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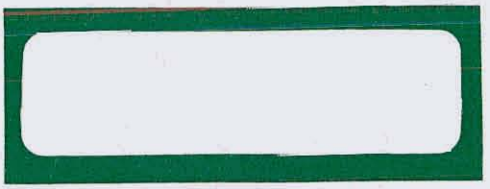

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STUDIES AND RESEARCH CONCERNING BNFP

LIFE OF PROJECT OPERATING EXPENSES FOR AWAY-FROM-REACTOR (AFR) SPENT FUEL STORAGE FACILITY

FINAL REPORT

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September 1979

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PREPARED FOR THE
DEPARTMENT OF ENERGY
FUEL CYCLE PROJECT OFFICE
UNDER CONTRACT DE-AC09-78ET-35900

ABSTRACT

Life of Project operating expenses for a licensed Away-From-Reactor (AFR) Spent Fuel Storage Facility are developed in this report. A comprehensive business management structure is established and the functions and responsibilities for the facility organization are described. Contractual provisions for spent fuel storage services are evaluated.

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1.0 INTRODUCTION

This report has been prepared by Allied-General Nuclear Services (AGNS) for the Department of Energy (DOE) under Contract No. DE-AC09-78ET-35900.

Information developed for this report is part of Task 1 - Spent Fuel Handling Studies activities and is intended to satisfy the following objective:

- Sub-Task 1.3.2 - Estimate and report "Life of Project" operating expenses for an Away-From-Reactor (AFR) storage facility using the 5000 metric ton uranium (MTU) expanded Barnwell Nuclear Fuel Plant - Fuel Receiving and Storage Station (BNFP-FRSS) arrangement developed in 1978 as the model. Include an evaluation of a business management system that could be utilized by the operator of an AFR storage site in arranging for fuel receipt, maintenance of identification during storage, and other requirements of an AFR operator.

Specific data regarding policy and procedure topics, capital and operating cost estimates, and manpower requirements are based upon those programs and cost-related activities previously developed by AGNS in preparation for the hot operation of the BNFP or developed by AGNS for the Department of Energy under Contract No. DE-AC09-78ET-35900.

Economic considerations have been evaluated for an expansion program whereby new storage pool modules are added to the existing FRSS to achieve a storage capacity of 5000 MTU. Expansion beyond 5000 MTU is achievable in the BNFP-FRSS; however, further capacity increases are beyond the scope of this study and therefore are not included.

2.0 ORGANIZATIONAL OBJECTIVES/STRUCTURE

In the determination of a business organization capable of ensuring effective management, operation, and maintenance programs for an AFR Light Water Reactor (LWR) Spent Fuel Storage Facility licensed under Nuclear Regulatory Commission (NRC) regulations, a number of essential and comprehensive business planning activities have to be evaluated and implemented. Following is a discussion of some of the major considerations for developing an effective organizational structure.

2.1 Purpose of Organization

The legal entity to be established for the organization needs to be determined early as it will directly influence the organization's statement of purpose and the development of its charter.

For this study, the organizational purpose and charter are assumed to be that of a contractor operating as an independent business entity; responsible for managing, operating, and maintaining a licensed government-owned AFR storage facility on a cost plus fee basis in accordance with (i) applicable laws and regulations and (ii) fair and reasonable practices with its employees and the general public.

Negotiations for storage and other contractual matters with customers are assumed to be handled through a Department of Energy (DOE) Operations Office similar to the arrangement currently employed for uranium enrichment services.

2.2 Policies and Procedures

The development of policies and procedures: written, verbal, formal, and informal will be required. It is expected that such policies and procedures would be developed during the preoperational phase of the project. Policies should cover the essential aspects of the business while describing the principles and responsibilities prescribed in order to achieve the organization's business objectives. Policies and procedures should be compatible with potential constraints placed upon the organization by its owners, customers, regulators (including federal, state, and local governmental authorities), employees, and those competitive alternatives available from other organizations. Examples of pertinent policy and procedure topics are provided in Appendix A.

2.3 Business Planning

Business planning which considers the near-, intermediate-, and long-term time dimensions will have to be conducted on a regular basis for effective AFR spent fuel storage programs. Plans should include consideration of such items as customer contractual commitments, future storage expansion programs, impact of new regulations or revisions to existing regulations, financial implications, and legal aspects of the business and the ability of the business organization to deal with these items.

2.4 Organizational Structure

Properly managing, operating, and maintaining an AFR spent fuel storage facility will require experienced and skilled personnel throughout the organization. The functions and responsibilities of each department should be integrated into an organization capable of effectively meeting the daily pre-operational, operational, and post-operational requirements of the facility in accordance with regulations applicable to nuclear fuel storage facilities. In addition, the capability to provide support services such as accounting, purchasing, employee relations, environmental control, and security should be considered in the development of the organizational structure.

A hypothetical organization, which would provide an organizational structure suitable for efficiently and effectively managing, operating, and maintaining a government-owned AFR storage facility on a contractor basis, has been developed and is described in Section 3.2 and Appendix B. This organizational structure contains the necessary functional units required to conduct spent fuel storage activities on an independent business basis.

2.5 Customer Contractual Arrangements

Preliminary plans published by the Department of Energy anticipate that spent fuel storage will be an integral part of the total scope of radioactive waste disposal services included in any contractual arrangement between the United States government and the United States utility companies or foreign utilities or governments. Therefore, contracts with the United States utility companies and possibly foreign utilities or foreign governments for spent fuel storage services will have to be negotiated, executed, and administered. However, for purposes of this study, only those activities associated with interim spent fuel storage are evaluated.

It is suggested that the lead governmental responsibility for AFR storage programs be delegated and coordinated through a DOE Operations Office in a manner similar to the government's enriched uranium production program.

Contractual arrangements for spent fuel storage should include provisions specific to the receiving, handling, and storing of spent fuel. For example, the shipping casks to be used in transporting the spent fuel should be evaluated prior to initial fuel receipt to determine the cask's compatibility with the facility cask receiving area. If special cask handling equipment is required then sufficient time should be scheduled to permit equipment procurement and checkout prior to initiating actual shipments. Also, the condition of the spent fuel should be determined and agreed upon prior to placing the fuel into storage, so that necessary handling and other requirements are properly considered beforehand. A number of specific contractual provisions, applicable to spent fuel activities, are provided in Appendix C. Also included in Appendix C is a suggested table of contents for a typical spent fuel storage contract.

3.0 ECONOMIC CONSIDERATIONS

3.1 Project Life Cycle

Project life cycle for an AFR spent fuel storage facility can be determined by adding together the various stages experienced during its project cycle. The principal stages in the life of an AFR storage facility include:

- Design, Construction, Licensing, and Preoperational Phase (DCLP)
- Fuel Receiving Operations (FR)
- Fuel Caretaker or Surveillance (FC)
- Fuel Removal Operations (FE)
- Facility Decommission (FD).

The total time required to complete these phases can be compressed or extended somewhat, the fuel caretaker mode being subject to the greatest elasticity. For purposes of this study, the time period for each stage has been assumed as follows:

- DCLP - Four years
- FR - Four years
- FC - Fifteen years
- FE - Four years
- FD - Three years.

A planning schedule for the 5000 MTU program could be phased so that the existing storage facility portion could be modified and placed into early operation (about 30 to 36 months) after authorization to start. In addition, new pool construction could commence simultaneously to spent fuel receiving and storage operations in the existing FRSS.

A typical life of project schedule (about 30 years) is presented in Figure 3-1.

3.2 Capital Requirements

Capital requirements for converting a reprocessing facility spent fuel receiving station into an AFR spent fuel storage facility were prepared by AGNS in FY 1978 using actual costs for the BNFP-FRSS as a basis for the estimate (Reference 1). A recent reexamination of these estimates was conducted and the preliminary conclusion is that the total capital cost estimate for storage expansion to 5000 MTU as prepared during FY 1978, along with the projected spending pattern for this capital, is still valid (Reference 4).

Expansion capital, i.e., the capital required to expand storage capacity to 5000 MTU, was estimated to be $109 million. Table 3-1 gives a breakdown of the major cost components in addition to providing an estimated spending pattern (Reference 1).

It is understood that an initial, substantial capital commitment may be required to make the spent fuel storage station of an existing reprocessing facility available for use by the government through a mutually agreed upon arrangement. However, it is beyond the scope of this study to estimate such cost or terms for the use of such a facility by the government.

For the purposes of this study, spent fuel storage racks of the high-density design are categorized as capital items; and, therefore, their cost is included in the estimate provided for expansion capital.

Capital approval and authorization lead times are assumed to be compatible with financial policies and procedures, to ensure achieving the spending patterns presented in Table 3-1.

3.3 Operating Expenses

Annual operating expenses were developed for AFR spent fuel storage activities using the BNFP-FRSS facility as the basis for the estimates. The facility descriptions (see Reference 1) for expanding storage within the existing facility and for adding new storage pools to the existing facility provided the framework for developing the manpower and operating cost elements.

Each essential function or activity associated with spent fuel receiving and storage operations at the BNFP-FRSS for the 5000 MTU storage configuration was identified, and a cost estimate was prepared for each activity. The principal operating cost categories considered in this study include: operations-related expenses, such as energy requirements, radioactive waste disposal, and operating supplies; and support service expenses, such as equipment for analytical services, security, and environmental monitoring and control.

In addition to identifying the operating cost functions, a facility organization, which would be responsible for managing, operating, and maintaining the facility as an independent business entity, was developed. The salaries and fringe benefit cost components for the entire staff of the hypothetical organization are based upon equivalent salaries of AGNS staff for similar duties and responsibilities. The hypothetical organization developed to manage, operate, and maintain an AFR storage facility was based upon the functional units developed for the BNFP. This organization, which could be utilized for AFR spent fuel storage activities, is described in greater detail in Appendix B. Manpower requirements associated with the functional organization chart are listed in Table 3-2. For the 5000 MTU storage facility, 215 and 125 employees have been identified for the receiving and caretaker modes of operation, respectively. Reduced activities during the caretaker mode would lower the total staff requirements in most of the functional units.

Specific items considered in developing the annual operating expense projections contained in Table 3-3 included the following:

- Salaries and fringe benefits for the staff
- Electricity
- Fuel oil
- Operations supplies
- Safety and environmental control equipment and supplies
- Maintenance materials and services
- Security equipment and supplies
- General office supplies.

Other cost items such as income, sales, use, ad valorem, property and other taxes, property insurance, and facility depreciation were not included in the analysis as the facility is assumed to be under government ownership; therefore, it is assumed that such items are not applicable as cost components.

The various cost categories were projected for the fuel receiving, caretaker, and removal modes of operations. The itemized costs for the life of project period were then summed and averaged over the term of operation to give an average annual cost estimate. The method of determining the undiscounted average annual operating expense for an AFR spent fuel storage facility of 5000 MTU capacity over a projected life cycle of about 30 years is provided in Table 3-4.

The estimated average annual operating expense is about $6.5 million.

TABLE 3-1

EXPANSION CAPITAL (1)
AFR SPENT FUEL STORAGE FACILITY

Category	Amount ($MM)	Year-Amount Expended ($MM)
Design Engineering	$ 7.5	1 - $ 1.5 2 - 20.6 3 - 27.3
Licensing	2.5	4 - 52.0 5 - 7.6
High Density Racks and Support Structures	34.0	
Existing Facility Modifications	6.5	
New Storage Pool Construction (Includes Support Systems)	58.5	
	$109.0	

(1) Based upon 1978 dollars escalated at 10% per year to midpoint of construction.

TABLE 3-2

MANPOWER REQUIREMENTS
AFR SPENT FUEL STORAGE FACILITY

Functional Unit	5000 MTU Capacity	
	Receiving or Removal	Caretaker
General Manager (Incl. Secretary)	2	2
Administration[1]		
• Division Manager (Incl. Secretary)	2	2
• Finance	15	6
• Procurement	10	6
• Data Processing, Records Management, and Office Services	13	10
• Contract Administration	1	1
Employee Relations[1]		
• Division Manager (Incl. Secretary)	2	2
• Employment and Employee Programs	1	1
• Training	3	2
• Community Relations and Public Affairs	1	0
Operations		
• Division Manager (Incl. Secretary)	2	2
• Receiving and Storage[2]	39	11
• Utility Operations	6	6
• Engineering, Planning, and Scheduling	4	1
• Analytical Services	7	3
• Maintenance		
- Mechanical	17	6
- Electrical and Instrumentation	12	6
Regulatory Services[1]		
• Division Manager (Incl. Secretary)	2	2
• Regulations and License Compliance	3	1
• Operational, Radiation, and Industrial Safety	15	7
• Environmental Control	2	1
• Quality Assurance/Control	5	3

TABLE 3-2 (CONTINUED)

MANPOWER REQUIREMENTS
AFR SPENT FUEL STORAGE FACILITY

Functional Unit	5000 MTU Capacity	
	Receiving or Removal	Caretaker
Safeguards[3]		
• Division Manager (Incl. Secretary)	2	2
• Physical Security[4]	38	36
• Technical Security	7	4
• Contingency Planning	1	1
• Nuclear Material Control	3	1
TOTAL STAFF	215	125

(1) The staff included herein would permit operation of the program as an independent business entity. It would be possible to coordinate a number of service-type functions through a centralized corporate structure thereby reducing the manpower requirements at the facility, if desired by the facility operator.

(2) Includes eight operators per four rotating shift crews for receiving or removal mode of operation. (One per shift plus three additional daytime operators for caretaker mode.)

(3) The size of the security staff reflects those requirements defined in pending safeguards requirements for AFR spent fuel storage facilities as described in proposed regulation 10 CFR Part 72 and regulation 10 CFR Part 73.

(4) Includes eight patrol officers per four rotating shift crews for each mode of operation.

TABLE 3-3

OPERATING EXPENSE BY CATEGORY ($MM/YEAR)[1]
AFR SPENT FUEL STORAGE FACILITY

Category	5000 MTU Capacity	
	Receiving or Removal	Caretaker
1. Salaries, incl. fringe benefits (standard plus hazardous workmen's compensation)[2]	$4.84	$2.82
2. Electricity	1.19	1.12
3. Fuel Oil	0.90	0.61
4. Security Equipment & Supplies	0.12	0.06
5. Office Equipment & Supplies	0.64	0.38
6. Operational Supplies[3] (ex. waste disposal)	0.35	0.31
7. Waste Disposal	0.08	0.03
8. Safety & Environmental Control Equipment & Supplies	0.35	0.18
9. Maintenance Materials & Services	0.27	0.18
Subtotal	8.74	5.69
10. Contractor Fees (6%)	0.52	0.34
TOTAL	$9.26	$6.03

(1) Constant 1979 dollars.

(2) Based upon equivalent AGNS salary for similar duties.

(3) High-density storage racks are considered a capital item in this study and are not included herein.

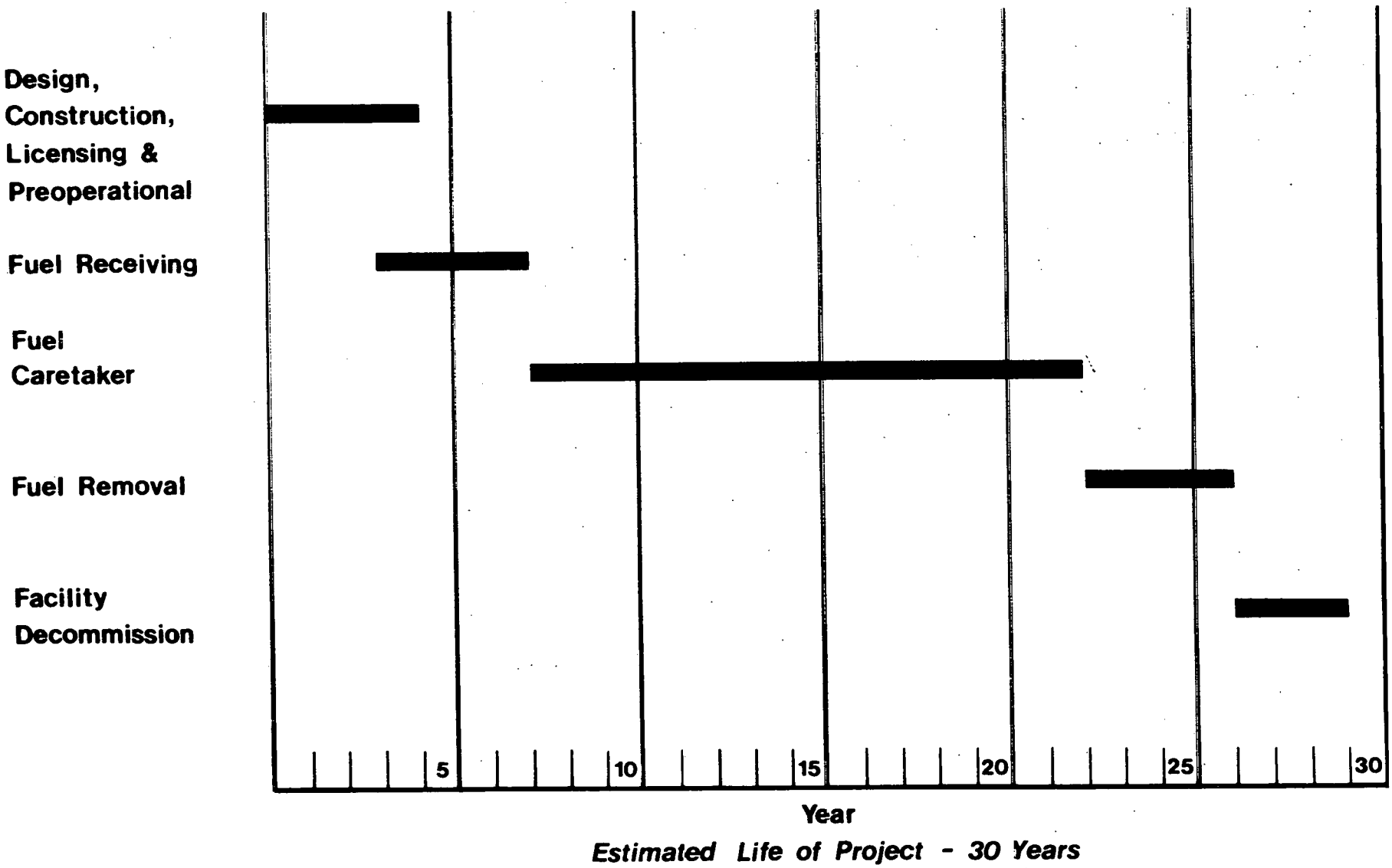
TABLE 3-4

AVERAGE ANNUAL OPERATING EXPENSES ($MM)
AFR SPENT FUEL STORAGE FACILITY

Mode of Operation	Years of Operation	Annual Operating Expense	Total Operating Expense
Preoperation (1)	4	$ 4.63	$ 18.52
Receiving	4	9.26	37.04
Caretaker	15	6.03	90.45
Removal	4	9.26	37.04
Decommission (1)	3	4.63	13.89
Subtotals	30		$196.94

Average Annual Operating Expense ≈ $6.5 Million

(1) Preoperational and decommission expenses on an annual basis are assumed to be 50% of the operating costs during the receiving or removal modes.



LIFE OF PROJECT SCHEDULE
AFR SPENT FUEL STORAGE FACILITY

FIGURE 3-1

4.0 REFERENCES

1. Frank A. Shallo, LWR Spent Fuel Storage, AGNS-1040-1.4-20 (August 1978).

2. Paul N. McCreery, et al, Interface Criteria for Shipping Casks and Fuel Handling Facilities, Report No. Y/OWI/SUB-78/1 (January 1979).

3. A. B. Johnson, Jr., Behavior of Spent Nuclear Fuel in Water Pool Storage, Battelle Pacific Northwest Laboratories, Richland, Washington, BNWL-2256 (September 1977).

4. Shallo, Frank A., et al, Converting Reprocessing Plant's Fuel Receiving and Storage Area to an Away-From-Reactor (AFR) Storage Facility, AGNS-35900-1.3-32 (September 1979).

LIFE OF PROJECT OPERATING EXPENSES FOR AWAY-FROM-REACTOR (AFR) SPENT FUEL STORAGE FACILITY

APPENDIX A

TYPICAL POLICY AND PROCEDURE TOPICS

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APPENDIX A

TYPICAL POLICY AND PROCEDURE TOPICS

Examples of policy and procedure topics listed on a functional basis for the AFR spent fuel storage facility organization described in Appendix B would include the following:

- Administration
  - Monetary Approval Authority
  - Energy Conservation
  - Standards Committee Participation
  - Operational Safety Committee
  - Speeches, Articles, and Interviews
  - Office Services
  - General Housekeeping
- Employee Relations
  - Manpower Requirements
  - Benefit Programs
  - Compensation Program
  - Compliance with Legal Requirements
  - Public Information
  - Photographic Authorization for Media
- Environmental Control
  - Environmental Monitoring
  - Effluent Monitoring
  - Meteorological Monitoring
  - Permit Applications
- Finance
  - Capital Budgeting
  - Expense Reporting
  - Travel
  - General Accounting
  - Payroll
  - Capital Additions, Retirements, and Transfers
- Licensing
  - Compliance with Legal Requirements
  - Relationships with Regulatory Bodies

- Nuclear Material Control

  - Control and Accounting Program

- Operational Safety

  - Reporting of Injuries
  - Incident/Event Reports
  - Industrial Safety
  - Safety Inspection
  - Site Emergency Plans and Procedures
  - Safety Improvement
  - OSHA Compliance
  - Personal Protection
  - Chemical Safety
  - Health Physics
  - Fire Protection and Prevention
  - Medical Program

- Operations

  - Authorities and Responsibilities for Safe Operation and Shutdown
  - Surveillance Testing of Systems and Equipment
  - Operations Lock and Tag
  - Change Authorizations
  - Preliminary Operating, Checkout, and Standard Operating Procedures
  - Work Request
  - Hazardous Work Permit
  - Maintenance Program
  - Shift and Relief Turnover
  - Off-Site Shipment of Hazardous Materials
  - Notification or Recall of Responsible Personnel
  - Correcting Abnormal or Alarm Conditions

- Procurement

  - General Purchasing
  - Preparation and Approval of a Purchase Requisition
  - Purchase Contract Approvals
  - Acceptance of Gratuities
  - Safety-Related Equipment or Material Purchases
  - Material Pedigrees
  - Purchasing Agreements

- Quality Assurance

  - Quality Assurance Program
  - Quality Assurance Committee
  - Classification and Replacement of Safety-Related Items
  - Cognizant Engineers
  - Welding and Materials Engineering
  - Exceptions

- Records Management

  - Control of Documents
  - Identification and Control of Correspondence, Reports, and Forms
  - File System
  - Central File Requests
  - Transmittal of Documents to Records Management
  - Records Storage Transfer
  - Publications
  - Library Services

- Security

  - Material Clearance
  - Personnel and Vehicle Access
  - Employee and Visitor Parking
  - Prohibited Items
  - Handling Special Incoming Mail or Material

- Training

  - Employee Indoctrination and Training
  - Retraining of Selected Personnel.

LIFE OF PROJECT OPERATING EXPENSES FOR AWAY-FROM-REACTOR (AFR) SPENT FUEL STORAGE FACILITY

APPENDIX B

PERSONNEL DESCRIPTIONS

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APPENDIX B

PERSONNEL DESCRIPTIONS

The operation of the Barnwell Nuclear Fuel Plant - Fuel Receiving and Storage Area including the necessary ancillary support areas as an AFR Spent Fuel Storage Facility with a capacity of 5000 metric tons of uranium as an independent business entity would require a staff of about 215 during the receiving mode and about 125 during a caretaker or surveillance mode. The following parameters were considered in the development of these staff requirements:

- Operation of the facility as an independent business entity on a contract basis
- The BNFP facility lay-out plan (Reference 1)
- Personnel training and certification requirements established to comply with existing and anticipated regulations.

This independent organization would function under five basic divisions reporting to a general manager as outlined in the organization chart (Figure B-1). The qualification, selection, training, and certification of the operating staff is expected to be governed by facility licensing commitments and compliance with the Code of Federal Regulations and Regulatory Guides. An extensive inhouse technician training program has been established at the BNFP to accomplish its objectives and the program was recently described in a study performed for the Department of Energy under contract ET-78-C-09-1040-5.3-37. It is assumed that such a training program would be used in conjunction with AFR spent fuel storage operations. The manpower required for the various departments of the basic divisions are estimated as follows:

1.0 Administrative Division

An initial staff of approximately 43 personnel providing the following services:

- Finance - Develops and controls the financial cost control system, establishes and implements accounting procedures, practices, and financial controls applicable to operations. With input from other departments, performs business planning for the organization.
- Procurement/Warehousing - Purchases equipment and merchandise required by the facility at the most economic price consistent with quality and schedule. Receives, stores, inventories, and disperses the material and merchandise to meet organizational needs.
- Data Processing - Provides computer programming and other EDP systems services for inventory, cost, material, and financial controls dictated by facility operations.

- Records Management/Office Services - Files, retains, and stores documents generated by Architectural/Engineering, outside sources, and all internal records applicable to operations. Provides word processing, communications services, and clerical support.

- Contract Administration - Provides interface with DOE to assure proper implementation of fuel storage contractual matters.

2.0 Employee Relations Division

An initial staff of approximately 7 personnel to develop, implement, and coordinate the following programs consistent with Federal regulations and organization policy:

1. Employment
2. Labor Relations
3. Salary Administration
4. Benefits and Employee Services
5. Affirmative Action/Equal Employment Opportunity
6. Orientation and Training.

In addition, this division is responsible for the following activities:

- Directs the formulation, interpretation, and application of established employee relations policies throughout the organization

- Protects the interests of employee in accordance with organization's personnel policies and procedures, and appropriate govermental laws and regulations

- Provides public relations including media contacts, public presentations, and contributions to support community activities

- Conducts organizational and management development programs along with operator training and required retraining activities.

3.0 Operations Division

An initial staff of approximately 87 personnel capable of providing the following services:

- Operations Department - Handles, with four rotating shift crews, the receipt of casks, storage of fuel, preparation of empty casks for the return shipment, maintains the operational readiness of the facility by controlling contamination levels and water quality, and operates ancillary utility areas.

- Technical Services Department - Coordinates production planning, scheduling, traffic and transportation; supplies technical knowledge to operating procedures, design and equipment changes; evaluates new equipment, facility design changes, etc.; and provides continuous radiochemistry and chemical analyses support to operations.

- Maintenance Department - Provides mechanical maintenance, preventative maintenance, and operation of mobile equipment. An electrical and instrumentation staff is included to provide maintenance, calibration, installation of new equipment for operations, and other service groups.

4.0 Regulatory Services Division

An initial staff of approximately 27 personnel required to perform the following:

- Regulatory Compliance (QA/QC and License Compliance) - Provides administrative, enforcement, and functional services to assure implementation of a Quality Assurance Program in conformance with Federal regulations applicable to the design, construction, operation, maintenance, modification, safeguards, and transportation activities related to the facility. This department also provides the principal interface for regulatory agency representatives.

- Operational Safety - Provides Health Physics support to the organization including advising on radiation protection criteria, and implementing a Health Physics program to minimize radiation exposure.

  This department assures that health and safety programs are effectively implemented, that all monitoring is implemented where appropriate, and that all monitoring devices are properly calibrated and working properly. Monitoring includes in-plant monitoring of areas and personnel, and in addition, environmental monitoring of areas around facilities and emissions from the facilities. Meteorological and hydrological data are collected to support environmental analysis.

  This department also provides support to the organization in regard to the environmental impact of actions and assures that no actions will adversely affect either the employees or general public from a radiological safety standpoint.

- Industrial Safety - Provides programs and develops policies and procedures to assure an industrially safe working environment. Programs conducted by this department include: industrial safety, accident prevention, industrial hygiene, fire protection, OSHA compliance, medical and first aid, and emergency equipment.

5.0 Safeguards Division

An initial staff of approximately 51 personnel required to provide the following services:

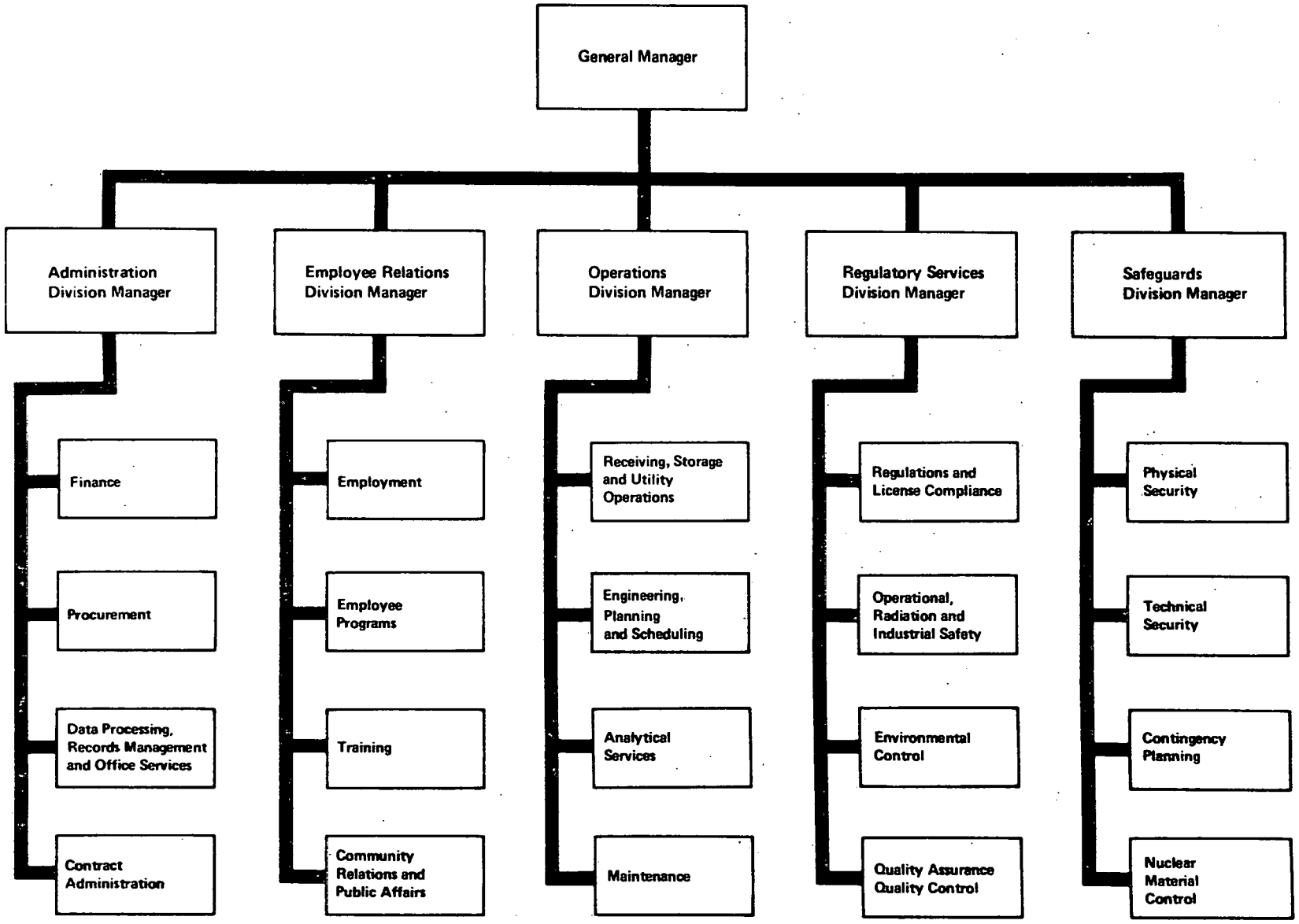
- Physical Security - Provides industrial security for plant through use of security forces, operation of security monitoring equipment, operation of a Central Alarm Station and Operations Center, and control of passageways and other security posts.

This department has the overall responsibility to:

- Prevent the theft of Special Nuclear Material (SNM)
- Prevent industrial sabotage
- Provide armed response to security alarms
- Provide overall industrial security for personnel and property.

- Technical Security - Provides the technical expertise to assure that all electronic monitoring equipment is properly installed and operational to established standards. Maintains all electronic equipment and directs outside maintenance where required. Assures that all monitoring equipment is properly calibrated. Reviews and selects equipment where applicable to meet all operational and regulatory requirements.

- Nuclear Materials Control - Provides development and management of the organization's Nuclear Materials Accounting and Control System. Assures maintenance of the control of SNM within limits required by regulations. Directs the organization audit and inspection program designed to monitor compliance with safeguards-related regulations. Develops and implements systems and procedures to assure proper control of SNM.



ORGANIZATION CHART
AFR SPENT FUEL STORAGE FACILITY

FIGURE B-1

LIFE OF PROJECT OPERATING EXPENSES FOR AWAY-FROM-REACTOR (AFR) SPENT FUEL STORAGE FACILITY

APPENDIX C

SPECIFIC CONTRACTUAL PROVISIONS

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APPENDIX C

SPECIFIC CONTRACTUAL PROVISIONS

Any contract between the Federal Government and domestic electric utility companies or foreign countries for AFR spent fuel storage services should contain a scope of services section which clearly defines the overall responsibilities of each party.

Activities such as providing shipping casks, defining the mechanical condition of spent fuel prior to shipment, transporting the spent fuel, assuring that casks are maintained in license condition, and transferring ownership of fuel would likely be included in the utility's scope of services. Receiving and unloading spent fuel from the shipping casks, placing spent fuel into storage and maintaining the storage facility, accepting ownership of spent fuel, preparing casks for empty off-site shipments, and providing adjustments if reprocessing of spent fuel occurs at a later date would be considered as Government responsibilities. Both parties would be mutually responsible for establishing the term and quantity of spent fuel covered by the contract, developing shipping and receiving schedules, complying with applicable Governmental regulations, and developing specific handling requirements for defective spent fuel.

Payment schedules would have to be established and made a part of the contract for the basic storage service along with provisions for charge adjustments for such items as (i) changes in Governmental regulations, (ii) supplemental services such as minor cask maintenance at the AFR storage facility, or (iii) special handling equipment and devices required for handling and storing fuel assemblies having mechanical failure(s).

Proper implementation of spent fuel storage activities requires that the compatibility between those cask systems to be employed in shipping fuel to the AFR storage facility and the cask receiving and handling capabilities at the AFR storage facility be established prior to initial fuel receipts. A report entitled, "Interface Criteria for Shipping Casks and Fuel Handling Facilities," was prepared by AGNS under contract with Union Carbide (Reference 2). This document examines in detail the characteristics of shipping and receiving facilities. In addition, transportation equipment is evaluated and essential requirements for properly interfacing this equipment with the shipping and receiving facilities are determined.

Contractual provisions which adequately cover the interface requirements of the cask system and the AFR storage facility necessary to ensure equipment compatibility should be an essential part of any contract arrangement between utilities and the owners of the AFR storage facility. The contract should address interface criteria such as presented in Reference 2. As a minimum, the following items should be considered:

- System for identifying fuel assemblies during loading and unloading operations
- Utilization of casks which are compatible with AFR storage facility
- Preoperational checkouts (i.e., "dry runs" at the AFR storage facility) of each cask type to be utilized
- Cask decontamination requirements
- Responsibility of each party regarding interface equipment such as cask yokes, grapples, wrenches, and other handling devices along with spare parts inventory
- Cask handling, unloading, and preparation for shipment procedures including appropriate checklists
- Requirements and responsibilities for cask maintenance, cask inspections, and cask emergency or accident situations
- Party designated as licensee and shipper (The licensee is responsible for obtaining all regulatory clearances, special permits, and the preparation of the Bill of Lading.)
- Schedules and plans covering advance notification of shipments to the AFR storage facility along with details about the fuel and shipping routes and the condition of the spent fuel.

Spent fuel characteristics were evaluated in a report prepared by A. B. Johnson, Jr., wherein he concluded that the failure rate of spent fuel has been low and experience indicates that spent fuel with reactor-induced defects can be handled, shipped, and stored satisfactorily (Reference 3). However, it appears prudent to include provisions in the contract to (i) establish the various levels of potential fuel failure; i.e., pinhole defects, longitudinal and/or circumferential cracks, breaks in cladding, etc., (ii) determine any special handling and storage methods to be employed, and (iii) provide for appropriate supplemental charges for handling and storing such spent fuel.

Provisions should also be included in the contract to permit either party the opportunity to visit the other party's site for inspections specific to spent fuel and/or spent fuel cask matters.

A typical table of contents which highlights many of the essential elements of a spent fuel storage contract is provided as Table C-1.

TABLE C-1

TYPICAL AFR SPENT FUEL STORAGE CONTRACT

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