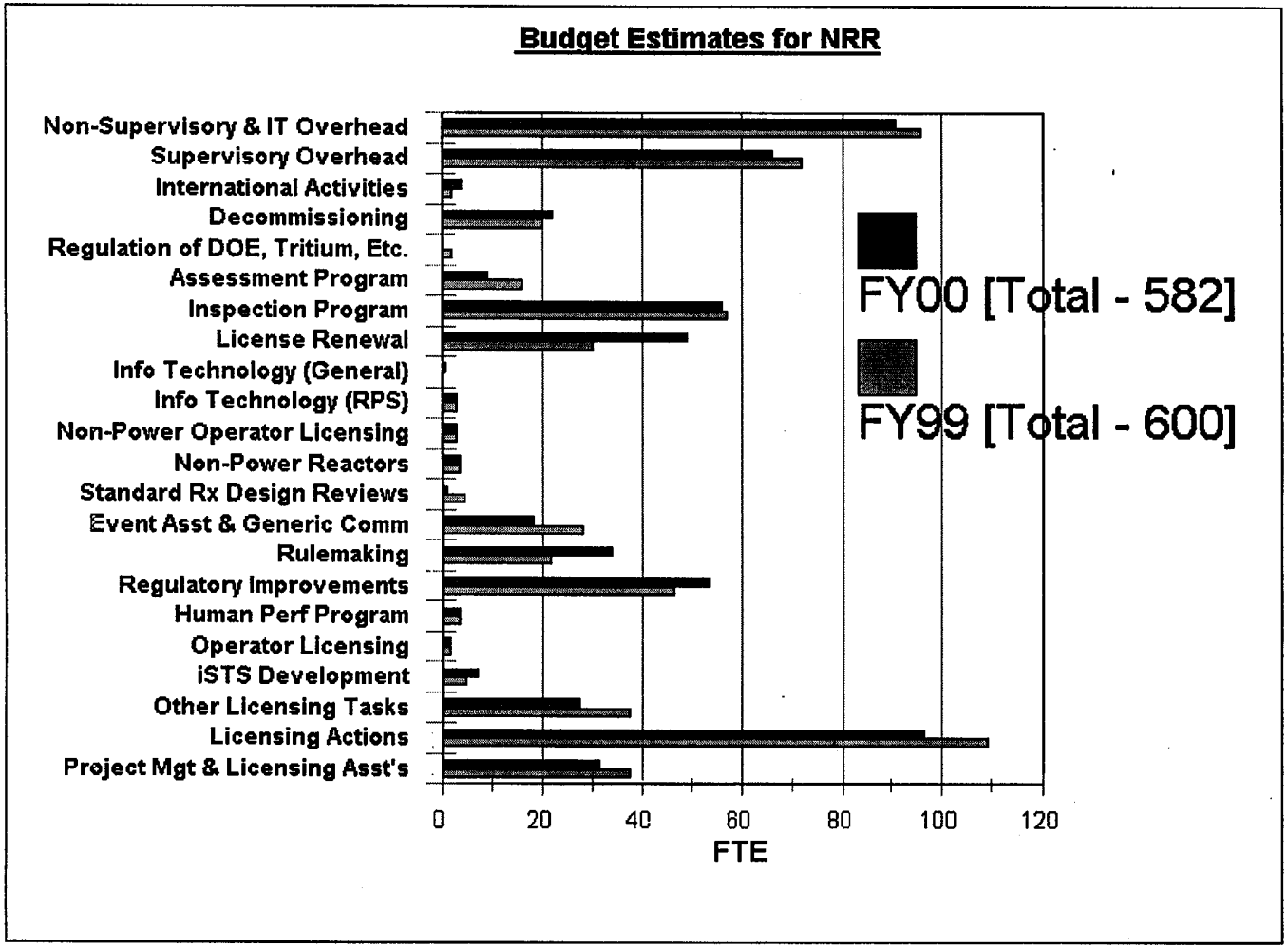
Nuclear Regulatory Commission

NRR Performance Management

Nuclear Regulatory Commission



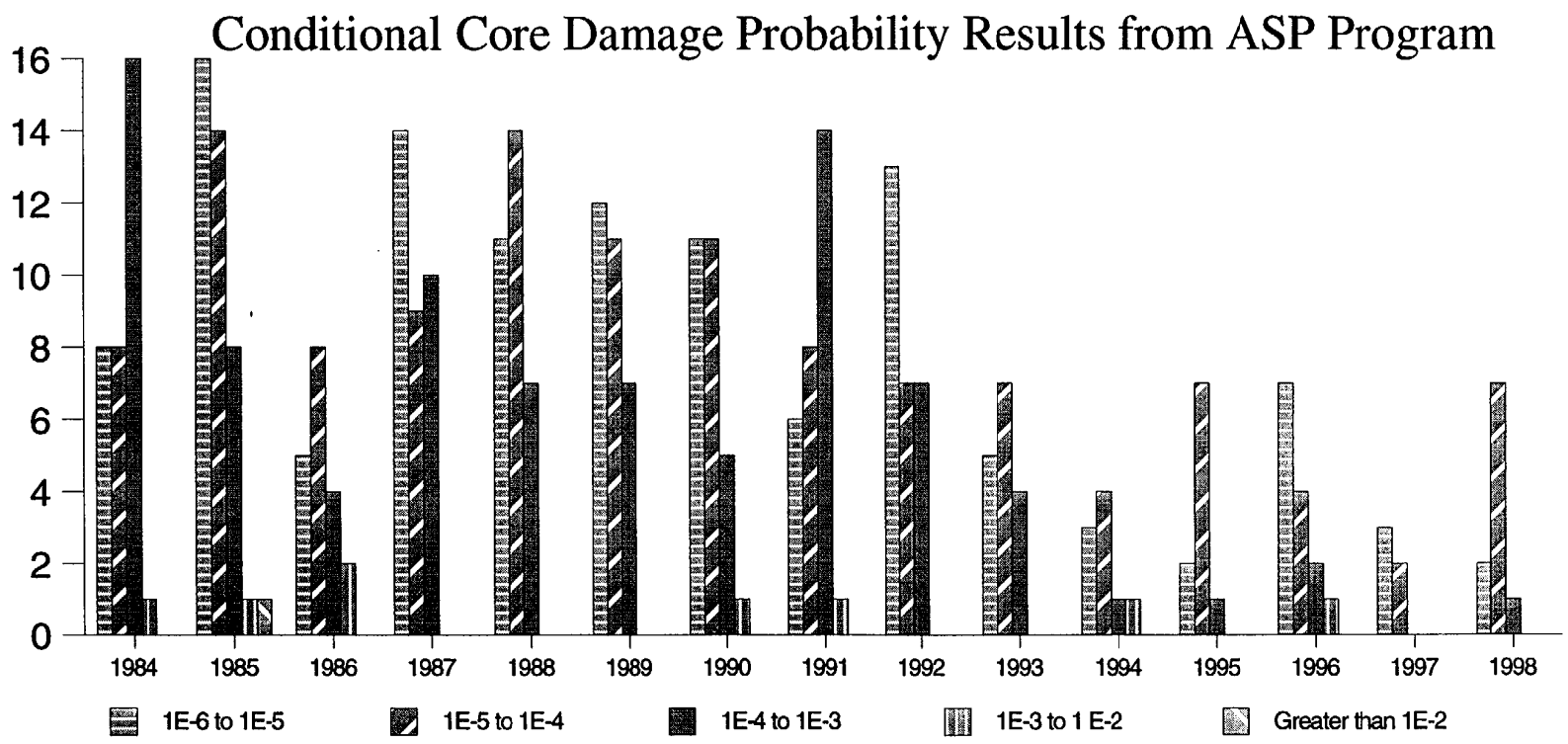
Nuclear Regulatory Commission



Performance Trends

Maintaining Safety

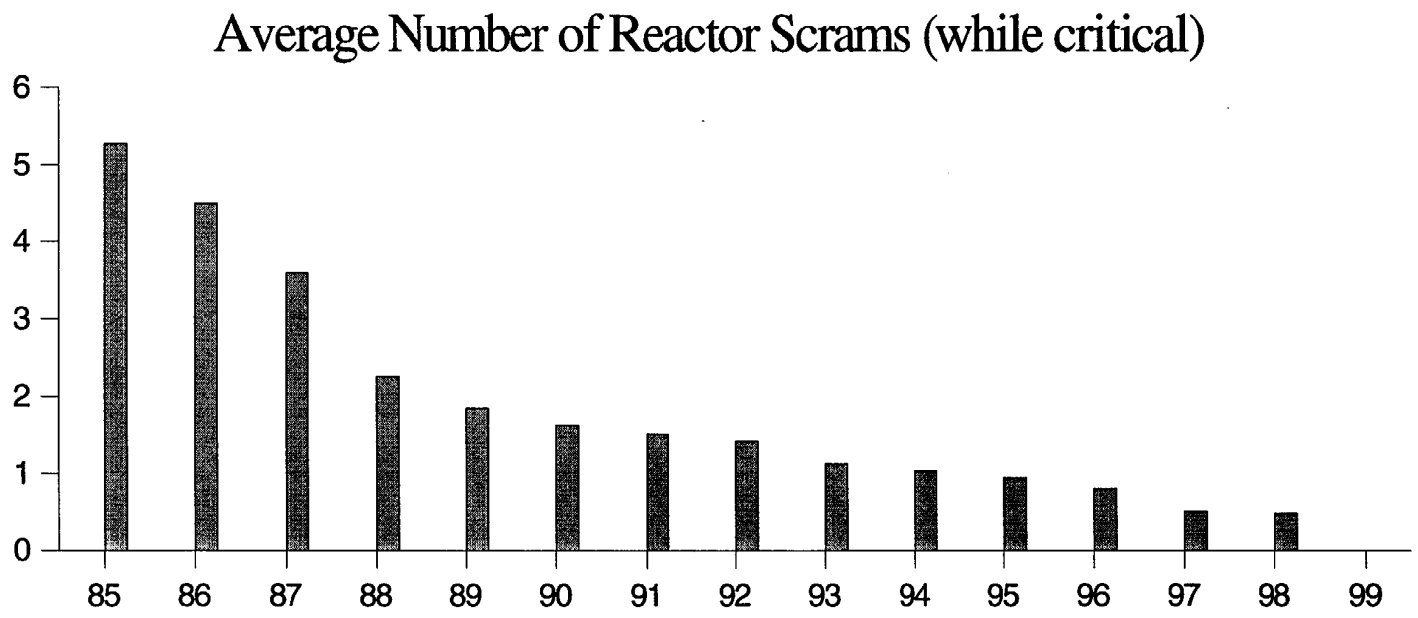
- Goal - One or less significant precursors
  (i.e., events with > 1E-3 probability of leading to an accident



Performance Trends

Maintaining Safety

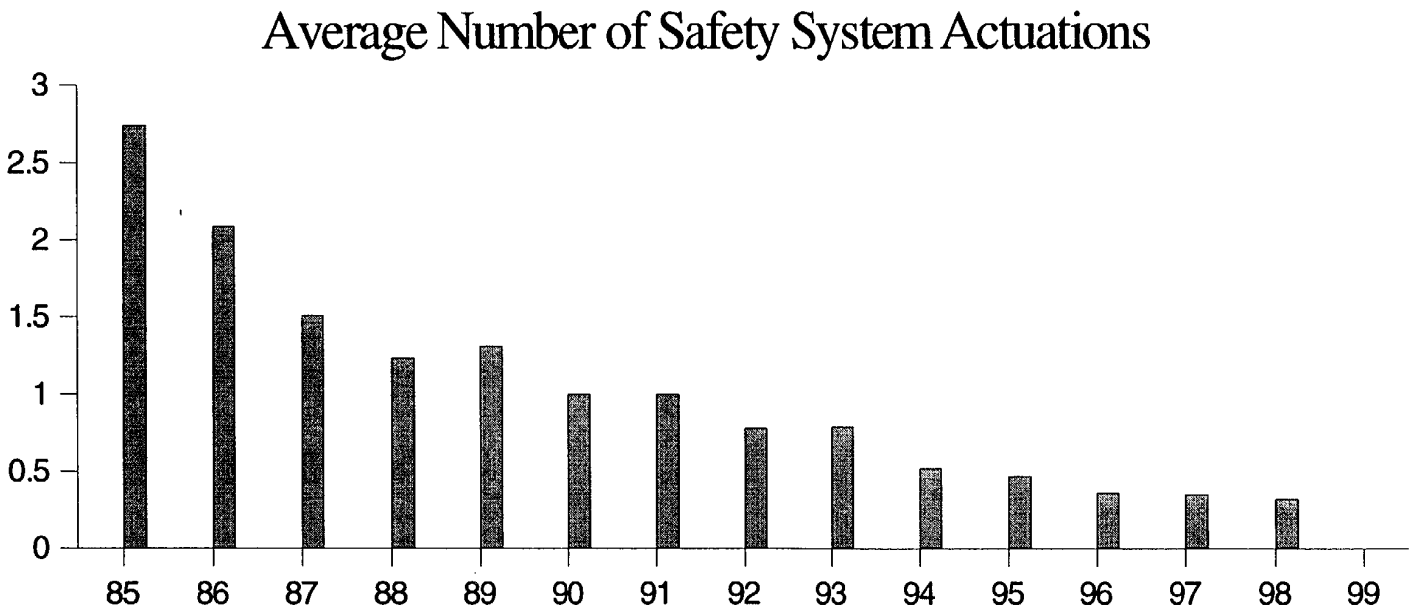
- Goal - No Significant Adverse Trends in Industry Performance Indicator



Performance Trends

Maintaining Safety

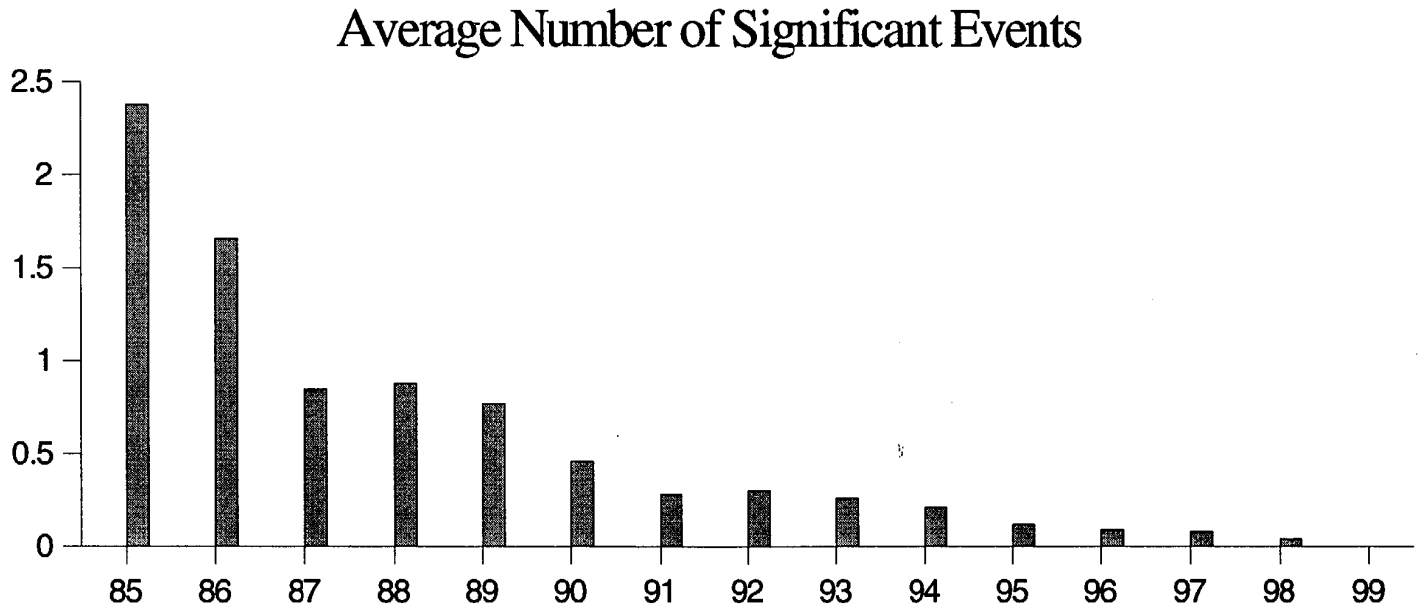
- Goal - No Significant Adverse Trends in Industry Performance Indicator



Performance Trends

Maintaining Safety

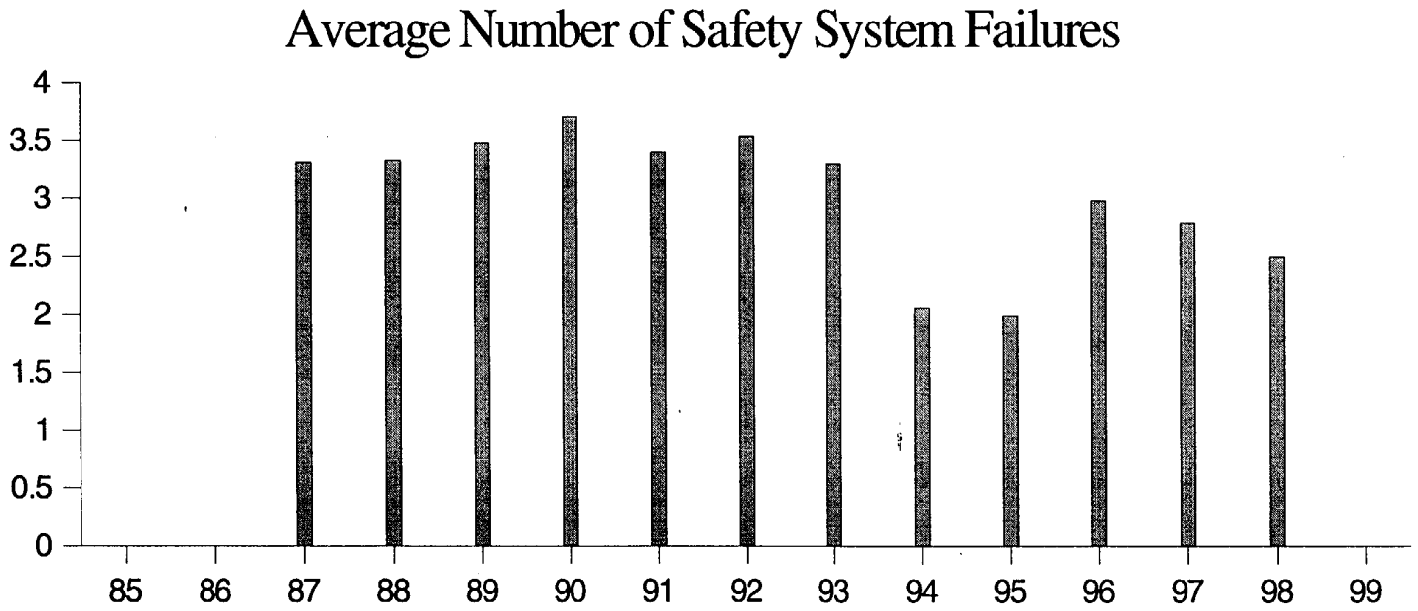
- Goal - No Significant Adverse Trends in Industry Performance Indicator



Performance Trends

Maintaining Safety

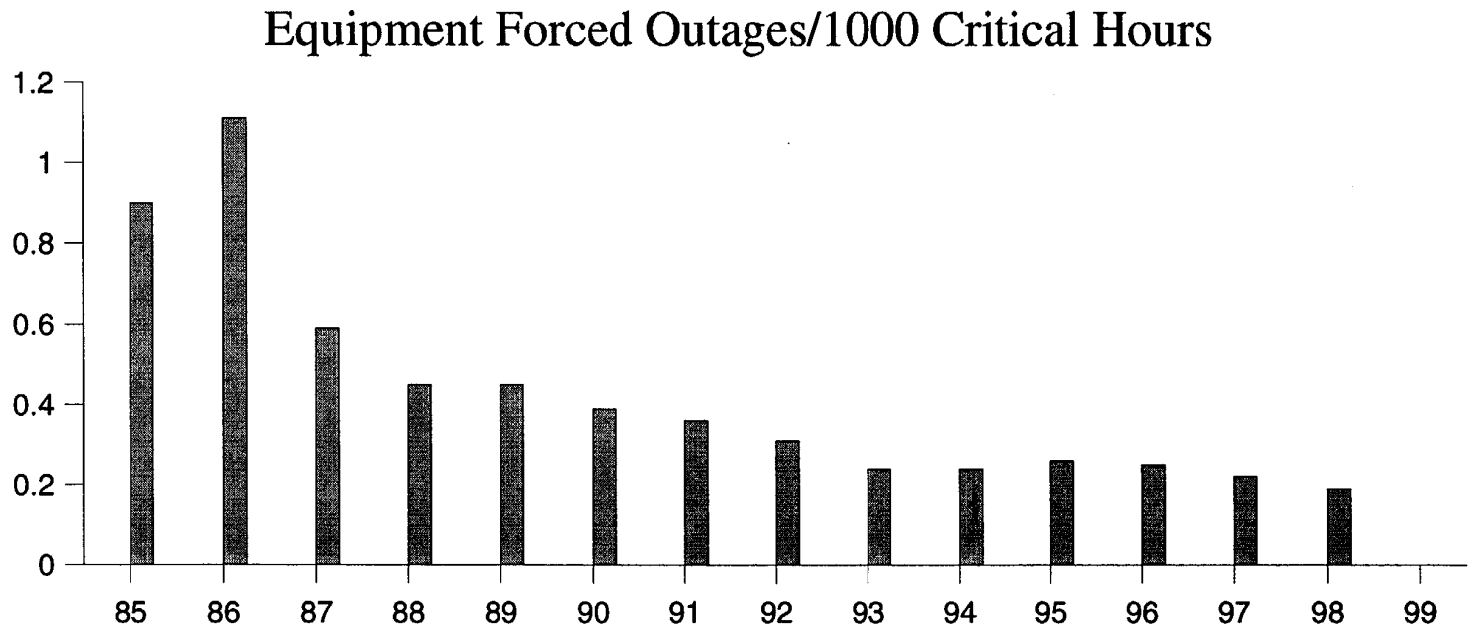
- Goal - No Significant Adverse Trends in Industry Performance Indicator



Performance Trends

Maintaining Safety

- Goal - No Significant Adverse Trends in Industry Performance Indicator



Performance Trends

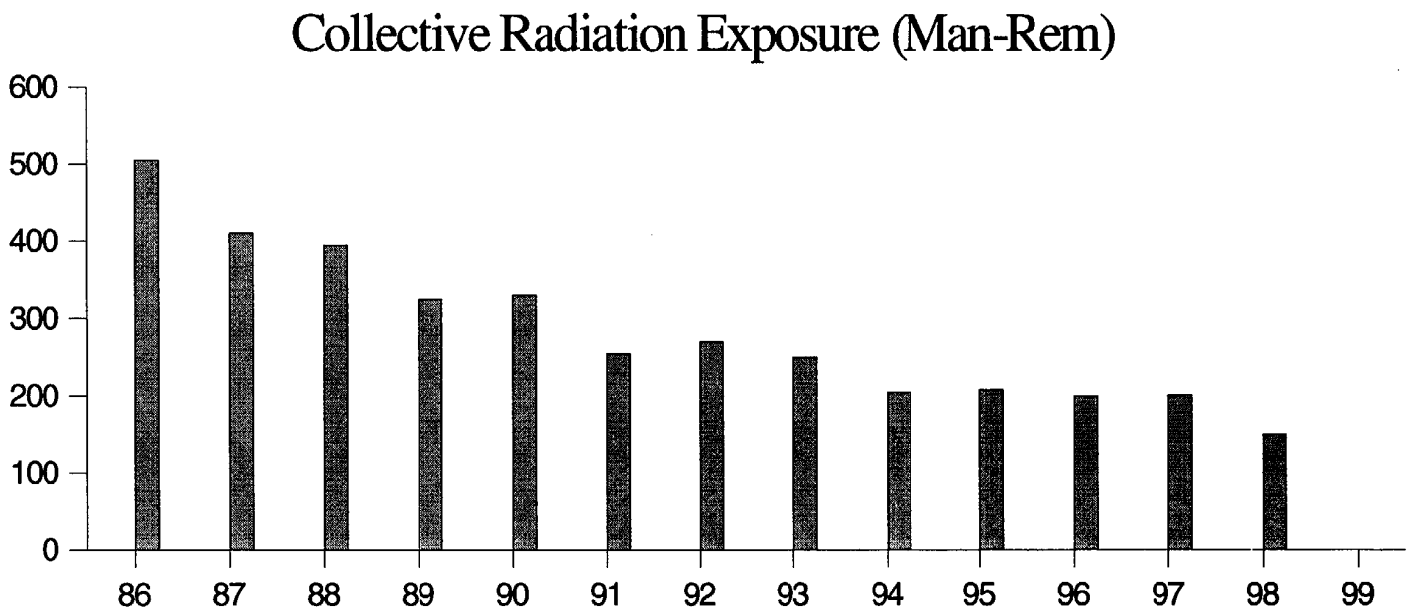
Performance Goal Measures

- No events resulting in exposures exceeding regulatory limits ✓
- No more than 3 releases to environment that exceed Regulatory Limits ✓
- No breakdowns in physical security that significantly Weaken the protection against radiological sabotage Theft or diversion of SNM ✓
- Environmental considerations appropriately addressed ✓
- Evaluation of revised oversight program in FY 2001 ✓

Performance Trends

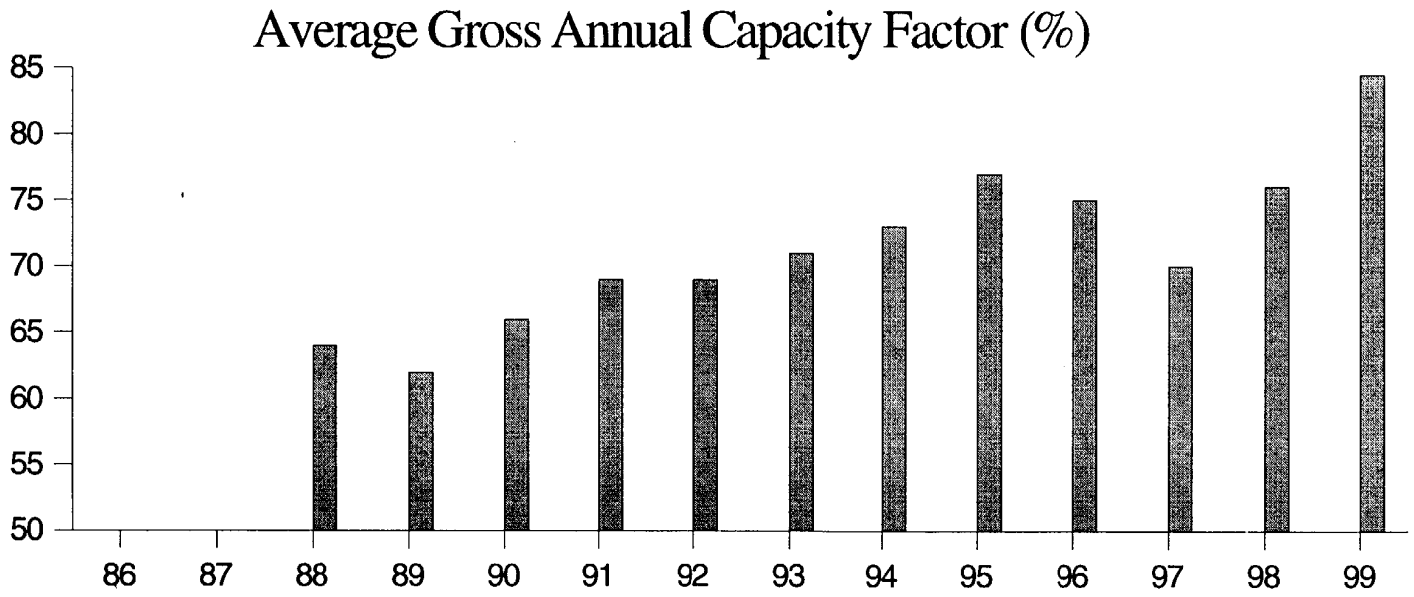
Maintaining Safety

- Goal - No Significant Adverse Trends in Industry Performance Indicator

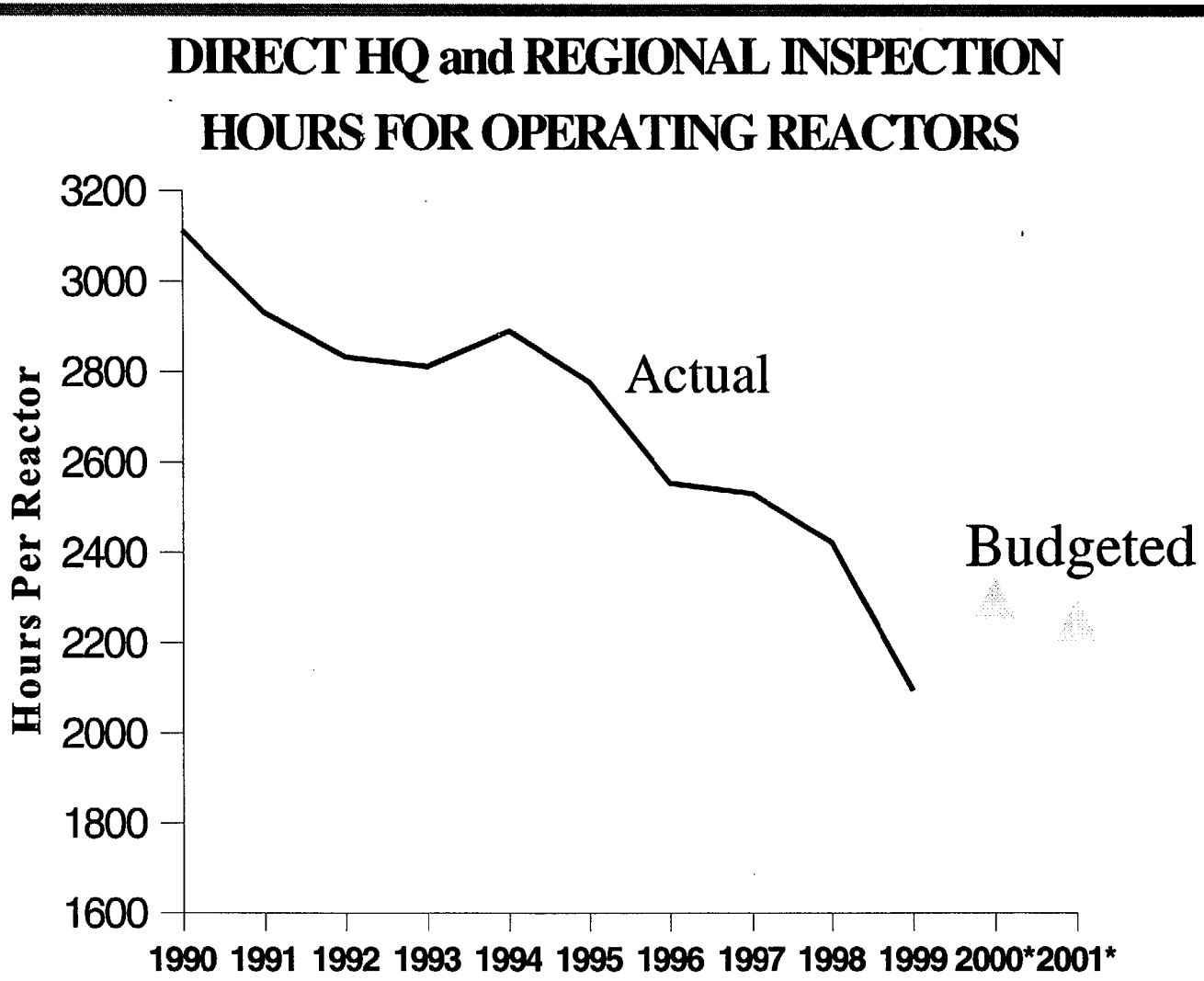


Performance Trends

- Goal - No Significant Adverse Trends in Industry Performance Indicator
- Safety goals are not incompatible with economic and performance goals



Resource Trends



Performance Trends

Maintaining Safety
Measures

- Stakeholder input requested for measures which portray NRC's sole contribution to safety as opposed to a combined NRC/industry contribution. Consider inspection findings and significance determination process of new reactor oversight program.

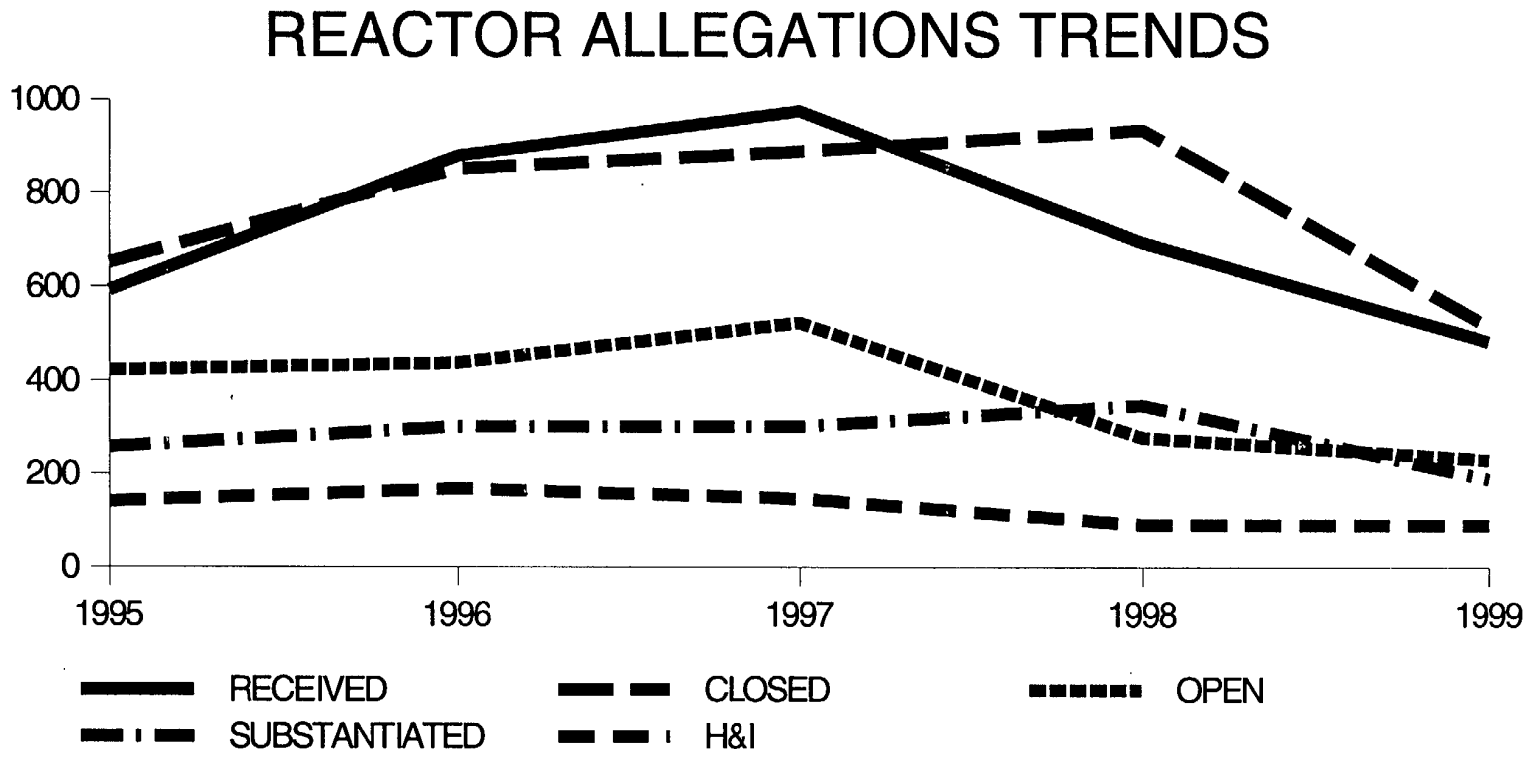
Performance Trends

Increase Public Confidence
Measures

- Stakeholder input requested on workable approaches to measure public confidence and on appropriate quantitative targets
- Initial Emphasis On
  - Allegations Program
  - Public Information Projects
  - Freedom of Information Act Requests
  - Public Correspondence
  - 2.206 Petitions
- Surveys?

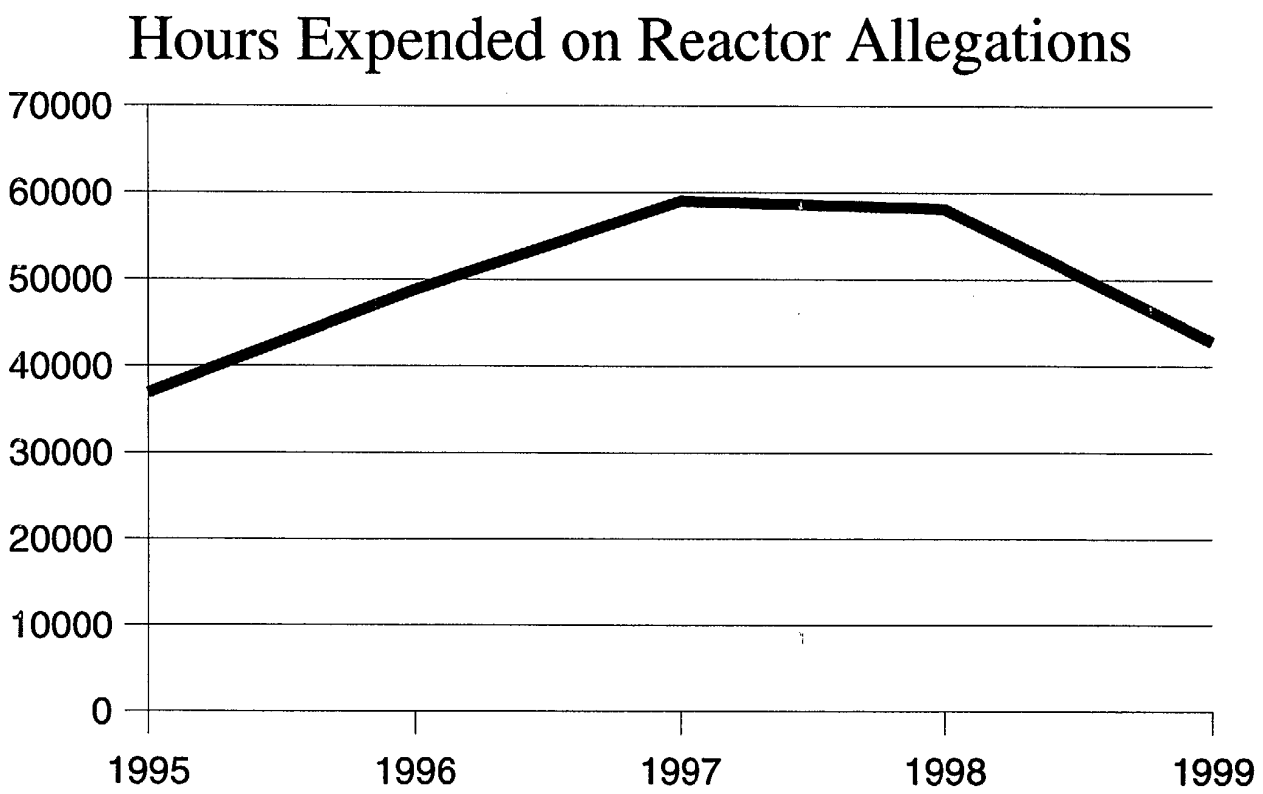
Performance Trends

Increase Public Confidence - Allegations Program



Performance Trends

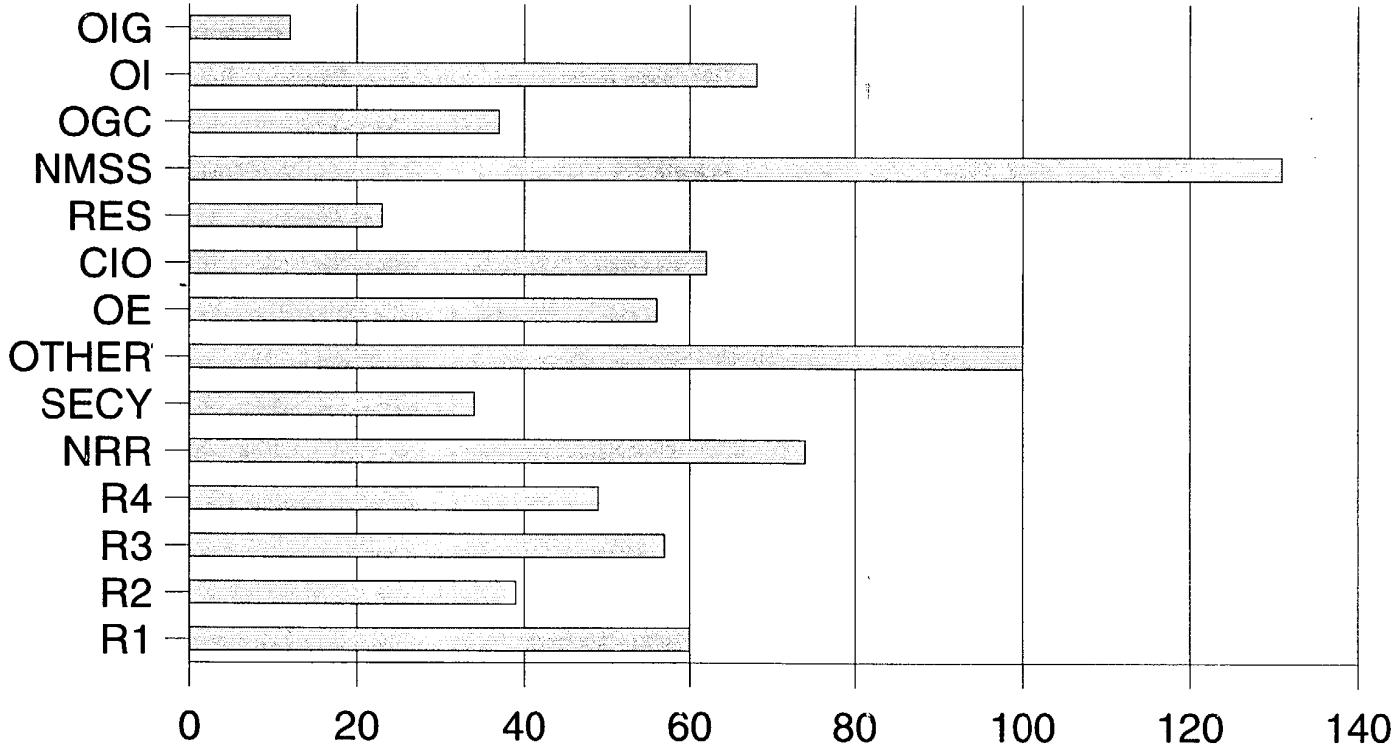
Increase Public Confidence - Allegations Program



Performance Trends

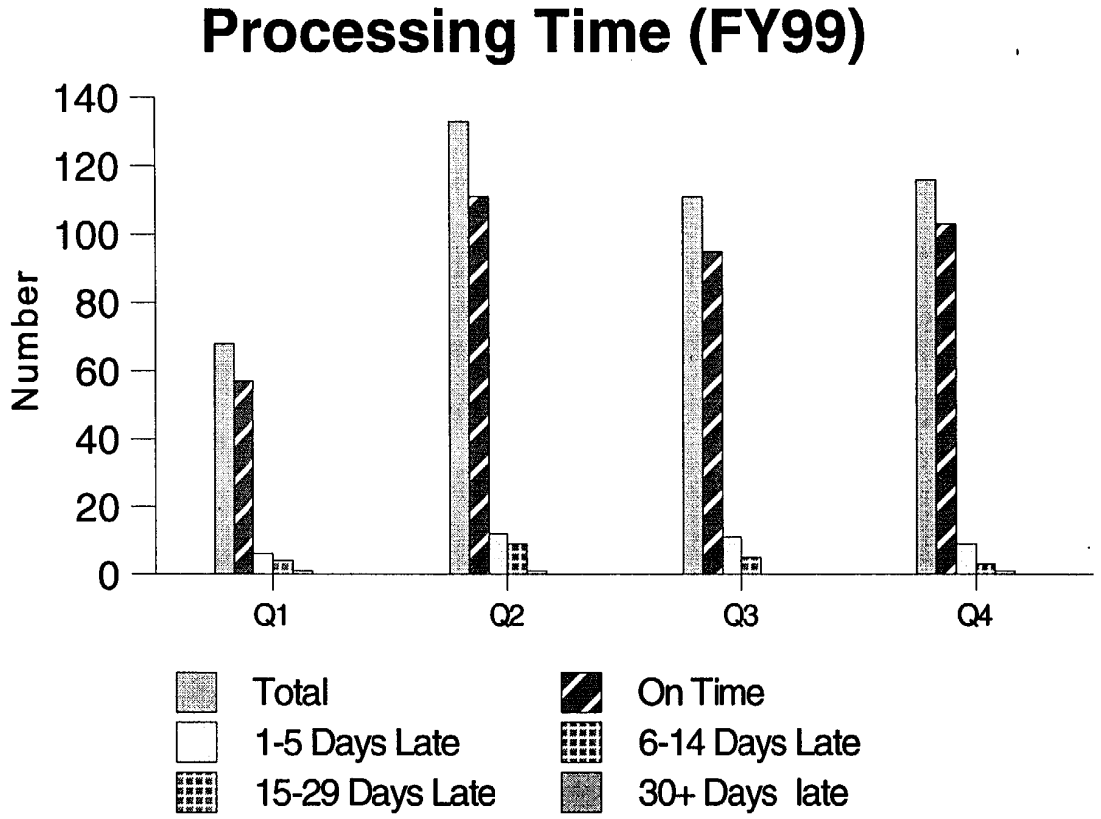
Increase Public Confidence - FOIAs

Freedom of Information Act Requests in FY99



Performance Trends

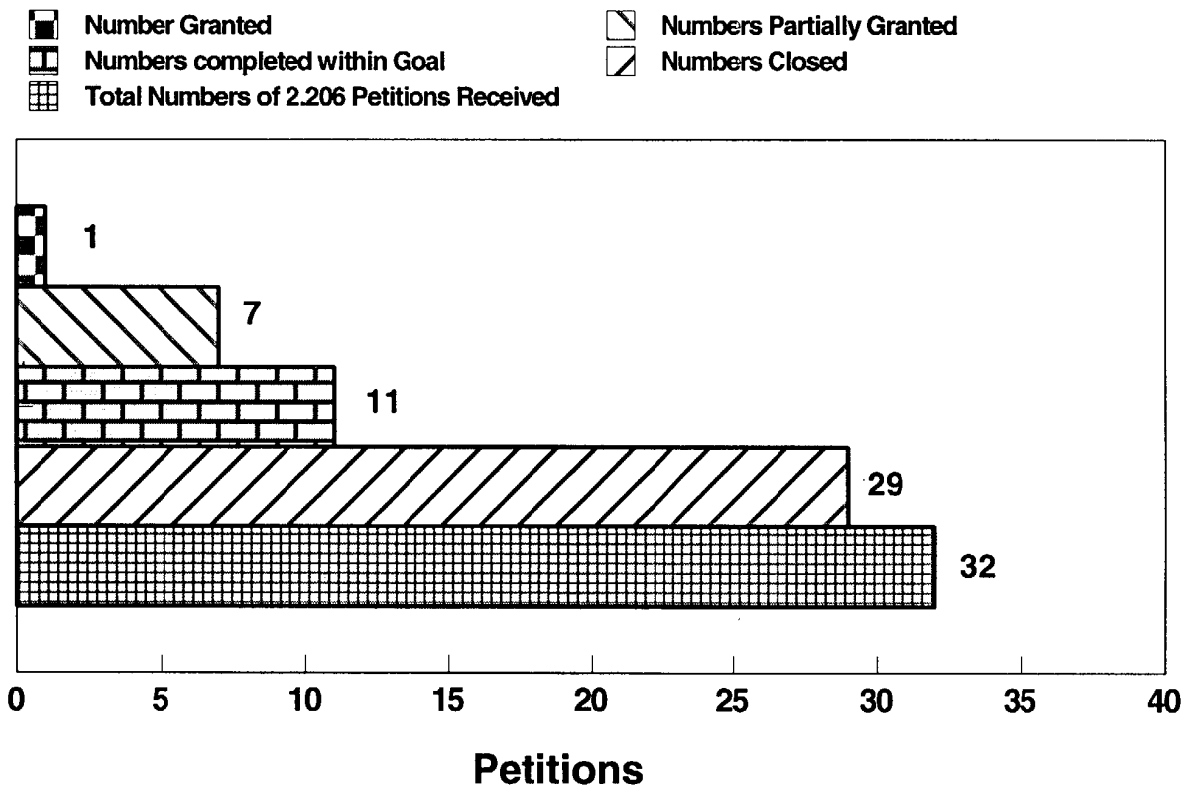
Increase Public Confidence - Controlled Correspondence



Performance Trends

Increase Public Confidence - 2.206 Petitions

Statistics of Petitions Processed under 10CFR2.206
For the Period 1/98 thru 12/99



Performance Trends

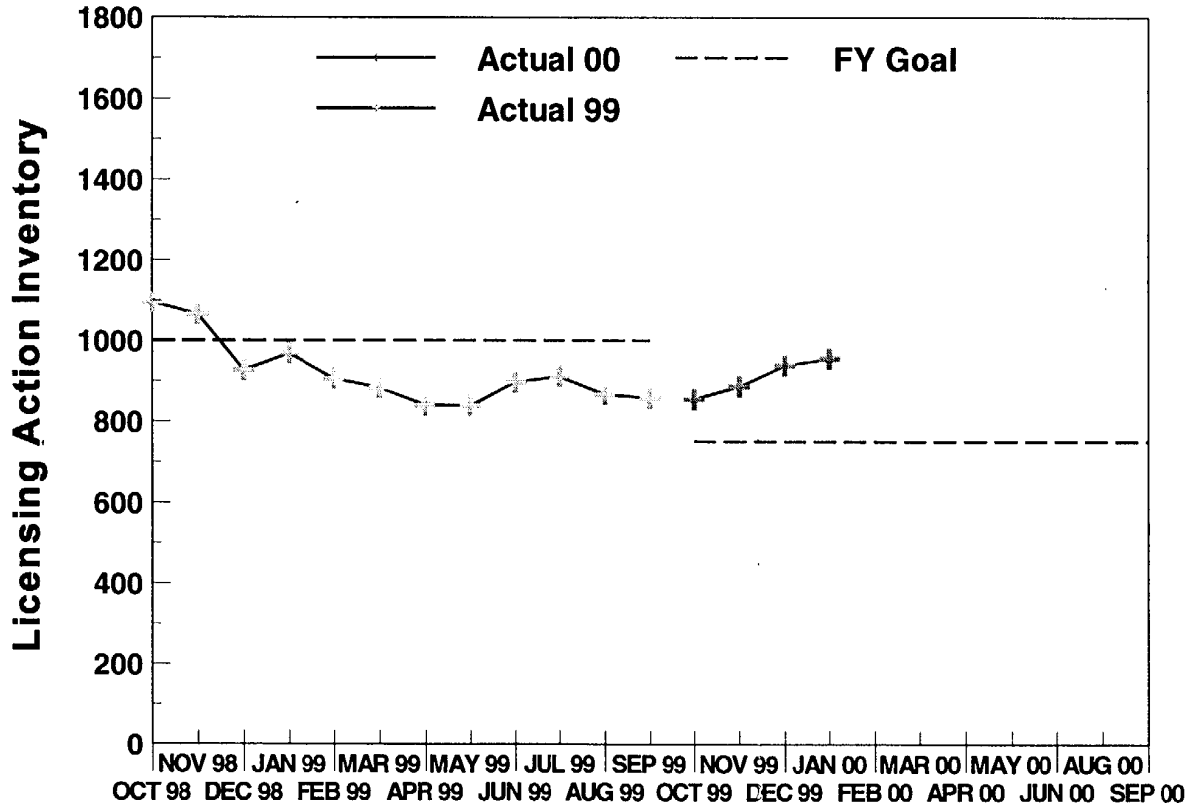
Reducing Unnecessary Regulatory Burden
Measures

- Seeking Suggestions for how to measure
- No shutdowns result from undocumented NRC influence
- No shutdowns result from failures of NRC processes
- Identify and Prioritize areas for greatest potential for reducing unnecessary regulatory burden
- Stakeholder input to focus/prioritize work

Performance Trends

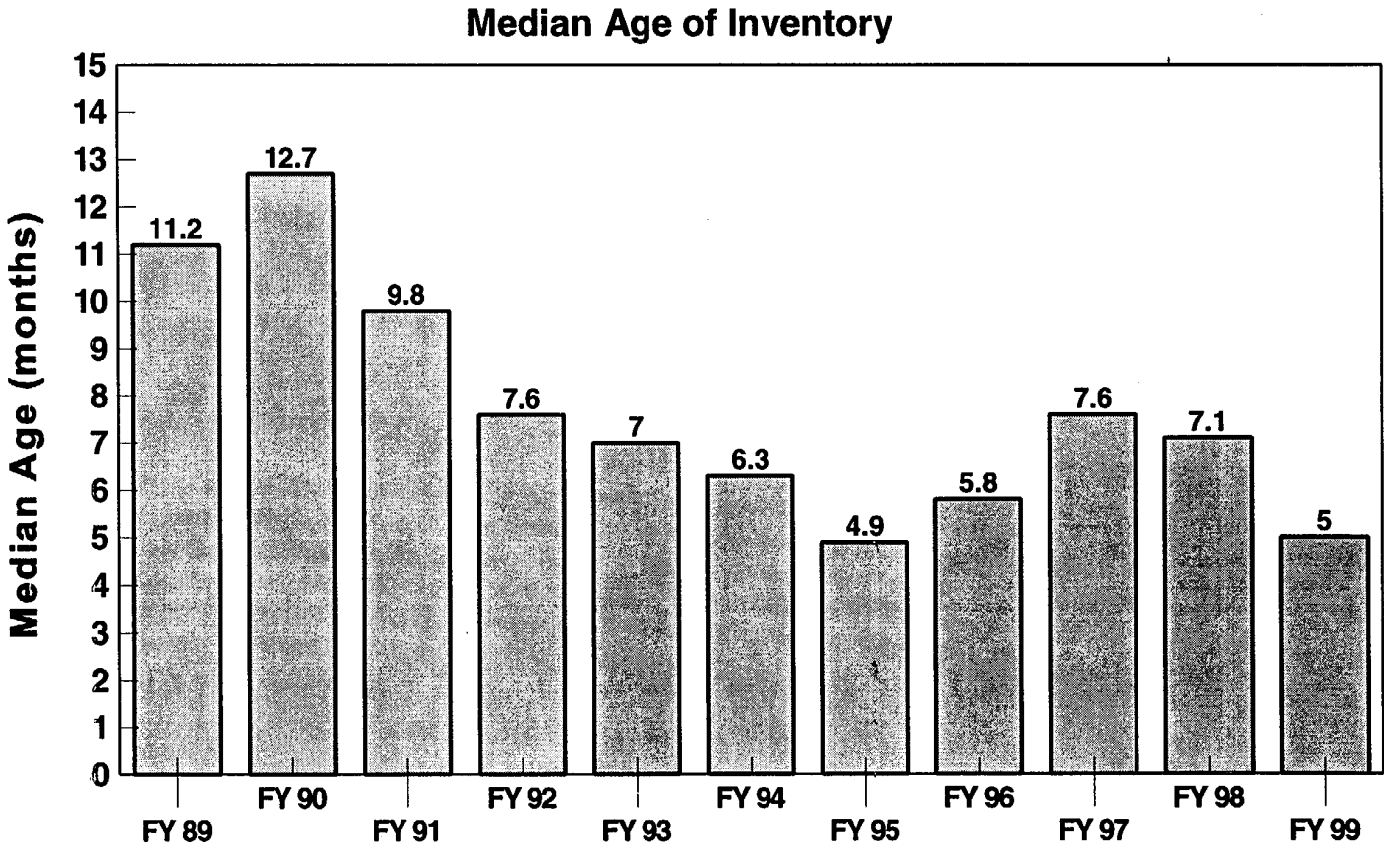
Nuclear Reactor Safety - Reactor Licensing

Performance Plan Target: Licensing Action Inventory ≤ 750



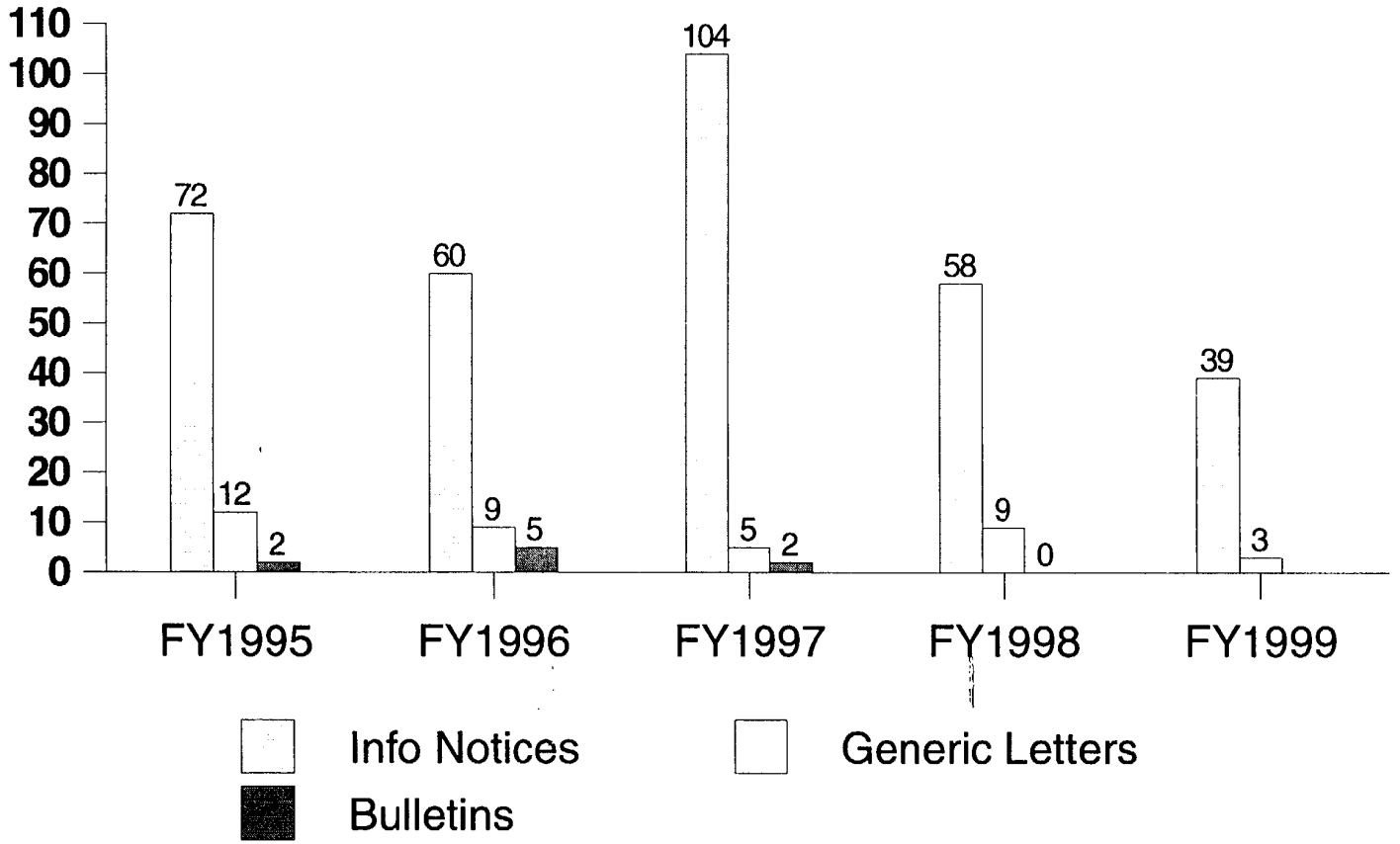
Performance Trends

Licensing Action Inventory



Regulatory Trends

GENERIC COMMUNICATIONS ISSUED



Performance Trends

Make NRC Activities and Decisions more Effective, Efficient, and Realistic

- Complete 95% of milestones in PRA Implementation Plan
- Reviews of key processes
- Complete 95% of milestones for use of MOX fuel
- Develop plan for risk-informing all reactor-related activities
- Complete major milestones in accordance with Commission-approved schedules for license renewal applications

Specific Challenges

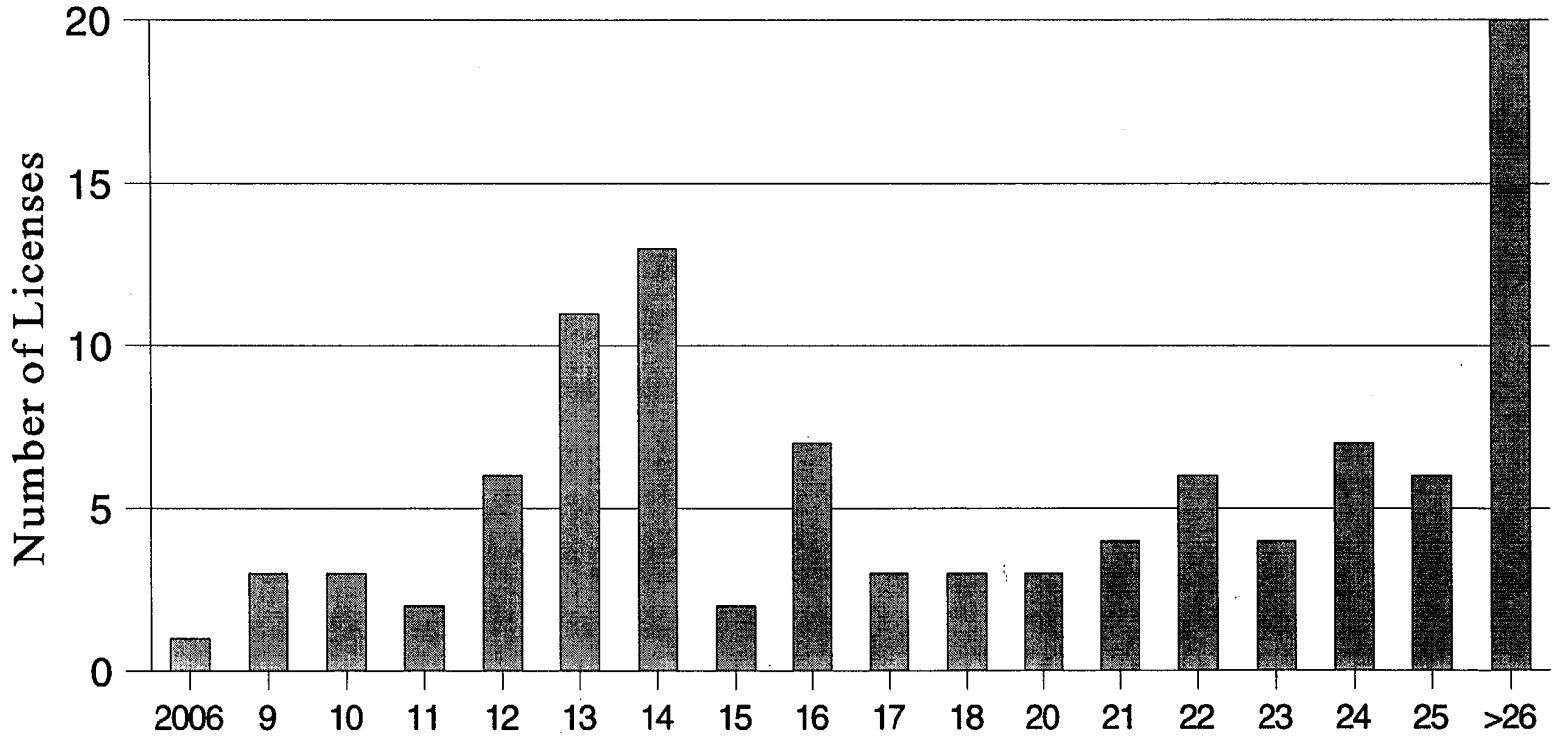
License Renewal

- Met FY 99 measure for renewal application review milestones for Calvert Cliffs and Oconee
  - Two applications expected for FY 00 (ANO-1 received)
- Increasing interest in license renewal
- High level waste transportation addressed generically in FY 99
- Expect continued resolution of generic renewal issues in support of implementation guidance development

Specific Challenges

License Renewal

Operating Licenses Expiration Date



Specific Challenges

Risk Informing NRC Activities

- Significant progress made in risk-informing NRC activities with stakeholder involvement (i.e., staff training, improving guidance and developing improved PRA methods and tools
- Regulatory Guides, Topical Reports and/or pilot plant applications approved in the following areas
  - Inservice Inspection (WOG topical, Vermont Yankee, Surry, ANO)
  - Inservice Testing (Comanche Peak, staff evaluating lessons learned)
  - Graded Quality Assurance (South Texas, staff addressing barriers to full implementation)
  - Technical Specifications (Allowed Outage Time Extensions)
  - Other Licensing Initiatives (BWR Vessel Shell Weld Inspections, ANO hydrogen monitoring order, San Onofre hydrogen recombiner exemption/amendment)

Specific Challenges

Risk Informing NRC Activities

- Rulemaking Initiatives
  - Maintenance Rule
  - Alternate Source Term
  - Risk Informing Regulations
    - SECY 99-256, Rulemaking Plan for Risk-Informing Special Treatment Requirements (RIP-50)
    - SECY 99-264, Proposed Staff Plan for Risk-Informing Technical Requirements in 10 CFR Part 50 (Option 3)
  - Decommissioning

Specific Challenges

Inspection and Performance Assessment

- Risk Insights Used to Define Scope and Depth of Inspection Program
- Cornerstones of Assessment Program Derived From Contributors to Plant Risk (i.e., initiating events, mitigation, barriers, emergency planning)
- Specific Inspection Findings evaluated for safety significance using risk insights

Specific Challenges

Inspection and Performance Assessment

- FY 99 performance plan measures met for key inspection and reactor performance assessment areas
- Revised oversight process
  - Pilot program implementation ongoing
  - Program monitoring to ensure consistency
  - Ongoing outreach involvement of NRC staff
  - Significant and frequent stakeholder interactions
  - Expected initial implementation at all sites in April 2000
  - Complete assessments of first year of initial implementation

Specific Challenges

Decommissioning Activities

- Risk-informed, integrated rulemaking effort to specify proper requirements for decommissioning plants in areas of emergency preparedness, security, insurance, operator staffing/training, and backfit rule
- Regulatory improvement initiative to include comprehensive review of all NRC regulations for applicability to decommissioning power reactors
  - Rules to be clarified or modified to address decommissioning
  - Relocation of most decommissioning rules to a dedicated part of 10 CFR

Specific Challenges

Other Initiatives

- Resource Allocations
- Safeguards Regulations
- Fire Protection
- Radiation Protection
  - (KI, Alternate Source Term, Control Room Habitability)
- License Transfers, Financial Reviews
- Routine Licensing Actions and Associated Processes

Regulatory Trends

Conclusions

- Generally Improving or Stable Trends
  - Industry and NRC
- Many Challenges Ahead
- Measure success in terms of:
  - 1) Maintaining Safety
  - 2) Increasing Public Confidence
  - 3) Reducing Unnecessary Regulatory Burden
  - 4) Increasing effectiveness, efficiency, and realism in NRC activities

Lessons Learned Panel Discussion

Don Jackson

PSE&G (D2)

Clay Warren

Wolf Creek (D3)

David Rogers

Consumers Energy (D4)

Hope Creek NRC Exam

December 1998 Exam Submittal

Don Jackson
Nuclear Training Manager
PSEG Nuclear

onology 1998

- August - Vendor Meeting
- September/October- Vendor Submits Sample Plan and Exam To PSEG
- November 5- PSEG Submits Written Exam To The NRC
- November 16- 1st NRC Meeting To Discuss Exam Problems

onology 1998-1999

- December 3- 2nd Meeting With NRC To Discuss Exam Repairs
- December 8- Exam Starts (1 Day Late)
- December 22- Written Exam Given (Last Day of Exam)
- Week Of January 25- NRC Conducts Exam Root Cause

ginal Scope Of Exam Issues

- Written Exam- 59 of 125 Questions Rated Unsatisfactory
- JPM Follow Up Questions- 29 of 60 Questions Rated Unsatisfactory
- Administrative Questions- 9 of 20 Rated Unsatisfactory
- Above Is Based On Chief Examiner's Comments and An Estimate of Repair Difficulty

l Review Of Exam Adequacy

- Approximately 30 of 125 Questions Were Not Satisfactory
- Approximately 7 of 60 JPM Follow Up Questions Were Not Satisfactory
- Administrative Section Was Satisfactory
- Simulator Scenarios and JPMs Were Satisfactory

itten Exam Issues

- Mostly "Low Level of Knowledge" Flaws, as Well As "Low Discriminatory Validity" Flaws
- These Are Somewhat Subjective In Nature
- Other Non-Subjective Flaws Did Exist
- These Were Also Seen In The Other Parts Of The Exam To A Lesser Degree

t Causes

- The Exam Review Was Not Adequate
- Exam Supplied By Vendor Did Not Fully Meet NUREG 1021 Reqts.
- Psychometric Reviews By PSEG and Vendor Did Not Detect The Problems

tributing Factors

- Adequate Resources Were Not Assigned To The Exam Review
- Resources Assigned Were Not Prepared For The Task
- Insufficient Management Oversight
- Procedural Guidance Did Not Provide Enough Guidance To Drive Reviews
- Corrective Actions From Feb. 98 Were Not Sufficient

ations Training Manager Insight

- Too Many Activities Were Scheduled At The Same Time
- Exam Security Control Limits Number of People Involved
- Class Performance Issues Kept Key Management Out Of The Exam Loop
- Over-Reliance On Contractor Performance
- Management Turnover- Sensitivity Level To Feb. 98 Exam Problems
- Exam Writing Technique Is Evolving Rapidly

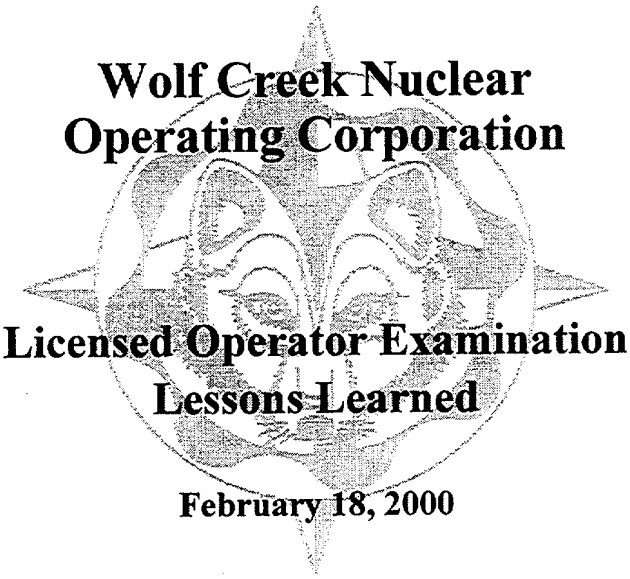
rective Actions

- Change Procedures To Drive Formation Of An Exam Review Team
- Develop An Exam Team Manual
- Validate 5 Year Plans Do Not Overload Department During Exam Development
- Exam Writing Training To Be Provided
- Train On NUREG 1021 Final Rev. 8 Process

Conclusion

- Dedicate Properly Trained Resources To Prevent Future Problems
- Endeavor To Communicate Frequently With The NRC To Ensure A Quality Exam Product
- Work Closely With Regional Training Group and The NRC To Raise The Standard Of Exam Submittals

Wolf Creek Nuclear Operating Corporation



Licensed Operator Examination Lessons Learned

February 18, 2000

Overview

- Introduction
- Background
- Training Program Assessment
- Operator Performance Observations
- Root Cause
- Examination Analysis
- Corrective Actions
- Summary

Background

- License examinations given to class of twelve operators in April and August, 1997
- All candidates passed the operational portions of the exams
- Four candidates scored less than 80% on the written examination in August
- Wolf Creek requested a meeting with the NRC to discuss exam performance
- Wolf Creek performed a detailed assessment of the Operator Training Program

Training Program Assessment

- Self Assessment Team Composition:
  - Outside Consultant
  - Technical Assistant to the Plant Manager
  - Wolf Creek Operations Staff (3)
  - Wolf Creek Training Staff (5)
- Self Assessment Scope:
  - Licensed Operator Training Program
  - Instructor Training Program
  - Licensed Operator written test development

Training Program Assessment
(continued)

- Self Assessment Results:
  - Program fully met accreditation standards
  - Program testing assures comprehensive operator knowledge level
  - Written test development and validation process did not provide consistent quality of exam components
- Other Assessments:
  - Industry peer assessments
  - Internal and external assessments of both the Operator Initial and Requalification Training Programs
  - Ongoing observation of Operator performance

Training Program Assessment
(continued)

- Conclusion: Wolf Creek Training Programs develop operators with a sound knowledge level and practical skills to operate the plant safely

Operator Performance Observations

- Review of performance during initial training confirmed comprehensive knowledge level
  - Exam scores throughout program averaged in high 80's to low 90's
- Operator performance on shift demonstrated good awareness of plant conditions and integrated plant knowledge

Root Cause

- Written exam preparation process did not have sufficient criteria for question development and validation
  - As a result, we failed to discern the difference between a plausible and a partially correct distracter

Examination Analysis

- 125 Questions from the August, 1997 examination:
  - 25 questions missed by $\geq$ 50 % of candidates:
    - 1 invalid question error
    - 9 question construction errors
  - 41 other questions missed by candidates:
    - 2 invalid question errors
    - 3 question construction errors
  - 59 questions not missed by any candidates:
    - 1 invalid question error
    - 3 question construction errors

Examination Analysis

- If all questions with errors were removed:
  - Test scores would have changed slightly, but outcome would have been the same
  - The examination would retain the correct topical percentages required by the sample plan
- Question stems are statistically sound and discriminate at the correct level
- Four question stems (3.2%) did not meet our new standards

Corrective Actions

- Developed a specific procedure for Licensed Operator exam preparation that:
  - Provides question construction criteria
  - Provides rigorous question validation criteria
  - Provides criteria for incorporating lessons learned in preparing JPM exams, simulator exams, and the administrative section
  - Provides criteria for a formal examination results analysis
- All staff involved in exam preparation will be trained to these requirements
- Applied for waivers and reexamined the four candidates who scored less than 80%

Summary

- The Wolf Creek Operator Training Program is Sound
- Written examination development and validation was not sufficiently rigorous
- Corrective actions have assured technical accuracy of subsequent exams
- Licensed Operators have sound knowledge levels and practical skills to operate the plant safely

Palisades Written Exam Failures

June 1999

itten Exam Results

- 3 of 7 Candidates Failed Written Exam
- Highest Grade 83%
- Students With Highest Scores on Cert Exam Failed NRC Exam

t Cause

- Ineffective Oversight Lead to Incomplete Change Management and Ineffective Communication
- Ineffective Oversight Resulted in Deficiencies in the Following:
  - Exam Validation
  - Candidate Preparation
  - Exam and Question Development

m Validation

- Peer Reviewer Responsibilities Not Understood
- Scores of Reviewers Ranged From 50-75%
- Management Not Informed of Low Scores

m Validation

- NRC Review Resulted in 5 New Questions
- No Final Validation Performed
- Management Review Performed by Training Manager Without a Palisades SRO

didate Preparation

- Program Did Not Prepare Candidates For a Very Difficult NRC Exam
- Candidates Felt They Had Adequate Technical Knowledge to Pass NRC Exam
- Materials Presented Were Accurate and Covered the Scope Adequately

didate Preparation

- Rigorous Practice Exams Not Developed
  - Exam Bank Did Not Contain Enough High Level Questions
  - Limited Resources To Develop New Questions
- Candidates Not Prepared for a 4 Hour, 100 Question Exam With > 60% of Questions at Higher Cognitive Level

gram Oversight

- HLC Instructors Reduced From 5 to 3
- HLC Supervisor Position Vacant For Most of Class
- Training Staff Believed NUREG 1021 Adherence Would Avoid Industry Problems

gram Oversight

- Self Assessment Completed Three Months Before Exam Identified Weaknesses In:
  - Lesson Content
  - Question Development
  - Exam Validation
- Concerns Not Shared Outside of Training
- No Action Taken

tification Exam

- Certification Exam Not Developed By Exam Team
- Certification Exam Primarily Based on a Previous NRC Exam
- 70% of Certification Exam Questions Were Previously Seen by Students

tification Exam

- Second Certification Exam Developed When Exam Overlap Detected
- Second Exam Only 30 Questions
- Difficulty Still Not on Par With NUREG 1021 Requirements

t Cause

- Ineffective Oversight Lead to Incomplete Change Management and Ineffective Communication
- Ineffective Oversight Resulted in Deficiencies in the Following:
  - Exam Validation
  - Candidate Preparation
  - Exam and Question Development

tributing Factors

- Adequate Resources Not Assigned
- Exam Validators Not Prepared For Task
- Inadequate Operations Department Involvement
- Security Concern Impacted Communication

rective Actions

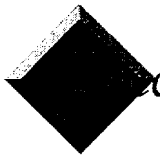
- Increased Exam Bank Quality and Quantity
- Increased Number of Training Exams
- Validation Process Formalized
- Developed Process For Identifying Problems Without Impacting Security

rective Actions

- Operations Department Involvement Increased
  - Operations Management Provides Final Approval of Exam
  - Formal Expectations Developed for Peer Reviewers
  - 5 Operators Transferred or Loaned to Training

rective Actions

- Review of Other Operator Training Programs Found Similar Process Issues Resulting From:
  - High Workloads and Reduced Staffing
  - Ineffective Monitoring Tools
  - Customer Service Focus Without Adequate Focus on Training Processes



clusion

- Inadequate Management Oversight Resulted in Technically Competent Students Being Unable to Pass a Challenging Exam

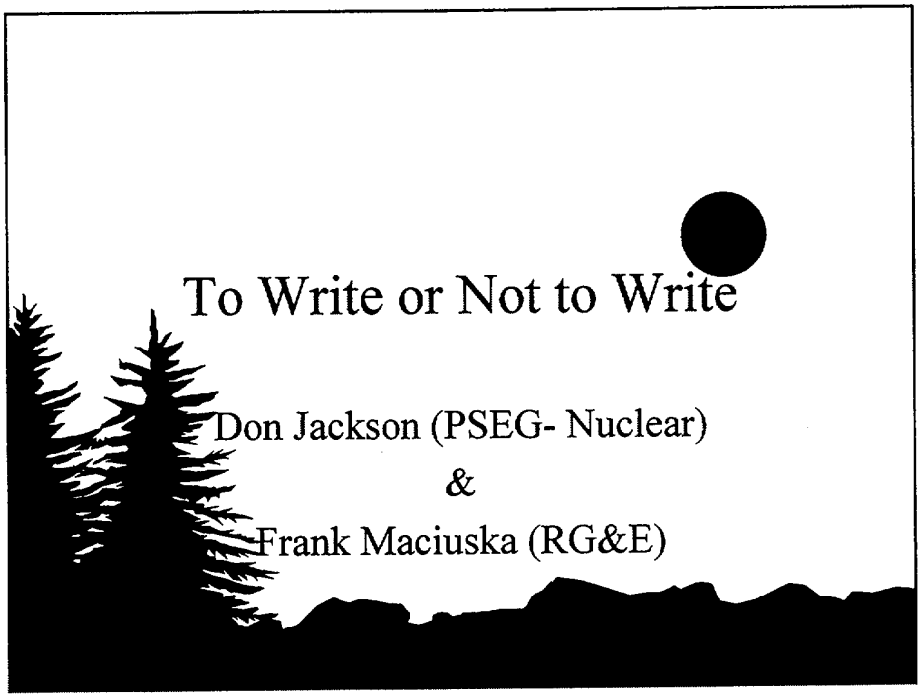
To Write or Not to Write

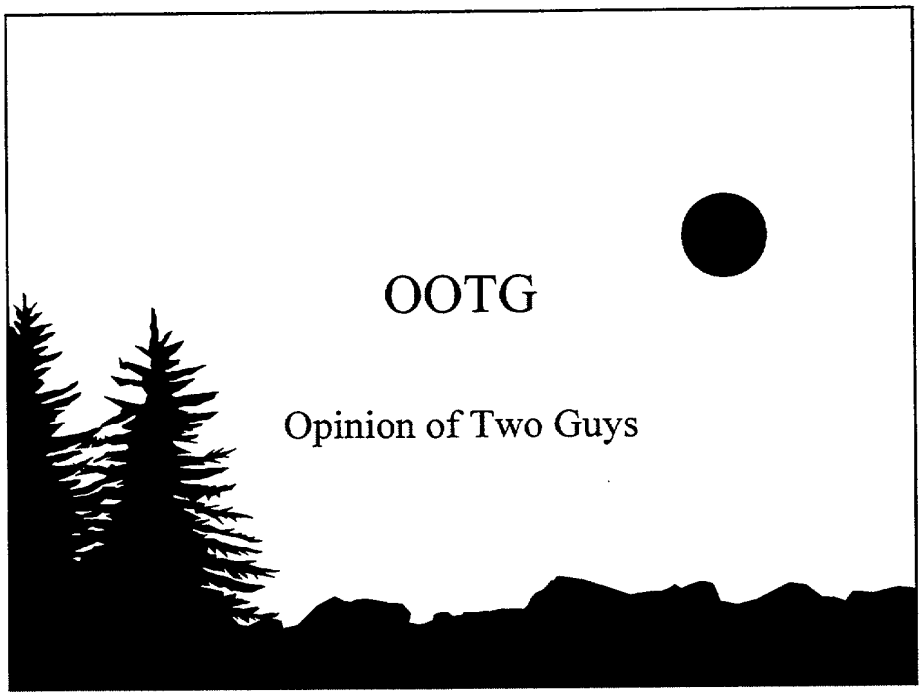
(Industry perspective)

(D5)

Don Jackson
PSE&G

Frank Maciuska
Rochester Gas & Electric Corp.


To Write or Not to Write
Don Jackson (PSEG- Nuclear)
&
Frank Maciuska (RG&E)

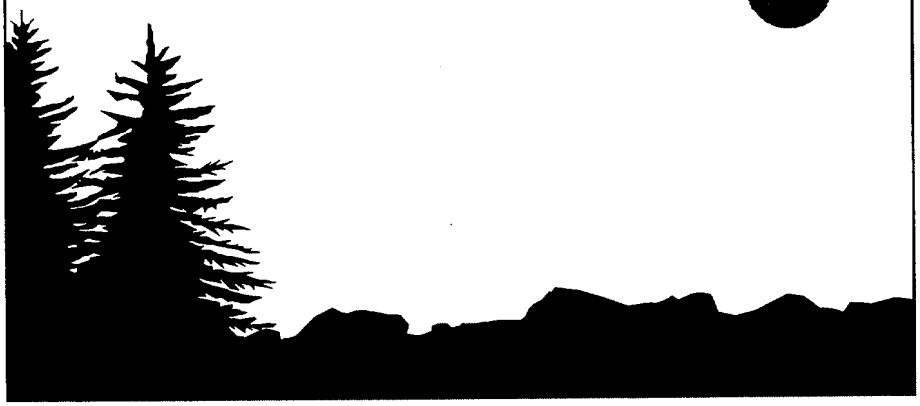

OOTG
Opinion of Two Guys

Benefits

- Technical Accuracy

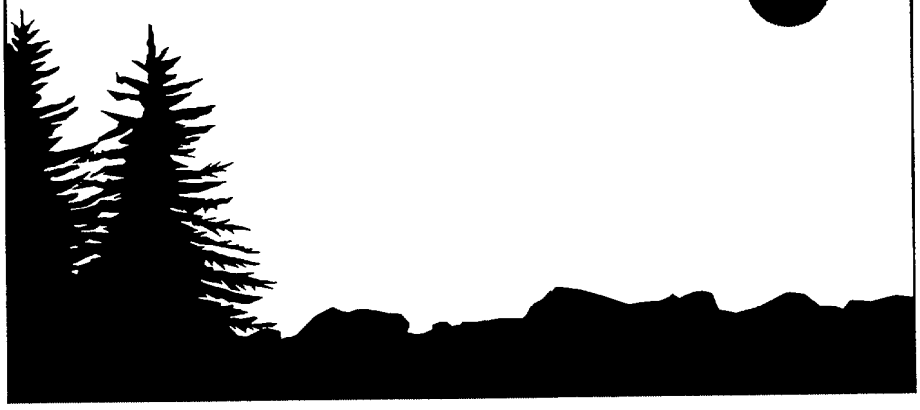
Benefits

- Familiar Wording/Style on Written



Benefits

- Fewer Questions That Miss The Mark

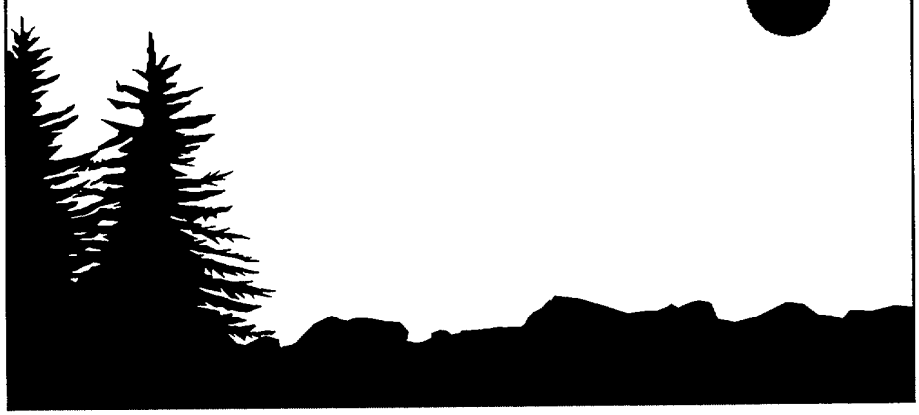


Benefits

- Audit/Final Overlap Control

Benefits

- Possible Cost Advantage



Benefits

- Schedule Flexibility

Benefits

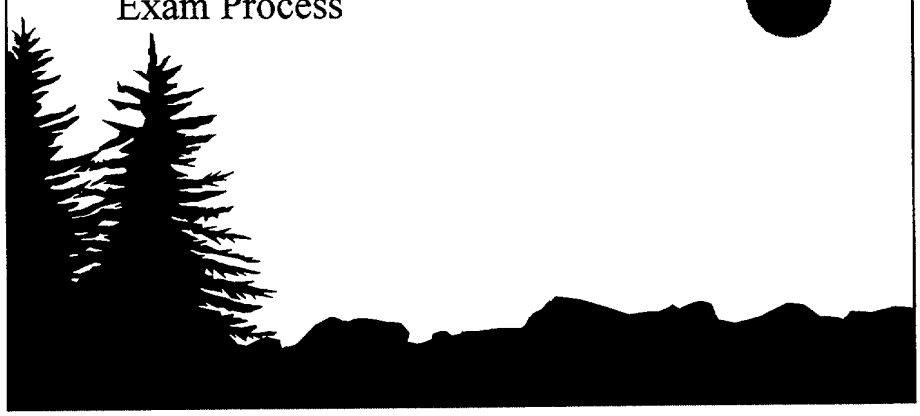
- Better Site Specific Exam

Benefits

- More Control of the Process

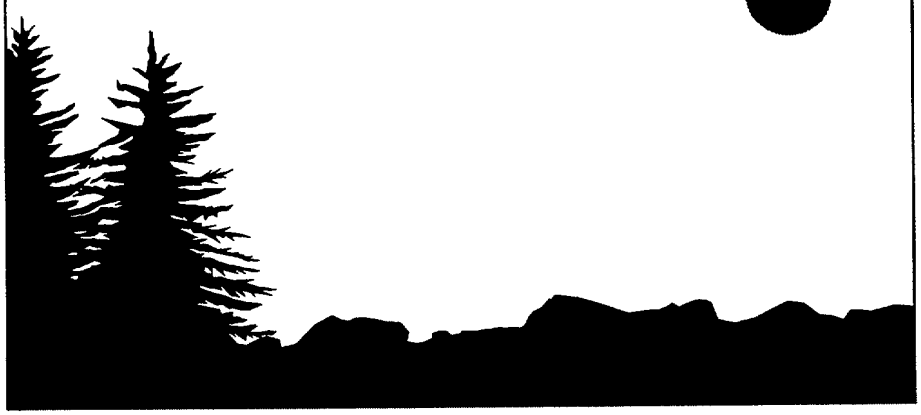
Benefits

- Increased Organizational Knowledge of the Exam Process



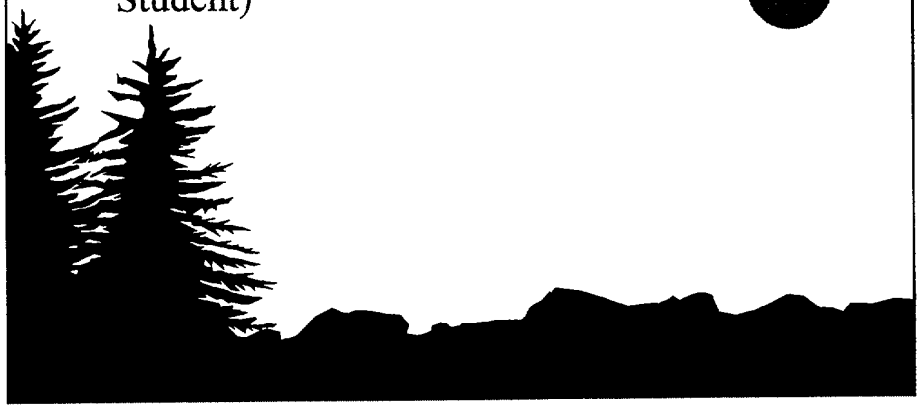
Benefits

- Less Material Sent to the NRC



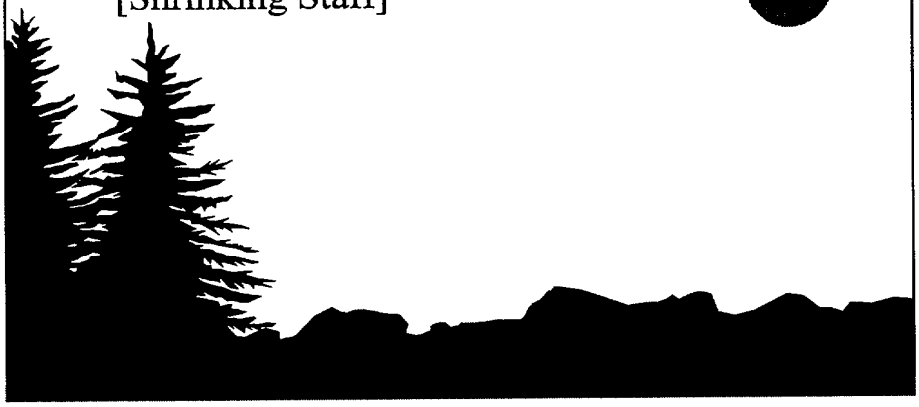
Benefits

- Less Student Stress (Perceived By The Student)



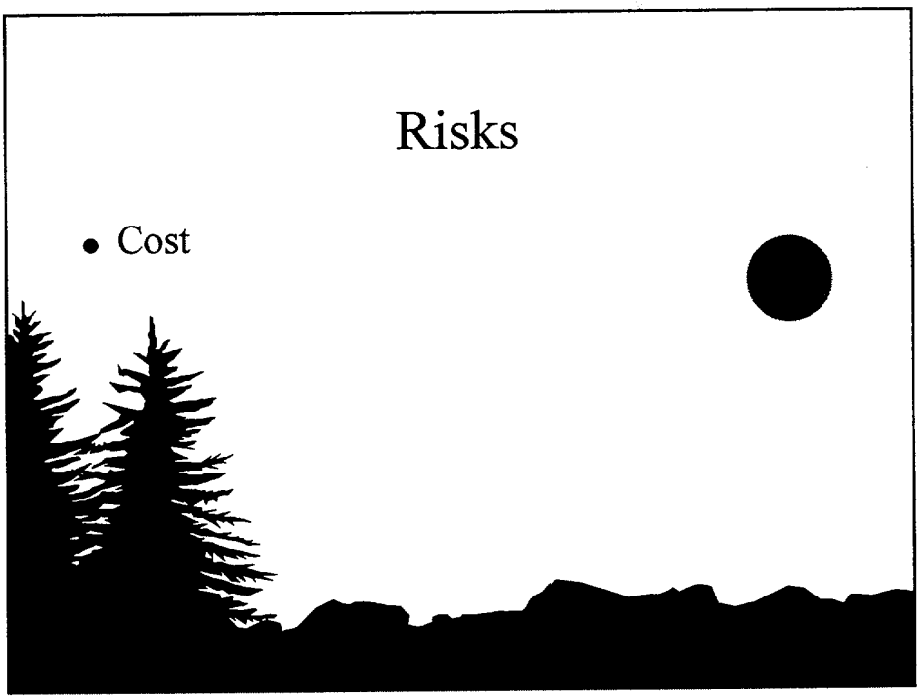
Risks

- Personnel (Clerical, Developer) [Shrinking Staff]



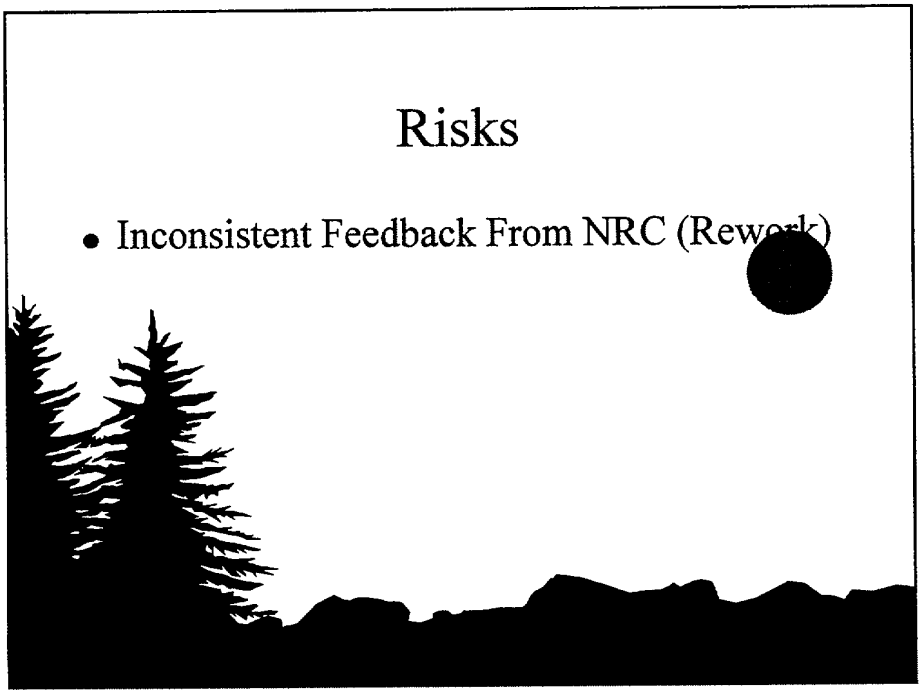
Risks

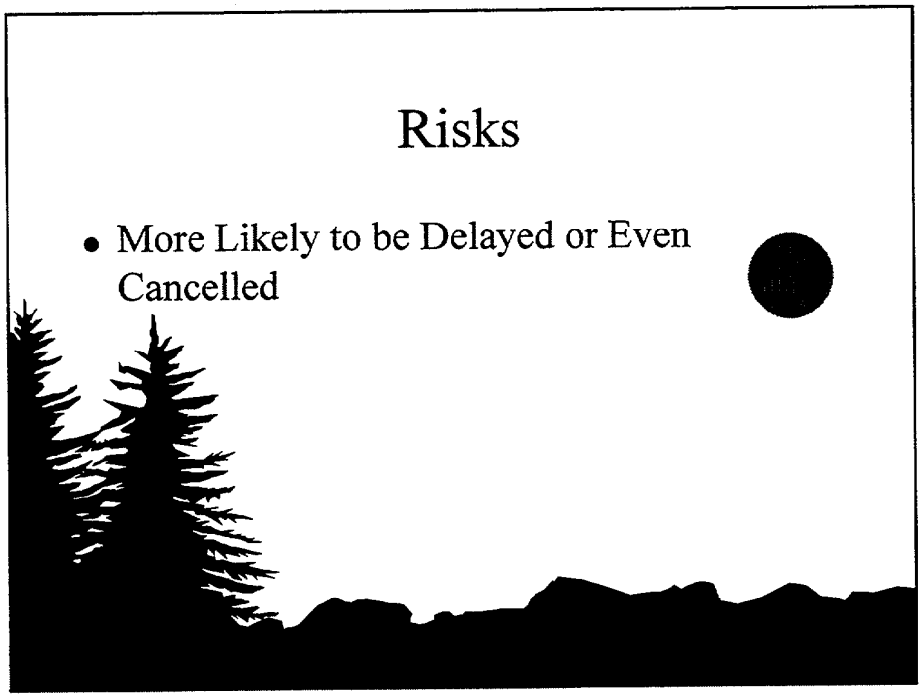
- Cost

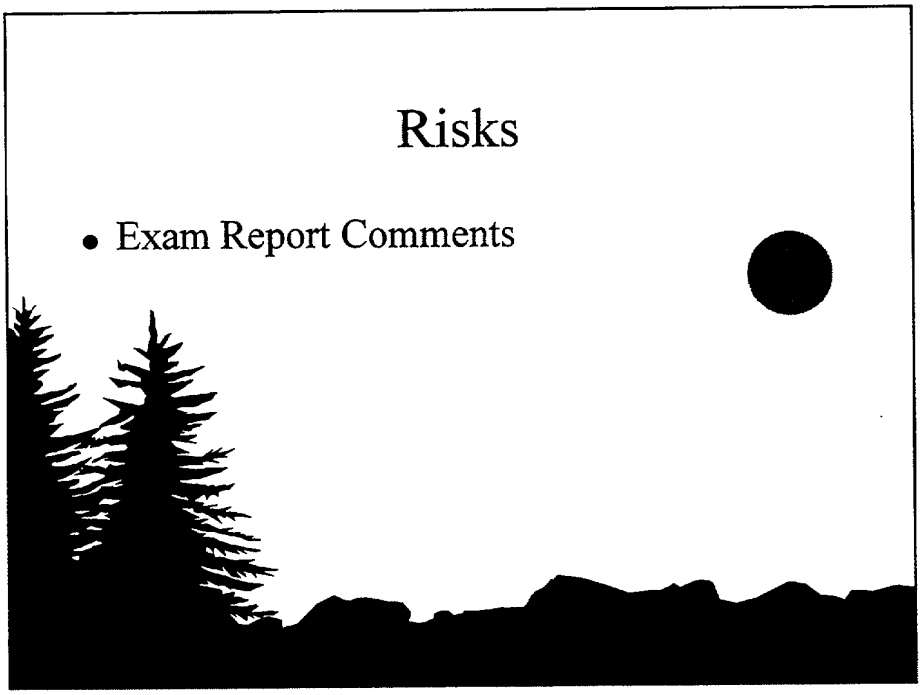


Risks

- Inconsistent Feedback From NRC (Rework)

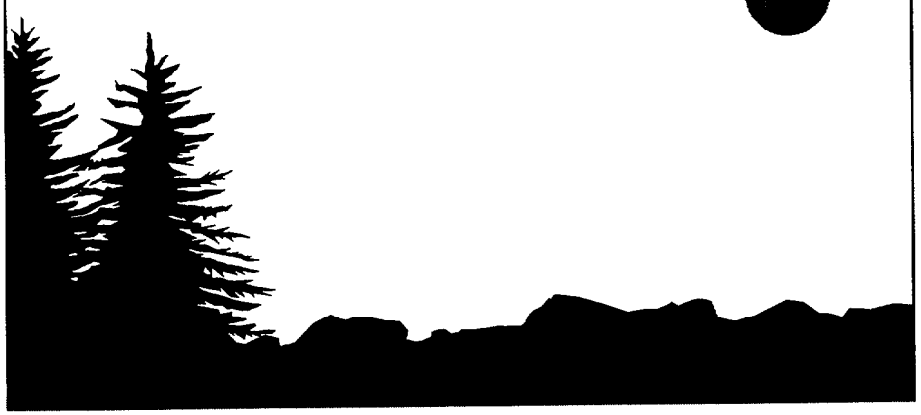



Risks
• More Likely to be Delayed or Even Cancelled


Risks
• Exam Report Comments

Risks

- Shifting Standard For Candidate Success



Risks

- Utility Exams are More Challenging

To Write or Not to Write

(NRC perspective)

(D6)

Rich Conte

Chief, Operational Support Branch

Nuclear Regulatory Commission

NEI-NRC OPERATOR LICENSING CONFERENCE

TO WRITE OR NOT TO WRITE - NRC PERSPECTIVE

RICHARD CONTE, CHIEF
OPERATIONAL SAFETY BRANCH - REGION I

FEBRUARY 17-18, 2000

NEI-NRC OPERATOR LICENSING CONFERENCE

OVERVIEW - TO WRITE OR NOT TO WRITE

- Licensees Writing NRC Exams
- Recent Incentives for Licensees to Write
- Time and Cost Analyses Considerations
- Summary

NEI- NRC OPERATOR LICENSING CONFERENCE

LICENSEES WRITING NRC EXAMS

- **Best position to write**
- **Consistent with other NRC Program Reviews**
- **Higher quality product**
- **Strong safety focus**

NEI-NRC OPERATOR LICENSING CONFERENCE

RECENT INCENTIVES FOR LICENSEES TO WRITE

- **NRC Staff Taking Substantial Action**
- **Just-in-time Changes to Revision 8**
- **Scheduling Practices / Allowing time to Fix**
- **Time and Cost – Bottom line after safety is satisfied**

NEI-NRC OPERATOR LICENSING CONFERENCE

TIME AND COST ANALYSES CONSIDERATIONS

- **Need to distinguish production & review time from supervisory review time**
- **Need to distinguish common from separate review time**
- **Current NRC planning numbers (406/812)**
- **Potential Performance Indicator - Non-supervisory productive/review hours**

NEI-NRC OPERATOR LICENSING CONFERENCE

SUMMARY - NRC PERSPECTIVE

- **LICENSEES are in the best position TO WRITE overall.**
- **NRC staff is being responsive to technical, process and financial issues.**
- **Do careful comparative hour and cost analyses.**
- **For the Future: NRC-Industry work on a common performance indicator for hours used.**

Industry Success Stories

Charles Sawyer

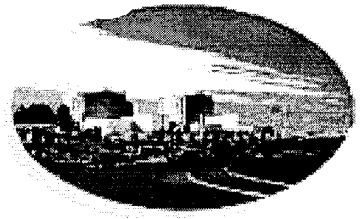
Duke Power Co. (E1)

Fred Riedel

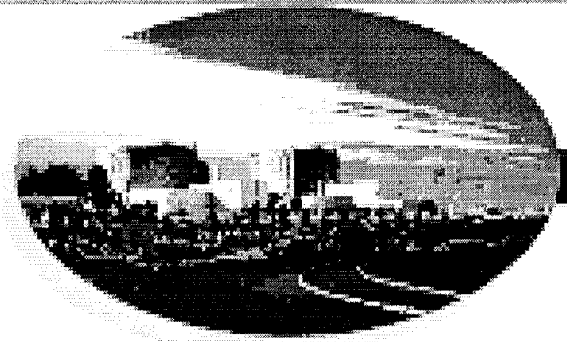
Arizona Public Service Co. (E2)

Keith Link

Virginia Power (E3)



Initial License Operator Examinations at McGuire Since 1995



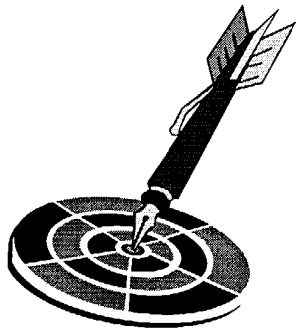
Duke Power

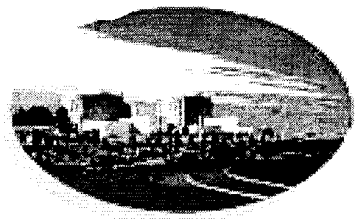
DUKE ENERGY BUSINESS UNITS

What it takes to be successful!

McGuire History

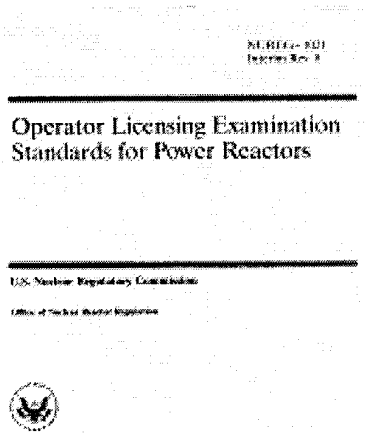
- 1995 Initial Examination (Rev. 7) - Poor Results
- NUREG 1021, Interim Rev. 7 issued
- McGuire volunteers to participate in the pilot process
- Since 1996 McGuire has written three examinations
- 29 of 31 candidates (94%) have passed





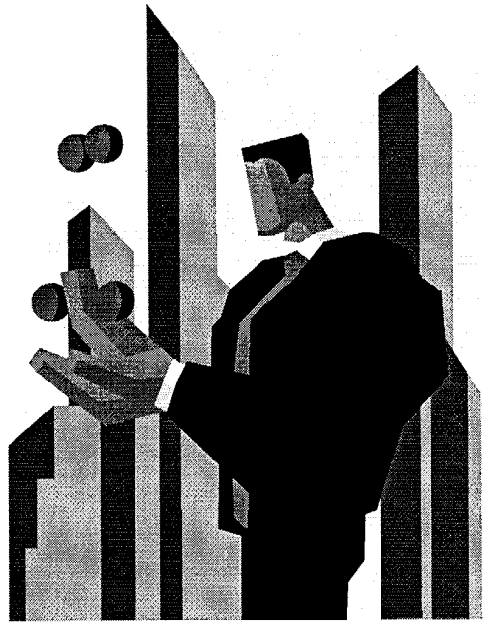
McGuire History

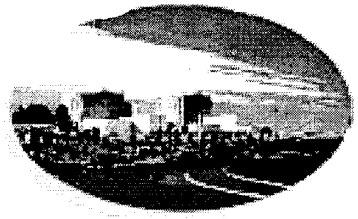
- **Currently writing our fourth exam**
- **First NUREG 1021, Revision 8 exam**


Operator Licensing Examination
Standards for Power Reactors

Process we use at McGuire

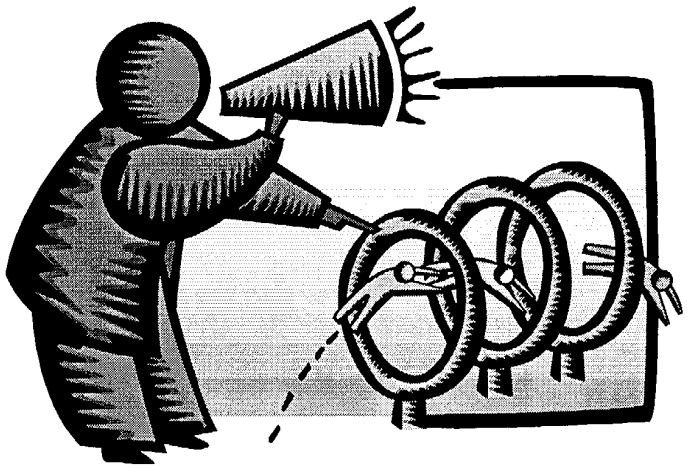
- Vendor is used to prepare our RO and SRO written exams
- McGuire develops the simulator scenarios, JPMs and Administrative portions of the exam



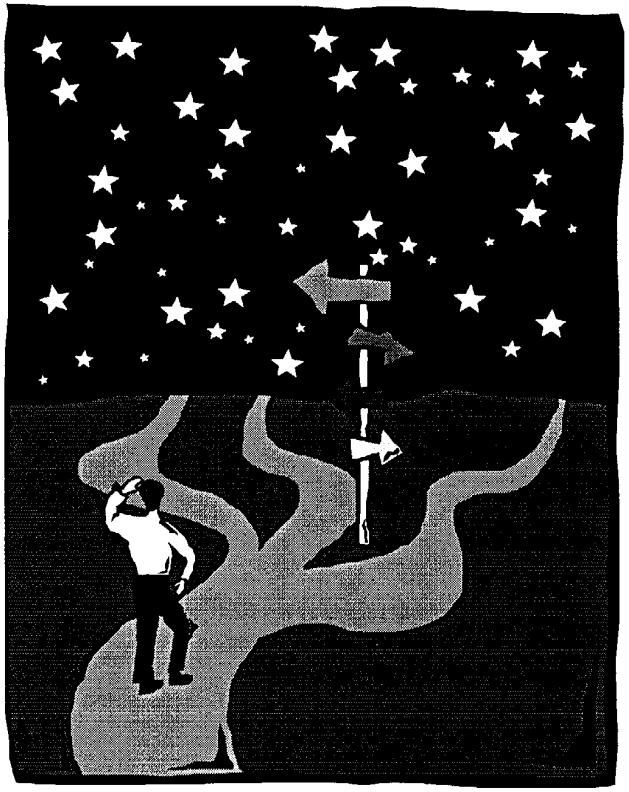


Elements of McGuire's Success

- Start Early
- Consistent players in the process
- Communications
- Relationship with the NRC
- Vendor
- Management Involvement



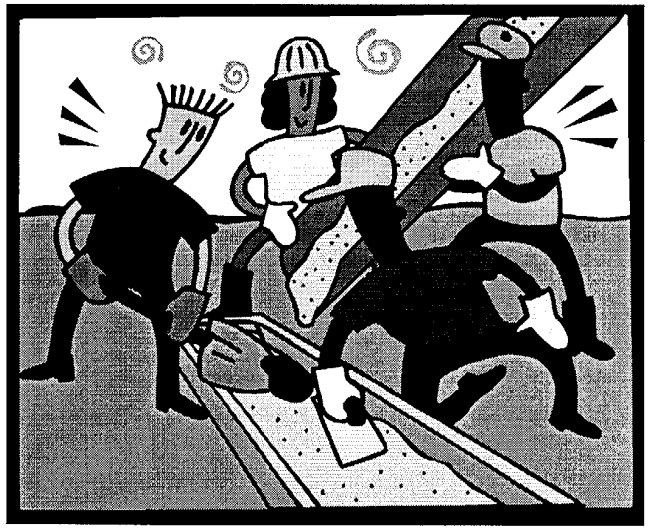
Start Early

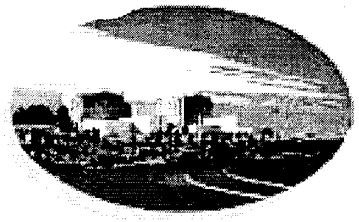


- Communicate with the NRC nine months in advance
- Completed exam two weeks before the due date

Consistent Players

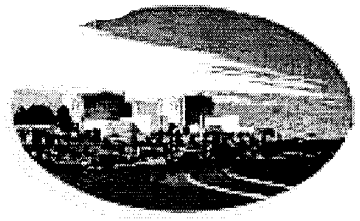
- Four people develop McGuire portions of the exam
- Each person does the same activity each year



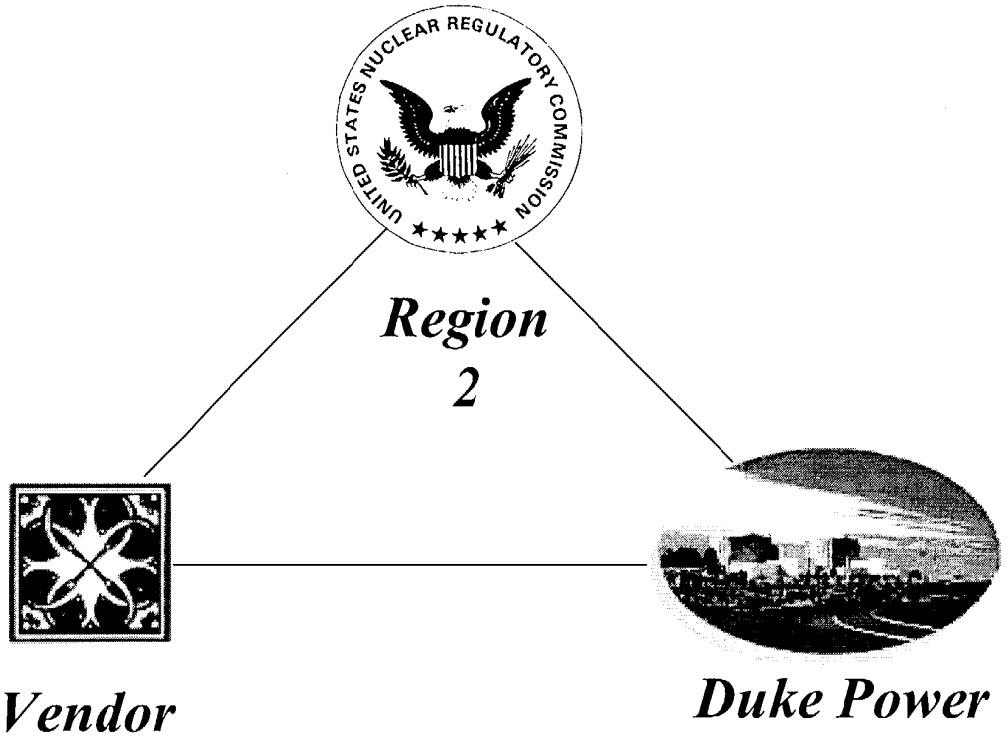


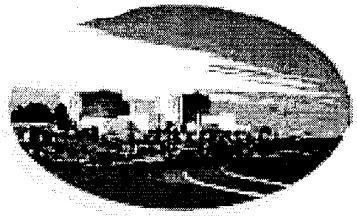
Communications

- Early & Often
- Establish ground rules
- Draft outlines provided to NRC well in advance of 75 day submittal
- Ask when uncertain - can prevent large investment of time in "a lost cause"



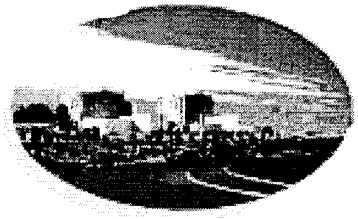
Working Relationships





Exam Development Considerations

- Exam development is a PROCESS, NOT a commodity
- The finished product is still an NRC exam, not a utility exam
- Attempt to accommodate all reasonable requests by NRC examiners
- Work together as a team throughout
- Resolve ALL disagreements using professional courtesy and integrity

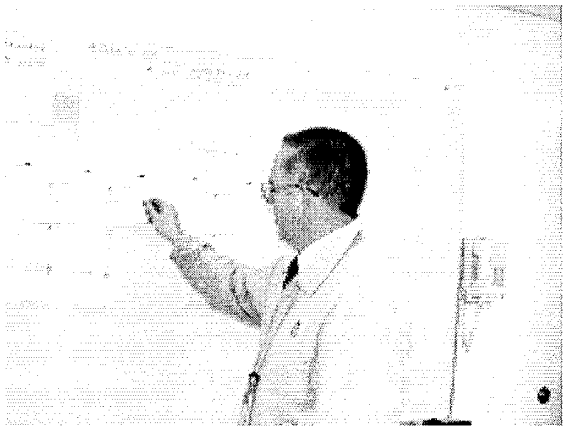


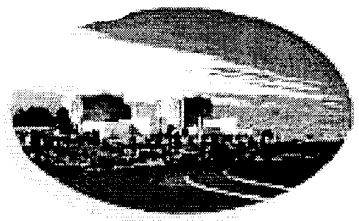
Relationship with the NRC

- No substitute for a good working relationship with the NRC and Chief Examiner
- Same Chief Examiner at McGuire now for the past three examinations
- Develop a sense of professional respect and trust

Vendor

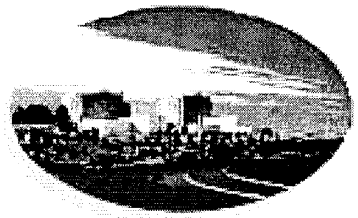
- Ex-NRC Westinghouse Certified examiner
- Brings the NRC perspective to the table as we develop our examination materials
- He has worked with us at McGuire for all of our examinations
- Confidence in his product



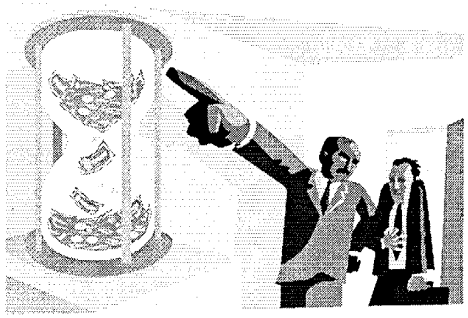


Management Involvement

- Funding
- Resources
- Time
- Allow issues to be handled at the working level
- Support if needed



Resources

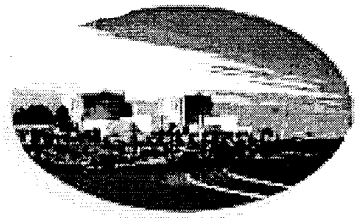


- **We spend one month to develop the scenarios, JPMs and Admin portions of the exam.**

  4 people x 40 hr/wk x 4 wks
  = *640 hours*

- **Plant review week (written exam and validation)**

  7 people x 40 hrs
  = *280 hours*



Resources Continued

- **NRC Prep Week**

  5 people x 40 hrs.

  = ***200 hours***

- **Week after prep week**

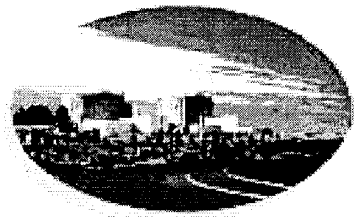
  4 people x 40 hrs.

  = ***160 hours***

- **Exam Administration**

  3 people for 2 weeks

  = ***240 hours***



Resources Continued

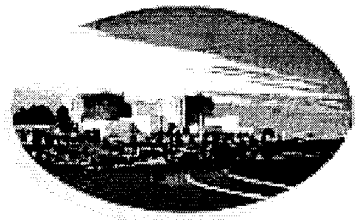
- **Post Exam review**

  2 people x 20 hrs/person
  = *40 hours*

- **Grand total of labor:**

  = *1560 hours*

to prepare and administer an initial exam.

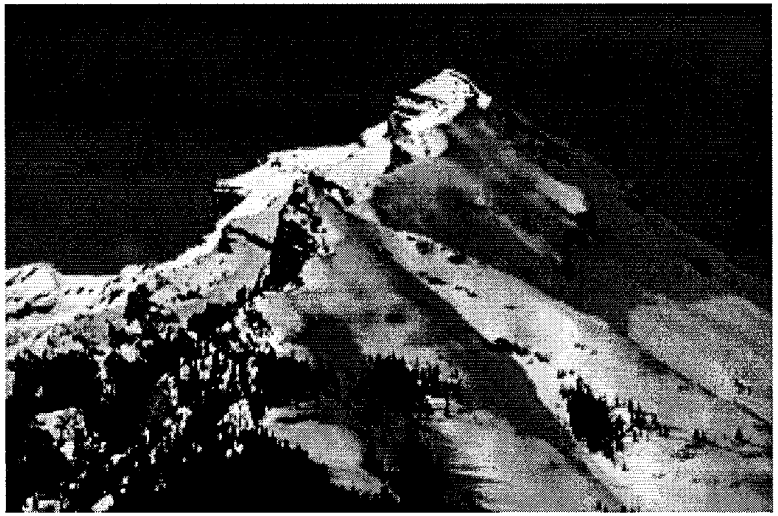


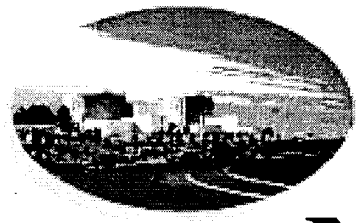
Validation Activities

- Use "selected" plant RO and SRO to take written exam
- Use additional plant RO and SRO to re-take written exam
- Plant RO and SRO review all portions of operating exam
- Exam development team also reviews written exam

Challenges

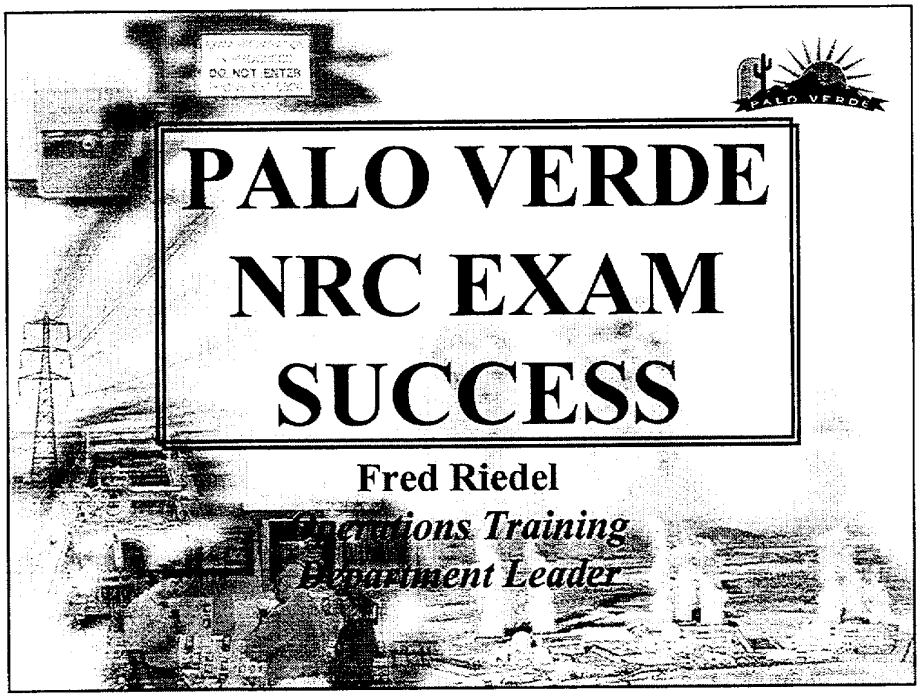
- Changing Chief Examiners
- Plant Support for exam material review and validation
- Written examination difficulty

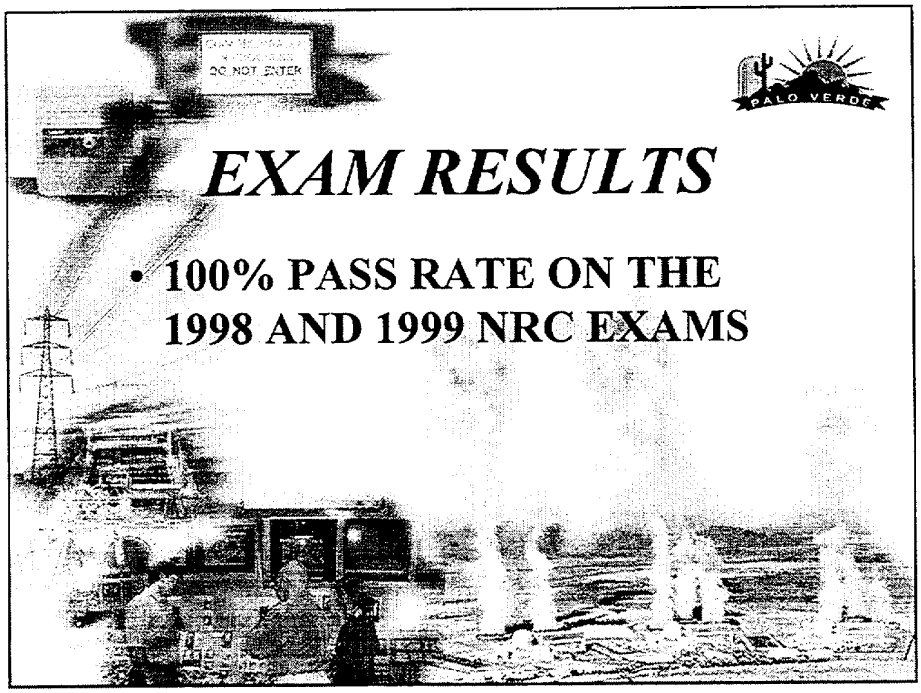


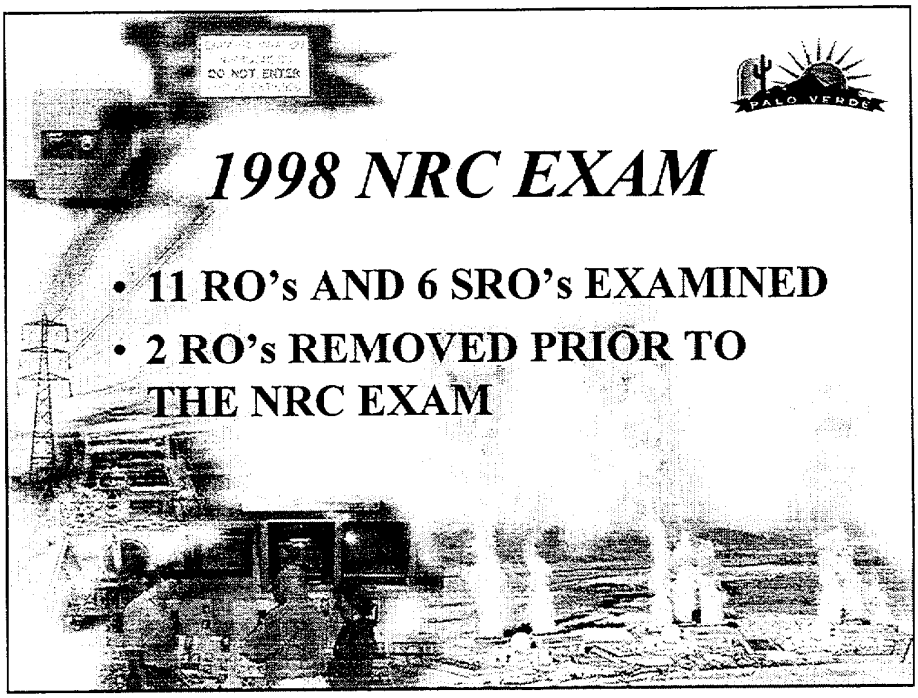


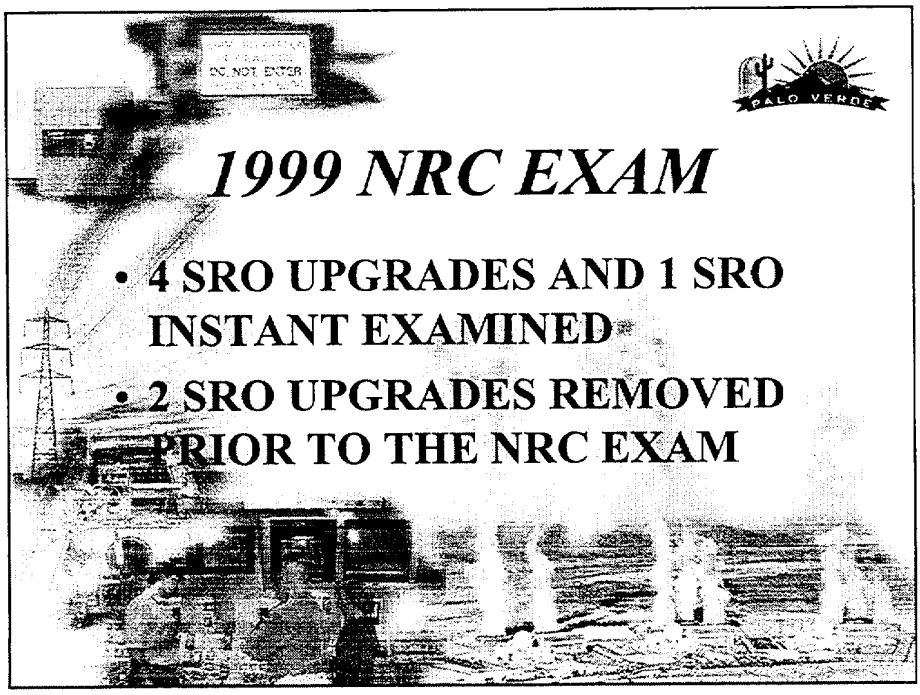
National Operator Licensing Workshop

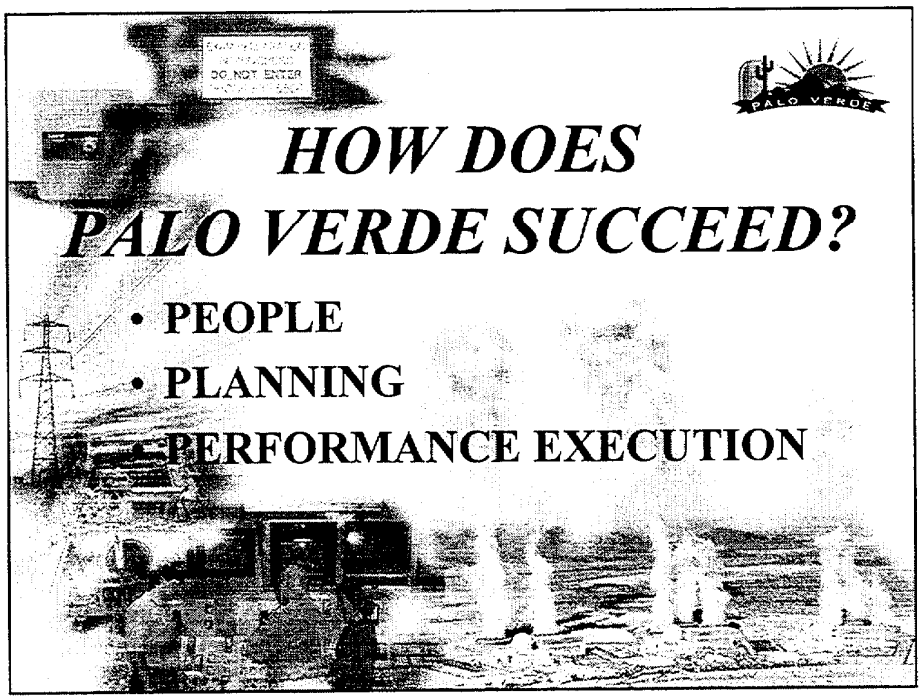
February 17-18, 2000

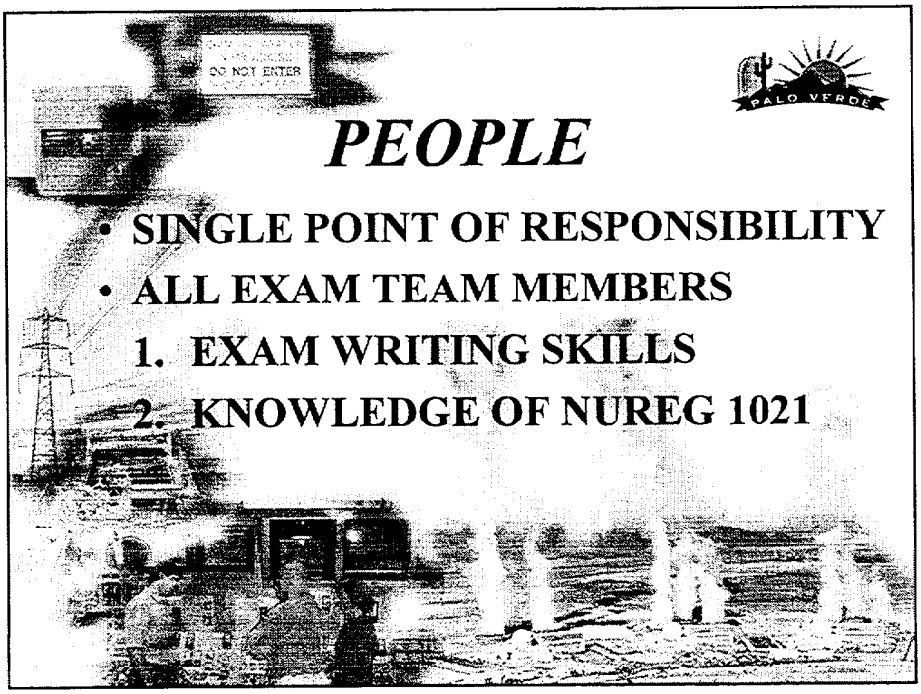

DO NOT ENTER
PALO VERDE
PALO VERDE
NRC EXAM
SUCCESS
Fred Riedel
Operations Training
Department Leader

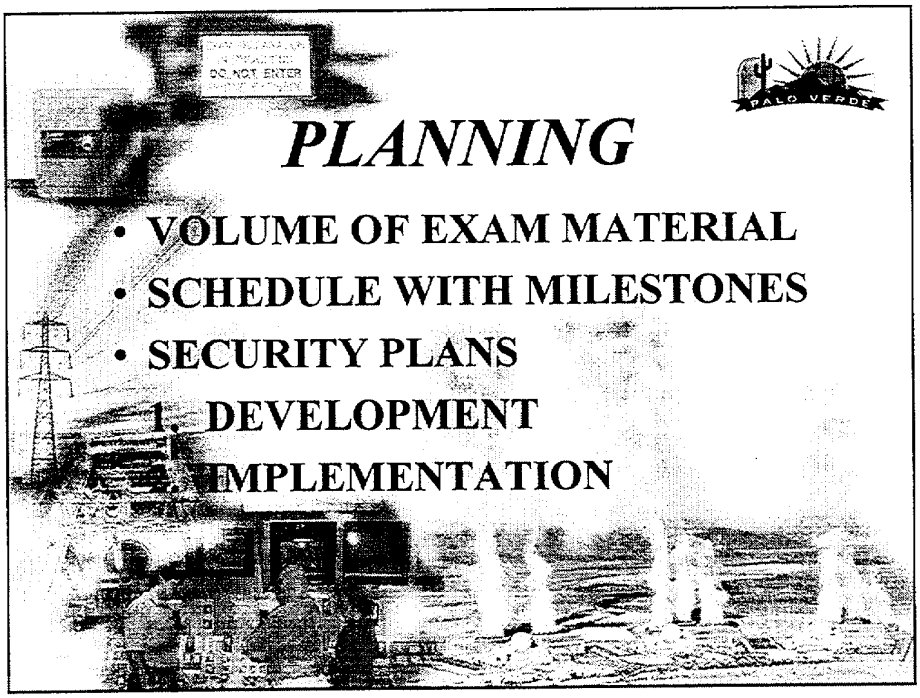

DO NOT ENTER
PALO VERDE
EXAM RESULTS
• 100% PASS RATE ON THE
1998 AND 1999 NRC EXAMS

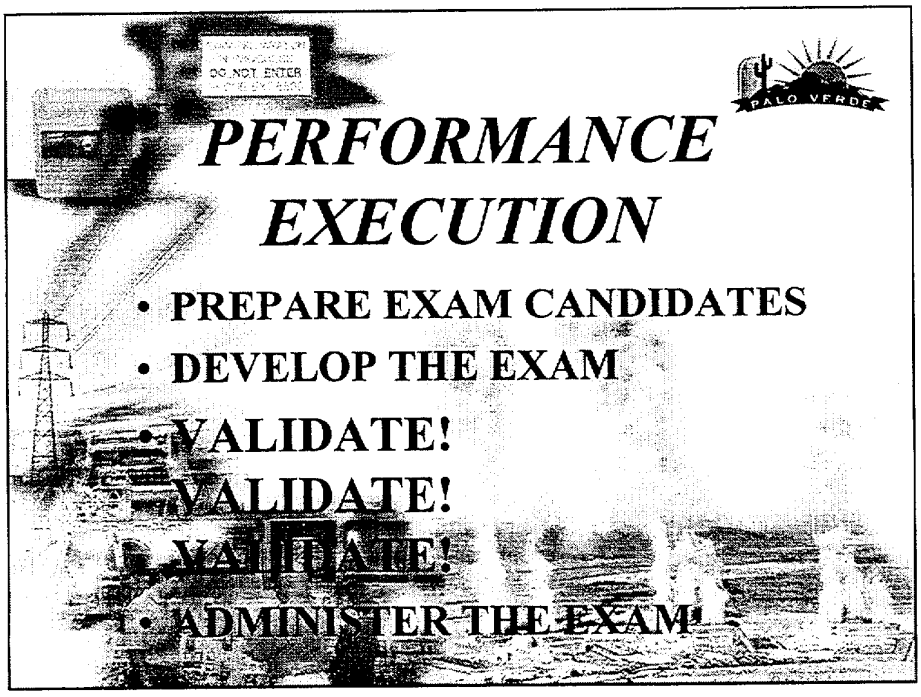

DO NOT ENTER
PALO VERDE
1998 NRC EXAM
• 11 RO's AND 6 SRO's EXAMINED
• 2 RO's REMOVED PRIOR TO THE NRC EXAM

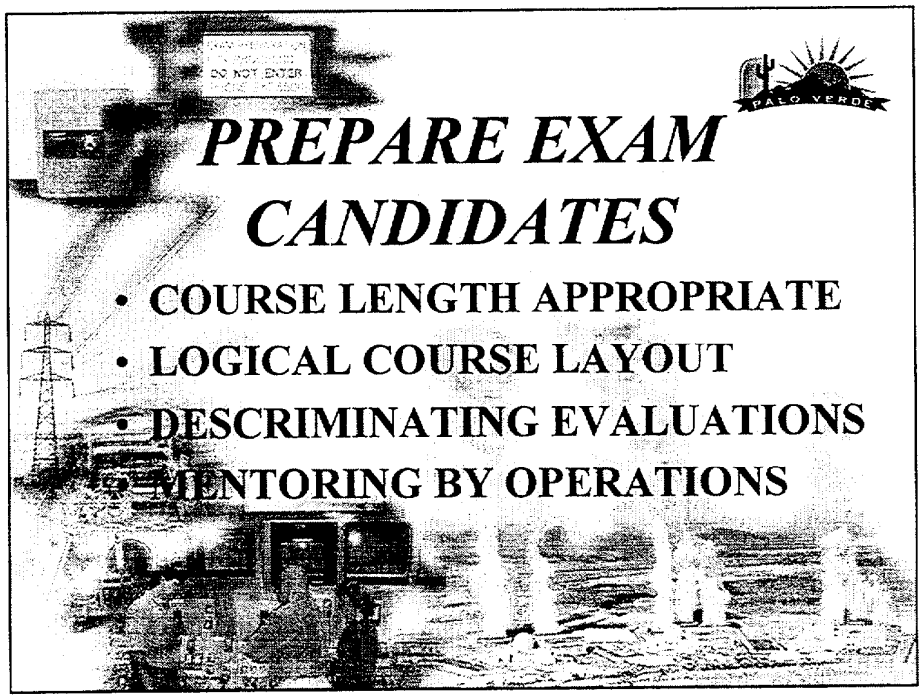

DO NOT ENTER
PALO VERDE
1999 NRC EXAM
• 4 SRO UPGRADES AND 1 SRO INSTANT EXAMINED
• 2 SRO UPGRADES REMOVED PRIOR TO THE NRC EXAM

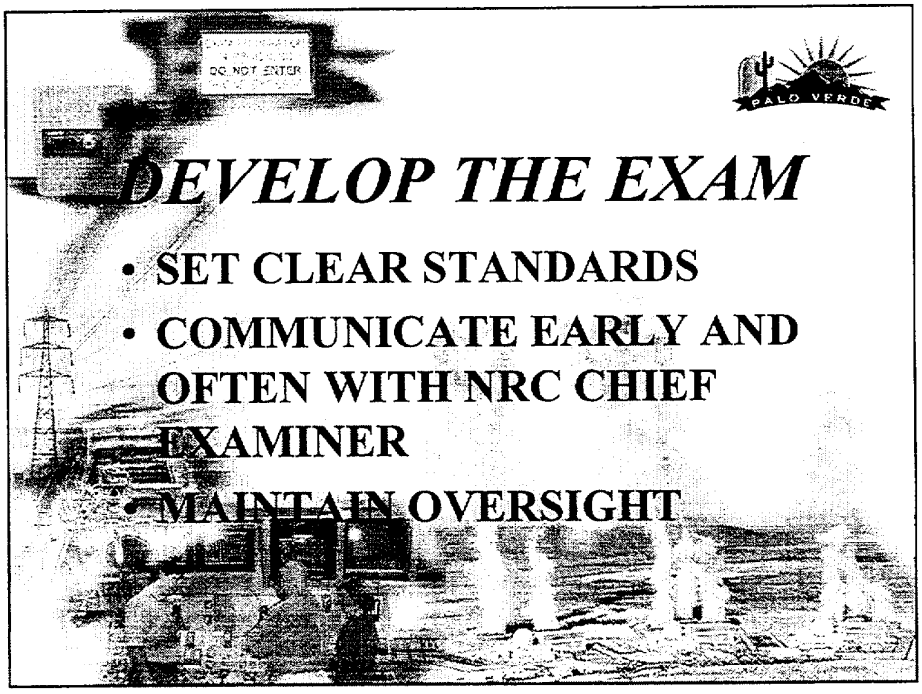

DO NOT ENTER
PALO VERDE
HOW DOES
PALO VERDE SUCCEED?
• PEOPLE
• PLANNING
• PERFORMANCE EXECUTION

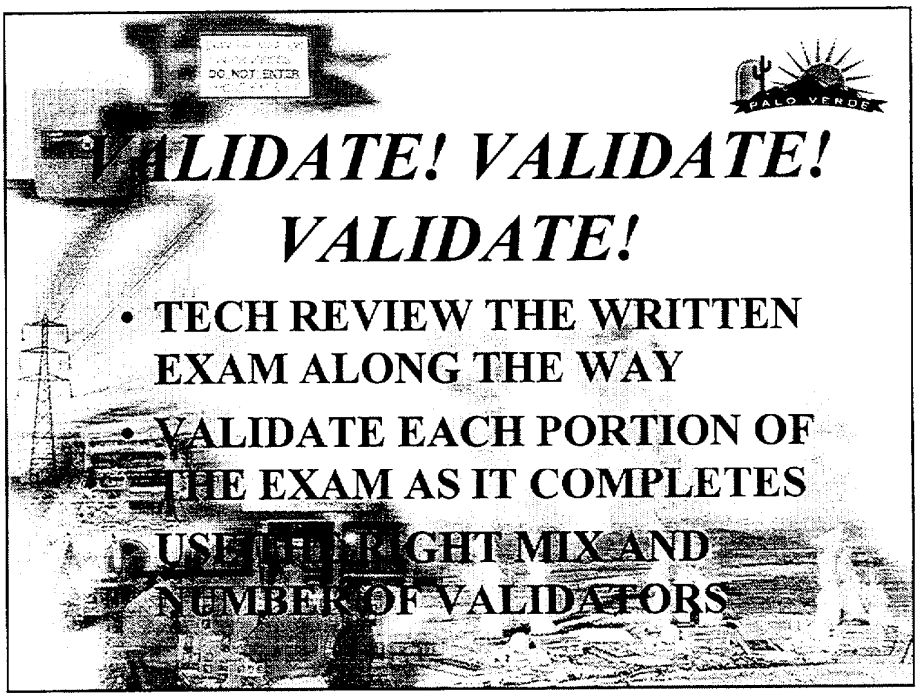

DO NOT ENTER
PALO VERDE
PEOPLE
• SINGLE POINT OF RESPONSIBILITY
• ALL EXAM TEAM MEMBERS
1. EXAM WRITING SKILLS
2. KNOWLEDGE OF NUREG 1021

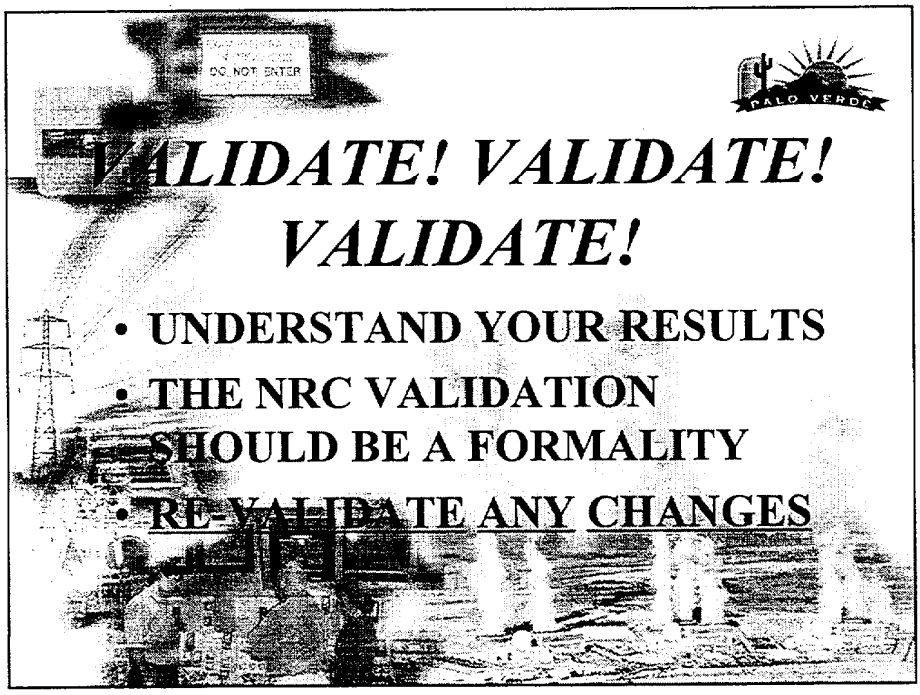

DO NOT ENTER
PALO VERDE
PLANNING
• VOLUME OF EXAM MATERIAL
• SCHEDULE WITH MILESTONES
• SECURITY PLANS
1. DEVELOPMENT
2. IMPLEMENTATION

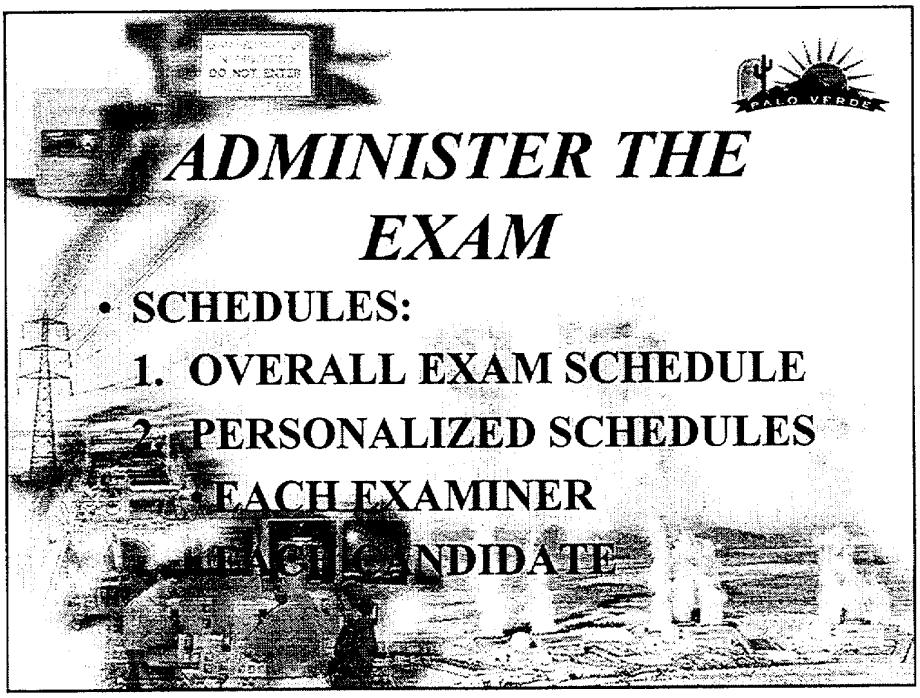

DO NOT ENTER
PALO VERDE
PERFORMANCE
EXECUTION
• PREPARE EXAM CANDIDATES
• DEVELOP THE EXAM
• VALIDATE!
• VALIDATE!
• VALIDATE!
• ADMINISTER THE EXAM!

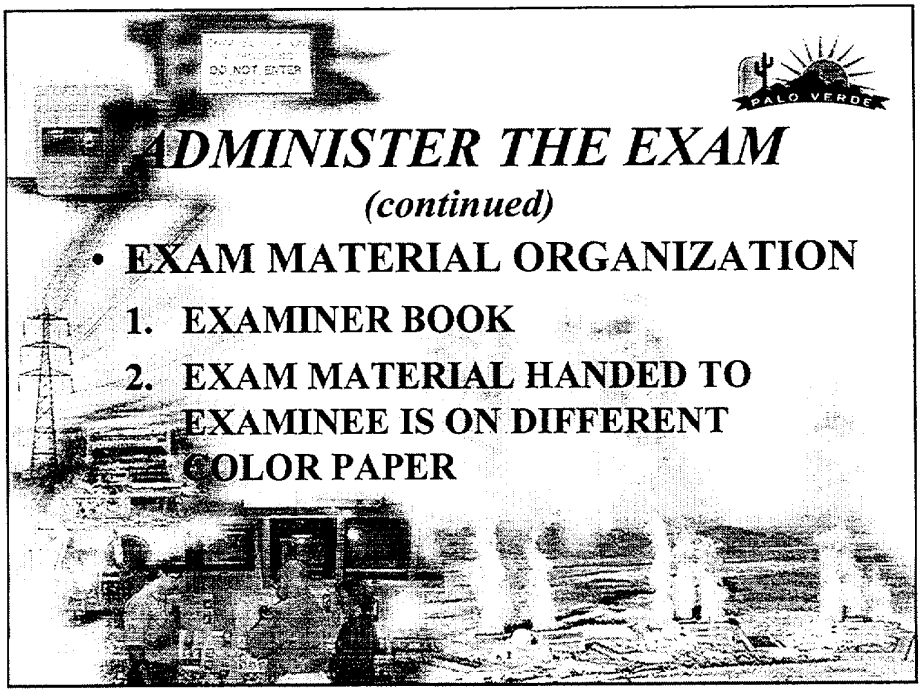

DO NOT ENTER
PALO VERDE
PREPARE EXAM CANDIDATES
• COURSE LENGTH APPROPRIATE
• LOGICAL COURSE LAYOUT
• DESCRIMINATING EVALUATIONS
• MENTORING BY OPERATIONS

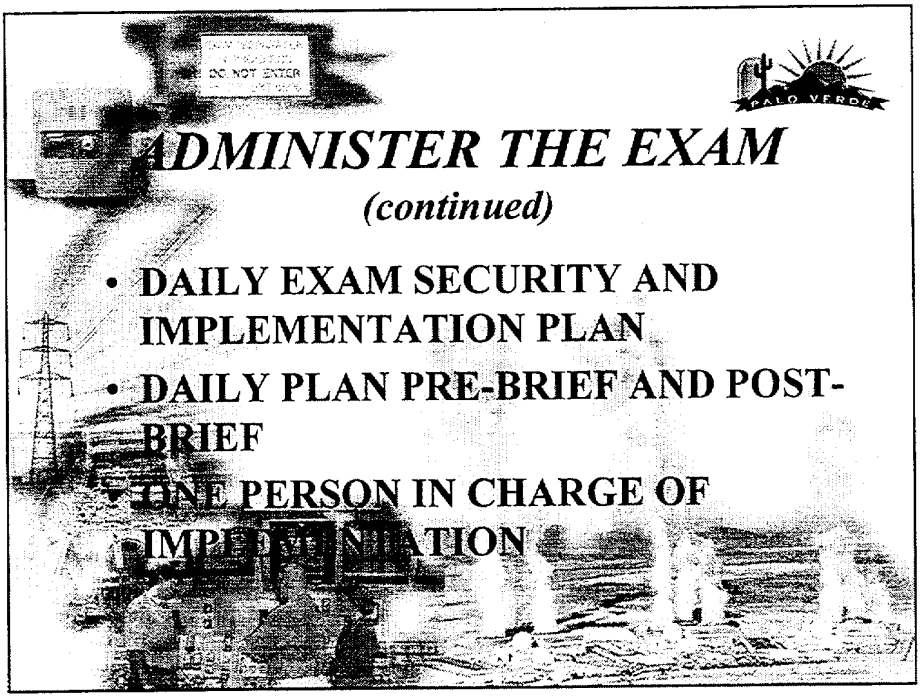

DO NOT ENTER
PALO VERDE
DEVELOP THE EXAM
• SET CLEAR STANDARDS
• COMMUNICATE EARLY AND OFTEN WITH NRC CHIEF EXAMINER
• MAINTAIN OVERSIGHT


DO NOT ENTER
PALO VERDE
VALIDATE! VALIDATE! VALIDATE!
• TECH REVIEW THE WRITTEN EXAM ALONG THE WAY
• VALIDATE EACH PORTION OF THE EXAM AS IT COMPLETES
• USE THE RIGHT MIX AND NUMBER OF VALIDATORS


DO NOT ENTER
PALO VERDE
VALIDATE! VALIDATE! VALIDATE!
• UNDERSTAND YOUR RESULTS
• THE NRC VALIDATION SHOULD BE A FORMALITY
• RE-VALIDATE ANY CHANGES


DO NOT ENTER
PALO VERDE
ADMINISTER THE EXAM
• SCHEDULES:
1. OVERALL EXAM SCHEDULE
2. PERSONALIZED SCHEDULES
• EACH EXAMINER
• EACH CANDIDATE

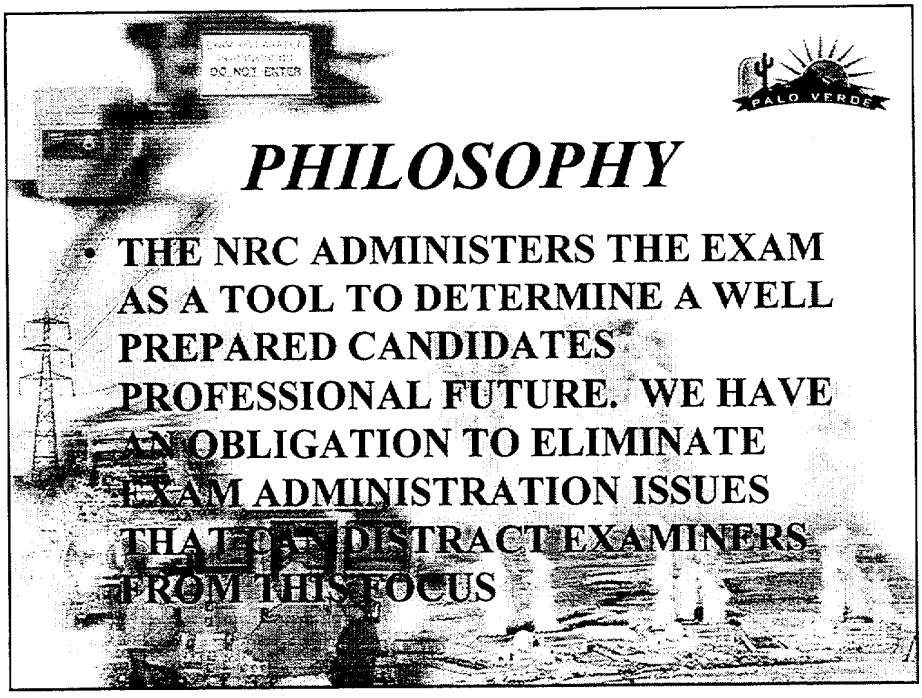

DO NOT ENTER
PALO VERDE
ADMINISTER THE EXAM
(continued)
• EXAM MATERIAL ORGANIZATION
1. EXAMINER BOOK
2. EXAM MATERIAL HANDED TO EXAMINEE IS ON DIFFERENT COLOR PAPER



ADMINISTER THE EXAM

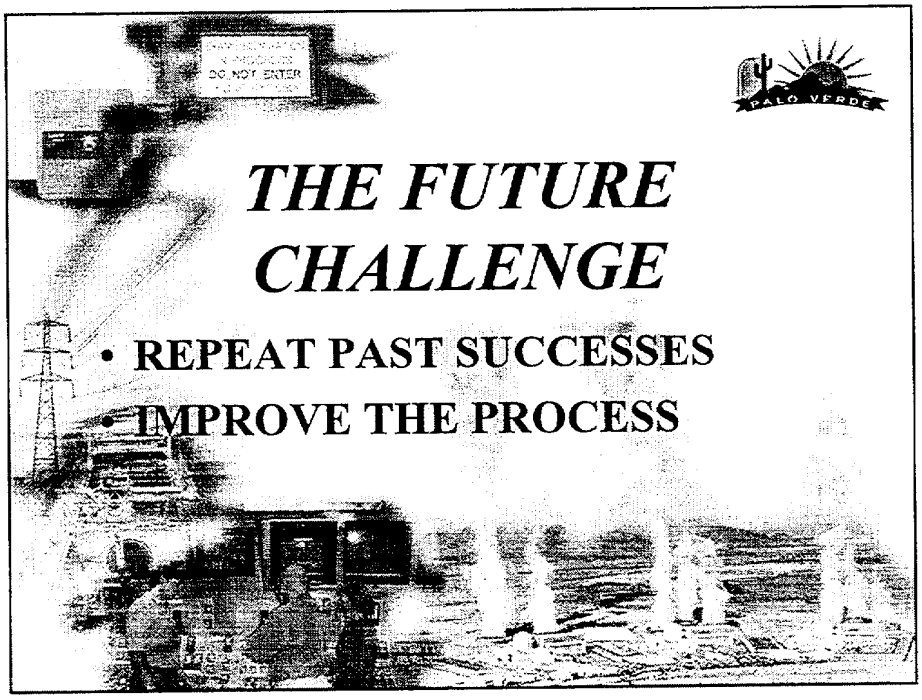
(continued)

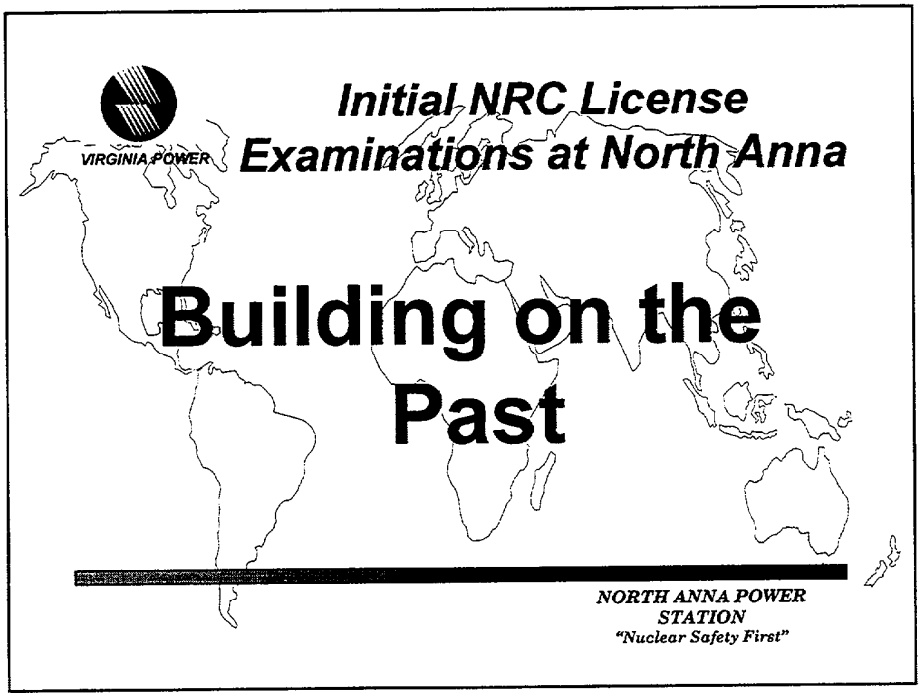
- DAILY EXAM SECURITY AND IMPLEMENTATION PLAN
- DAILY PLAN PRE-BRIEF AND POST-BRIEF
- ONE PERSON IN CHARGE OF IMPLEMENTATION

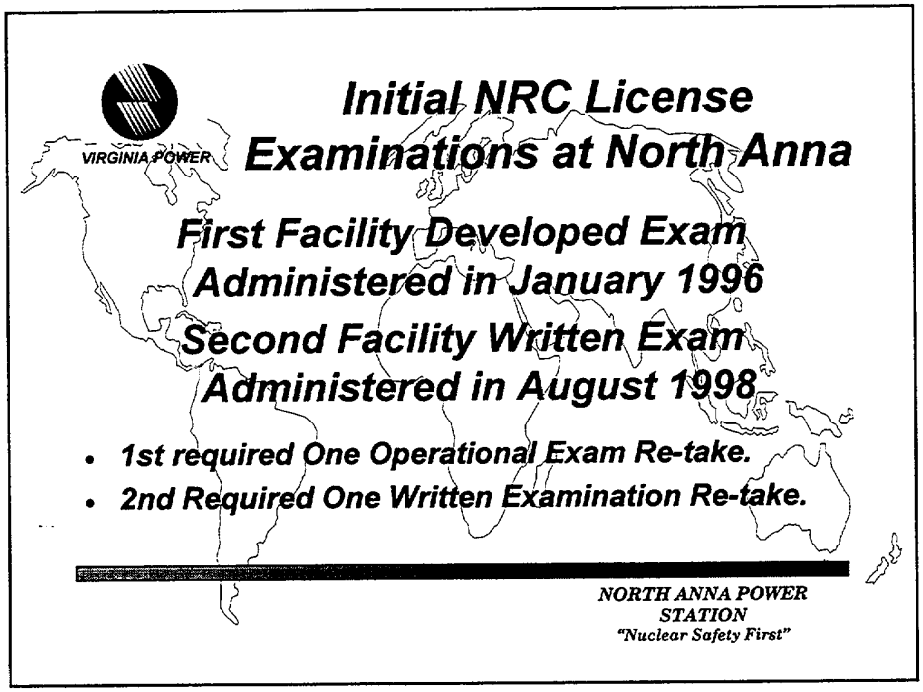


PHILOSOPHY

- THE NRC ADMINISTERS THE EXAM AS A TOOL TO DETERMINE A WELL PREPARED CANDIDATES PROFESSIONAL FUTURE. WE HAVE AN OBLIGATION TO ELIMINATE EXAM ADMINISTRATION ISSUES THAT CAN DISTRACT EXAMINERS FROM THIS FOCUS


DO NOT ENTER
PALO VERDE
THE FUTURE CHALLENGE
• REPEAT PAST SUCCESSES
• IMPROVE THE PROCESS


VIRGINIA POWER
Initial NRC License Examinations at North Anna
Building on the Past
NORTH ANNA POWER STATION
"Nuclear Safety First"

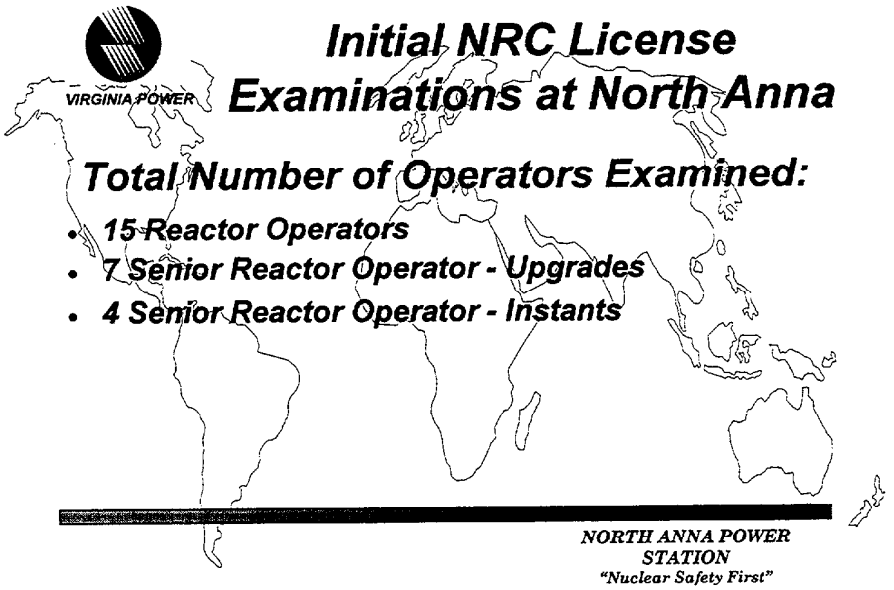

VIRGINIA POWER
Initial NRC License Examinations at North Anna
First Facility Developed Exam Administered in January 1996
Second Facility Written Exam Administered in August 1998
• 1st required One Operational Exam Re-take.
• 2nd Required One Written Examination Re-take.
NORTH ANNA POWER STATION
"Nuclear Safety First"

VIRGINIA POWER

Initial NRC License Examinations at North Anna

Total Number of Operators Examined:

- 15 Reactor Operators
- 7 Senior Reactor Operator - Upgrades
- 4 Senior Reactor Operator - Instants



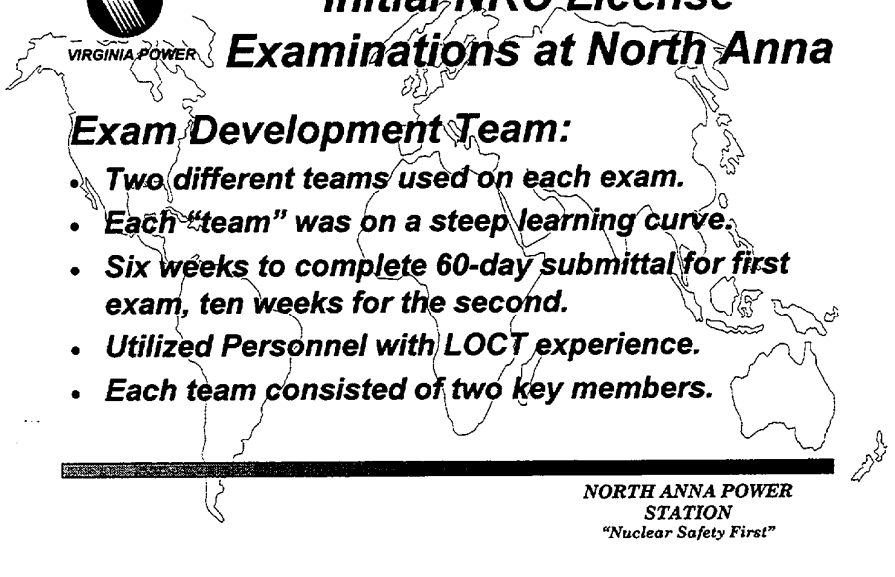
NORTH ANNA POWER STATION
"Nuclear Safety First"

VIRGINIA POWER

Initial NRC License Examinations at North Anna

Exam Development Team:

- Two different teams used on each exam.
- Each "team" was on a steep learning curve.
- Six weeks to complete 60-day submittal for first exam, ten weeks for the second.
- Utilized Personnel with LOCT experience.
- Each team consisted of two key members.



NORTH ANNA POWER STATION
"Nuclear Safety First"

VIRGINIA POWER

Initial NRC License Examinations at North Anna

Exam Security Measures:

- Developed procedure covering exam security:
  - Exam integrity.
  - Conflict of interest.
  - Physical security.
- Room in training building modified for use as exam development room.

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"Nuclear Safety First"

VIRGINIA POWER

Initial NRC License Examinations at North Anna

Exam Security Measures:

- Extreme caution was used in packaging exam material shipped to the NRC.
- NRC Chief Examiner did not voice any security concerns when on-site for prep week or exam weeks.
- Exam report did not mention exam security at all.

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"Nuclear Safety First"

VIRGINIA POWER

Initial NRC License Examinations at North Anna

Preparing Exam Outline:

- Proposed exam week schedule was provided to Chief Examiner prior to beginning outline development.
- Insufficient time was spent on creating an "optimum" exam week schedule.
- As a result, too much exam material was developed. (5 JPMs/ questions weren't used).

VIRGINIA POWER

Initial NRC License Examinations at North Anna

Preparing Exam Outline:

- Written Exam
  - Utilized Excel spreadsheet developed by another utility, modified for use at NAPS.
- Admin walkthrough
  - Benchmark to see what types of items have recently been used successfully and are viewed favorably by NRC examiners.

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Initial NRC License Examinations at North Anna

Preparing Exam Outline:

- Simulator scenarios
  - Compare scenario sets for balance.
  - Consider incorporating an additional component malfunction and instrument malfunction into each outline over the minimum required.
  - These will serve as optional events that can be used to "salvage" a scenario if one of the candidates misses a planned component or instrument malfunction.

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"Nuclear Safety First"

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Initial NRC License Examinations at North Anna

Preparing Exam Outline:

- Simulator scenarios
  - After completing the draft outlines, run the scenarios on the simulator to ensure they will work as planned.
  - Ensure each malfunction will require an action to be taken by the individual for whom the malfunction is intended.
  - Try to accurately estimate the amount of time each scenario will require to complete.

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Initial NRC License Examinations at North Anna

Outline Submittal:

- After the outline is complete, consider developing a sample of each portion of the exam.
  - Five to ten written exam questions, one or two JPMs, one simulator scenario, and one or two Admin topics.
  - This could increase the efficiency of the exam review process by promoting early identification and correction of generic exam development concerns.

VIRGINIA POWER

Initial NRC License Examinations at North Anna

Outline Submittal:

- NRC comment resolution occurred at Region II.
  - Feedback from NRC review of exam outline was minimal.
  - Initial telephone conversations were ineffective in establishing positive relationship with Chief Examiner.
  - Exam author visit to Region II HQ for comment resolution established positive rapport with Chief Examiner.

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Initial NRC License Examinations at North Anna

Examination Development:

- **Written Examination**
  - Shoot for the upper-range of higher-cognitive questions.
  - Establish rules up front with Chief Examiner regarding use of reference material provided to candidates during exam.

VIRGINIA POWER

Initial NRC License Examinations at North Anna

Examination Development:

- **JPMs**
  - Ensure critical standards really are critical; if necessary, write justification for each critical standard.
  - Ensure plant procedures provide adequate guidance so that JPM expectations (critical standards) can be met.
  - During validation, scrutinize very closely to ensure the associated plant procedure works.
  - Keep track of time required to walkdown each task and total up the entire JPM set.

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Initial NRC License Examinations at North Anna

Examination Development:

- Admin walkthrough
  - Use care to avoid making any one item too easy to fail.
  - When an item involves a calculation, be sure to assign an appropriate range of acceptable values for each stage of the calculation.
  - Ensure the answers to all calculations are independently verified.

VIRGINIA POWER

Initial NRC License Examinations at North Anna

Exam Material Validation:

- Schedule simulator for audit, prep week and exam weeks to avoid conflict with LOCT.
- Use on-shift operators for validation.
- If significant changes occur during prep week, consider re-validating the affected material.

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Initial NRC License Examinations at North Anna

Exam Material Validation:

- **Written Examination Validation**
  - Select 'average' operators for validation.
  - Validate in a realistic setting, i.e. no distractions.
  - Encourage the flagging of concerns as they answer each question.
  - Debrief while the exam is still fresh in their minds.

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Initial NRC License Examinations at North Anna

Exam Material Validation:

- **Simulator scenario validation**
  - Ensure validation crews understand to perform as they normally would on-shift.
  - Need to get accurate representation of the length of time required to run each scenario.
  - Validate a maximum of 2 scenarios per day.

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Initial NRC License Examinations at North Anna

Exam Material Validation:

- JPM/Admin Walkthrough Validation
  - In order to maintain exam security, exercise care when performing walkdown of in-plant JPMs and Admin JPMs, especially when candidates are in-plant.
  - Document the time required to complete each JPM.
  - Ensure each JPM set will not require an excessive amount of time to complete.

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Initial NRC License Examinations at North Anna

Words of Wisdom

- Extensive reliance on one individual should be avoided, if possible.
- Coordinate ILO exam and LOCT activities to ensure secure facilities are available for both.
- Devote time to creative exam week scheduling to minimize the amount of exam material required. Ensure Chief Examiner provides feedback.

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Initial NRC License Examinations at North Anna

Words of Wisdom

- Ensure plant procedures provide adequate guidance so that JPM expectations (critical standards) can be met.
- Request the Chief Examiner's work schedule through the exam date, including any updates in the interim.

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Initial NRC License Examinations at North Anna

Words of Wisdom

- The exam author should meet with the Chief Examiner early in the process to establish rapport and become familiar with the Chief Examiner's expectations.
- Validate everything!

NORTH ANNA POWER STATION
"Nuclear Safety First"

Q&A Panel Discussion

John Pellet

David Hills

Chris Christensen

Rich Conte

George Hopper

(Others as applicable)

RO/SRO Eligibility

(E4)

Bill Fitzpatrick

Department Manager

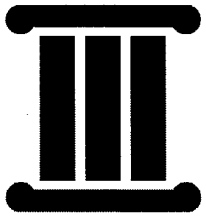
INPO

RO/SRO Eligibility

National Operator Licensing Workshop

February 18, 2000

Bill Fitzpatrick



Background

June 1983 - Academy establishes PWR experience requirements

June 1985 - Academy establishes BWR experience requirements

April 1987 - Reg Guide 1.8 Rev.2 endorses ANSI/ANS 3.1 - 1981 for RO,SRO,RO, and STA experience requirements

1987 - NuReg 1262 lifts obligation for Reg Guide 1.8 for SAT based, accredited training programs and states equivalency of Academy requirements

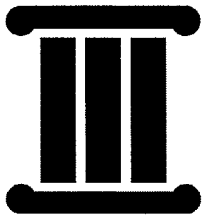
Oct 1991 - ACAD 91-012 Replaces previous academy guidelines and removes experience requirements

Feb 1999 - NRC asks INPO to reinstate experience requirements

Dec 1999 - Requirements developed and approved

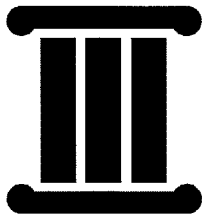
Flowpaths

- NLO to RO
- RO and RO equivalencies to SRO
- Degreed Staff Engineers to SRO
- Degreed Managers and NLOs to SRO
- Certified SRO Instructors



Includes:

- Defines Plant Staff Engineer - ESP population in ACAD 98-004
- Adopts Nuclear Responsible Power Plant Experience Concept for direct SRO (3 yrs)
- Adds Degreed Managers and NLOs (3 yrs)
- Adds SRO Certified Instructors (4 yrs)
- 6 months on site for all prior to course of instruction



Exemptions

- IAW ACAD 92-004
- Use Utility Internal Process
- Check Box on Application

National Operator Licensing Workshop

February 17-18, 2000

National Question Bank Discussion

(E5)

Bill Fitzpatrick

Jim Makucin

INPO

Operator License Examination Question Bank

National Operator Licensing Workshop

February 18, 2000

Jim Makucin

INPO Long-Term Objective

"Establish an Operator License Examination Question Bank for the industry."

2

Progress

- Working Group Meeting - 11/99
- Functional Design Complete
- Questions need to be input

3

Working Group

- Must be searchable by K/A
- Required fields determined
- Users want raw data (questions)
- INPO will provide basic queries
- Get data by Web download or CD

4

Process

- Central database at INPO
- Import ASCII text file from NRC
- INPO receives/verifies questions
- ACCESS & ASCII files produced
- Upload to INPO Website & Produce CDs

5

Process (cont'd)

- The entire question bank will be downloaded from INPO's website
- Downloading the entire bank eliminates security issues
- Plants will search the question bank with their software tools
- Question maintenance as necessary

6

Planned Actions

- Code/test data entry/import modules
- Design Website
- Produce ACCESS file
- Import/Enter Data
- Test system with working group
- Implement with all utilities

7

RO/SRO Eligibility

National Operator Licensing Workshop

February 18, 2000

Bill Fitzpatrick

Background

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2

Flowpaths

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- Certified SRO Instructors

3

Includes:

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- 6 months on site for all prior to course of instruction

4

Exemptions

- IAW ACAD 92-004
- Use Utility Internal Process
- Check Box on Application

5

Senior Management Issues Session

(F1)

Sam Collins, NRC

Jon Johnson, NRC

Bruce Boger, NRC

Phil McCullough, INPO

Jim Davis, NEI

Where do we go from here?

(F2)

Bruce Boger, NRC

NATIONAL OPERATOR LICENSING WORKSHOP

FEBRUARY 17-18, 2000 ❖ THE GROSVENOR ❖ ORLANDO, FL

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