NRC FORM 658
(9-1999)

U.S. NUCLEAR REGULATORY COMMISSION

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DATE OF MEETING
02/09/2000

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Docket Number(s) _____

Plant/Facility Name _____

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Reference Meeting Notice _____

Purpose of Meeting
(copy from meeting notice) **Commission Briefing by the Office of Nuclear Regulatory Research**

NAME OF PERSON WHO ISSUED MEETING NOTICE	TITLE
Jocelyn Mitchell, contact	**Senior Level Technical Advisor**

OFFICE
RES

DIVISION
DRAA

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COMMISSION BRIEFING

OFFICE OF NUCLEAR REGULATORY RESEARCH

FEBRUARY 9, 2000

AGENDA

- Role of RES
- Leveraging resources
- Current benefits of past research
- Planned Accomplishments and examples
- Future
- Summary

ELEMENTS OF RES ROLE

To achieve the mission, RES will:

- Conduct research to improve the agency's knowledge
- Coordinate risk-informed, performance-based efforts
- Conduct systematic evaluations of regulatory requirements
- Conduct independent technical assessments
- Identify safety issues from research results, operating experience
- Perform anticipatory research
- Maintain an infrastructure of expertise, analytical tools, and data

In performing its work RES will:

- Ensure meaningful stakeholder participation
- Conduct work efficiently, including using leverage

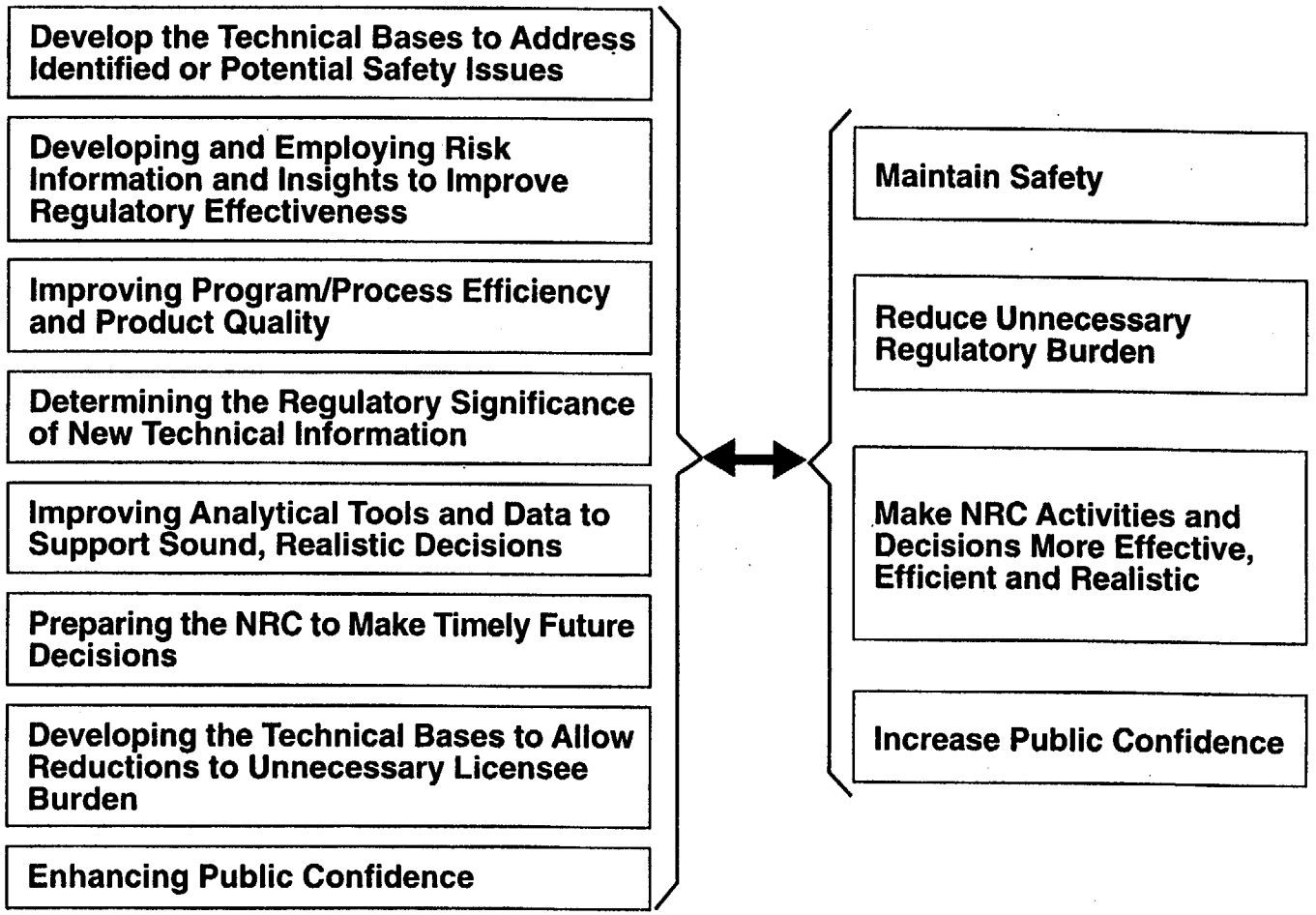
LEVERAGING NRC RESOURCES

- Domestic agreements with 13 entities
  - Electric Power Research Institute and Department of Energy participate in several programs
- Bi-lateral or multi-lateral agreements with 29 countries
- For an NRC contribution of approximately $4M, NRC receives a research benefit costing approximately $60M

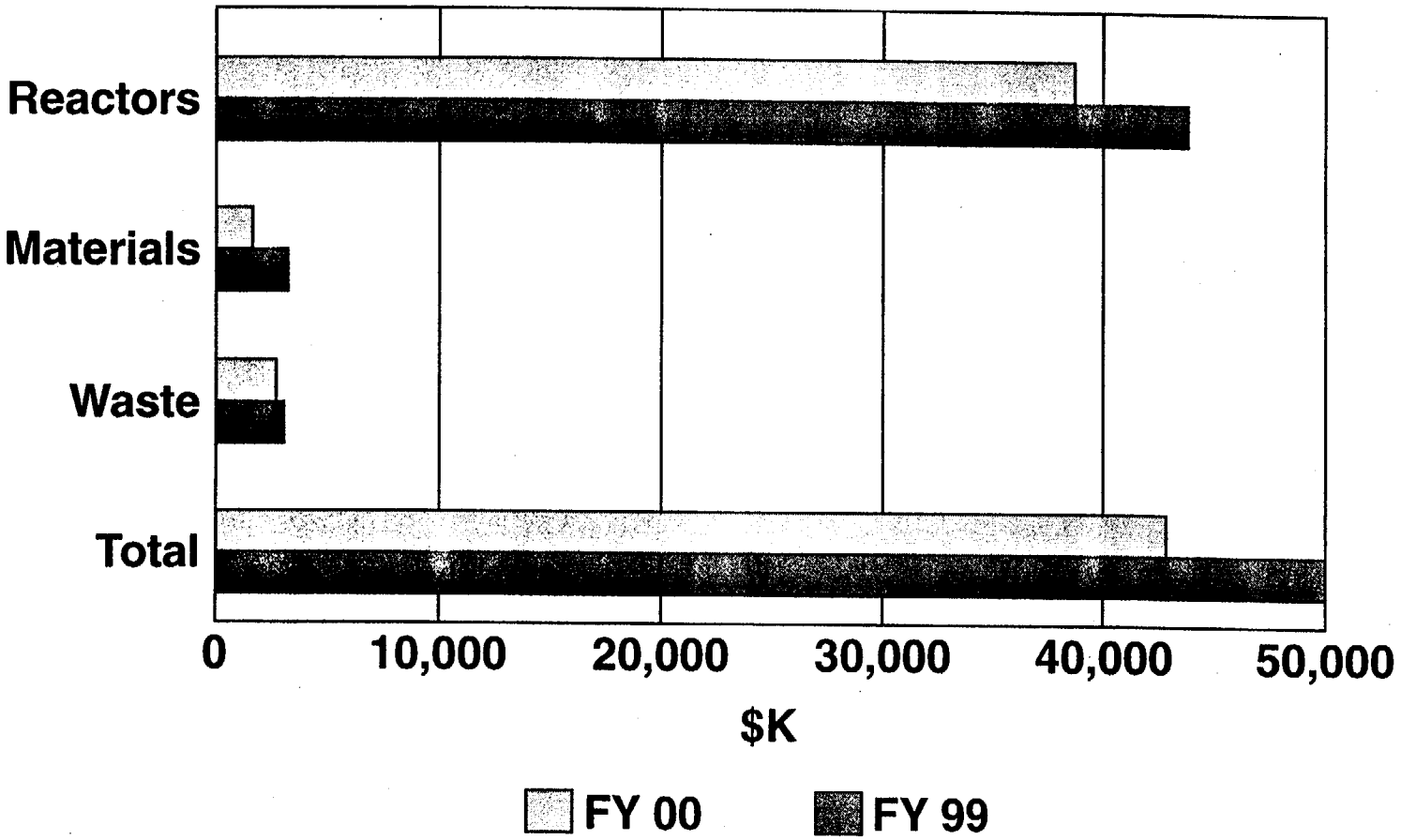
EXAMPLES OF CURRENT BENEFITS FROM PAST RESEARCH

- License Renewal
- Risk Informed Activities
- Decommissioning
- Revised Source Term Rule

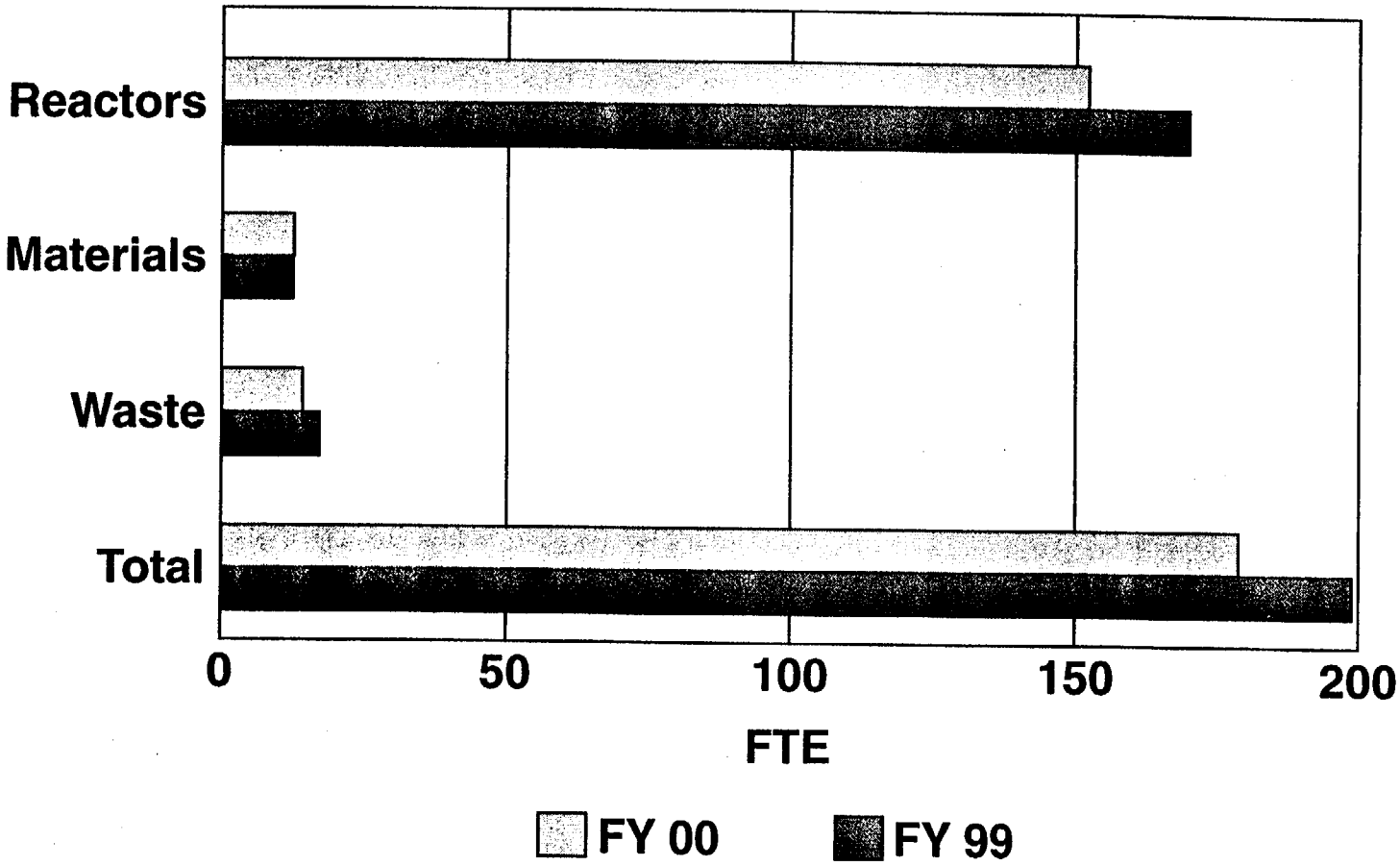
EIGHT PLANNED ACCOMPLISHMENTS ARE OUTCOME ORIENTED



RESOURCE TREND OVERVIEW - $



RESOURCE TREND OVERVIEW - FTE



ASSURING THE INTEGRITY OF THE RPV

OUTCOME: Plants can increase operational flexibility and a few plants can have flexibility to consider license renewal through improved understanding of RPV issues

ACCOMPLISHMENTS: FY99

- **PTS re-evaluation project**
- **Completed work with ASME on revision of basis for P-T limits**

KEY FUTURE ACTIVITIES: FY00 FY01

- **Complete development of technical bases for PTS re-evaluation**
- **Complete final draft of RG 1.99, Rev. 3 on Radiation Embrittlement**

T/H program supports

LONG TERM STORAGE OF SPENT FUEL

OUTCOME: Realistic evaluation of spent-fuel storage systems and timely evaluation of dry cask storage renewal requests

ACCOMPLISHMENTS: FY99

- **Initiated a cooperative program with EPRI and DOE**
- **Opened the Castor-V/21 steel cask loaded in 1985**
- **Performed a visual inspection of the cask seals, fuel assemblies, and fuel tubes**

KEY FUTURE ACTIVITIES: FY00 FY01

- **Remove 12 rods from one assembly to determine fuel integrity**
- **Perform a visual inspection of the VSC-17 concrete cask exterior**
- **Seek foreign and additional domestic participation**
- **Develop models for nuclide inventories and source characteristics**

REALISTIC IMPACTS - RADIATION EXPOSURE

OUTCOME: Realistic decisions on decommissioning, clearance, and products and materials exempt from licensing, resulting in better safety focus and reduced cost

ACCOMPLISHMENTS: FY99

- **Characterization of waste disposal costs**
- **Initiate BEIR VII - health effects, low level ionizing radiation**
- **Feasibility study of entombment as a decommissioning option**

KEY FUTURE ACTIVITIES: FY00 FY01

- **Technical basis for collective doses and costs for clearance rule**
- **Assessment of doses for exempt products and materials**
- **Completion of dose modeling for DandD and RESRAD codes**

OPERATIONAL DATA ASSESSMENTS

OUTCOME: Important lessons of operating experience are learned. Operational experience can be used to evaluate the effectiveness of the regulatory framework.

ACCOMPLISHMENTS: FY99

- **Evaluation of operating events**
- **Development of performance indicators**
- **Preparation of reports on reactor system reliability**

KEY FUTURE ACTIVITIES: FY00 FY01

- **Review of operating events and system reliability**
- **Development of risk-based performance indicators**
- **Maintain equipment reliability databases**

RISK-INFORM REGULATIONS AND ACTIONS

OUTCOME: Regulations and regulatory actions will have a better safety focus. Will result in safety improvements and in lower costs

ACCOMPLISHMENTS: FY99

- **SECY-98-300 on options for modifying Part 50 to be risk-informed**
- **Provided insights on risk-informed inspection program**

KEY FUTURE ACTIVITIES: FY00 FY01

- **Complete study of reactor technical requirements and develop bases for proposed changes**
- **Finalize RG on ISI, update RGs on TS, IST, QA**
- **Develop Agency plan for risk-informed activities**

T/H program supports

MANAGING AND RESOLVING GSIs

OUTCOME: Important new risk-significant generic information is incorporated into the regulatory process

ACCOMPLISHMENTS: FY99

- **One GSI was reprioritized based on updated information, and five GSIs were resolved with no new or revised requirements for licensees.**
- **A new Management Directive was developed to improve the efficiency, timeliness, and clarity of the Generic Issue process.**

KEY FUTURE ACTIVITIES: FY00 FY01

- **Three new reactor GSIs were identified for prioritization.**

PROVIDING BURNUP CREDIT TO REDUCE REGULATORY BURDEN

OUTCOME: Potentially fewer casks needed for storage or transportation of spent fuel

ACCOMPLISHMENTS: FY99

- **Interim Staff Guidance for assessment of residual BUC margins for actinides**
- **Finalize agreement with Belgonucleaire for integral test data**

KEY FUTURE ACTIVITIES: FY00 FY01

- **Assessment of residual BUC margins for fission products and 62 Gwd/MTU fuel**
- **Obtain fission product test data to validate codes used for BUC**

BENEFITS TO NRC FROM T/H CODES

- Independent capability to assess/audit vendor/licensee analyses
  - Identified a problem with AP600 automatic depressurization system sizing
  - Aided review of AP600 test and analysis program
  - Identified problem with licensee analysis of Electro-sleeves
- Assess operating events, support risk-informed regulation activities
- Respond to industry initiatives
  - Power uprates, longer operating cycles, new fuel designs
- Resolution of safety issues
  - PTS, Boron dilution, ATWS, BWR stability

ANALYSIS INFRASTRUCTURE

ISSUE: Maintaining and Improving NRC Analysis Infrastructure in Thermal-Hydraulics, Fuel Behavior, and Severe Accidents

OUTCOMES: (1) Independent, more accurate codes to be used by the Agency to support regulatory decisions, including development of a risk-informed Part 50, (2) Assessment of high burnup fuel performance, and (3) Reduction in the cost of code maintenance

ACCOMPLISHMENTS: FY99

- **Consolidated the Boiling Water Reactor, Pressurized Water Reactor, and 3-D neutronic capabilities into a single code: TRAC-M**
- **Developed the Graphical User Interface for RELAP5 Code**
- **Performed analyses to support assessment of steam generator tubes repaired by Electro-sleeving**

ANALYSIS INFRASTRUCTURE (CONT)

KEY FUTURE ACTIVITIES: FY00 - FY03

- T/H code
  - In FY 2001, support two codes: TRAC-M and RELAP-5
  - In FY 2003, TRAC++ will replace existing suite of codes
  - In FY 2003, complete all major test programs
- Fuel behavior code
  - In FY 2001, complete peer review and release of improved FRAPTRAN code

ANALYSIS INFRASTRUCTURE (CONT)

KEY FUTURE ACTIVITIES: FY00 - FY03

- Severe accident code
  - Supporting two codes FY 2000: SCDAP/ RELAP5, MELCOR
  - In-house analyses for source term implementation
  - In FY 2003, all capabilities merged into a single code
  - In FY 2003, complete international experimental study on lower head creep

EXAMPLES OF IMPORTANT ISSUES FOR THE FUTURE

- High burnup fuel properties and failure criteria
- Digital instrumentation and control
- Plant aging
- Mixed oxide fuel
- Risk-informed power plant performance indicators
- Future waste technologies
- Economic deregulation
- New designs

ENHANCED INTEGRATION WITH INTERNAL STAKEHOLDERS

- RES employees involved in vision statement, in self-assessment, to achieve culture change
- ACRS/ACNW reviews and communications
- Periodic office-level meetings with NRR and NMSS
- Quarterly Divisional counterpart meetings
- Program level review meetings
- Active participation of RES in licensing issues that involve new or complex technical issues
- Research Effectiveness Review Board
- Linking RES Operating Plan with NRR and NMSS
- Enhanced Regional communications

ENHANCED INTEGRATION WITH EXTERNAL STAKEHOLDERS

- Periodic open meetings of PRA Steering Committee - NRC and industry
- Public workshops
- Periodic office-level meetings with EPRI and DOE
- MOUs with EPRI and DOE
- Participation in university workshops
- Cooperative research with other Federal agencies
- Annual meeting with national laboratory Directors
- Participation in standard setting organizations and professional societies
- Annual Light Water Reactor Safety Meeting
  - NEI, EPRI, utilities, universities, foreign partners
- RES web page improved

CHALLENGES FOR THE FUTURE

- Current plants are operating with a mix of technologies, some developed over 25 years ago
- Infrastructure of US experimental facilities for assessing safety is declining
- Competitive market exists for replacement of nuclear skills and knowledge
- US influence in world nuclear research agenda has declined in key areas

SUMMARY

- Research program is directly tied to NRC goals
- Research program is outcome oriented
- Research program is providing a center of technical expertise in many areas
- Today, NRC and industry are reaping the benefits of past research - we must ensure that forward-looking research will similarly prepare us for the future
- Additional challenges remain for the future