Civilian Radioactive Waste Management System

Management & Operating Contractor

TRW

Role of the M&O Contractor in Integrating the CRWM Program

NUCLEAR WASTE TECHNICAL REVIEW BOARD

R.L. Robertson

January 8, 1992

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TO ASSURE SUCCESSFUL PROGRAM INTEGRATION,

THE INTEGRATING ORGANIZATION MUST HAVE

AUTHORITY

RESPONSIBILITY

CAPABILITY

M&O as Program Integrator

Authority:

- **The M&O contractor is assigned the role of system integrator for the CRWM program**

Responsibility:

- **DOE has assigned a set of program activities whose successful performance by the M&O will assure program and system integration**

Capability:

- **The M&O team has the demonstrated capability for successful execution of this role**

M&O SOW: Management & Integration

- ". . . integrating the work of various program participants . . ."
- "Coordinates recommended changes to the OCRWM NWMS baseline and interfaces with all potentially affected program participants."
- "Consistent with DOE approved baselines . . . provide technical, schedule and budget direction to contractors . . . with parallel information provided to the DOE Project Office with the exception of . . ."
- ". . . direction provided to DOE National Laboratories, other Federal agencies, or DOE-NV prime contractors which must pass through the DOE representative."

Key M&O Assignments

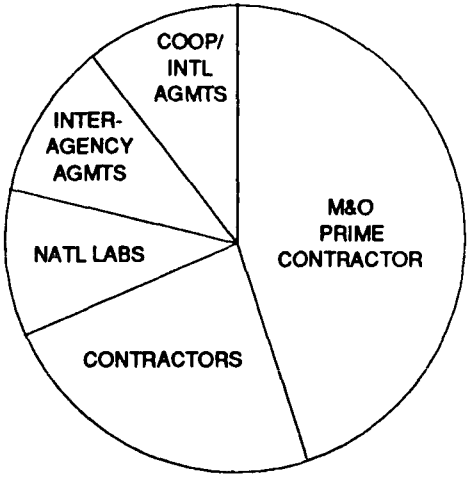
- Program Management
  - Cost and Schedule Baseline Management
  - Program Management System Implementation
  - Configuration Management
  - Outreach
- System Engineering
  - Technical Baseline Management
  - System Studies
  - Strategic and Contingency Planning
  - System Compliance
  - Design and Construction Management
- Regulatory Compliance
  - Site Characterization Technical Direction/Integration
  - Performance Assessment
  - Licensing

THE M&O WORKS FOR ALL RW ORGANIZATIONS

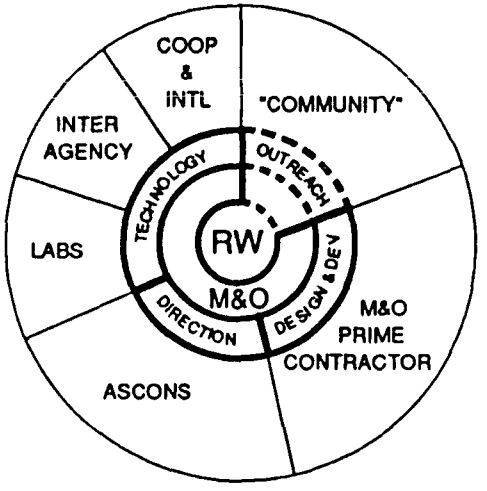
AND

MANY M&O TASKS BRIDGE SEVERAL RW ORGANIZATIONS

M&O Role



AFTER RESTRUCTURING



AFTER TRANSITIONING

PROGRAM MANAGEMENT SYSTEM

WBS TASKS ASSIGNED TO:	CRWMS ROLE	M&O ASSIGNED ROLE:		
OCRWM (HQ & YMPO)	POLICY-MAKER PROGRAM DIRECTION	TECHNICAL SUPPORT (TS)	SYSTEMS ENGINEERING (SE)	MANAGEMENT & INTEGRATION (M&I)
M&O	PRIME CONTRACTOR	DESIGN & DEVELOPMENT		
ASSOCIATE CONTRACTORS (ASCONS)	SPECIAL ACTIVITIES & STUDIES	TECHNICAL DIRECTION (TD)		
NATIONAL LABS	TECHNOLOGY DEVELOPMENT & REVIEW	TECHNOLOGY APPLICATION (TA)		
INTERAGENCY AGREEMENTS				
COOPERATIVE/INTL AGREEMENTS				

Team

TRW	-	Prime Contractor
Fluor Daniel	-	Surface Facility Design and Development
Morrison-Knudsen	-	Underground Facility Design and Development
Babcock & Wilcox	-	Engineered Barrier Design and Development
Woodward-Clyde	-	Site Characterization
Duke Engineering	-	Licensing, Outreach, MRS Design, QA
INTERA Technologies	-	Performance Assessment
E.R. Johnson Assoc.	-	Storage and Transportation Analysis
JK Research Assoc.	-	Socioeconomic and Policy Analysis
R & D Associates	-	Systems Engineering and Modeling Support

Program Management System Development and Implementation

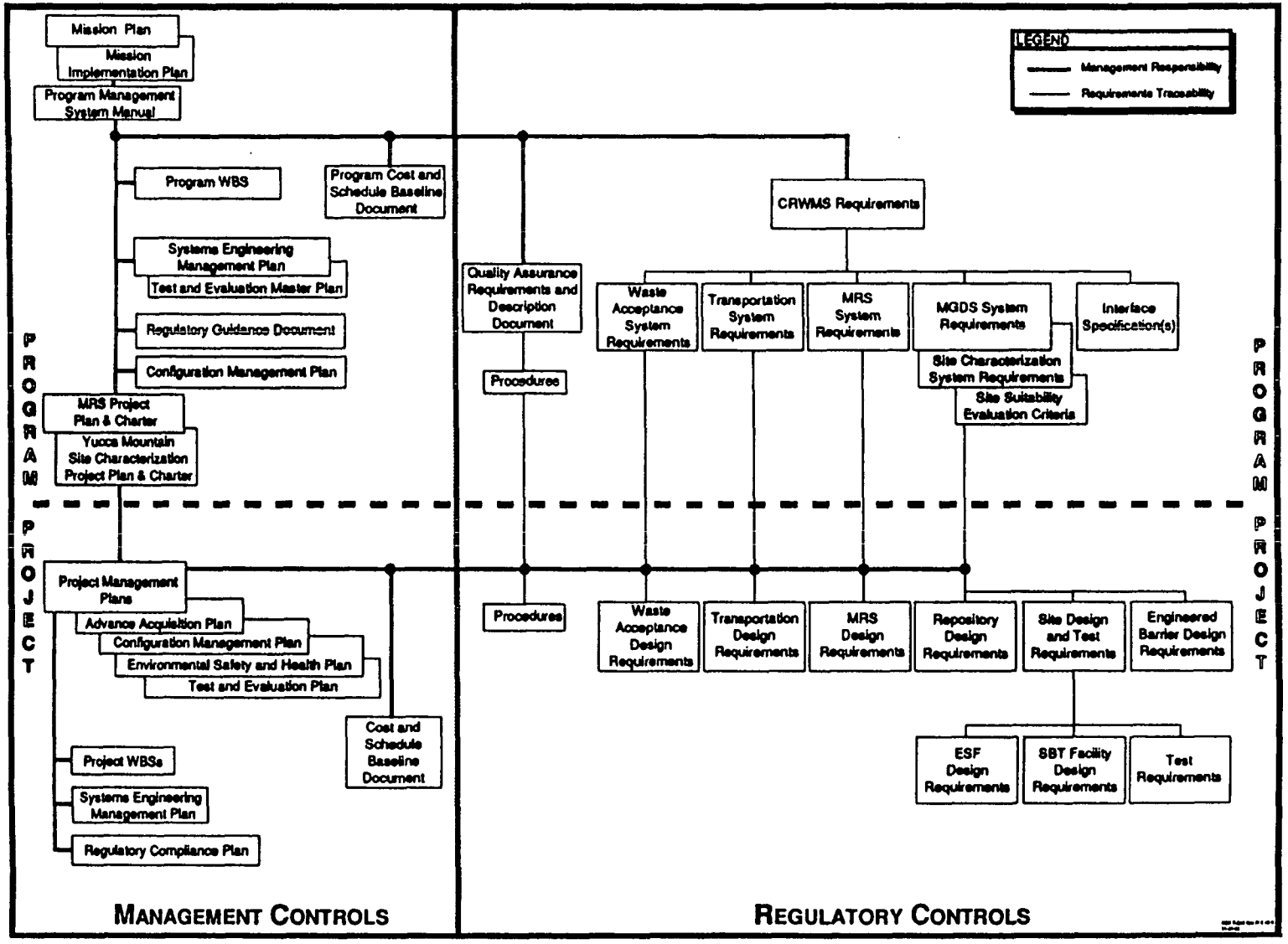
Scope:

- **Support OCRWM in putting in place an improved program management system (MSIS implementation)**
  - **Program Management System**
  - **Technical requirements framework**

Status:

- **OCRWM management document hierarchy**
- **PMSM, SEMP and CMP development**
- **InfoSTREAM**

OCRWM Document Hierarchy



Technical Baseline Management

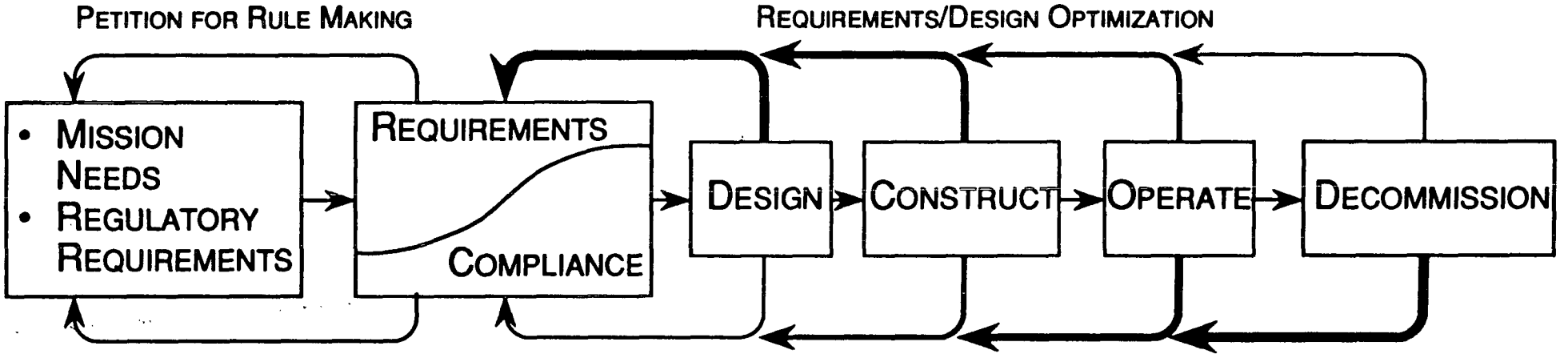
Scope:

- Implement system engineering process
  - Requirements flowdown and traceability
  - System synthesis
  - Performance criteria
  - System studies definition
  - Compliance assessment

Status:

- Requirements document hierarchy approved
- Technical document management plans approved
- MRS, MGDS, Transportation, and Waste Acceptance requirements documents underway
- Developing operational concept for CRWMS
- Conducting system studies

System Engineering Process



Cost and Schedule Baseline Management

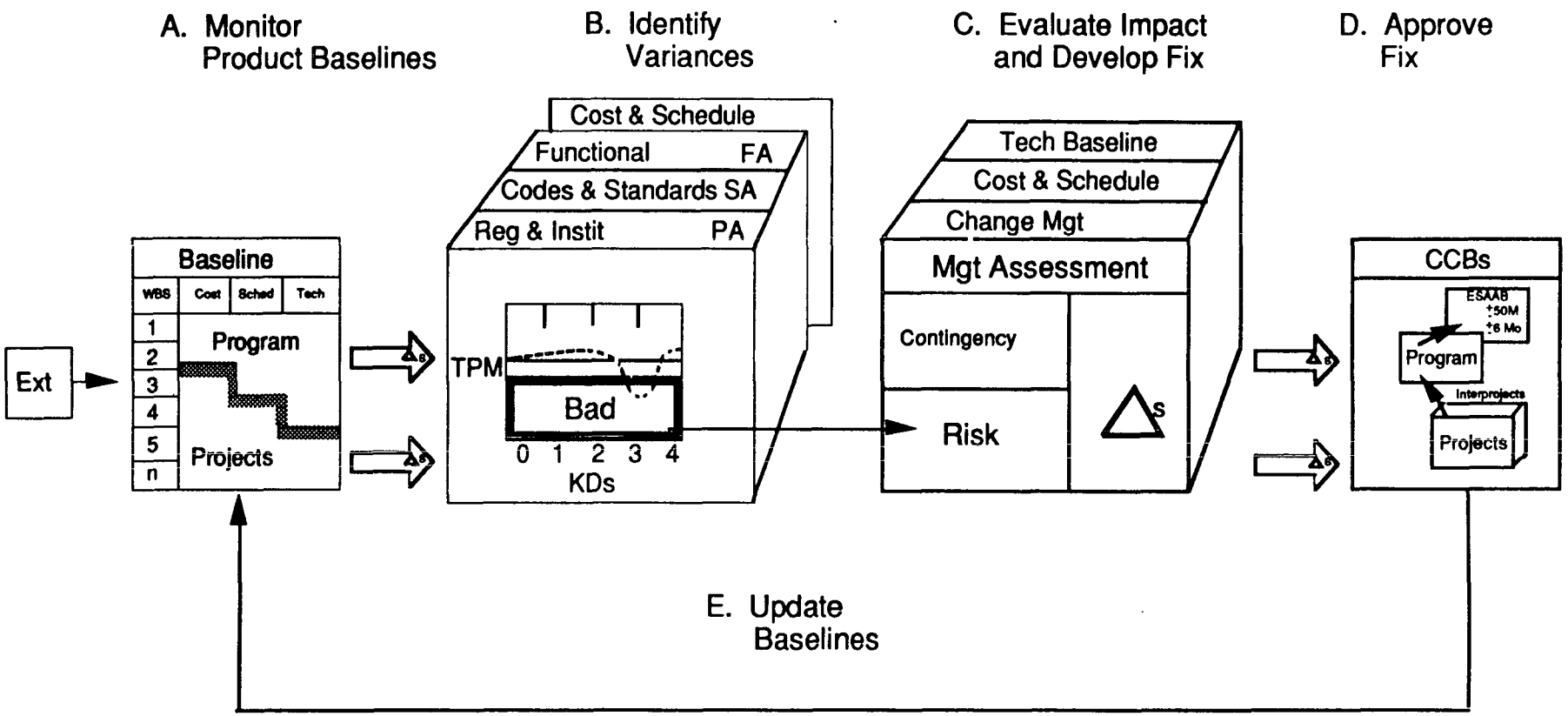
Scope:

- Implement cost and schedule baseline management

Status:

- Input to program WBS
- PMSM under development
- Supporting FY '94 budget call
- Implementation in transition

The Decision-Making Process



Configuration Management System Operation

Scope:

- Implement Configuration Management System
- Secretariat for the Change Control Boards
- Evaluation of all change proposals
  - Feasibility
  - Alternatives
  - Interfaces
  - Cost and schedule
  - Documentation
  - Regulations
  - Study Requirements

Status

- Developing Configuration Management Plan and Procedures
- Establishing Program-level, MRS, Transportation and Waste Acceptance CM programs
- MGDS transitioning

Program Configuration Control Threshold Hierarchy

Level 0

- *Approves any cost impact >$50M or 5%, whichever is greater, or schedule impacts >6 months*

Level 1

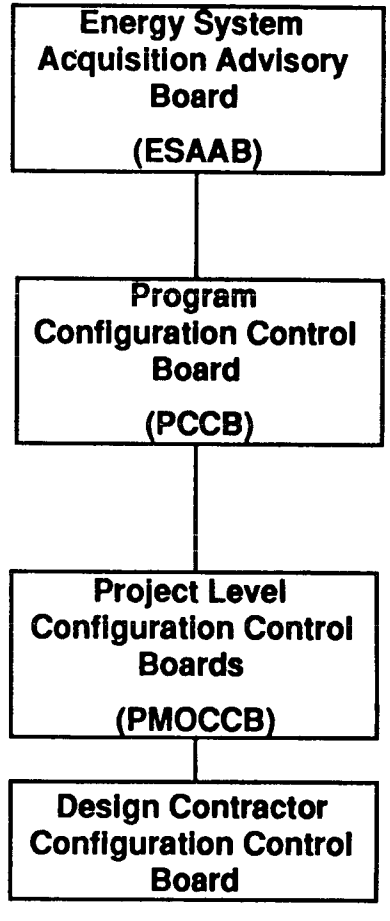
- *Approves all level 1 & 2 functional requirements and Class 1 ECPs*
- *Approves any change when cost impact is > $2 million and < $5 million*
- *Approves any change which impacts schedule > 2 mo. and < 6 mo.*

Level 2

- *Approves all Class 2 ECPs*
- *Reviews as necessary and Class 3 ECPs for Concurrence.*

Level 3

- *Approves all Class 3 ECPs and field changes as required.*



System Studies

Scope:

- System studies for total system integration and optimization
  - Design decisions
  - System requirements
  - Issues resolution
  - Requirements change impacts
  - Feasibility screen

Status:

- System studies
  - Throughput Rate Study
  - System implications of Hot vs Cold Repository
  - MRS Issues Assessment

Throughput Rate Study

Objectives:

- Develop data to support the selection of a throughput rate design basis for CRWM system elements
- Determine sensitivities to design and operational changes

Approach:

- Use multiple measures of effectiveness to reflect cost, safety and public concerns
- Use EIA Database and computer models to characterize waste, model logistics, and compute costs and other measures of effectiveness (WSA, Interface including simplified SOLMOD, SECAM)

Schedule:

- Study initiated 6/91
- Interim Technical Report; results and conclusions of analyses for oldest-fuel-first acceptance, issued 12/20/91
- Scheduled completion 7/92

System Implications of Hot vs Cold Repository

Objectives:

- Determine impacts on CRWM system elements of a range of thermal loading concepts
- Determine the range of corresponding throughput schedules which fit the thermal loading scenarios

Approach:

- Define, with DOE consensus, a set of thermal loading concepts (Cold, SCP Baseline, 1000 years dry, 10,000 years dry)
- Develop a plan for analyzing these concepts which will include inputs from M&O (MGDS System Integration, Waste Package Design, MRS Design, Performance Assessment) and from LLNL and Sandia

Schedule:

- Study initiated 8/91
- Scheduled completion 7/92

MRS Issues Assessment

Objectives:

- Provide information for making decisions on key issues that affect MRS Title I design

Issues Under Investigation:

- Throughput rate impacts on MRS design
- MRS storage capacity
- Waste packaging location
- Fuel rod consolidation
- Dual purpose/multi-purpose casks
- Impacts of Hot vs. Cold repository on MRS design
- Impacts of storing retrieved waste packages at MRS

Schedule:

- Study initiated 7/91
- Scheduled completion 3/92

Strategic/Contingency Planning

Scope:

- **Provide integrated support to OCRWM planning**

Status:

- **Strategic and contingency planning process**
- **Plans in process**
  - **Yucca Mountain unsuitability**
  - **Delayed MRS Siting**
  - **Delayed underground access to Yucca Mountain**
- **Plans under consideration**
  - **Constrained funding**
  - **Additional waste forms**

Performance Assessment

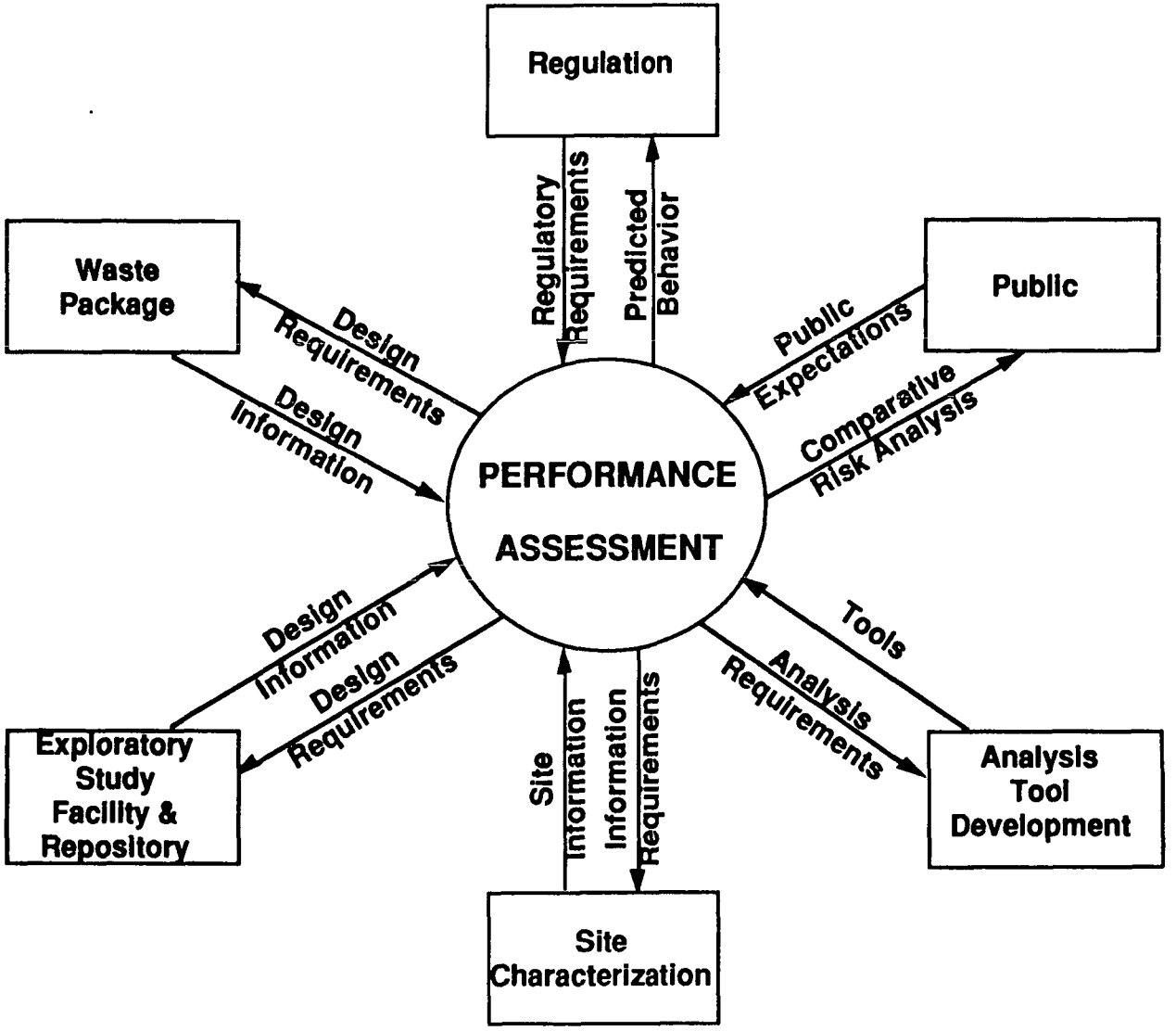
Scope:

- Develop an integrated CRWMS performance assessment strategy
- Review and integrate participant efforts
- Evaluate and develop models for demonstrating conformance
- Integrate peer review and expert judgement into the PA process
- Conduct system level performance assessment

Status:

- Integration of participants' efforts initiated
- Developed a PA strategy
- Approximately 30 models reviewed and evaluated
- Developing total system scenarios

Performance Assessment



Performance Assessment Strategy

- Base Performance Assessment on licensing and public acceptance needs
  - Predict system behavior relative to regulatory requirements issues
  - Provide risk analyses which address public concerns

- Gain scientific community acceptance through:
  - International program interactions
  - Analog studies
  - Publications
  - Institutional peer reviews

- Drive program development by:
  - Setting requirements
  - Evaluating designs
  - Identifying weak links
  - Resolving issues

Performance Assessment Stategy

- **Conduct iterative performance assessments to:**
  - **Identify data needs**
  - **Build confidence in methodologies and results**
  - **Provide assurance in meeting program milestones**
  - **Support issues resolution process**
  - **Meet license application needs**

Licensing

Scope:

- Develop guidance for license applications
  - Establish licensing strategy
  - Prepare licensing management plans
  - Develop annotated outlines for MGDS and MRS
- Implement issue resolution initiative

Status:

- Licensing Strategy document in preparation
- MGDS Licensing Management Plan prepared
- Preparation of AOs for MGDS and MRS initiated
- AO planning packages submitted to NRC for comment and guidance
- Leading issue resolution initiative for the program

Annotated LA Outline

MRS SAR Annotated Outline Planning Package
Form 1: Text

Revision: 0
Date: 09/30/91

1. Section No. & Title: SAR 3.3 - Safety Protection Systems
2. Lead Author & Phone No. ~~Robert G. Morgan (703) 994-0440~~ [redacted]
3. First Phase Planning Package Due: 09/30/91
   Second Phase Planning Package Due: ~~00/00/00~~ [redacted]
   First Phase Skeleton Draft Due: ~~00/00/00~~ [redacted]
   Second Phase Skeleton Draft Due: ~~00/00/00~~ [redacted]
4. Plan Approved: RGMorgan (MRS Licensing Manager)
5. Section Summary (Approximately 100 Words):

   This section discusses the special design considerations of the MRS based upon site selection, operating conditions and other requirements. The safety protection systems ensure the safe, long term storage of the spent fuel ~~or high-level waste~~. Other operations that occur at the MRS in addition to long term storage are also [redacted] to demonstrate that operating hazards are minimized.

6. Opening Statement:

   This section discusses the special design considerations of the MRS based upon site selection, operating conditions and other requirements. The safety protection systems ensure the safe, long term storage of the spent fuel or high-level waste. Other operations that occur at the MRS in addition to long term storage are also [redacted] to demonstrate that operating hazards are minimized.

7. Main Body Outline:

3.3 SAFETY PROTECTION SYSTEMS

3.3.1 GENERAL

3.3.2 PROTECTION BY MULTIPLE CONFINEMENT BARRIERS AND SYSTEMS

3.3.2.1 Confinement Barriers and Systems

a. Criteria for protection against any postulated internal accident or external natural phenomena.

Annotated Outline Information Need Form
Form A: Information Request

Log No. JBS-1
Revision: 0
Date: 09/30/91

1. Section No. & Title: SAR 3.3.2.1 - Confinement Barriers and Systems
2. Lead Author & Phone No.: J. B. Stringer (704) 373-0706
3. Work Location: MRS Design, Charlotte, NC

Instructions: Sections 1 - 8 are completed by the lead author. This form is used during the development of the license application when a lead author has identified the need for information which must be supplied by another group. More than one request for information may be placed on one form, but only if the information is to be supplied by the same group. The group responding to the request for information may use section 9 and 10 to respond, or use Form B: Information Response. Attach additional sheets if more space is needed.

4. Type of information needed:

   Section 3.3.2.1 of the SAR will discuss each method of confinement used to ensure there will be no uncontrolled release of radioactivity to the environment. The criteria used for protection against external natural phenomena will also be discussed. The MRS Design Group is author of section 3.3. We need information as to what external natural phenomena must be considered in the MRS design.

5. What is the information needed for? (e.g., SAR Section 3.2):

   This information is needed to develop SAR Table 3.3-C, which lists the major MRS components and the design requirements or criteria which it satisfies.

6. What group is the probable information supplier?

   The MRS Siting Group should provide this information as part of its site characterization work.

7. When is the information needed?

   As soon as a site is nominated and site characterization/environmental assessment begins.

8. What kind of related information is already available in references, etc.? (List any known, related information sources):

   None. The information is site dependent.

9. Response by: _____ Date: _____
10. Response: _____

MRS SAR Annotated Outline Planning Package
Form 3: References

Revision: 0
Date: 09/30/91

Section No. & Title: SAR 3.3 - Safety Protection Systems

Lead Author & Phone No. ~~Robert G. Morgan (703) 994-0440~~ [redacted]

Instructions: List all books, articles, or other references which you expect to use for your section. Indicate whether references are draft or final, and whether they are publicly available (i.e., published). Refer to the Writer's Guide, Appendix D of the Annotated Outline Management Plan for guidance on formatting reference information.

11. U. S. Nuclear Regulatory Commission, Cost-benefit Analysis for Radwaste Systems for Light-Water-Cooled Nuclear Power Reactors, Regulatory Guide 1.110, March 1976.

12. U. S. Nuclear Regulatory Commission, Design, Testing, And Maintenance Criteria for Normal Ventilation Exhaust System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants, Regulatory Guide 1.140, Revision 1, October 1979.

13. U. S. Nuclear Regulatory Commission, Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants, Regulatory Guide 1.143, Revision 1, October 1979.

14. U. S. Nuclear Regulatory Commission, Source Terms, NUREG-0800, Standard Review Plan 11.1, Revision 2, July 1981.

15. U. S. Nuclear Regulatory Commission, Liquid Waste Management Systems, NUREG-0800, Standard Review Plan 11.2, Revision 2, July 1981.

16. U. S. Nuclear Regulatory Commission, Gaseous Waste Management Systems, NUREG-0800, Standard Review Plan 11.3, Revision 2, July 1981.

17. U. S. Nuclear Regulatory Commission, Solid Waste Management Systems, NUREG-0800, Standard Review Plan 11.4, Revision 2, July 1981.

System Compliance

Scope:

- Incorporate conformance matrices as an integral part of the system requirements documents
- Implement technical performance measurement process
- Implement system test and evaluation program
- Evaluate risks

Status:

- Conformance matrices
- Technical performance measurement
- Test and evaluation master plan
- Risk management plan
- Requirements research
- Automated requirements management system

Site Characterization Technical Direction

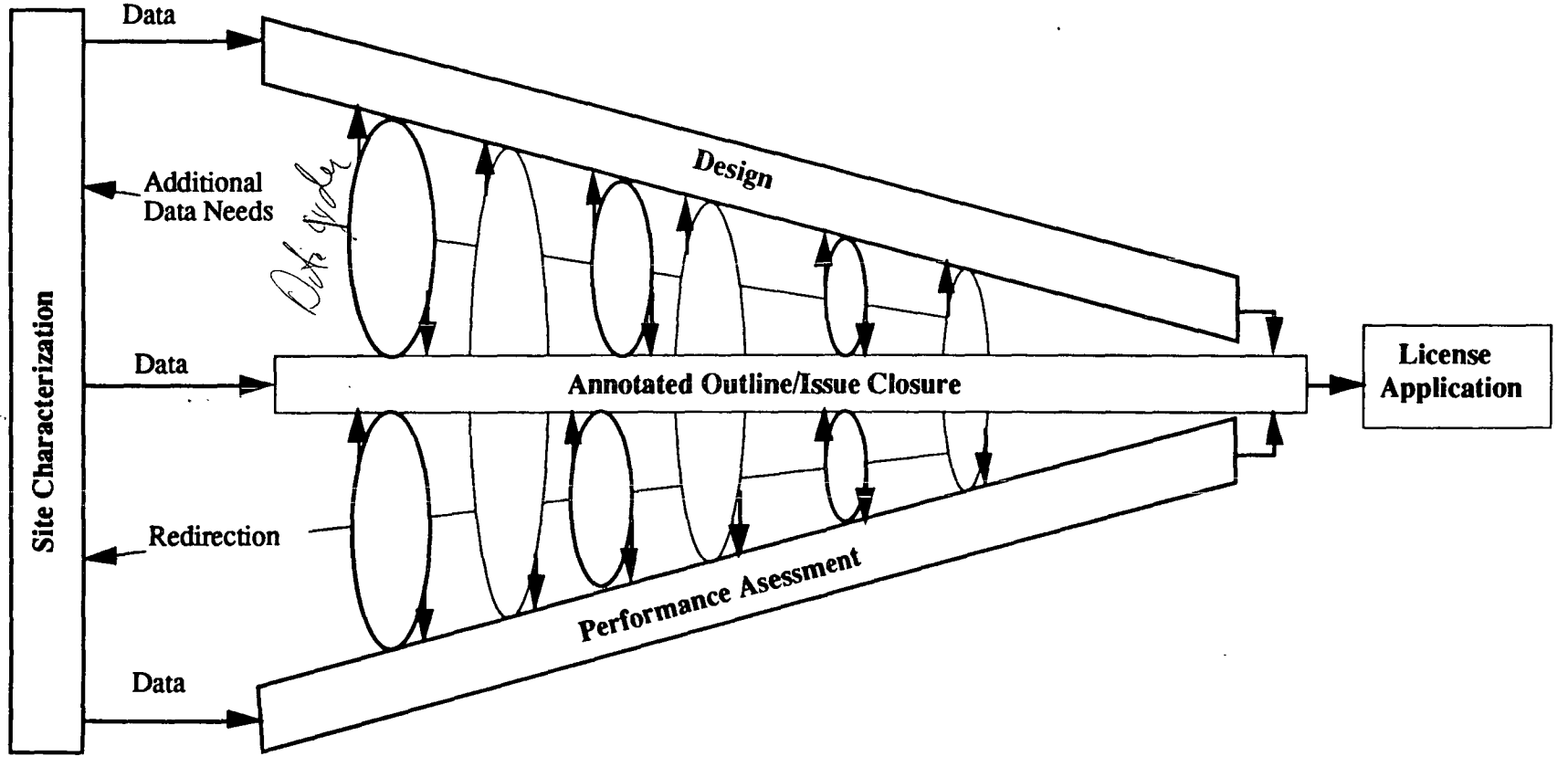
Scope:

- Evaluate existing activities
- Technical direction for future activities

Status:

- Surface based testing requirements
- Study plan and work program job package development and coordination
- Contingency planning and annotated outline
- Test interference analyses
- Technical assessment review of seismic design basis for ESF
- Surface seismic program

Convergence of Site Characterization



Design and Construction Management

Scope:

- Title I and II designs for MRS, Repository, and Engineered Barrier System
- Title II design for ESF
- Construction management for ESF
- Title III design inspections
- Transportation system design

Status:

- Conceptual design for MRS
- Title II design of ESF (Oct 92)
- EBS strategy document
- ESF construction management plans
- ESF/MGDS interface
- Phase One casks procurement

Outreach Support

Scope:

- Support OCRWM in gaining public acceptance for all objectives of the CRWMS
- Integrated into the systems engineering process
- Advise OCRWM on public outreach strategies

Status:

- Environmental Assessment Outreach Plan
- Key issues and community concerns identification system for MRS
- Office of Nuclear Waste Negotiator support
- Outreach Transition Plan and M&O External Affairs Plan for YMPO
- Tours of independent fuel storage facilities
- MRS slide presentation
- Transportation conference exhibit support

THE GOAL OF SYSTEMS INTEGRATION

IS

CLOSURE WITH CONFIDENCE

The Tools of Closure

- Design control management processes
- Requirements translated into performance specifications
- Requirements, design and compliance reviews
- Test and evaluation plans
- License application annotated outlines
- System level performance assessment
- Site characterization issues resolution process
- Systems studies
- System & subsystem models

Near Term Focus

- Program Management System upgrade
- Technical baseline documentation
- MRS conceptual design
- MRS siting, Outreach & EA
- Phase One casks procurement
- Performance assessment integration
- LA annotated outlines/licensing strategy
- Systems studies
- M&O QA program readiness
- Site characterization issues closure
- Strategic and contingency planning

Mid Term Focus

eoly 93

- Full technical direction/integration of site characterization
- Completion of technical baseline documentation
- System level performance assessment iterations
- MRS Title I & Title II design
- Assumption of ESF Title II design
- EBS & MGDS conceptual/Title I designs
- Systems/subsystems models
- Test and Evaluation Master Plan
- Configuration management
- Regular technical-cost-schedule reviews of participants

Longer Term Focus

- Updated project and program technical cost schedule baselines
- Design and compliance reviews
- Convergence of site characterization on design/license needs
- Models validation

Summary

- **The M&O *is* facilitating program-wide systems engineering and integration**
- **The M&O concept is a significant cultural change requiring *commitment, patience and sensitivity***
- **Successful inculcation of systems engineering and integration into this program will be *evolutionary rather than revolutionary***