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PROGRAM PLAN OF THE EPICOR AND WASTE RESEARCH AND DISPOSITION PROGRAM OF THE TECHNICAL SUPPORT BRANCH

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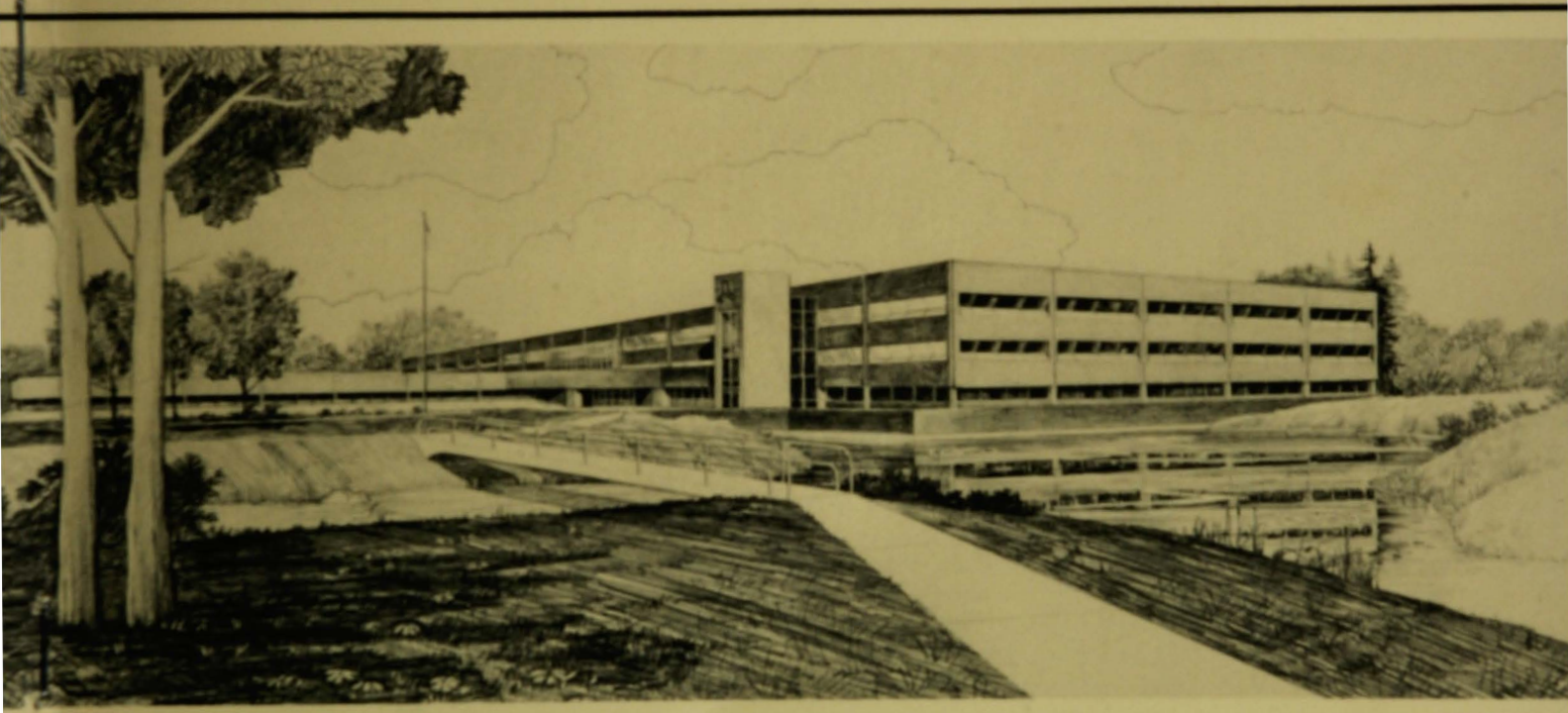
Operated by the U.S. Department of Energy



This is an informal report intended for use as a preliminary or working document

Prepared for the
U.S. DEPARTMENT OF ENERGY
Three Mile Island Operations Office
Under DOE Contract No. DE-AC07-76-ID01570

EG&G Idaho

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PROGRAM PLAN
OF THE
EPICOR AND WASTE RESEARCH AND DISPOSITION PROGRAM
OF
THE TECHNICAL SUPPORT BRANCH

Revised December 1983

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1. INTRODUCTION

Three Mile Island (TMI) Unit 2 reactor cleanup requires sophisticated decontamination techniques. That decontamination effort has generated a variety of nuclear wastes, the disposal of which will use existing waste disposal technologies wherever possible. The Department of Energy (DOE) recognizes that solutions to TMI problems will provide generic information applicable to a broad spectrum of nuclear accidents plus develop new procedures, techniques, and equipment. Accordingly, DOE has committed research and development funds[a,b] to support a variety of TMI recovery efforts. The EPICOR and Waste Research and Disposition Program allows General Public Utilities Nuclear Corporation (GPUNC) and DOE to demonstrate commercial disposal of special wastes and safe storage of abnormal wastes. It also fosters advancing the technology of nuclear waste disposal. Special wastes generated by both accident and routine power station operations are typified by the EPICOR-II organic resins and inorganic ion exchange zeolites used in water decontamination at TMI. Abnormal wastes at TMI are those contaminated with excess amounts (>100 nCi/gm) of transuranic elements which preclude their disposal at commercial facilities. This program plan defines the work that will be done by EG&G Idaho, Inc. in the EPICOR and Waste Research and Disposition Program, and it explains under what controls the work will be accomplished.

1.1 Goals

Goals of the EPICOR and Waste Research and Disposition Program are (1) to safely dispose of the 50 EPICOR-II liners as Class "C" low-level wastes and (2) to provide for safe receipt and storage of all abnormal wastes on a reimbursable basis until they can be disposed at a federal repository.

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a. Memorandum of Understanding between the U.S. Nuclear Regulatory Commission and the U.S. Department of Energy, July 15, 1981.

b. Memorandum to the Secretary of Energy from the President of the United States, Decisions on Department of Energy Appeal, March 20, 1981.

1.2 Objectives

The objectives for the EPICOR and Waste Research and Disposition Program are as follows:

- o Prepare/construct facilities and equipment suitable to receive and interim store TMI EPICOR-II liners.

- o Perform liner integrity examinations, resin degradation, resin solidification and other research evaluations of the liners and contents including field tests of solidified samples.

- o Develop and test a high integrity container (HIC) suitable for use in disposing of liners in a commercial burial ground as Class "C" wastes.

- o Secure agreement from the State of Washington for use of the High-Integrity Container in disposal of EPICOR-II liners.

- o Provide for a demonstration disposal of one liner and its High-Integrity Container overpack at a commercial low-level waste disposal facility.

- o Perform operations to prepare the remaining disposable liners for disposition at a commercial disposal facility, within constraints of existing and proposed low-level waste regulatory criteria.

- o Dispose of selected materials as DOE research remains.

- o Provide facilities for safe receipt and storage of abnormal wastes (pending successful negotiations with GUNC).

- o Make available samples of abnormal wastes for research.

- o Remove selected EPICOR program equipment from the TAN-607 Hot Shop.

Progress in this program has seen major completions in the first five listed objectives. Most of the facility upgrades, construction activities, and preparations needed for receipt of liners were complete in FY-1982. The first of the liners were received and placed into interim storage in that year. This was followed by a shipping campaign in FY-1983 whereby all of the liners were removed from TMI shipped to INEL and placed in storage. Continuance of work initiated in FY-1981 led to completion of the HIC design, construction and acceptance testing in FY-1983. At the end of FY-1983, in preparation for a HIC Disposal Demonstration, one liner, PF-18, was prepared, placed in an HIC, sealed and placed in the newly constructed CNS-14-190 shipping cask awaiting authorization from the State of Washington to complete the demonstration. That demonstration is to be followed by a regular disposal campaign. The disposal demonstration awaits the outcome of negotiations on the "Use Agreement" that were ongoing through FY-1983. This agreement is for use of the HIC in burial operations at the commercial burial ground near Hanford, Washington. The agreement was prepared under contract by U.S. Ecology, operator of the facility, and submitted to the State. The State solicited comments on this use from the NRC. EG&G Idaho, Inc. U.S. Ecology, and Nuclear Packaging (who designed and constructed the prototype HIC units) collectively prepared responses to the NRC comments; the outcome of this exchange is yet to be determined.

Meanwhile, in FY-1983, EG&G/DOE presented the Resin Research Plan to the NRC with the result that the NRC is assuming funding responsibility and program control about mid-FY-1984. That research work has progressed with completion items such as all research equipment essentially complete, liner integrity exams complete, disposal of PF-3 and PF-16 research remains complete, liner coring for solidification work complete, and degradation work well along.

The EPICOR and Waste Research and Disposition Program Plan presented herein is a revision that no longer reflects all those activities and objectives that have been completed as discussed above. The revised plan does reflect a major modification in the scope of work, the addition of TMI Abnormal Waste Receipt and Storage activities, a decision that was reached

by DOE and others in FY-1983. This has led to changing the title of the program plan from the "EPICOR-II Research and Disposition Program" of earlier years to that given on the title page of this document. Other work described in this plan include completion of EPICOR liner disposal operations, completion of Resin Research work prior to NRC assuming control of the program, and certain other activities of a facility restoration nature.

2. TECHNICAL DESCRIPTION

2.1 EPICOR-II Project

The water in the TMI-2 Auxiliary and Fuel Handling Building (AFHB) was decontaminated by processing it through tanks of ion exchange zeolites and resins. Fifty tanks (called EPICOR-II liners) were used during the AFHB decontamination operation. Each liner contains approximately 35 cubic feet of either organic resin or resin plus inorganic zeolite (Figure 1). The 50 liners removed approximately 80,000 curies of radioactivity (principally cesium, strontium, and their daughter products) from the AFHB water.

Each EPICOR-II liner is a cylinder (4 ft dia by 4.5 ft tall), fabricated from 0.25-inch welded steel (Figure 1). The top surface is recessed 6 inches below the edge of the side wall. In the top, threaded ports function as inlet and outlet for filtered liquids, attachment of instrumentation, and ventilation. The inlet and outlet ports are connected individually to header systems inside the liner. The inlet header system spreads contaminated water over, while the outlet header system collects filtered water from, the ion exchange medium. At the present time, the small ports are closed by threaded steel plugs. Also in the top is a large port covered by a cap made from the end of a standard 55-gallon steel drum. The cap is sealed with a bung. The large port was used when the liner was equipped with its ion exchange medium and fitted with header systems. The bottom is constructed of a steel plate larger in diameter than the cylinder (study Figure 1). As a result, the bottom plate is attached to the side wall via external and internal circumferential welds.

The ion exchange medium in 11 EPICOR-II liners is organic resin; that in the remaining 39 liners is organic resin mixed with a layer of inorganic zeolite. Each liner is loaded with less than 2,200 curies, comprised mostly of strontium-90, cesium-134 and -137, and their daughter products; small amounts of ruthenium-106, rhodium-106, and barium-137; and trace amounts of uranium-238 and transuranic elements (neptunium-237, plutonium-241, and americium-241). The radiation field outside each liner

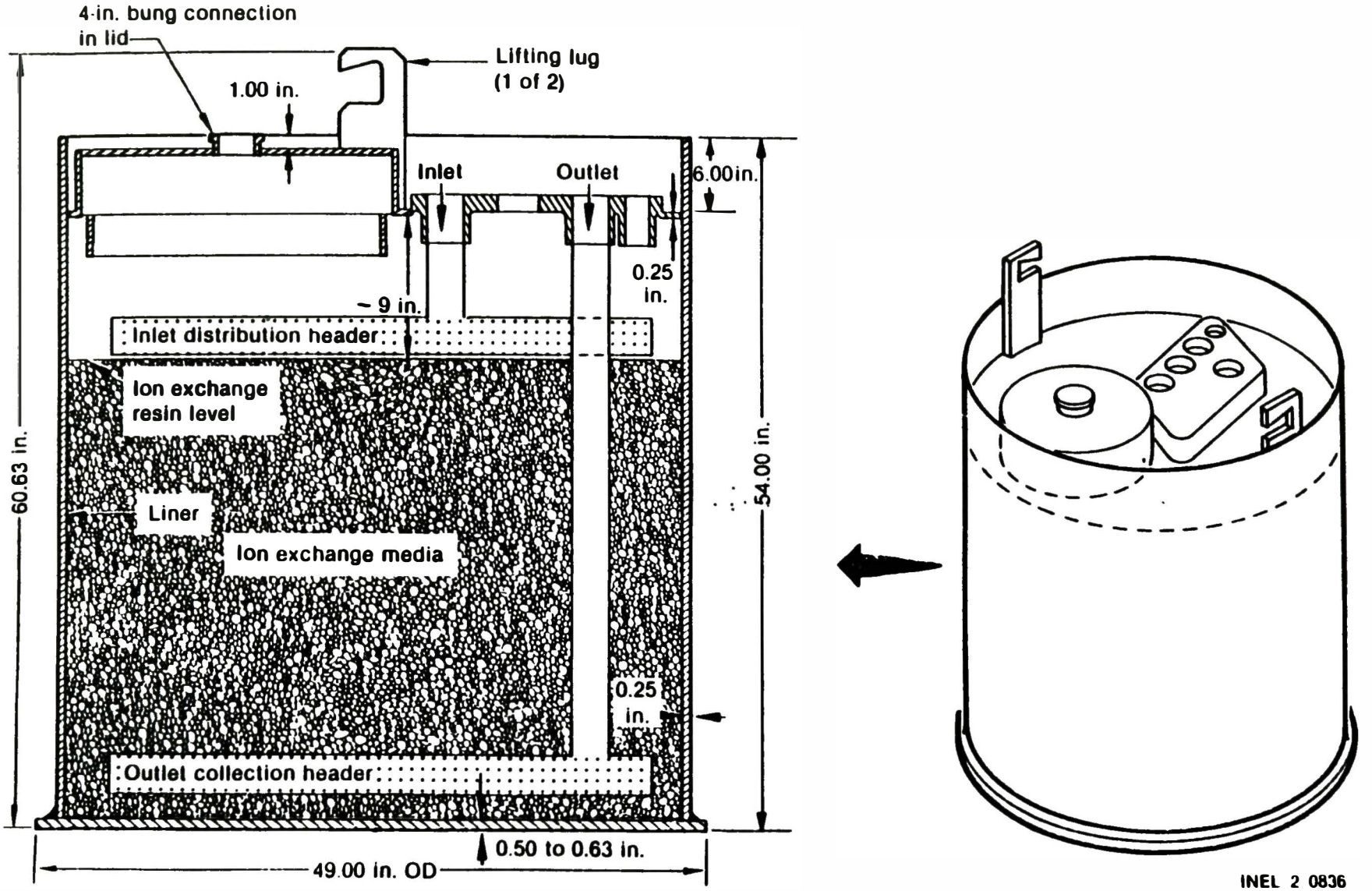

Figure 1. Schematic Diagram of EPICOR-II Liner.

approaches 2800 R/hr on contact. In those liners with organic resins only, the radioactivity presumably declines from the top to the bottom of the resin bed. In those containing both resin and zeolite, the radioactivity appears concentrated in the layer of zeolite.

Liners are stored in two shielded storage silos within the TAN-607 Hot Shop. The silos are each 19.75 feet in diameter; fabricated from two upright, steel cylinders; and erected over a turntable measuring 17.5 feet in diameter (Figure 2). Each silo is covered with a removable lid constructed of steel beams supporting the weight of lead plate (2.5 inch thick). Shielding in the silo wall attenuates the radiation field from the enclosed 24 liners to less than 50 mR/hr at 3 feet from the outside wall. Shielding in the silo roof reduces the dose-rate to less than 50 mR/hr at the level of the overhead crane, 38 feet above the silo. Calculations of shielding efficiency are based on the conservative assumptions that all 24 liners are loaded to 2,300 curies each. That quantity of activity would produce a radiation field of 1100 R/hr at 1 foot from the side of the liner.

The High-Integrity Container is a cylinder resembling that diagrammed in Figure 3. Its dimensions are 5.2 feet in diameter by 7 feet tall, and it is constructed of 6 inches of high-strength reinforced concrete, with a 0.25-inch internal steel jacket. Development and use of a High-Integrity Container for EPICOR-II liners is an alternative to the immobilization of filtration resins from operating commercial power reactors. The High-Integrity Container permits disposal of filtration resins at a commercial disposal facility as Class "C" wastes, because the overpack is an efficient barrier to intruders, as discussed in 10 CFR, Part 61 (draft); and it effectively will confine radionuclides in the resins and zeolite for 300 years, eclipsing the 150-year minimum in 10 CFR, Part 61 (draft).

The Disposal Demonstration focuses on disposing of one EPICOR-II liner (PF-18) contained in a High-Integrity Container at a commercial low-level waste disposal facility. PF-18 was placed and sealed in a High-Integrity Container and is awaiting authorization for disposal at the commercial disposal facility near Richland (WA).

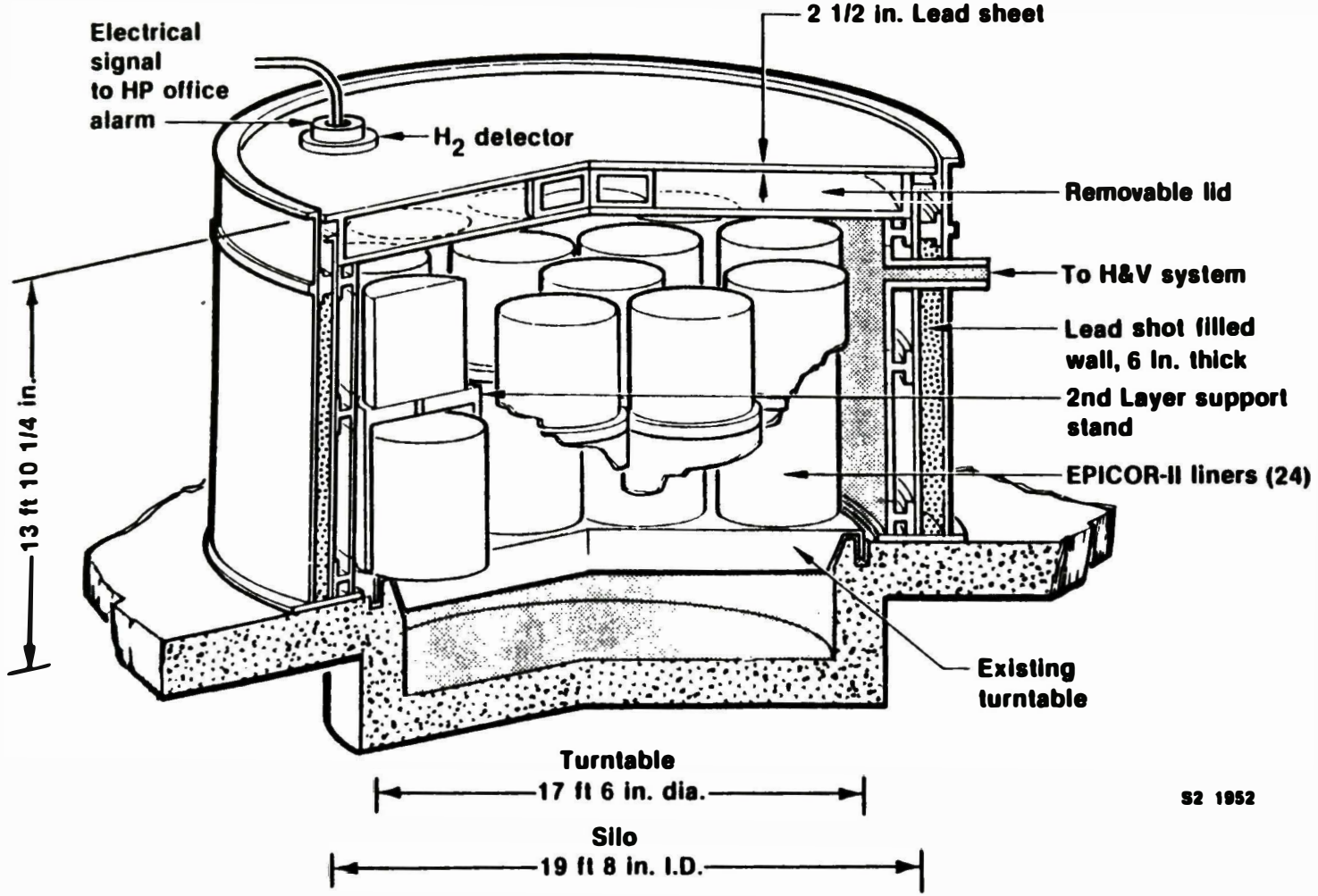

Figure 2. Storage Silo for EPICOR-II Liners in the TAN-607 Hot Shop.

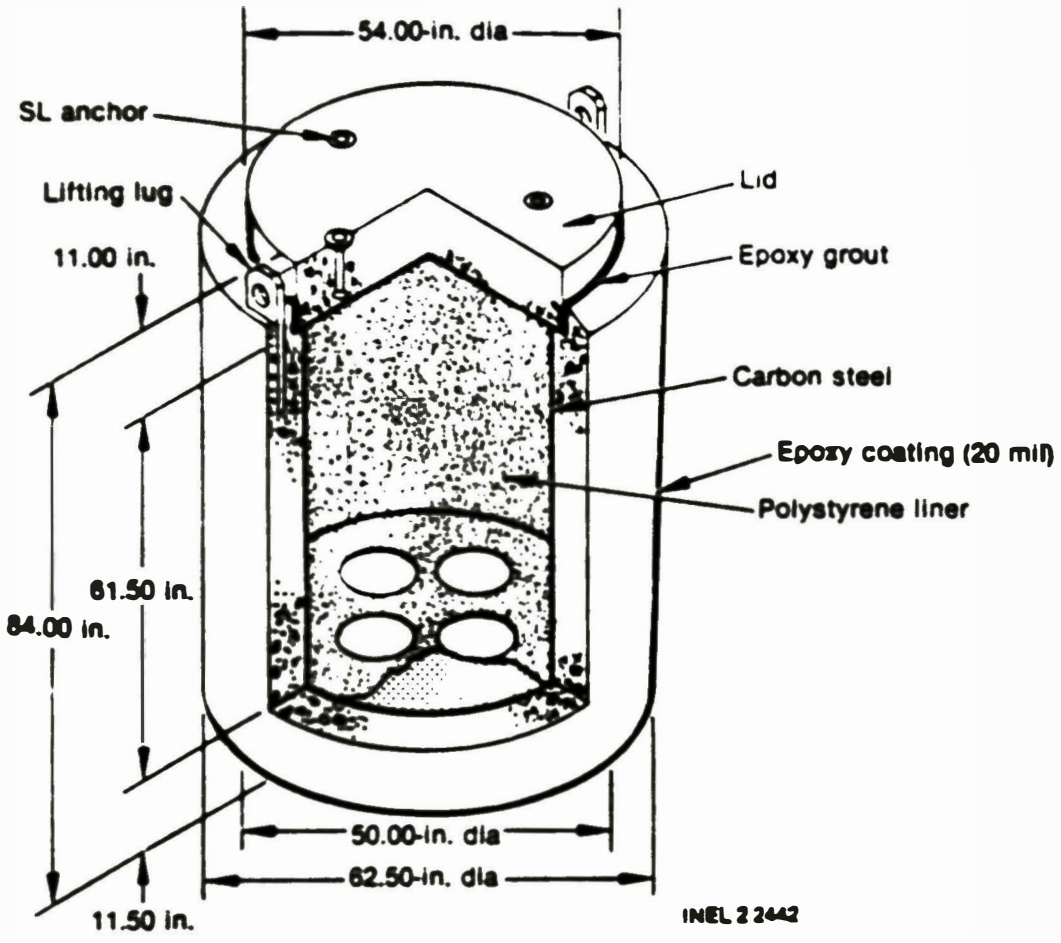

Figure 3. Diagram of the High-Integrity Container

2.2 Abnormal Waste Project

Abnormal wastes at TMI are estimated volumetrically at 800 cubic feet; they include plant cartridge filters, sludges, organic ion-exchange resins, miscellaneous contaminated equipment, subsurface demineralizer system cartridges, and sand filter assemblies. When those wastes are characterized in more detail, some wastes may prove acceptable for disposal at a commercial disposal facility. Because total volumes and types of waste expected from the TMI cleanup are uncertain, storage and disposal methods are flexible enough to handle significant changes in volume.

In the United States, disposal sites for high-TRU wastes do not exist at present, although such facilities are under development. To provide for the final disposal of the TMI abnormal waste, a disposal sequence was developed that allows interim storage of the waste until final disposal sites are developed. Figure 4 illustrates the sequence.

The first step involves packaging the waste according to criteria formulated by INEL and transporting to the INEL for interim storage. The second step necessitates providing suitable storage facilities which will permit retrieving or sampling wastes for research. And the last step is retrieval of the waste and repackaging it into forms acceptable to the yet-to- be-built federal repository.

In the sequence just described GPUNC retains responsibility for the final disposal of the TMI abnormal waste, and DOE provides storage for the waste because of its high-beta-gamma activity. At the end of the storage period, INEL could process the waste to a final disposal form(s), or it could coordinate the processing with other DOE or commercial facilities. INEL would coordinate shipping the waste to the disposal site.

Three options for storage at INEL are being considered. The three options are (1) outdoor storage in Temporary Storage Casks at TAN, (2) underground vault storage at RWMC, and (3) storage in the EPICOR-II silos in the TAN-607 Hot Shop. Each option has advantages and disadvantages.

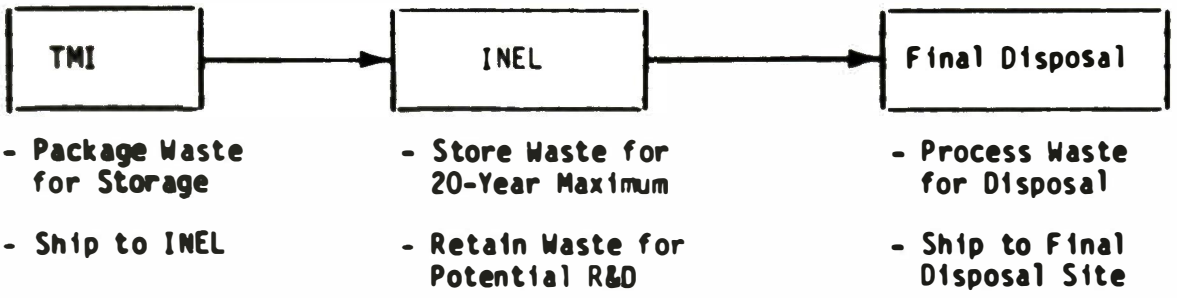

Figure 4. TMI Abnormal Waste Disposition Sequence.

Option 1 involves placing the packaged TMI abnormal waste in concrete Temporary Storage Casks (Figure 5) and storing the casks outdoors at TAN. Eight 30-gallon drums or three SES filters would be placed in each cask. Twenty-eight casks (25 for sludges and three for filters) would be sufficient to store the wastes currently identified.

Option 1 for storage has several advantages: For example, the method is flexible with respect to different total waste volumes because the number of casks bought can be changed easily. Another advantage is that the Temporary Storage Cask can accommodate several sizes of waste packages. Long-term storage of TMI abnormal waste by this method would not impact any other known INEL programs. Similar storage casks were built in 1960 and have remained outdoors since then with no deterioration. One disadvantage is that Option 1 requires more handling of the waste and this increases the accident risk compared with other options. The scheduling of unloading operations in the TAN Hot Shop also would require close coordination with other projected programs in that facility.

Option 2 involves placing the TMI abnormal waste in underground storage vaults at the Intermediate Level Transuranic Storage Facility (ILTSF) of the RWMC. Figure 6 shows a typical RWMC ILTSF vault (24-inch diameter by 15-ft length) presently used for routine TRU waste storage. Fifty vaults of this type would be used for storage of the 30-gallon drums containing the TMI abnormal waste. The SDS filters would require five 30-inch-diameter vaults of a similar design. A 30-inch vault could be used for 55-gallon drums.

The Option 2 has several advantages over other options. The first is that similar waste has been stored routinely at RWMC for almost eight years and the technology is well developed. Much of the required equipment, procedures, and systems for monitoring the waste already exist. Personnel experienced in waste handling and equipment operation also are available at RWMC. In addition, this option has some flexibility with respect to the total waste volume to be stored. However, the time to construct the vaults and pads for Option 2 would be longer than the time needed to begin storage

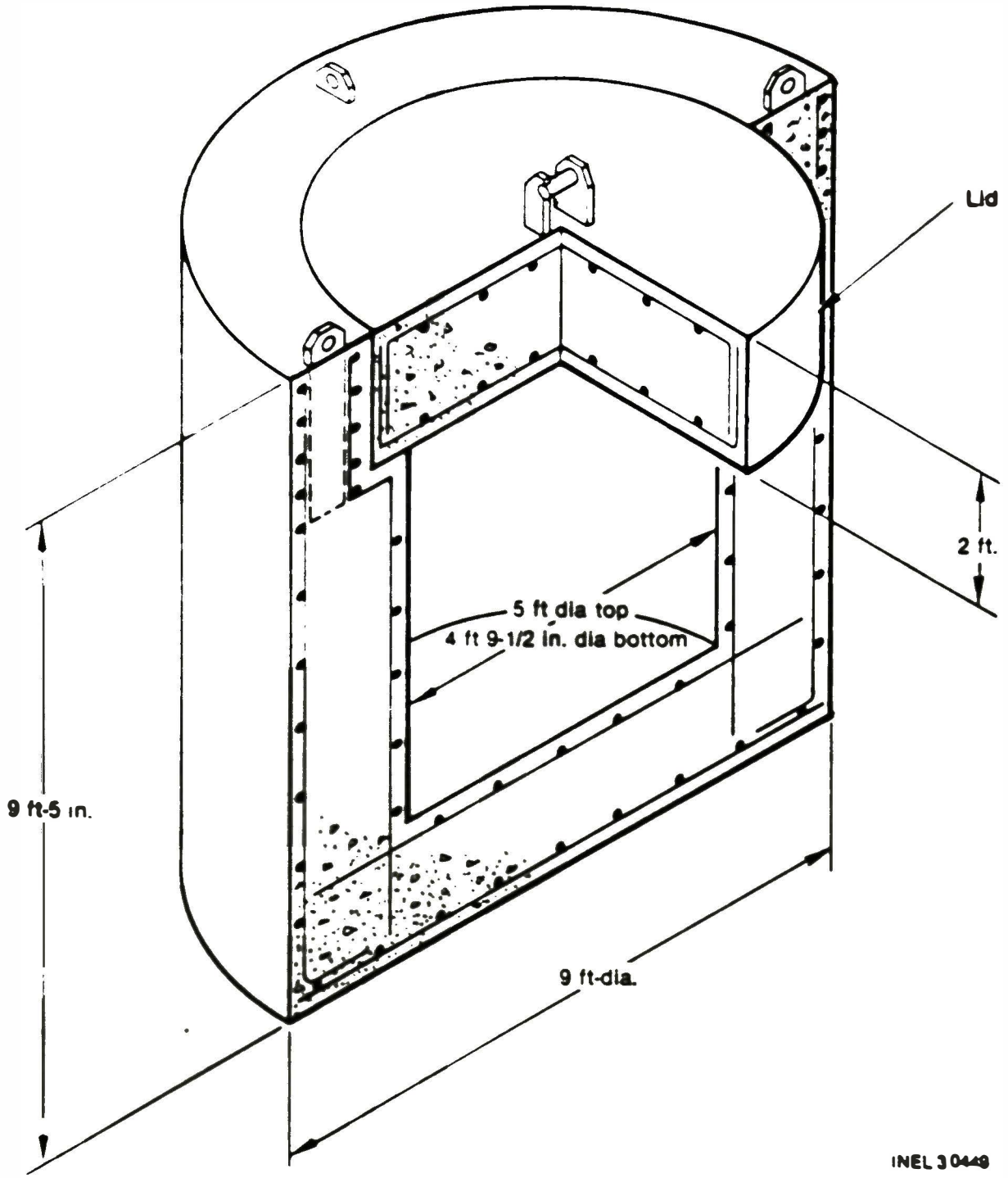

Figure 5. Concrete Temporary Storage Casks for TMI Abnormal Waste.

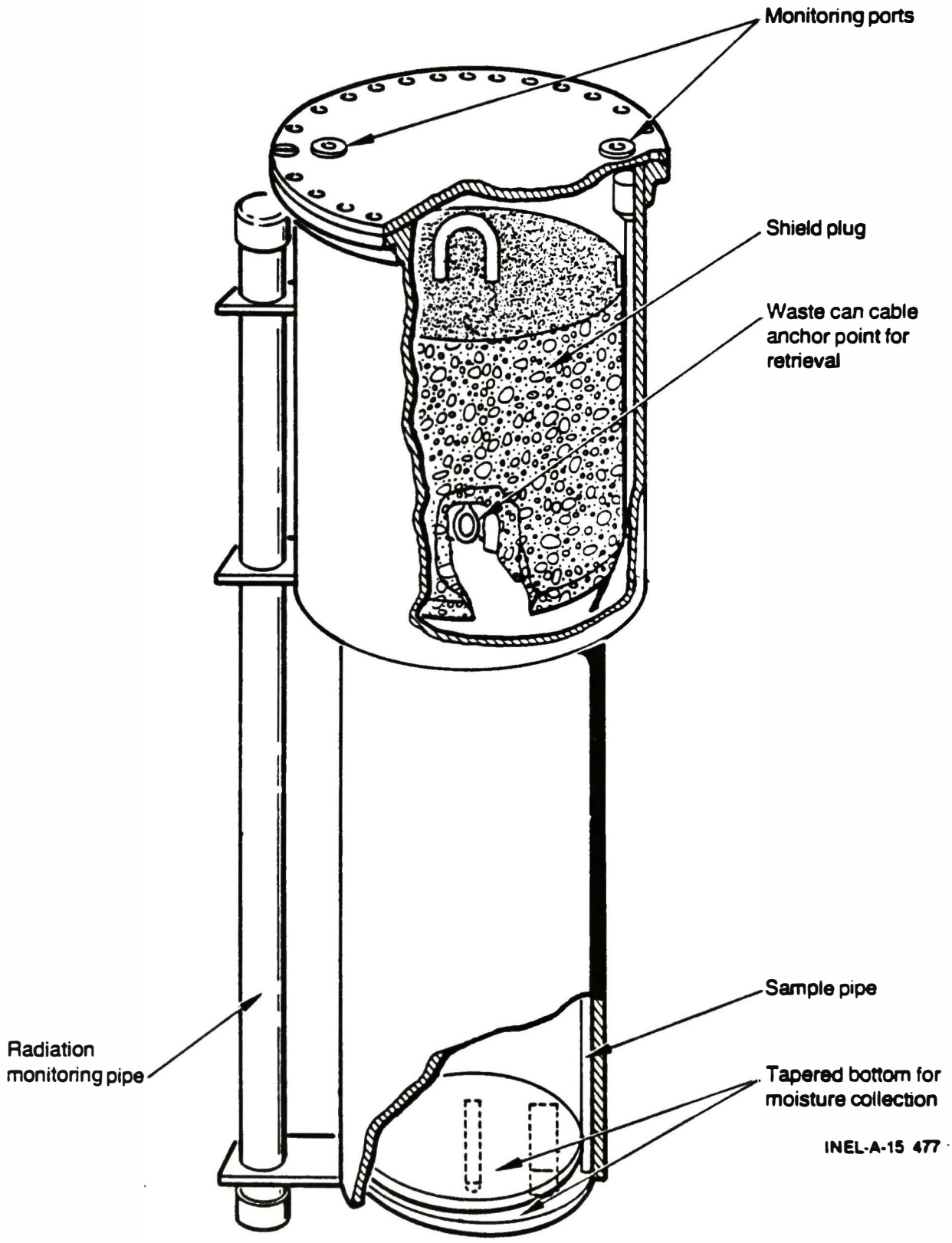

Figure 6. Typical 24-inch diameter intermediate level TRU waste vault at the RWMC.

using Temporary Storage Casks (Option 1). Several disadvantages are apparent with the Option 2. Present RWMC criteria for acceptance of TRU contaminated waste are based on waste acceptance criteria of the Waste Isolation Pilot Plant and would require immobilization of the sludges and, possibly, resins and filters. An exception or variance from the immobilization requirement would be necessary to preserve the form of the abnormal waste for future research and development use. Immobilization agents, such as cement, would also significantly increase the volume of waste. In addition, a new RWMC transfer cask would be needed to receive waste with radiation levels higher than 100 R/hr on contact. Special permission also would be required for receipt of waste with radiation levels above 30 R/hr on contact. This could be a severe limitation, considering the unknown radioactivity of some of the TMI abnormal waste .

Option 3 involves placing the TMI abnormal waste in one of the TAN-607 storage silos constructed for the EPICOR-II Program. Figure 2 shows a silo filled with EPICOR-II liners. With special racks, a storage silo could hold as many as 252 30-gallon drums and 18 SDS filters. The drums would be stacked in four layers and the filters in two layers. Thus the numbers and types of waste containers must be determined before the silo racks are designed. This information would be especially critical if 55-gallon drums or 4 x 4 liners were used.

There are several advantages of the Option 3. The first advantage is that the silo exists, thereby minimizing construction costs and startup time. Procedures also exist for unloading EPICOR-II liners, and modification of those procedures for abnormal waste would be minimal. All operations would take place in the containment of the Hot Shop, which would significantly reduce environmental risk during an accident. Several disadvantages also exist for this option. Other anticipated programs could create schedule conflicts with waste receipt, similar to those potential conflicts discussed for the temporary storage cask option. The volume of abnormal waste that can be received and stored in the Hot Shop is limited to the storage space available in the silos. If waste produced at TMI significantly exceeds the estimate, another method of storage may be required.

3. PROGRAM MANAGEMENT

3.1 Organization Structure

The EPICOR and Waste Research and Disposition Program is an element of the Program Plan for the U.S. Department of Energy TMI-2 Programs. Technical responsibility for the Program resides in the Technical Support Branch of the Nuclear Materials Evaluation Programs Division (NMEPD) of EG&G Idaho, Inc. Overall responsibility for the Program is that of DOE-ID.

Organization of the EPICOR and Waste Research and Disposition Program is illustrated in Figure 7. Responsibility for management and control of all phases of the program resides with the Program Manager. Responsibility includes negotiations with DOE, establishment of program requirements and criteria, identification and authorization of work to be performed, establishment and control of direct budget and schedule requirements, monitoring and reporting program status and performance to NMEPD and DOE-ID, and maintaining liaison with the TIO Branch. The Program Manager, who reports to the Manager of the Technical Support Branch, is supported by a cadre of cost account managers each of whom administers a work package of the Program. The major work scope of each cost account manager is defined in Figure 7.

3.2 Responsibility Matrix

Specific responsibilities of each performing organization are shown in Table 1. The responsibilities are listed relative to work packages of the Program. The Program Manager has overall responsibility for cost, schedule and technical performance and has authority to direct all aspects of the program within the work scope and budget as baselined by this program plan. Each cost account manager is responsible to the Program Manager for technical, cost and schedule, and performance and has authority for the implementation of his respective areas. The systems engineer is responsible for establishing the technical requirements of the program work packages and the interfaces between work packages and will monitor

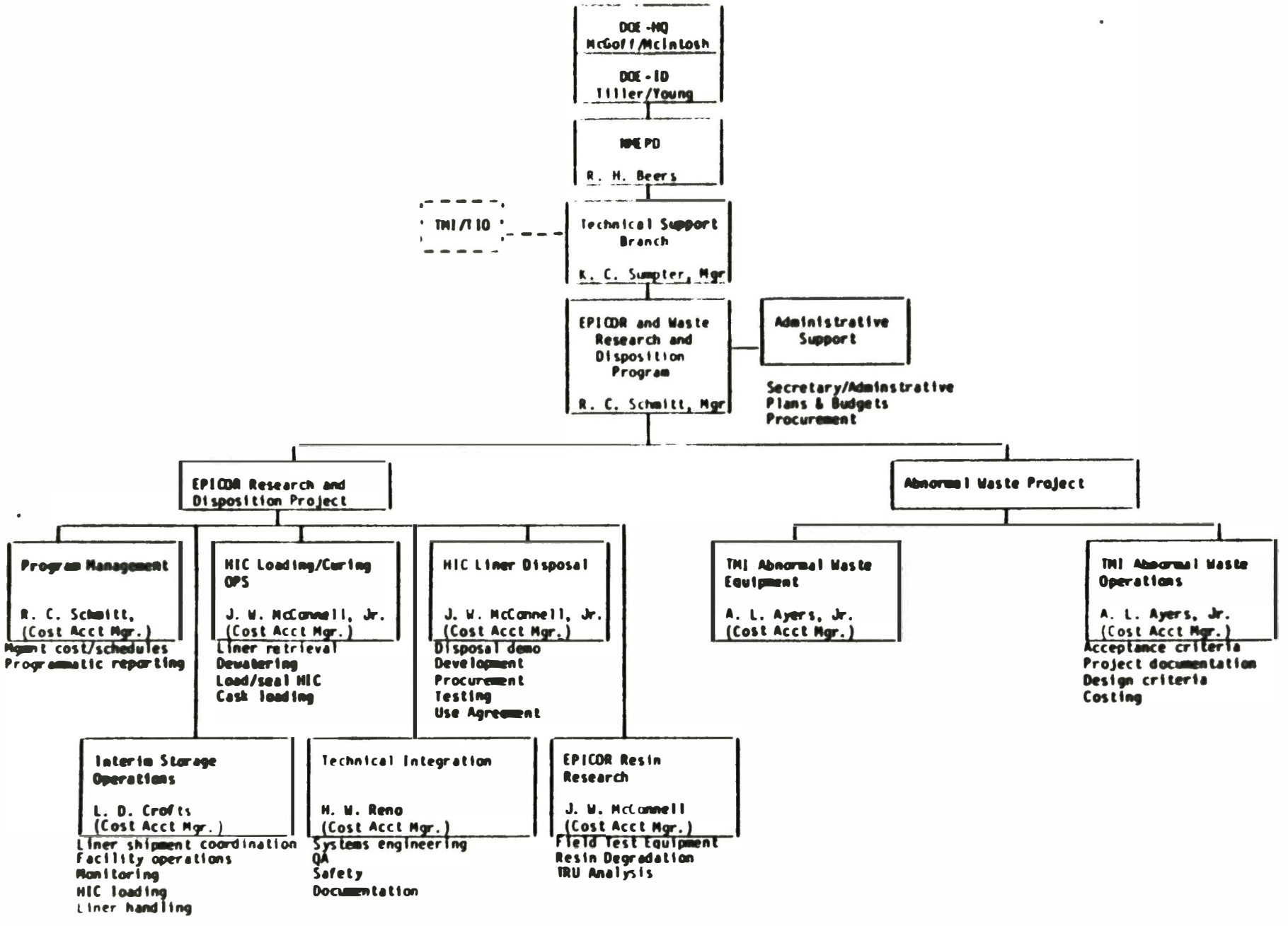

Figure 7. Functional Organization of the EPICOR and Waste Research and Disposition Program, Identifying Principal Participants and Cost Account Managers.

TABLE 1. RESPONSIBILITY MATRIX FOR THE EPICOR AND WASTE RESEARCH AND DISPOSITION PROGRAM

	Technical Direction	Coordinator	Review Design	Approve Design	Perform Work	Approve Changes Within Budget/Schedule	Prepare Document	Review Document	Approve Document
PROGRAM MANAGEMENT									
Program Plan	TSB	TSB	NA	NA	ALL	TSB	ALL	ALL, ID	TSB, NMEPD, ID
Project Management	TSB	TSB	NA	NA	TSB	TSB	TSB	ALL	TSB, NMEPD
HIC LOADING/CURING OPS									
Liner Retrieval	TSB	TSB	HSD	HSD	FAC-OP	TSB	FAC-OP	ALL	TSB
Dewatering	TSB	TSB	HSD	HSD	FAC-OP	TSB	FAC-OP	ALL	TSB
Load/Seal HIC	TSB	TSB	HSD	TSB, HSD	FAC-OP	TSB	FAC-OP	ALL	TSB
Cask Loading	TSB	TSB	HSD	TSB, HSD	FAC-OP	TSB	FAC-OP	ALL	TSB
HIC LINER DISPOSAL									
HIC Procurement	TSB	TSB	E&I	TIO, ID	GPUNC	TIO, ID	TIO, GPUNC	TIO, GPUNC	GPUNC, ID
Shipping	TSB	TRANS	HSD	HSD	E&I	E&I	E&I	E&I	E&I
Disposal (Commercial	PSY	PSY	E&I	PSY, HSD	SUBCONT	PSY	SUBCONT	ALL	PSY
Disposal (DOE)	PSY	PSY	ALL, ID	PSY, C	TSB	PSY	TSB	ALL, ID	PSY, ID
INTERIM STORAGE OPERATIONS									
Operations	FAC-OP	FAC-OP	FAC-OP, HSD	FAC-OP, HSD	FAC-OP	FAC-OP	FAC-OP	FAC-OP	FAC-OP
TECHNICAL INTEGRATION									
Document Preparation	TSB	TSB	TSB	NA	TSB,TP	TSB	TSB,TP	TSB, NMEPD	TSB, NMEPD, ID
ABNORMAL WASTE									
Shipping	TSB	TRANS	HSD	HSD	TIO, GPUNC	TIO, GPUNC	TIO, GPUNC	TIO	TIO
Design	PSY	PSY	PSY, HSD	PSY, HSD	PSY, ENG	PSY	PSY, ENG	ALL	PSY
Procurement	PSY	PSY	NA	TSB, C	PSY, ENG	PSY	PSY, ENG	ALL	PSY
Fabrication	PSY	PSY	NA	NA	TANMFG	PSY	PSY, ENG	ALL	PSY
Installation	FAC-OP	FAC-OP	FAC-OP, HSD	FAC-OP, HSD	TANMFG	FAC-OP	FAC-OP	ALL	FAC-OP
QA Inspection	QD	TSB	ALL	QD	QD	NA	QD	ALL	TSB
Checkout	FAC-OP	FAC-OP	FAC-OP, HSD	FAC-OP, HSD	FAC-OP	FAC-OP	FAC-OP	ALL	FAC-OP
Receipt	FAC-OP	FAC-OP	FAC-OP, HSD	FAC-OP, HSD	FAC-OP	FAC-OP	FAC-OP	FAC-OP	FAC-OP, HSD
Monitoring	FAC-OP	FAC-OP	FAC-OP, HSD	FAC-OP, HSD	FAC-OP	FAC-OP	FAC-OP, TSB	FAC-OP, TSB	FAC-OP, HSD
Sampling	FAC-OP	FAC-OP	FAC-OP, HSD	FAC-OP, HSD	FAC-OP	FAC-OP	FAC-OP	FAC-OP	FAC-OP, HSD
Criteria/Requirement	TSB	TSB	HSD	HSD	TSB	TSB	TSB	ALL, ID	TSB, C, HSD

ATI	=	All of the following except C, E&I, GPUNC, ID, and TIO
C	=	ID approves by commenting
E&I	=	EG&G and ID review
ENG	=	Design Engineering Division
FAC-OP	=	TAN-607 Facility Operations
GPUNC	=	General Public Utilities Nuclear Corporation
HSD	=	Health and Safety Division
ID	=	Department of Energy, Idaho Operations Office
NMEPD	=	Nuclear Materials Evaluation Programs Division
QD	=	Quality Division
PSY	=	Project Management and Systems Engineering Office
SUBCONT	=	Subcontract to Others
TANMFG	=	TAN Manufacturing
TIO	=	Technical Information Office (Branch)
TRANS	=	Transportation Division
TSB	=	Technical Support Branch

compliance with the established technical requirements and assess the impact of changes to these requirements. The Facility Management Division reviews planned activities and coordinates with the Program.

3.3 Program Baseline

The approved baseline is the Work Breakdown Structure (WBS) as defined in the program plan work scope, cost, and schedules. Detailed work packages, including statements of work scope, costs, and schedules are developed from the program plan and summarized to the summary cost account level. Any changes to the summary cost account will require further CCB action.

The detailed work packages contain the following information as a minimum:

1. Scope of work--a concise description of work to be performed.

2. Assumptions--Identifications of assumptions made when developing the work scope.

3. Products and Deliverables--What is produced or delivered as a result of work package completion.

4. Milestones--Establishment of schedules with milestones which can be evaluated relative to the established budget. What programmatic milestones are supported.

5. Prerequisites--Those items restraining the work package.

6. Establishment of cost estimates providing detailed nonlabor and labor allocations by the accounting month for the current fiscal year. The detailed nonlabor and labor allocations will define the travel, direct purchase, computer, laboratory services, printing, technical publications, graphics, subcontracts, and

technical functional support by organization. This breakdown will be provided every fiscal year and included in the Current Year Working Plan of NMEPD.

3.4 Work Breakdown Structure

The EPICOR and Waste Research and Disposition Program is divided into two projects, each of which is subdivided into work tasks. The Work Breakdown Structure of each project is illustrated in Figure 8 and each work package is summarized below.

3.4.1 EPICOR Project

Program Management--This task provides day-to-day management of the EPICOR Project and control of program milestones, budget, reporting, and personnel. The project is predicated on the following assumptions:

- The program budget baseline for FY-1984 will be $1.03M operating; this baseline is augmented by reimbursable funds from GPUNC estimated to be $670K and $660K for abnormal waste receipt and storage operations and EPICOR disposal costs, respectively. The reimbursable funds are in negotiation with actuals still to be determined.

- There will be no limitations on funding schedule. Monies will be received, as agreed, within the designated fiscal year.

- Commercial disposal operations require concurrence on a HIC Use Agreement with the State of Washington; if such agreement is not obtained, significant program changes will be necessary.

- Present funding projections include costs of disposing of the first or demonstration liner since that demonstration was not completed in FY-1983 as originally scheduled.

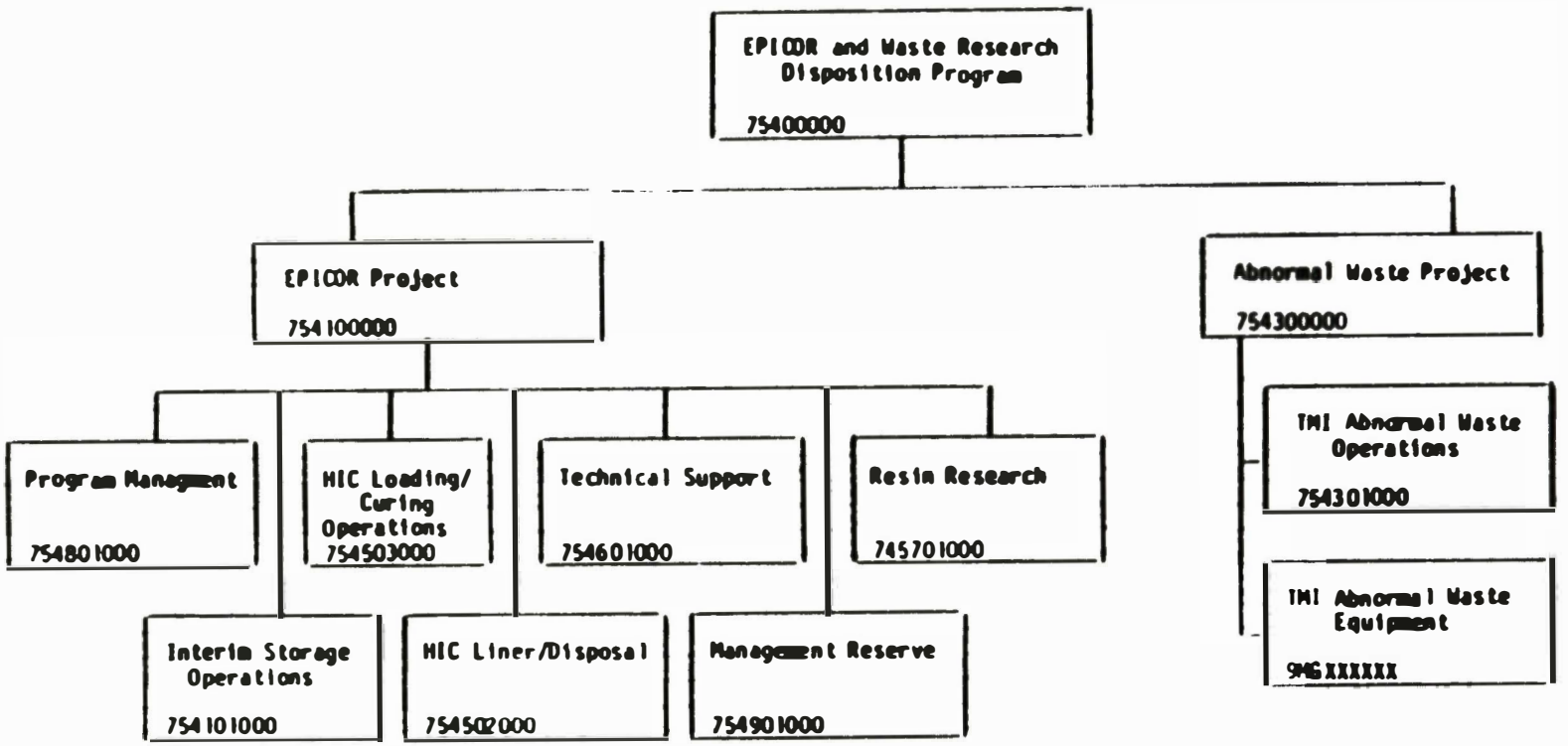

Figure 8. Work Breakdown Structure (Levels 2, 4, 5) for the EPICOR and Waste Research and Disposition Program.

- Transportation and disposal costs of all liners at a commercial disposal facility following the demonstration are the responsibility of GPUNC.

Interim Storage Operations--This task provides the necessary operating support for temporary storage of 47 EPICOR-II liners in silos in the TAN-607 Hot Shop. The remaining three liners are stored in temporary storage cask outside the Hot Shop. Included in this task is all operational support necessary to monitor liners while in silo storage. The task also provides funding to prepare for the removal of one silo and associated gear, and additional shielding for silo lids to eliminate a radiation leak. The additional shielding is needed during Hot Shop Equipment Upgrade tasks.

HIC Loading and Curing Operations--This task provides for remotely retrieving each liner from storage in a silo, dewatering the liner, loading the liner into an HIC, sealing the HIC, and placing the HIC in the transportation cask.

HIC Liner Disposal--This task provides for disposal of all liners with their HIC overpacks at the commercial disposal facility in the State of Washington and preparing a GEND report on the HIC Disposal Demonstration/EPICOR Disposal Campaign.

Technical Support--This task provides technical support and integration of that support into the EPICOR Project to ensure that the project is technically sound, correctly monitored, and adequately documented.

Resin Research--This task provides for completion in field test equipment preparations, resin degradation analyses, TRU analyses, liner coring, and related activities prior to NRC assuming responsibility for the program. That is, this task closes out DOE responsibility for the activity.

3.4.2 Abnormal Waste Project

TMI Abnormal Waste Operations--This task provides for preparation and receipt of TMI abnormal wastes at INEL. Preparation includes assisting in negotiation of a contract between DOE and GPUNC, developing INEL waste acceptance criteria, preparing project documents, developing long-term monitoring plans, preparing equipment to store the wastes, actual receipt and storage operations, and project management. This task is being negotiated and defined in FY-1984. Once the task is delineated, additional work structure may be added.

TMI Abnormal Waste Equipment--This task provides for the design, fabrication and procurement of the equipment needed in receiving and storing of abnormal wastes. The actual form of the equipment remains to be selected depending in the final option for storage.

3.5 Program Controls

Program controls follow those identified and discussed in the Management Plan of the Technical Support Branch. In that Management Plan are directions for controlling costs and schedule, formulation of work breakdown structure, configuration management, procurement, and quality assurance. A further constraint/control on the Program is that those costs associated with Abnormal Waste Project must be kept clearly separate from those costs for EPICOR project. This is accomplished by the Work Breakdown Structure and cost rollup system described above.

3.6 Reporting and Review

A monthly report is prepared for the management of the TMI Program and other EG&G Idaho, Inc. organizations, as well as DOE-ID. That report highlights work accomplished in the current month and work to be performed in the coming month. The report includes a summary cost account breakdown by work package, when the costs deviate more than 10% of the planned budget.

All design work is reviewed and approved by EG&G Idaho, Inc. Formal design reviews are held at key design stages to verify that the design satisfies design criteria, and functional and operational requirements. Additional informal design reviews are conducted as appropriate to control the design effort. EG&G Idaho, Inc. notifies DOE-ID of the formal design and facility readiness reviews. Results of those meetings (e.g., agreements and commitments) are formalized and submitted to the DOE-ID via conference records.

3.7 Documentation

The program document tree is shown in Figure 9. A list of program documentation was prepared which gives a title, brief statement of purpose, identification of performing organization, review and approval organization identifications, and preparation/review/approval schedules for each document. Responsibilities for documentation and its control matrix for the Program are shown in Table 2. Configuration management for the program follows the Configuration Management Plan given in the Management Plan of the Technical Support Branch.

3.8 Program Interfaces

Major interfaces of the Program are illustrated in Figure 10.

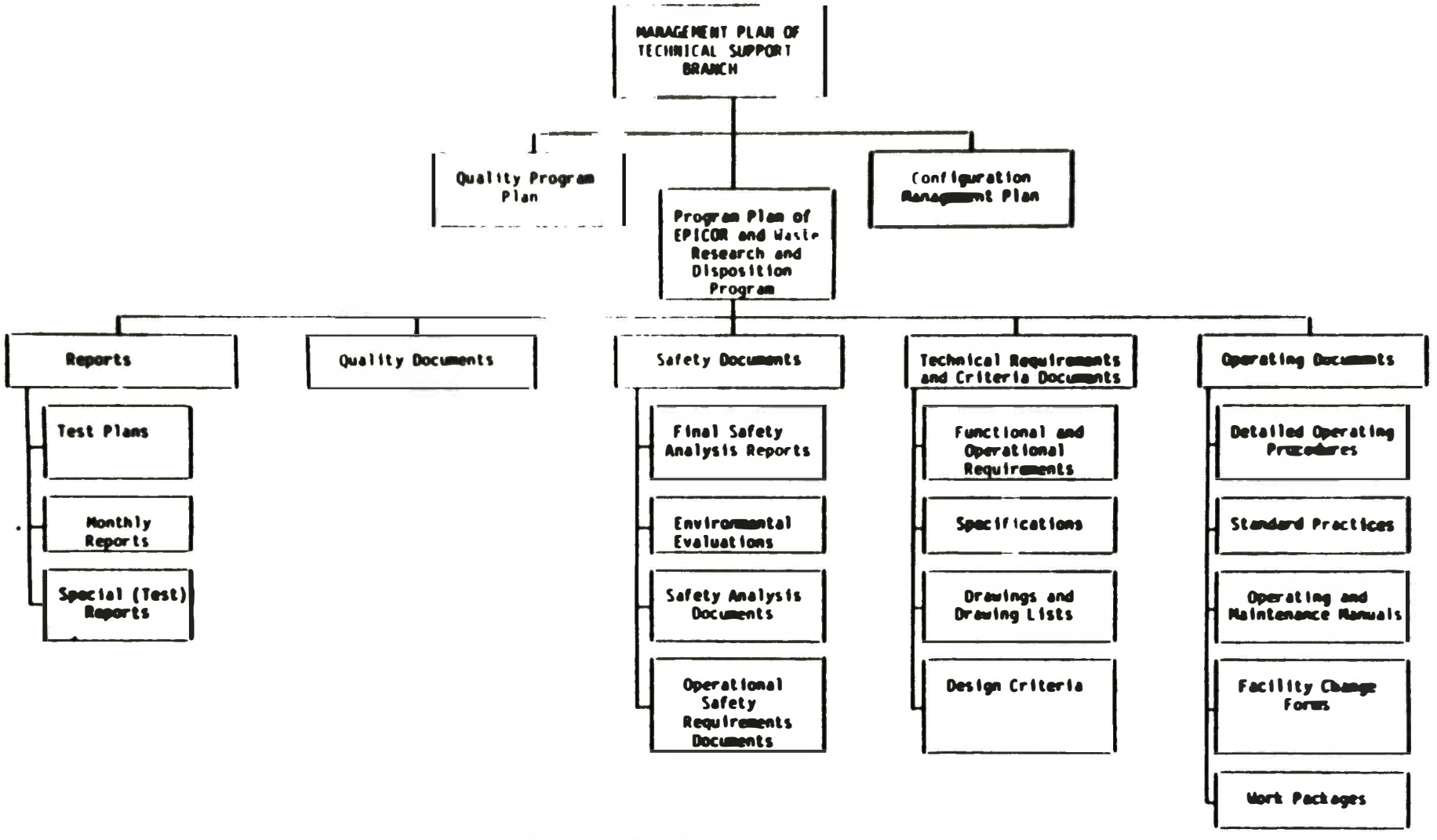

Figure 9. Document Tree for the EPICOR and Waste Research and Disposition Program.

TABLE 2. DOCUMENTATION RESPONSIBILITY/CONTROL MATRIX FOR EPICOR/WASTE PROGRAM

	Document	Prepare Baseline/ Revisions	Review Baseline/ Revisions	Approve Baseline/ Revisions	DOE-ID Review	DOE-ID[a] Approval	Procedure Reference
1.	Functional and Operational Requirements	PSY	All	TSB, FMD	X	X	(b)
2.	Hot Cell-Functional and Operational Requirements	FAC-OP, HSD	FAC-OP, HSD	FAC-OP	X	--	(b)
3.	Design Specifications	PSY, TSB	ALL	PSY, TSB	X	--	--
4.	Design Reports	PSY	ALL	PSY, TSB	X	--	(b)
5.	Design Reviews	PSY	ALL	PSY, TSB	X	--	Quality Manual
6.	Test Plans/Reports	PSY	ALL	PSY,TSB	X	--	--
7.	Quality Program Plan	QD	ALL	QD, TSB	X	X	(b)
8.	SADs, FSARs, OSRD	TSB, HSD	ALL	TSB, HSD	X	X	Safety Manual
9.	Hot Cell-SADs, FSARs, OSRD	TSB, FAC-OP	FAC-OP, HSD	FAC-OP	X	X	Safety Manual
10.	Environmental Evaluations	TSB, ELS	ALL	TSB, HSD	X	X	--
11.	Program Plan	TSB	ALL	TSB	X	--	(b)
12.	Task Plans (Work Packages)	TSB	ALL	TSB	--	--	CAPS Manual
13.	Specifications	TSB, PSY	ALL	TSB	--	--	Specification Preparation Manual
14.	Drawings	PSY, FAC-OP	ALL	TSB FAC-OP	--	--	Drawing Requirements Manual
15.	Detailed Operating Procedures	FAC-OP	ALL	FAC-OP, HSD	--	--	(b)
16.	Standard Practices	NMEPD	ALL	TSB, HSD	--	--	--
17.	Hot Cell-Standard Practices	FAC-OP	FAC-OP, HSD	FAC-OP, HSD	--	--	--
18.	Operating and Maintenance Manuals	FAC-OP	ALL	FAC-OP	--	--	(b)

TABLE 2. DOCUMENTATION RESPONSIBILITY/CONTROL MATRIX FOR EPICOR/WASTE PROGRAM (continued)

Document	Prepare Baseline/ Revisions	Review Baseline/ Revisions	Approve Baseline/ Revisions	DOE-ID Review	DOE-ID[a] Approval	Procedure Reference
19. Facility Change Forms	FAC-OP	ALL	FAC-OP	X	X	Reactor Operations Manual

a. In some instances, DOE-ID approval is by signature (e.g., Items 7 and 8); in other instances, incorporate DOE-ID comments provided after review constitues approval.

b. A draft of preparation instructions exists in the Configuration Management Manual. The Configuration Management Manual, or other existing procedures, can be used as a guide.

Legend

ALL	=	All of the following, except ELS
ELS	=	Earth and Life Sciences
FAC-OP	=	TAN-607 Facility Operations
FMD	=	Facilities Management Division
HSD	=	Health and Safety Division
NMEPD	=	Nuclear Material Evaluation Programs Division
PSV	=	Project Management and System Engineering Office
QD	=	Quality Division
TSB	=	Technical Support Branch

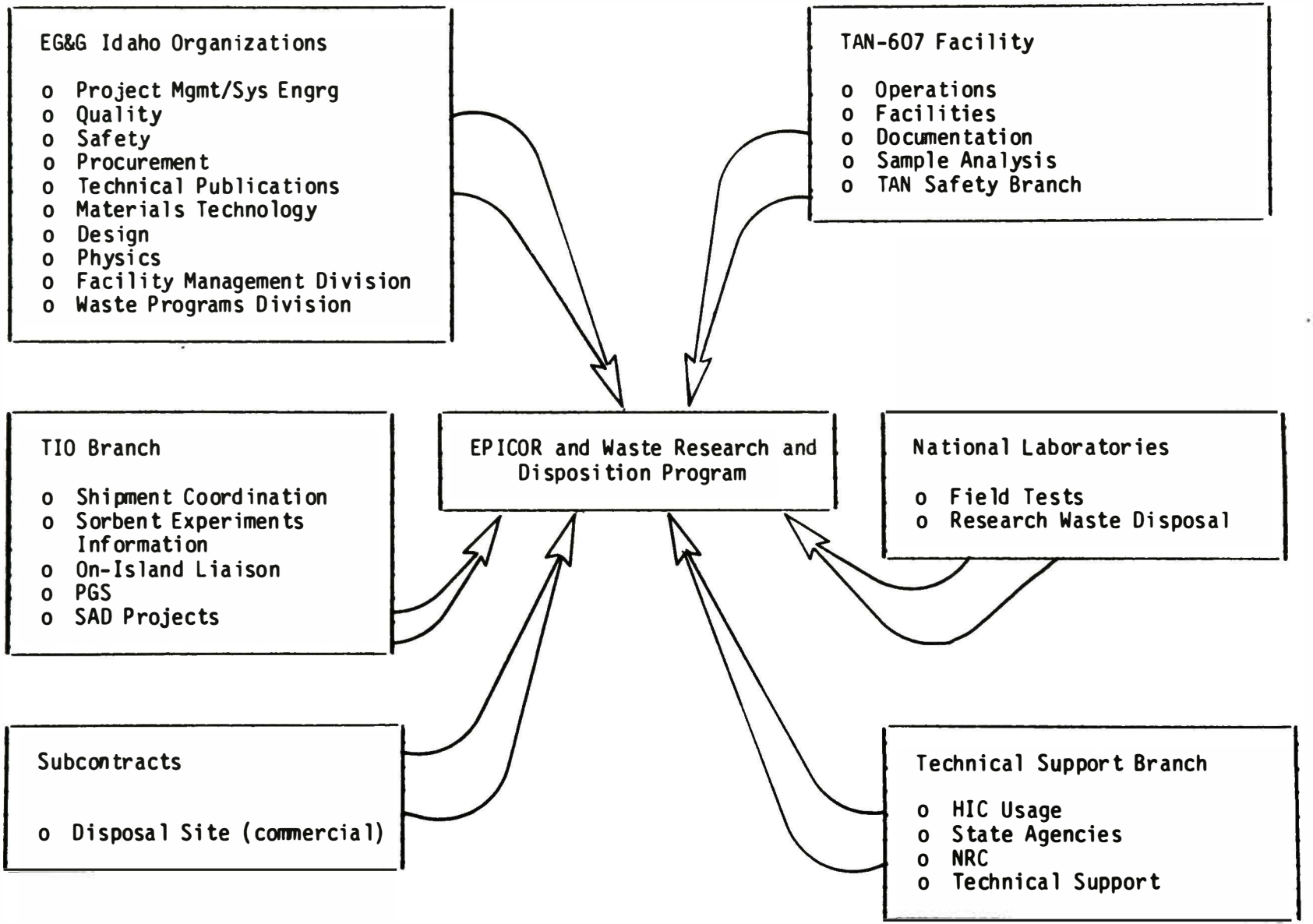

Figure 10. Program Interfaces for the EPICOR and Waste Research and Disposition Program.

4. COSTS

Costs for the EPICOR and Waste Research and Disposition Program presented below define the funding baseline for FY-1984. They are highlighted in the Tables 3 and 4. Some of the costs in Tables 3 and 4 are augmented by funds to be provided by GPUNC as defined in footnotes.

4.1 EPICOR Project

Table 3 depicts EPICOR funding by work package for FY-1984 and it provides forecasted funding in the out years. Revision 1 of the Program Plan for the EPICOR-II Research and Disposition Program summarizes costs for previous years.

TABLE 3. BASELINE FY-1984 FUNDING FOR THE EPICOR PROJECT

Work Package	Baseline ($1000s) FY-1984	Forecast ($1000s) FY-1985	Forecast ($1000s) FY-1986
Program Management	115.8	100	50
Interim Storage OPs	103.3	70	600
HIC Loading/Curing OPs	297.2[a]	528[a]	--
HIC-Liner Disposal	88.7	90	--
Technical Support	78.9	50	50
Resin Research	70.0	--	--
Management Reserve	176.0	100	--
Total Funding	930.0	938	700

a. These costs are augmented by $660K and $700K proposed for reimbursement from GPUNC for expenses incurred in EPICOR disposal operations in FY-1984 and FY-1985, respectively; the actual amount to be recovered is still in negotiation.

4.2 Abnormal Waste

Table 4 depicts Abnormal Waste funding by work package for FY-1984 and it forecasts total funding by year for duration of the project. Forecasts are not subdivided by work packages, since the project is being defined and developed during FY-1984.

TABLE 4. BASELINE FY-1984 FUNDING FOR THE ABNORMAL WASTE PROJECT

Work Package	Baseline ($1000s) FY-1984	Forecast ($1000s) FY-1985	FY-1986
TMI Abnormal Wastes Operations	100[a]	50[a]	50
TMI Abnormal Wastes Equipment	--[b]	--[b]	--
Total Funding	100.0	50	50

a. These costs are augmented by $320K and $420K estimated to be recovered from GPUNC for expenses incurred in abnormal waste operations in FY-1984 and FY-1985, respectively; actual costs to be reimbursed are being developed for negotiation at this time.

b. These costs are augmented by $350K and $370K estimated to be recovered from GPUNC for equipment costs incurred in FY-1984 and FY-1985, respectively; actual costs to be reimbursed are being developed for negotiation at this time.

5. SCHEDULE

Summary schedules are presented for the EPICOR and Abnormal Waste Projects. The summary schedule (Figure 11) highlights major activities and deliverables for both projects.

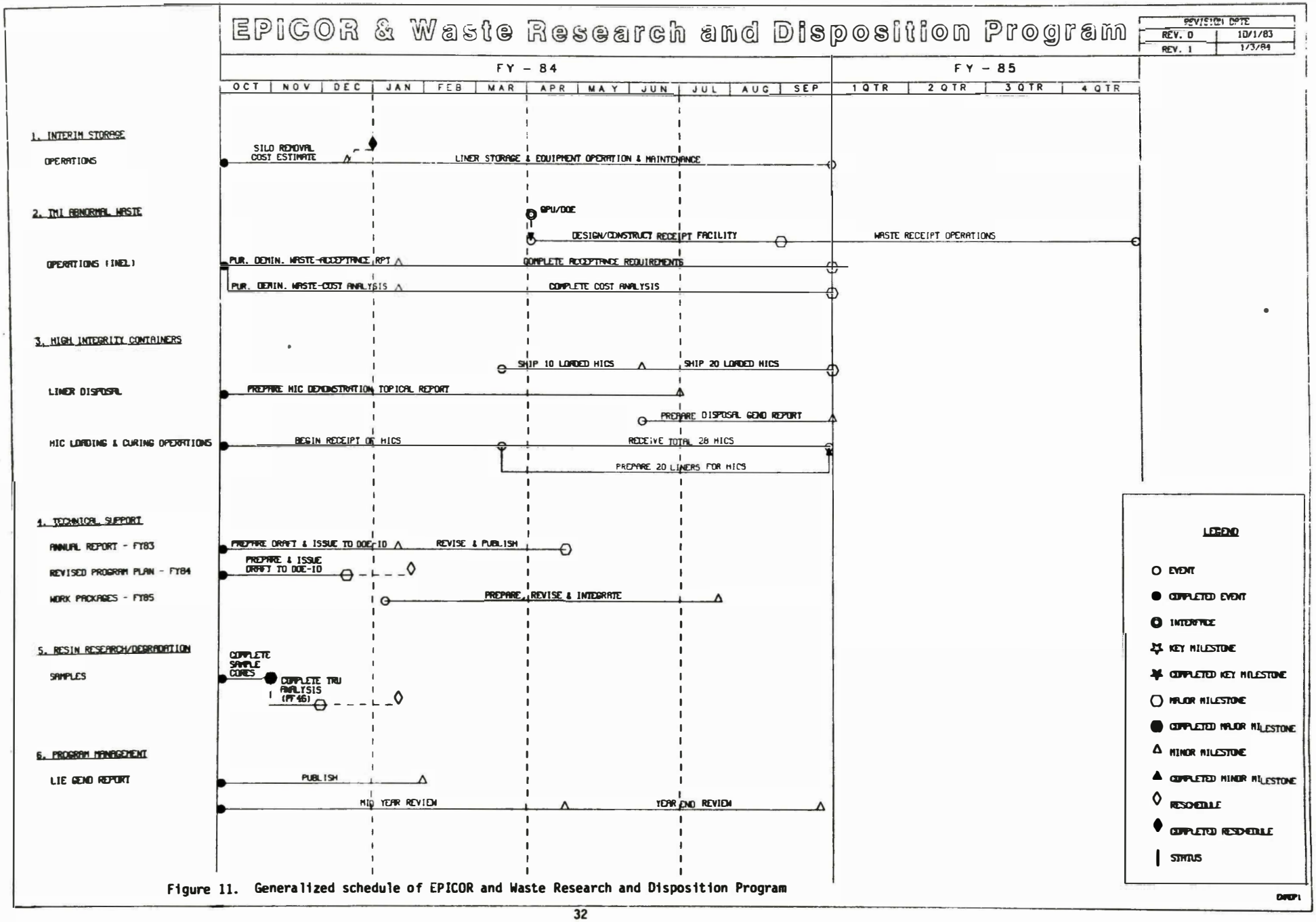

Figure 11. Generalized schedule of EPICOR and Waste Research and Disposition Program

6. QUALITY

Quality assurance requirements for the EPICOR and Waste Research and Disposition Program are coordinated with the Quality Division of EG&G Idaho, Inc. and in accordance with Quality Program Plan developed for the Technical Support Branch (see Appendix C of the Management Plan for the Technical Support Branch of the Nuclear Materials Evaluation Programs Division). The QPP for the Technical Support Branch interdigitates with the QPP governing activities in the TAN-607 Hot Shop.

7. SAFETY AND ENVIRONMENTAL

Safety and environmental concerns and issues related to the EPICOR and Waste Research and Disposition Program are governed by that stated in the Management Plan for the Technical Support Branch of NMEPD.