

**ACTION PLAN
FOR THE
INSPECTION, SAMPLING, AND
CHARACTERIZATION OF
RESIDUES, TRU, AND TRU-MIXED WASTES**

**PM-018-002
REVISION A
NOVEMBER 12, 1993**

EG&G Rocky Flats, Inc.

**CLASSIFICATION
REVIEW WAIVER PER
CLASSIFICATION OFFICE**

REVIEWED FOR CLASSIFICATION
By *[Signature]*
Date *12/13/93*

ADMIN RECORD

A-GW-001700

I. INTRODUCTION

Background. In September 1993, EG&G Rocky Flats, Inc. prepared a report addressing the safety risks associated with the storage of certain types of plutonium-bearing residues (Reference 1). In a letter to EG&G, DOE-RFO highlighted potential safety issues brought by the Defense Nuclear Facility Safety Board (DNFSB) with regard to the storage and handling of residue drums (Reference 2). In response, EG&G conducted a risk assessment which concluded that the materials in question did not present immediate safety concerns to the public or the workers and reported those results to DOE (Reference 3). In order to better characterize and identify any long term problems the these materials, EG&G has committed to conduct additional investigatory actions to include the inspection, sampling, and analysis of the residue materials, their packaging, and their containers, as appropriate.

An action plan (Reference 4) was generated and submitted to DOE-RFO to define the activities that will be undertaken to develop a detailed Project Plan specifically for the characterization of stored electrorefining (ER) salt residues. The ER salt residue Project Plan would then define the specific activities that will lead to the generation of data that will support (or refute) the conclusions of the risk assessment described above and also identify any potential future problems. These plans are specific to ER salt residues.

Purpose and Objective. The purpose of this Action Plan is to define the activities that will be undertaken to develop a detailed Project Plan for all stored solid residues, transuranic (TRU), and TRU-mixed wastes. The Project Plan will, in turn, define the specific activities that will be necessary to inspect, characterize, and manage these materials. More importantly, the Project Plan will emphasize the integration of all EG&G organizational efforts and requirements, e.g., Safety, RCRA, Gas Generation, Safeguards and Security, etc., into a single program. Some of the information that will be required in the Project Plan is known to some extent while other information will require additional effort to obtain. The intent of this Action Plan is to: (1) present a thorough list of the information required in the Project Plan, (2) identify the organizations responsible for obtaining that information, (3) develop an initial outline of the Project Plan, and (4) provide estimates of the cost and schedule of completing the Project Plan.

Scope. This Action Plan covers the development of a Project Plan for the inspection, characterization, and management of all stored, solid residues, TRU, and TRU-mixed waste except ER salt Residues. The schedule for ER salt residues (Reference 4) however, has been incorporated in section V of this action plan. These materials are stored in 55-gallon drums, 10-gallon drums, 8801/8802 Vollrath cans, and other containers. The various containers are currently located in Buildings 371, 771, 776, 777, 779, 559, and 707.

II. INFORMATION REQUIREMENTS

The data requirements to prepare the residue, TRU, and TRU-Mixed Waste Inspection, Sampling, and Characterization Project Plan include the following elements of information:

1. What characterization and inspection information is required to determine whether or not the residues/TRU/TRU-mixed waste are inherently safe in their current storage configuration?
2. What Item descriptions (IDCs) and their amount make up the current inventory of residues/TRU/TRU-mixed waste, what subset of the current total inventory is to be sampled and inspected, and which IDCs will be prioritized over others based upon process knowledge and historical data?
3. How are the sampling, inspection, and analytical operations to be carried out and by whom?
4. What equipment, facilities, and buildings will be required to complete the sampling and inspection program and are they currently available?
5. What equipment and facilities will be required to complete the laboratory analyses of samples and are they currently available?
6. What are the requirements for a residue/TRU/TRU-mixed waste integrated inventory database? What is the current capability? How can additional requirements be satisfied?
7. Can future RCRA inspections, safety inspections, radiological surveys, and safeguards and security inspections be integrated for residue/TRU/TRU-mixed waste containers?
8. What are the procedural, programmatic, management, and administrative obstacles that must be overcome to accomplish this task, and what individuals/organizations must be involved and in the approval cycle in order to ensure success.

A brief discussion of each of the above issues is included in the following paragraphs.

Characterization and Inspection Data Requirements

Characterization Data. Both the chemical composition and the physical characteristics of the residue/TRU/TRU-mixed waste material must be determined. In addition, the integrity of the internal packaging must be assessed. The complete characterization of the residues/TRU/TRU-mixed-waste and their containment will be established through a program of process knowledge review, historical data review, sampling, and physical and chemical analyses. A preliminary list of analytical requirements has been prepared. This list will include not only the requirements to

confirm whether or not residues/TRU/TRU-mixed waste and their containers are currently safe, but also include analyses necessary to provide more complete characterization data anticipated for other purposes, e.g., WIPP certification, RCRA characterization, potential repackaging needs, and storage permit compliance. The rationale for including these analytical requirements is that once the containers are opened and the contents sampled, a full spectrum of analyses should be performed to eliminate the need for accessing the containers again at some time in the future. Sampling a drum again in the future would result in unnecessary increases in radiation exposure to operators.

The types of analyses that will be required for residues/TRU/TRU-mixed wastes include qualitative chemical analyses (to determine the presence of such constituents as reactive metals, peroxides, hydrides, etc.) and quantitative chemical analyses (headspace gas composition, quantities of toxic metals, etc.). A complete list of required analyses will be compiled, reviewed, and finalized in the Project Plan.

The Project Plan will provide for the acceleration of the drum head space gas sampling program of drums containing resin IDCs and continue with drums from other residue/TRU/TRU-mixed waste categories. It will also provide a plan to determine if hydrogen accumulation in individual residue packages is a problem and to assist with the determination of gas-generation rates. Analyses will determine if reactive metal reactions postulated in Reference 1 are actually occurring and will verify the presence of other RCRA characteristics.

Inspection Requirements. The integrity of the external containers must be assessed. The types of inspections that will be required for residues/TRU/TRU-mixed wastes include qualitative inspections (drum integrity, container pressurization, IDC verification, etc.). A preliminary list of inspection requirements has been prepared. This list will include the requirements to characterize and identify any potential storage problems with the residues/TRU/TRU-mixed waste and their containers. Free liquids may also be found in some of the containers. The capability for handling and sampling of free liquids must be reviewed.

Certain inspections may be required of all drums or containers. For example, all residue/TRU/TRU-mixed waste drums not fitted with drum vent filter assemblies will be inspected to determine if any of these drums are pressurized. Those drums fitted with vent filters will be visually inspected for vent filter corrosion. The Waste/Residue Assay and Storage group has already performed a visual inspection of drums for IDC categories 330, 331, 336, 337, 338, 339, and 341 to check for the presence of a drum filter and any corrosion as well as serve as a baseline inspection date for future inspections based upon recommendations given in Reference 1 and RCRA requirements. A complete list of required inspections and their requirements will be compiled, reviewed, and finalized in the Project Plan.

Sample Base

Residues/TRU/TRU-mixed waste are currently categorized in over 100 separate IDCs. They are stored in 55-gallon drums, 10-gallon drums, 8801/8802 Vollrath cans, Vollrath cans inside of 55-gallon drums, and other containers. Buildings within which the materials are currently stored include Buildings 371, 771, 776, 777, 779, 559, and 707. Containers are stored in vaults, the 371 Stacker/Retriever, vault-like rooms, and other storage locations. These storage locations include both inert and non-inert atmospheres. The materials were generated during the period of 1959 through 1989 approximately and, thus, represent a spectrum of the degree of "aging" that has taken place both in terms of the material itself as well as its packaging and containment. The Project Plan will identify the specific IDCs that will be characterized and sampled.

The determination of the subset of the current total material inventory to be inspected, sampled, and characterized relies on many factors. These factors include at least the following:

- IDC number
- Type of containment package
- Type of internal package
- Storage environment
- Generation environment
- Age
- Process Knowledge
- Historical Data

To provide a manageable level of the amount of samples to be taken, the Project Plan will define the statistical sampling strategy and the analytical data interpretation for the inspection, sampling, and characterization of the residues. A proposal for a statistically valid sampling plan will be developed. Responsibilities for the sample selections and identification of RFP organizations to perform the required tasks will be outlined in the Project Plan.

A determination will also be provided within the Project Plan as to which IDCs or groups of IDCs will be prioritized for characterization over others based upon safety, RCRA status, safeguards and security, and other considerations. A ranking system of risk factors will be developed based upon current process experience, historical data, and theoretical knowledge. Characterization review priority may also be based upon a lessons learned type of priority. Priorities may also change as new information is obtained on the materials.

Sampling, Inspection, and Analytical Procedures

Sampling, inspection, and analysis operations take place routinely at Rocky Flats for wastes. The procedures defining how sampling and inspection take place will be obtained, reviewed, and adapted to the materials to be sampled. Likewise, the types of analyses that will need to be accomplished are defined either in existing laboratory procedures or in external documents such as EPA SW-846. If there are analyses that are not defined in existing documents, then methodologies will be developed based on standard analytical techniques. The Project Plan

will identify what procedures are to be used and developed, if necessary, and where those procedures are to be found. The Project Plan will also identify what Rocky Flats organizations will be tasked to perform the various operations.

It has been recommended (Reference 1) to change operating procedures for the Non-Destructive Assay (NDA) Group and other operating agencies to require documentation of drum conditions when drums are opened to change lids or for any other reasons. Changing the NDA operating procedure to require documentation of drum conditions would provide a mechanism for collecting information on drum and drum vent filter assembly corrosion. The Project Plan will initiate actions to fund any changes or modifications in the NDA and other operating procedures.

Sampling and Inspection Equipment, Facilities, and Buildings

One of the primary objectives to be accomplished during the development of the Project Plan is the identification of the building or buildings and the facilities within those buildings that will be used to accomplish the sampling and inspection operations. Building 371, 771, and 779 have been proposed as possible venues with Building 779 suggested as the baseline against which other buildings will be compared. Equipment requirements and availability, building and facility condition, and transportation requirements will be included as final selection criteria.

Detailed procedures will be required before drums or other containers can be moved from their current storage locations, opened, inspected, sampled, and possibly repackaged. Some procedures may already exist as part of previously initiated sampling and repackaging programs. These procedures, whether existing or to be prepared, will specify the sampling location, the equipment necessary to protect workers while drum containment is breached, and the equipment required to obtain, package, and transport the samples to the appropriate analytical laboratory.

Preparation of the Project Plan will include a review of applicable procedures to determine the facility and equipment requirements necessary to achieve safe and efficient sampling and inspection operations. Equipment and facility requirements will then be compared to the resources currently available to determine if there are any shortfalls. This resource evaluation task will include an assessment of the operability of existing equipment to determine immediate maintenance or replacement requirements. For example, certain containers may contain free liquids; therefore, appropriate equipment such as an aqueous glovebox with a criticality drain must be used. Inert gloveboxes on the other hand, will be used for the sampling and characterization of potentially pyrophoric materials.

Analytical Equipment and Facilities

To accomplish the spectrum of analyses to be proposed in the Project Plan, one or more of the Rocky Flats laboratories will be tasked to provide analytical support. The final selection of sample analysis requirements will be reviewed, and a list of the required personnel qualifications, analytical equipment, and instrumentation will be prepared. The appropriate laboratory facilities will also be identified. The requirements will then be compared to that currently available in existing laboratories. If required equipment is either not functional or otherwise unavailable, then plans will

be made to repair, replace, or acquire it. Similarly, personnel training or certification, if required, will be planned.

Integrated Inventory Database(s)

Two major databases are presently functioning at the RFP that deal with Special Nuclear Material (SNM), residues, and waste. These databases are the Safeguards Accountability Network (SAN) and the Waste and Environmental Management System (WEMS). Both of these databases were developed for different purposes, and the information contained within each, at times, is contradictory. Additionally, each database contains unique information, many times excluding the specific information needs pertinent to issues surrounding residues/TRU/TRU-mixed waste. The Project Plan will provide a plan for a zero-based evaluation of database requirements, to include alternatives such as a single database, multiple related databases, separate SNM, residue, TRU waste, and low-level waste databases, or combinations of these. The Project Plan will include a schedule and cost estimates for selecting and implementing the best solution.

There are several efforts underway at this time to resolve the residue/TRU/TRU-mixed waste database question, including a combined SAN/WEMS database, a residue characterization system, and an effort by the Nuclear Material and Waste Management Team to define guidelines for obtaining timely and accurate information regarding nuclear materials. These efforts will also be reviewed for possible integration.

Integration of Residue/Waste Inspections

The Project Plan will review the integration of residue/TRU/TRU-mixed container inspections. If all required inspections and surveys can be performed at the same time, then worker exposure will be reduced and costs involved with the processing of containers minimized. Various requirements and considerations for storage inspections include safety, RCRA, safeguards and security, ALARA, manpower optimization, radiological surveys, etc.

The Project Plan will identify the types of residue/TRU/TRU-mixed waste inspections and surveys required, determine if some or all of them can be performed at one time, and recommend whether the number of personnel performing the inspections and surveys can be minimized. The consolidation of inspections may result in process improvement savings.

Procedural, Programmatic, Management, and Administrative Requirements

In addition to the organizations actually performing the inspection, sampling, and analysis of residues/TRU waste, there will be other Rocky Flats organizations which will be in a position to prepare, review, revise, or provide approval authority for various documents that define the operation. Requirements imposed by such organizations as Safety, Safeguards and Security, Radiological Engineering, Quality Assurance, NEPA and Ecology, Waste Operations, and the Fire Department will have a significant impact on the procedures that must be prepared. The specific organizations having oversight and approval authority as well as the requirements imposed by those organizations will be determined as part of the preparation of the Project Plan. Prerequisites for

initiating sampling operations, e.g., safety screens and readiness evaluations, will also be determined. Plans will be made for a readiness review, which must be performed before the project plan is executed.

Multiple work packages exist that deal with the storage, inspection, and sampling of residues/TRU/TRU-mixed waste containers. There is no single work package that addresses all of the elements included in this work plan and some of the requirements identified herein may not exist in any current work package. Similarly, there is no single EG&G organization responsible for all aspects of this effort. To provide a more efficient and unified system, these work packages must either be consolidated or collected and managed synergistically. Applicable work packages will be reviewed, and recommendations for revisions or realignments will be made. Actions by the Plant Change Control Board may be necessary.

Efforts to prepare the Project Plan will include the development of a Task Information Package (TIP) or a procedure for this project. It is expected that a procedure will be prepared instead of a TIP because of the magnitude of this project. The TIP/Procedure will embody all of the operational and procedural aspects of the sampling program and constitute approval of those procedures by each of the cognizant organizations. Final approval of the TIP/Procedure will probably not take place until several months after the preparation of the Project Plan. Therefore, the objective is to have draft TIP/Procedure prepared in parallel manner with the preparation of the Project Plan. The initial task to be defined in the Project Plan will be to obtain final approval of the TIP/Procedure. A summary flow chart of the processes leading to the preparation of the Project Plan is given in Figure 1.

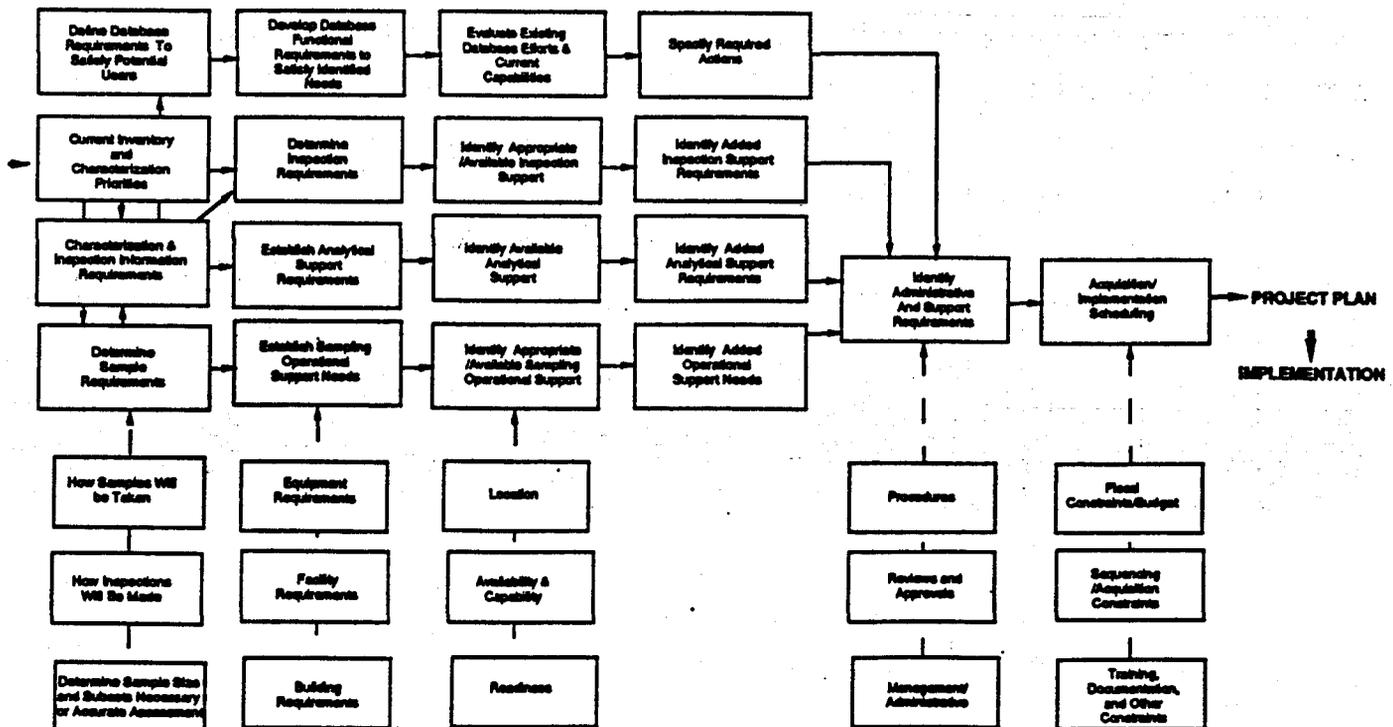


Figure 1 Project Plan Development Flow Chart

III. INFORMATION ACQUISITION

Section II described in general terms the information that will be required to prepare a more detailed Project Plan and a draft TIP/Procedure to characterize residues/TRU/TRU-mixed waste. This section identifies the organizations which will be tasked to provide this information and will be ultimately responsible for ensuring that all information needs are met for their particular area of expertise. Supporting organizations are also identified.

Characterization and Inspection Data Requirements

Primary: Residue Treatment Technology/Waste Programs
Support: Residue Operations
Radioactive Waste Programs
Waste Identification and Characterization

Sample Base

Primary: Waste Identification and Characterization
Support: Waste Assay and Shipping

Sampling, Inspection, and Analytical Procedures

Primary: Residue Operations
Support: Pu Operations Support Laboratory
Radioactive Waste Programs

Sampling and Inspection Equipment, Facilities, and Buildings

Primary: Residue Operations
Support: Radioactive Waste Programs

Analytical Equipment and Facilities

Primary: Pu Operations Support Laboratory
Support: TBD

Integrated Inventory Database

Primary: Residue Elimination
Support: Information Resources

Integration of Residue/TRU/TRU-Mixed Waste Inspections

Primary: Waste/Residue Assay and Storage
Support: TBD

Programmatic, Procedural, Administrative, and Management Requirements

Primary: Residue Elimination
Support: Facilities Management and Operations
Residue Operations
Residue Treatment Technology

Two additional tasks which are components of the development of the Project Plan are: (1) the preparation of the actual Project Plan document, and (2) the preparation of the draft TIP/Procedure as needed. Don Dustin (Residue Elimination) will coordinate the preparation of the Project Plan document with input from those persons responsible for obtaining the various elements of information defined above. Responsibility for the preparation of the draft TIP/Procedure will fall to the Operations Manager(s) for the facility where the sampling and inspections are to take place. Management oversight of the entire residue characterization project will be provided by Ron Williams (Residue Elimination).

IV. PROPOSED PROJECT PLAN OUTLINE

The Project Plan for the inspection, sampling, and characterization of residues/TRU/TRU-mixed waste will follow the same general format as the "Sampling and Analysis Plan for Pyrochemical Salts" (Reference 5). Integrated into the Project Plan will be the information that was identified and will be developed as described in Section II, above. The proposed second-level outline is as follows:

PROPOSED PROJECT PLAN OUTLINE

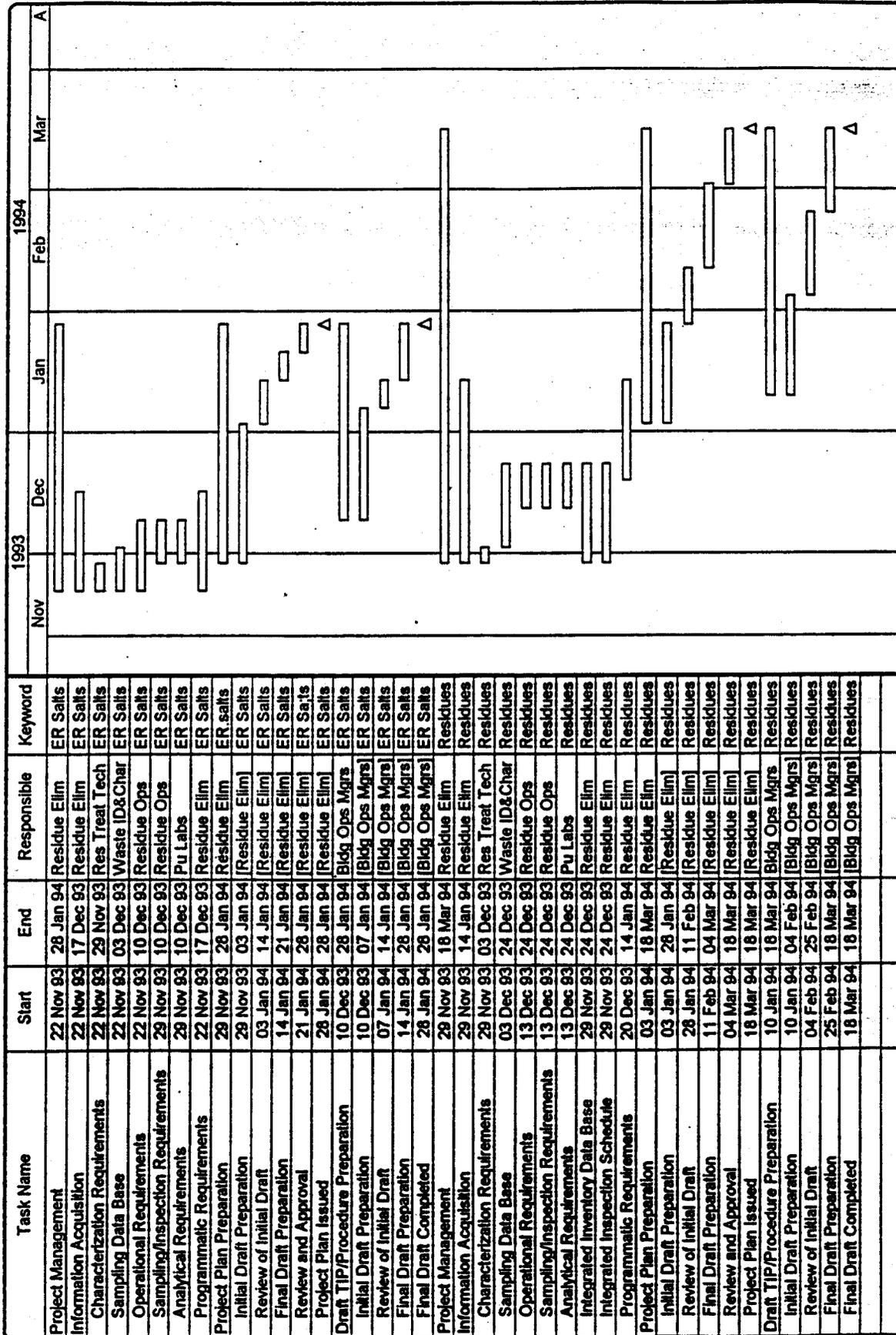
- I. Introduction
 - A. Background
 - B. Purpose and Objectives
 - C. Scope
- II. Characterization and Inspection Requirements
 - A. Qualitative Inspection
 - B. Qualitative Analyses
 - C. Quantitative Analyses
 - D. Sample Selection Strategy
- III. Equipment and Facility Requirements
 - A. Sampling and Inspection
 - B. Laboratory Analysis
 - C. Availability/Operability Assessment
 - D. Remedial Actions

- IV. Methodology and Procedures
 - A. Container Retrieval and Movement
 - B. Container and Package Inspection
 - C. Container and Package Sampling
 - D. Sample Transfer
 - E. Sample Analysis
 - F. Container Repackaging
 - G. Waste Disposal
- V. Coordination and Integration Programs
 - A. Coordination of Residue/TRU/TRU-mixed Waste Storage, Inspection, and Sampling Work Packages
 - B. Integrated Inventory Database
 - C. Integration of Residue/TRU/TRU-mixed Waste Inspections
- VI. Organizational Responsibilities
 - A. Residue Operations
 - B. Waste Identification and Characterization
 - C. Waste Assay and Shipping
 - D. Radiological Waste Programs
 - E. Residue Elimination
 - F. Residue Treatment Technology
 - G. Facilities Management and Operations
 - H. Pu Operations Support Laboratory
 - I. Other Support Organizations
- VIII. Data Quality Objectives
- IX. Schedule and Cost

V. COST AND SCHEDULE

The proposed schedule for the preparation of the Project Plan and the draft TIP/Procedure is shown in Figure 2. The schedule includes six weeks of information acquisition and ten weeks of document preparation leading to issue of two documents identified as milestones. Two review periods are incorporated into the schedule for the preparation of the final Project Plan whereas only one review period is included for the preparation of the draft TIP/Procedure. The schedule is based on the assumption that this Action Plan will be approved by EG&G Rocky Flats, Inc. and DOE not later than December 3, 1993. Figure 2 incorporates the previously submitted planning schedule for sampling and characterizing ER salt residues.

FIGURE 2. PREPARATION OF RESIDUE CHARACTERIZATION PROJECT PLANS--CONSOLIDATED SCHEDULE



Printed: 11 Nov 93

The estimate of the labor requirements for each of the project planning tasks shown in the schedule was developed to determine a rough-order-of-magnitude cost for the preparation of the Project Plan and draft TIP/Procedure. The results of that estimate are shown in the following Table.

Task	FTE	Duration (mo.)	Employee-Months
Project Management (Overhead)	0.1	3.50	0.35
Information Acquisition	0.2	1.50	0.30
Characterization Requirements	1.0	0.25	0.25
Sampling Data Base	1.0	0.75	0.75
Operational Procedures	1.0	0.50	0.50
Sampling/Inspection Requirements	1.0	0.50	0.5
Analytical Requirements	1.0	0.50	0.50
Integrated Inventory Database	1.0	1.00	1.00
Integration of Inspections	0.5	1.00	0.50
Programmatic Requirements	1.0	0.75	0.75
Project Plan Preparation			
Overhead	0.5	2.50	1.25
Direct	0.5	2.50	1.25
Draft TIP/Procedure Preparation	2.0	2.50	5.00
Additional General Support (Contingency)			2.00
Total Labor Resource Requirements			
Overhead			1.60
Direct			13.30

Based on an estimate of \$150,000 per employee-year, the anticipated cost of producing a Project Plan and a draft TIP/Procedure is approximately \$186,000 of which \$20,000 will be charged to overhead. The \$166,000 of direct labor expenses is in addition to the \$93,000 of direct labor expenses required to prepare the ER Salt Residue Project Plan. The \$93,000 direct labor expenses for the preparation of the ER Salt Residue Project Plan exists in FY94 work packages. These work packages will be reviewed to determine the most appropriate source of funding prior to initiation of the more comprehensive residue/TRU/TRU-mixed Project Plan activities.

VI. REFERENCES

1. **W. V. Connor Report, "Evaluation of Residue Drum Storage Safety Risks," RO-93-002, September 27, 1993.**
2. **M. N. Silverman ltr (12168) to H. P. Mann, Draft Findings from the Defense Nuclear Facilities Safety Board Staff Visit, Week of September 22, 1993, October 18, 1993.**
3. **H. P. Mann ltr (93-RF-12968) to M. N. Silverman, Rocky Flats Plant Hazardous Material Storage Issues, Recommended Course of Action, October 20, 1993.**
4. **Action Plan for the Sampling and Characterization of Electrorefining Salt Residues (Revision A), PM-018-001, November 5, 1993.**
5. **Sampling and Analysis Plan for Pyrochemical Salts (DRAFT), 1-10000-EWQA, February 12, 1993.**