

**MRS  
SYSTEMS STUDIES**

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**PRESENTATION TO THE  
NUCLEAR WASTE TECHNICAL REVIEW BOARD  
MARCH 7-8, 1989**

# PURPOSE

- **TO UPDATE ANALYSIS OF THE ROLE OF MRS RELATIVE TO THE WASTE MANAGEMENT SYSTEM DEFINED BY NWPAA**
- **RESULTS TO BE PROVIDED TO DOE MANAGEMENT AND MRS REVIEW COMMISSION**
- **FOLLOW-ON ANALYSIS WILL BE REQUIRED TO SUPPORT DEVELOPMENT OF DOE POSITION ON MRS FACILITY**

# SCOPE

- **SERIES OF SHORT-TERM TECHNICAL STUDIES**
- **PRELIMINARY, SCOPING ANALYSES**
- **BASED ON EXISTING MRS AND REPOSITORY DESIGNS**

# APPROACH

- **DEFINE PARAMETERS WHICH MAY IMPACT WASTE MANAGEMENT SYSTEM WITH MRS**
- **SELECT REPRESENTATIVE WASTE MANAGEMENT SYSTEM SCENARIOS**
- **ANALYZE IMPACTS OF OPTIONS IN COMPARISON TO A WASTE MANAGEMENT SYSTEM WITHOUT AN MRS**

# TASKS

- **10 TASKS:**
  - A. SCENARIO DEVELOPMENT AND SYSTEM LOGISTICS**
  - B. FACILITY DESIGN (REPOSITORY/MRS)**
  - C. MRS STORAGE CONCEPT**
  - D. HIGH-LEVEL WASTES**
  - E. WASTE PACKAGE DESIGN**
  - F. TRANSPORTATION ANALYSES**
  - G. SYSTEM STORAGE, AT-REACTOR IMPACT AND INTEGRATION ANALYSES**
  - H. LICENSING**
  - I. SYSTEM RELIABILITY ANALYSIS**
  - J. FINAL REPORTING**

# **TASK A. SCENARIO DEVELOPMENT AND SYSTEM LOGISTICS**

## **OBJECTIVE:**

**DEVELOPMENT OF SYSTEM SCENARIOS AND LOGISTICS TO BE USED  
AS THE BASIS FOR THE OTHER STUDIES**

## **STATUS**

- **SCENARIOS IDENTIFIED, BEING USED AS BASIS FOR OTHER TASKS**

# **TASK A. SCENARIO DEVELOPMENT AND SYSTEM LOGISTICS**

- **VARIABLES CONSIDERED:**

- **REPOSITORY AND MRS PACKAGING FACILITY CONFIGURATIONS**
- **MRS LOCATION**
- **WESTERN FUEL STRATEGY**
- **HLW PACKAGING LOCATION**
- **MRS PHASING**
- **FACILITY START DATE ASSUMPTIONS**
- **WASTE ACCEPTANCE SCHEDULES**

# **TASK B. FACILITY DESIGN (REPOSITORY/MRS)**

## **OBJECTIVE:**

**TO ANALYZE NECESSARY CHANGES TO EXISTING MRS AND REPOSITORY DESIGNS TO ACCOMMODATE THE VARIOUS SYSTEM SCENARIOS DEFINED IN TASK A**

## **SCOPE:**

- **TO DEVELOP ESTIMATES FOR SURFACE FACILITY:**
  - **CONSTRUCTION COSTS**
  - **OPERATING COSTS**
  - **CONSTRUCTION SCHEDULES**
  - **ASSOCIATED UNCERTAINTIES**



# **TASK C. MRS STORAGE CONCEPT**

## **OBJECTIVE:**

**TO EVALUATE REFERENCE AND ALTERNATIVE MRS STORAGE CONCEPTS**

## **SCOPE:**

- **CONSIDER SEVERAL STORAGE TECHNOLOGIES**
  - **CONCRETE SEALED CASKS**
  - **HORIZONTAL CONCRETE MODULES**
  - **DRYWELLS**
  - **MODULAR DRY VAULTS**
  - **TRANSPORTABLE STORAGE CASES**

# **TASK D. HIGH LEVEL WASTES**

## **OBJECTIVE:**

**TO REVIEW ISSUES AND COSTS ASSOCIATED WITH  
HANDLING/PACKAGING COMMERCIAL AND DEFENSE HIGH LEVEL  
WASTES AT THE MRS**

## **SCOPE:**

**ENGINEERING AND LICENSING IMPLICATIONS OF  
HANDLING/PACKAGING HIGH LEVEL WASTES AT THE MRS**

# **TASK E. WASTE PACKAGE DESIGN**

## **OBJECTIVE:**

**TO PROVIDE DESIGN AND COST INPUT TO OTHER TASKS REGARDING  
WASTE PACKAGE CONTAINERS AND MRS CANISTERS**

## **SCOPE:**

- **SKETCHES, DESCRIPTIONS, AND COST ESTIMATES FOR EACH  
CONTAINER MATERIAL CURRENTLY UNDER CONSIDERATION**
- **SKETCHES, DESCRIPTIONS, AND COST ESTIMATES FOR CANISTERS  
PREPARED AT MRS**
- **SUMMARY DESCRIPTIONS OF “ALTERNATIVE” WASTE PACKAGE  
CONCEPTS**
- **DISCUSSION OF POTENTIAL BENEFITS/IMPACTS OF “HEAT  
TAILORED” WASTE PACKAGES ON REPOSITORY DESIGN AND WASTE  
ISOLATION**

# **TASK F. TRANSPORTATION ANALYSES**

## **OBJECTIVE:**

**GENERIC TRANSPORTATION ANALYSES TO DETERMINE THE  
TRANSPORTATION IMPACTS ASSOCIATED WITH EACH SCENARIO**

## **SCOPE:**

- **SPENT FUEL AND HIGH-LEVEL WASTE TRANSPORTATION ROUTING  
AND COST ANALYSES**
- **RISKS ANALYSES LIMITED TO POPULATION EXPOSURE ALONG  
ROUTES**

# **TASK G. SYSTEM STORAGE, AT-REACTOR IMPACT AND INTEGRATION ANALYSES**

## **OBJECTIVE:**

**ASSESS THE IMPLICATION AND IMPACT OF SYSTEM STORAGE IN VARIOUS SCENARIOS. ANALYZE METHODS FOR INTEGRATION WITH AT-REACTOR OPERATIONS**

## **SCOPE:**

- **ANALYZE SYSTEM STORAGE NEEDS**
- **ADDRESS THE IMPACTS ON REACTORS OF THE VARIOUS SYSTEM SCENARIOS**
- **ANALYZE METHODS FOR INTEGRATING AT-REACTOR OPERATIONS WITH WASTE MANAGEMENT SYSTEM OPERATIONS**

# **TASK H. LICENSING**

## **OBJECTIVE:**

**ASSESS THE LICENSING IMPACT OF INCLUDING AN MRS IN THE WASTE SYSTEM**

## **SCOPE:**

- **EXAMINE POSSIBLE LICENSING CONSIDERATIONS IF THE DISPOSAL CONTAINER IS PRODUCED AT THE MRS AND SHIPPED TO THE REPOSITORY**
- **QUANTIFY POSSIBLE SCHEDULE BENEFITS FROM SIMPLIFYING THE LICENSING PROCESS FOR THE REPOSITORY TO LARGELY UNDERGROUND CONCERNS**

# **TASK I. SYSTEM RELIABILITY ANALYSIS**

## **OBJECTIVE:**

**EVALUATE THE RELIABILITY OF THE WASTE MANAGEMENT SYSTEM TO FUNCTION AND FULFILL ITS MISSION SUCCESSFULLY**

## **SCOPE:**

- **FACILITY DESIGN CAPABILITIES**
- **REDUNDANCY IN SYSTEM CAPABILITY**
- **SYSTEM CONTINGENCY CAPABILITIES**
- **RELIABILITY COMPARISON OF SYSTEM CONFIGURATIONS WITH AN MRS TO A REPOSITORY-ONLY SYSTEM**

# **TASK J. FINAL REPORTING**

## **OBJECTIVE:**

**OUTPUT FROM TASKS A-I TO BE COMPILED, ANALYZED, AND  
SUMMARIZED FOR DOE MANAGEMENT**

**THIS TECHNICAL INFORMATION, ALONG WITH POLICY  
CONSIDERATIONS WILL BE USED AS INPUT TO FURTHER  
EVALUATIONS TO SUPPORT DEVELOPMENT OF DOE  
POSITION ON MRS FACILITY**



# **FOLLOW-UP TO MRS SYSTEMS STUDY**

- **THIS STUDY WILL PROVIDE ADDITIONAL TECHNICAL INFORMATION ON THE MRS AND ITS POTENTIAL USES**
- **RESULTS WILL BE REVIEWED TO DETERMINE ANY AREAS WHERE FURTHER INFORMATION IS DESIRABLE**
  - **FOCUS ON MOST PROMISING OPTIONS**
- **THIS STUDY AND FOLLOW-ON STUDY RESULTS WILL CONTRIBUTE TO DEVELOPMENT OF POSITIONS ON MRS BY DOE MANAGEMENT**

# STATUS

- **TASK A COMPLETED LAST SUMMER**
- **TASKS B THROUGH I, UNDERGOING PEER REVIEW**
- **PEER REVIEW REPORT SCHEDULED FOR MARCH 31, 1989**
- **TASK J REPORT IS UNDER PREPARATION**
- **ALL TASK REPORTS ARE SCHEDULED FOR RELEASE IN LATE APRIL**