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REMOVAL ACTION PROJECT PLAN (RAPP) FOR PHASE I OF RA#15 PROCESSING AND DISPOSAL OF AN ESTIMATED 2,210 TONS OF NON-RCRA SCRAP METAL FROM THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT (FEMP) SITE

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PROJECT PLAN

REMOVAL ACTION PROJECT PLAN (RAPP)

for

PHASE I of RA #15

PROCESSING AND DISPOSAL

OF AN ESTIMATED 2,210 TONS

of

NON-RCRA SCRAP METAL

from the

FERNALD ENVIRONMENTAL MANAGEMENT

PROJECT (FEMP) SITE

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REMOVAL ACTION PROJECT PLAN (RAPP) FOR THE REMOVAL OF NON-RCRA SCRAP METAL FROM THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT (FEMP) SITE

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REMOVAL ACTION PROJECT PLAN (RAPP) FOR THE REMOVAL OF NON-RCRA SCRAP METAL FROM THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT (FEMP) SITE

1. Objectives

The SEG Team's objectives are to remove, decontaminate, or process substantially, an estimated 2,210 tons of non-RCRA scrap metal from the Fernald Environmental Management Project (FEMP) site, and to package, transport and process the metal by decontamination and metal melting. The target of said processing is to allow unrestricted or beneficial reuse of these materials commercially or by governmental agencies while minimizing the economic impact to Fernald Environmental Restoration Management Company of Ohio (FERMCO).

The low-level radioactively contaminated scrap metal pile is currently located on the B69 in the northeast corner of the FEMP. All of the scrap metal was generated at the FEMP as a result of demolition projects, removal of abandoned equipment, and the upgrade of facilities and vehicles.

The recoverable scrap metal was further segregated into ferrous and non-ferrous and within each of these catagories, they were again segregated into high-count and low-count. Scrap metal with gross fixed alpha contamination greater than 200,000 disintegrations per minute/window area was considered the high-count. Scrap metal with gross fixed alpha contamination less than 200,000 disintegrations per minute/window area was considered low-count.

Based on the contract between FERMCO and Scientific Ecology Group, Inc. (SEG), only Phase I activities from within Removal Action Number 15 Work Plan will be performed. Furthermore, SEG will not remove, process, or disposition any potentially RCRA bearing refuse materials that are addressed in Removal Action Number 9 Work Plan.

The 2,210 tons of scrap metal is a combination of approximately 238 tons of high-count recoverable ferrous metal, 1,793 tons of low-count recoverable ferrous metal, 54 tons of high-count recoverable non-ferrous metal, and 125 tons of low-count recoverable non-ferrous metal as defined in Removal Action Number 15 Work Plan (RA 15), Section 1.2 - Background of the Scrap Metal Piles. The remaining FEMP inventories of scrap copper, low-count recoverable ferrous, and low-count recoverable non-ferrous metal will not be processed by SEG under this contract. Any material, that may be found within the metals piles described above which meets the definition of Refuse Metal according to RA 15, cannot be

beneficially reused due to potential RCRA characteristics (leachable metals). These materials will be turned over to FERMCO for RCRA determination and dispositioning.

The objective of obtaining unrestricted or beneficial reuse of these metals will be accomplished while minimizing, through an active waste minimization program, the amount of secondary waste generated. This program has already started with the selection of process and design operations to minimize waste generation. When secondary waste generation is unavoidable, the objective will be to volume reduce this material to the maximum extent possible, thus again reducing the economic and environmental impact to FERMCO. These principal operational objectives will be managed with the necessary QA and ES&H commitments to protect the worker, the public, and the environment.

The SEG Team has carefully analyzed the solicitation statement of work and has used it to:

- develop this Removal Action Project Plan (RAPP) in accordance with RA 15 for the physical material handling and logistics requirements of the project;
- determine that decontamination of the scrap metal is cost-effective;
- determine that beneficial reuse of decontaminated scrap metal is feasible;
- determine organizational approaches to perform this work successfully; and
- minimize the environmental impact of the operation.

These considerations were used to develop the technical, managerial, and organizational approaches to this project.

Additionally, existing programs, successfully implemented at the SEG-Oak Ridge and Quadrex-Oak Ridge facilities, will be available to support this project. The SEG computerized Waste Inventory and Tracking System (WITS) will be used to monitor movements and provide accountability for the scrap metal on this project. A description of the WITS has been provided as Attachment 5 of the RAPP.

In addition to metal processing, this project requires experience in handling contaminated materials on DOE sites and transporting radioactive materials in accordance with applicable regulations.

The SEG Team RAPP is divided into subsections for special focus on especially important considerations of project executions. The RAPP provides an overview of the planning and functions including: project integration and management; on-site activities; transportation; SEG and Quadrex facilities; decontamination and melting for maximum beneficial reuse; and the SEG Team plan for waste minimization. The technological aspects of processing the respective materials describing the processes, flows, equipment, and facilities are described. The WBS and its narrative support and define the movements and treatments of materials. Project Control details the control procedures with which the SEG Team will accomplish the objectives of this project. The Organizational Approach provides a description of the SEG Team, the organizational structure and functional assignments, and identifies reporting relationships and lines of responsibility. The SEG Team's unique qualifications related to the successful accomplishment of this project are presented.

A preliminary Work Breakdown Structure (WBS) has been developed to assess and implement the work methodologies, logistics, schedules, and their interdependencies. This WBS identifies the elements necessary to accomplish each task efficiently. The technical approach provides a narrative description of the project with specific tasks as identified in the WBS Dictionary. The WBS Dictionary is located in Attachment 2.

2. The Work Breakdown Structure (WBS)

The WBS provides the major assessment tools to establish the baseline planning activities necessary for execution of this project. This tool provides for the managerial and technical functions and identifies the early functions, such as work requirement identification and proceeds through execution of these requirements. The SEG Team has outlined the major functions, which include survey of existing conditions, analysis of options and alternatives, development of conceptual design and specifications, completion of engineering, as required, award of subcontracts, and management of work elements to execute and complete the tasks.

The WBS identifies the work activities; that is, it defines the scope on a summary basis, as well as the results expected to be achieved. The budget, cost, and schedule are also defined in the project management task. The second element of the WBS identifies how the project can be achieved in a cost-effective manner. Consideration of the total work plan provides necessary guidance on the interdependence of the

various work breakdowns and how they interface with one another. For example, the packaging and transportation of the metallics are dependent upon whether they are considered candidates for decontamination or for beneficial reuse. The work execution phase is the implementation of the technical and managerial decisions reached in the previous elements to accomplish the given task.

This project has been structured into six major tasks using the WBS. These tasks are covered in the following subsections:

- Planning and Integration, WBS 1.1;
- On-Site Processing, WBS 1.2;
- Transportation, WBS 1.3;
- Off-Site Processing, WBS 1.4;
- Beneficial Reuse, WBS 1.5; and
- Waste Processing, WBS 1.6.

2.1 Planning and Integration (WBS 1.1)

General

Project Planning and Integration provides for the implementation of specific tasks through a matrix management approach. The following functions are included in this task:

- establishing conceptual design packages and the procuring and implementation of allocated funds;
- establishing work packages and authorization of their implementation;
- interfacing with WEMCO/FERMCO and DOE, as necessary, for the successful accomplishment of the project;
- coordinating the Quadrex, Southern Alloy Metals (SAM), and SEG transportation subcontractors' activities;
- monitoring project aspects through personnel observance and formal status reports;
- maintaining the project status and the input of detailed schedules to aid the timely accomplishment of the tasks identified in the WBS;
- establishing and maintaining QA for the project; and

- establishing ES&H controls to maintain a safe and healthful working environment for the employee and to ensure that environmental releases, when necessary, have minimal impacts on the environment or the public.

This WBS will include the initial planning effort, training, physicals, baseline assays, and supply of all submittals, as identified in the bid specification, that are required to be accomplished prior to commencement of removal activities. Included in this mobilization effort will be verification of equipment readiness, and transportation of the equipment to the FEMP site. Interface planning meetings will be held with appropriate representatives of FEMP and SEG. A Site Safety and Health Plan (SSHP), in accordance with 29 CFR 1910.120 and this Removal Action Project Plan, will be submitted prior to field mobilization, along with the other specific bid submittals required.

The SEG Program Manager will be responsible for the development of the packages defined in the bid specification. The SEG Manager of Industrial Hygiene, Manager of Quality Assurance and Project Manager will play key support roles in the development of these packages.

Equipment - The SEG Team plans to use the following equipment (or similar) to remove the scrap metal:

- 1,200 ton shear for sizing materials as required
- 50 ton crawler crane in conjuntion with a 50 ton crane magnet for removing materials from the pile and loading into containers going to SEG-Oak Ridge
- 977 Cat crawler with a 4-1 bucket for removing materials from the pile and loading materials into sea/land containers going to Quadrex
- tool trailer for small equipment storage
- stocked mechanics truck for equipment repairs
- portable air compressor for use with air powered tools
- portable welder for heavy equipment repairs
- dynamometer for weighing metals and equipment suspended by the crane

- yard tractor for placing the flatbed trailers where needed
- 12,000 pound fork lift for moving containers and other equipment

Area Characterization/Surveys - Area radiological surveys within SEG's designated boundary will be performed to: (a) determine the extent of the controlled area; (b) determine existing and potential contamination levels; (c) ensure that all areas are properly posted; (d) develop, pictorially, a map or simple plan for initial and up-to-date radiation and area contamination levels; (e) establish appropriate physical boundaries for posted areas; (f) establish "clean" zones for smoking, eating, drinking, etc., and (g) supplement established Personnel Protective Equipment (PPE) requirements, as necessary. Initial survey for airborne levels will be conducted.

This baseline survey will be used in conjunction with the Site Safety and Health Plan to maintain exposures ALARA.

The baseline surveys will be conducted by SEG Health Physics personnel. Equipment that will be used for the baseline survey will be the following, or similar:

- Eberline RO-2 ion chamber
- Ludlum Model 2929 dual channel scaler with Model 43-10-1 detector
- Ludlum Model 3 with Model 44-9 probe
- Ludlum Model 3 with Model 43-5 Alpha scintillation detector
- High volume air sampler

The procedures to be used will be existing SEG procedures and applicable FEMP site procedures. SEG personnel will be trained in the site specific plans prior to implementation. All training will be documented and files maintained at the SEG field office and home office.

Quality Assurance

The SEG Team has multiple levels or programs for QA; on-site processing QA Programs meet the requirements of applicable federal, state, and local regulations. Selected sections of the QA Program will be applied to this project, as appropriate. A project specific QA Plan will be developed.

Compliance with the details of the plans and procedures referenced in this RAPP is vital to maintain the superior health, welfare, and safety of personnel and achieve

environmentally sound on-site processing of the metal scrap.

The SEG Team will comply with the Project QA Plan by periodically auditing the project from QA/QC aspects. Noncompliance items found during the audit will require corrective action and may result in work cessation until corrected. Audit records will be maintained, and will be inclusive in order to indicate the presence or absence of nonconformances and corrective actions required. QA audits for on-site processing will focus primarily on four areas:

- environmental compliance;
- health, safety, and radiological compliance;
- scrap metal processing inspections; and
- shipping of radioactive materials.

Environmental, Safety, and Health

Proven and existing procedures will be used to implement the SEG Team's ES&H Program. This program will be modified as discussed in the SSHP. The ES&H policy is based upon comprehensive training that involves sound engineering, strong management guidance and commitment, and professional staffing to implement an effective program that meets or exceeds federal, state, DOE, and EPA requirements. An important responsibility of the ES&H organization will be the implementation of the project requirements without significant impact to the FEMP site. SEG has removed metals, similar to the metals involved in this project, from other sites. In addition, with effective H&S plans and procedures, SEG has processed large quantities of materials contaminated with uranium, as well as essentially all of the other radioactive isotopes, and has never allowed an environmental release or any over-exposures to the workers or to the public.

Project Controls

The WBS will be used for performance control, such as scheduling. Described in the proposal is the SEG Waste Inventory Tracking System that will accurately account for the movement of radioactive materials between the various SEG Team processing facilities, and the shipment of the metal slag and the low specific activity (LSA) waste to NTS for disposal. This system is currently providing SEG accountability for over 100 commercial waste generators.

Materials Accountability

Materials control and accountability, will track the flow of material, chart the routes over which the material is transported, and identify material imbalances.

The SEG WITS uses barcoded information to maintain a strict accountability of material received and processed for disposal. WITS assimilates and tracks the identity of each unit delivered, processed, packaged, and transported. SEG will modify and apply this unique and proprietary program to this project. Further information regarding this system is in Attachment 5.

Quadrex utilizes a computerized tracking system that records alpha numeric numbers placed on the scrap material. Information on this system is found in Attachment 6.

Subcontractor Control

The SEG Team involves three major firms. Consistent with the approach of authorizing, managing, and controlling project work at the work package level, SEG and subcontractors will be responsible for carrying out the work contained in the work packages assigned to them. The assigned unit will be required to report cost and schedule information on a regular and timely basis. Periodically, audits will be conducted involving QA, ES&H, finance, and other areas, as necessary.

2.2 Technical Approach for On-site Processing (WBS 1.2)

The technical approach for on-site processing of metallic scrap consists of five WBS tasks. Each major task contains multiple subtasks that must be completed to accomplish the scope of work. Each major task's technical approach is discussed separately. Actual work on major tasks and subtasks may occur simultaneously.

The on-site processing task involves a scope of work which includes:

- providing the on-site project management, radiological controls, environmental controls, and industrial hygiene and safety services to support the on-site sorting, segregation, size reduction, packaging, and preparation of materials for transportation off-site; and

- providing material handling and size reduction equipment, personnel, materials, and facilities to support the on-site sorting, segregation, size reduction, packaging, and preparation of materials for transportation off-site.

Machinery and scrap metal handling expertise, such as a 1200 ton shear, conventual loading equipment, and the use of a magnet suspended from a crane will be supplied by Southern

Alloys and Metals Corporation (SAM). SAM's equipment will combine with contaminated material handling, containment and a proprietary process supplied by the remainder of the SEG Team to successfully complete the scrap metal project.

Procedures developed and refined by the SEG Team for the K-25 Site and the DOE Y-12 Plant in Oak Ridge, Tennessee and at the FEMP site will be employed.

Key support for such activities as scaling the loaded trucks, assistance with container decontamination, if required, QA/QC oversight, etc., will be provided by FERMCO personnel.

The SEG Team will take control of the scrap metal area for project purposes. This area will be designated as a Radiological Control Area (RCA), and all work will be conducted within the confines of the RCA. Environmental and industrial controls will be maintained throughout the project, starting with baseline ambient air monitoring and fixed and removable contamination surveys of the project site and surrounding FEMP equipment and facilities. The information obtained from these surveys will be used to determine the appropriate personnel protective clothing for workers during the initial project tasks. The information will also be used for a comparison at the end of the project with similarly obtained data to determine if SEG operations increased the possible migratory contamination levels. Any FEMP facilities or equipment found to have increased radiological contamination due to SEG operations will be cleaned to pre-mobilization levels. For determining removable contamination, one hundred square centimeter smears will be taken and counted for alpha and beta/gamma radiation with instrumentation as described in SEG Work Procedure 3001-HP-1.5 (Operation of the Ludlum Model 2929 Duel Channel Scaler with Model 43-10-1 Detector). Instrumentation, such as described in SEG Work Procedures 3001-HP-1.12 and 3001-HP-1.8 (Operation of the Ludlum Model 177 Ratemeter with Model 44-9 Probe and Operation of the Ludlum Model 3 with Model 43-5 Alpha Scintillation Probe respectively) will be utilized to determine fixed contamination. Radiological surveys will continue throughout the project to ensure of the proper personnel protective clothing and that the environmental levels are being exceeded.

The SEG Team will package and transport a portion of the metal scrap from the FEMP site to SEG-Oak Ridge for melting into shield blocks. The remaining portion of the metals will be moved to Quadrex-Oak Ridge for decontamination. When it is economical to decontaminate the materials in lieu of melting, high pressure water and other appropriate techniques will be used to decontaminate the material for unrestricted release.

Other metals that are candidates for direct decontamination or processing action without the need for sizing or segregation at the Oak Ridge facility, such as the large sections of aluminum, may be packaged for direct transportation to Quadrex for processing.

On-site Processing (See Flow Chart on Attachment 1)

The SEG Team will begin to mobilize its work crew on-site within the time frame noted on the schedule. Sufficient personnel will be located on-site to complete the objectives of the mobilization and project preparation task. The SEG Team will interface with appropriate project contractor personnel to complete necessary administrative and security requirements. Indoctrination training, radiological protection training, medical surveillance examinations, respiratory fit testing, and bioassay urinalysis of SEG Team employees will be completed. An office trailer will be located on the FEMP site and utility connections completed. Material handling and size reduction equipment and supporting supplies will be located on the site, inspected, and approved by project contractor personnel. The equipment will be made operable by the SEG Team. The RCA will be defined (i.e., dispatching/staging area, personnel monitoring area and access/egress control point). Environmental air samplers will be set up, around the perimeter of the RCA, and analyzed to determine background contamination levels.

Receipt and Staging of Shipping Containers

Various shipping containers will be used for packaging the scrap metal waste due to the waste configuration. Typical containers are B-25 metal boxes (4'x 4'x 6'), and Sea/Land type containers (8'x 8'x 40'). The primary container to be used will be the SEG 6.5'x 6.0'x 6.5' box specifically designed for this scrap metal removal project (see attachment 3). Empty shipping containers will be transported to the FEMP site staging area on flatbed trailers. A receipt radiation and contamination survey will be performed by SEG health physics personnel to verify the trailer/container units free of contamination. As needed, the trailer/container units will be moved to the scrap metal loading site using the dedicated yard tractor.

Handling Empty Containers

Upon arrival at the scrap metal loading area, the trailer/container(s) unit will be positioned for loading, or the container will be removed from the trailer and positioned for loading. Removal of containers from the flatbed will normally be accomplished by using the 50 ton capacity crane

with appropriate spreader devices and slings to lift containers and place them on a radiologically clean surface. The lid fasteners will then be released and the lid lifted and staged for later reinstallation.

Shipment Characterization

SEG personnel will radiologically characterize the scrap metal waste. Standard methods for activity determination will be employed. Beta, gamma, and alpha radiation and contamination surveys will be performed and documented in order to properly classify the waste for segregation, transportation and processing purposes. Package activity determinations may be performed by averaging activity over the surface area of the waste, or by dose-to-curie conversion methodology.

Waste Segregation

The scrap metal waste will be segregated into two separate categories based on the expected processing option. Approximately fifteen (15) percent of the total scrap metal waste volume is expected to be shipped to the Quadrex Recycling Center in Oak Ridge, TN. The remaining eighty-five percent of the waste will be shipped to the SEG-Oak Ridge facility for metal melting.

For the most part, all of the non-ferrous metal will be transported to the Quadrex facility for decontamination and the ferrous metals will be transported to the SEG-Oak Ridge facility for metal melting. Other determining factors for assigning specific pieces of metal to a process method is the geometry or having the accessibility to perform a release survey, visual qualification to determine the appearance of the materials surface (rough surfaces may not be adaptable to decontamination processes), and guidance from NUREG 1.86. The on-site Quadrex supervisor will provide direct oversight for the segregation activities due to his intimate knowledge of the capabilities of the Quadrex facility processes. The segregated scrap will be packaged in separate containers for shipment to Quadrex or SEG, as appropriate.

Preparation for Loading of Scrap Waste

After segregation, the waste will be assessed for shipping efficiency. As far as practicable, waste items will be packaged to assure that void spaces are kept to a minimum within the shipping containers.

Loading the Container

All loading activities will be conducted under the direct and continuous observation of SEG health physics and safety personnel. Area radiation, contamination and airborne radioactivity determinations will be performed during loading operations. SEG does not expect fugitive airborne contamination emissions while loading the containers. This expectation is based on past experience from working with similar materials and WEMCO air sampling data from when the scrap metal piles were relocated.

A real-time and delayed air sampling program will be implemented to ensure contaminate migrations do not exist outside the RCA. The real-time monitoring will be conducted by using a continuous air monitor (CAM) located downwind at the RCA perimeter. The CAM has a audible and visual alarm that will be set at 10% of the permissible derived air concentration (DAC) for uranium. If the CAM should alarm, work inside the RCA shall cease and personnel outside the perimeter shall don respiratory protection. Immediately after such an occurrence, a review by the SEG HP, SSHO, and Project Manager will ensue to determine the cause and generate remediation measures.

Additional air sampling data will be obtained from the use of breathing zone air samplers (BZA) used in close proximity of the project activities and by obtaining information from FERMCO that is generated from the northeast cluster of air monitoring equipment. This data would not be real-time but will be documented to identify trends associated with project activities.

The material will be sized (as required) by the shear for packaging and subsequent metal melting or decontamination.

Using the 50 ton capacity crane, shear, and/or the loader, waste material will be removed from the scrap metal pile, and carefully placed into the waste container. In the interests of personnel safety and contamination control, access to the shipping container and surrounding area will be controlled while loading containers. Waste may be loaded using other equipment, if the radiological and safety conditions associated with the proposed method have been thoroughly evaluated. Scrap metal will be added to the container until full or until the weight capacity for the specific container is reached (for example, nominal value of 40,000 pounds for a 40' Sea/Land container).

Container Closure

When the shipping container is full, the lid will be carefully reinstalled and secured. External surfaces of the shipping container will be surveyed and decontaminated, as necessary, to meet contamination level limitations contained in the Department of Transportation (DOT), Title 49, Code of Federal Regulations, (49 CFR). A barcode for tracking the material will be affixed to each loaded container. Each loaded container will be weighed and placed on the flatbed for transport.

Shipping Waste Containers

SEG will verify that all scrap metal shipments leaving the FEMP site are properly classified, surveyed, marked, labeled and placarded in accordance with Department of Transportation regulations. All necessary shipment documentation (manifests, bills of lading, vehicle inspections, radiological surveys, driver's exclusive use instructions, etc.) will be generated by SEG personnel and forwarded to FERMCO. All waste shipments will be adequately shored, blocked or braced to prevent any shifting of the load under normal transportation conditions. Prior to final release, loaded vehicles will be weighed (typically at the FEMP on-site scales) to verify actual loaded weight is within legal limits. Shipments will be tracked until receipt is verified.

Receipt Verification

Receipt documentation will be provided to FERMCO within ten (10) days of actual shipment. Receipt documentation will consist of a copy of the signed bill of lading indicating arrival of the waste at either SEG or Quadrex.

Demobilization

Following completion of onsite work, a radiological assessment of all tools and equipment brought on to the FEMP site will ensue. This assessment will be conducted by utilizing SEG work procedures located in Attachment 4 of this RAPP. Following the radiological surveys, decontamination processes will be conducted if the tools or equipment are found to exceed the FEMP release criteria. The decontamination of small tools and slightly contaminated equipment will be performed by hand wiping with a foaming cleaner and paper towels or HEPA filtered vacuuming. SEG will utilize the existing FEMP decontamination facility (steam cleaner) to clean large and multi-demential equipment. At the discretion of SEG, tools and equipment that are unable to be decontaminated or it is known to be usable in an RCA at the SEG-Oak Ridge facility, may be packaged and transported to SEG in accordance with DOT regulations.

Additional tasks may include the decontamination of the work area found to have increased radiation or contamination levels due to SEG operations. This task will be determined by comparing post work radiological surveys to the baseline surveys conducted during site mobilization. If decontamination is required, non-destructive cleaning methods similar to those used for tools and equipment will be utilized.

Any residuals left on the concrete pad from the removal of the scrap metal, such as oxidation and paint chips, will not be removed by SEG. Materials such as these are potentially RCRA bearing and are not within the Scope of Work for this subcontract.

All equipment to be free released from the FEMP will be radiologically surveyed by FEMP Radiation Safety Technicians.

The procedures (which will be available on-site) for this task will include applicable onsite procedures related to demobilization of equipment.

Complete post-project medical surveillance examinations and bioassay urinalyses will be conducted on all on-site processing personnel. Radiological surveys will be performed on all equipment, facilities, and supplies prior to removal from the site. Usable equipment and materials that are removed from the site will be transported in accordance with applicable federal, state, and local regulations. Post-project environmental monitoring will be completed. Appropriate project close-out documentation will be prepared and submitted to FERMCO.

Final Report - A Final Report for the onsite work will be submitted to FERMCO by SEG within four weeks following final material processing and dispositioning. Items to be covered in the Final Report will include:

- Waste weights per classification
- Schedule variations
- Health and Safety concerns
- Total radiological exposure
- Decontamination
- Material Balance

2.3 Transportation (WBS 1.3)

Trucks are considered the primary method of transporting the material to Oak Ridge for decontamination or melting for beneficial reuse.

Following on-site loading, the contaminated metals will be moved to the SEG-Oak Ridge metal melting facility for processing into shield blocks as delineated in the WBS discussion on beneficial reuse. Trucks will also transport material to Quadrex-Oak Ridge for decontamination.

Transportation surveys will be made and documents prepared prior to any material leaving the site. To determine isotopic inventory, on-site personnel will assess each loaded transport container prior to removal from site.

From the FEMP Site to SEG

Transportation to SEG from the FEMP site will be by the following route: South on Highway 128 to I-275, west on I-275 to I-75, south on I-75 to I-640, west on I-640 to I-40, west on I-40 to TN Highway 58, north on Highway 58 to Bear Creek Road, east on Bear Creek Road to SEG.

If road closures or other long term traffic stoppages are encountered, local alternate routes may be utilized. Primary routes must be used whenever possible.

From the FEMP Site to Quadrex

Transportation to Quadrex from the FEMP site will be by the following route: South on Highway 128 to I-275, west on I-275 to I-75, south on I-75 to I-640, west on I-640 to I-40, west on I-40 to Pellissippi Parkway, north to Oak Ridge to Lafayette Blvd., right on Emory Valley to Flint Road, right on Flint Road to Quadrex.

If road closures or other long term traffic stoppages are encountered, local alternate routes may be utilized. Primary routes must be used whenever possible.

SEG to NTS

Transportation to NTS from SEG will be by the following route: West on Bear Creek Road to TN Highway 58, south on Highway 58 to I-40, west on I-40 to Highway 93, north on Highway 93 to Highway 146, west on Highway 146 to I-15, north on I-15 to Highway 95, north on Highway 95 to NTS (Mercury exit).

If road closures or other long term traffic stoppages are encountered, local alternate routes may be utilized. Primary routes must be used whenever possible.

2.4 Processing Facilities (WBS 1.4)

The SEG Team will use the SEG licensed facility at Oak Ridge

for the processing activities. Size reduction, to accommodate packaging and processing, will be performed at the job site.

SEG-Oak Ridge

SEG has constructed a melting/casting facility and has modified its existing licenses and permits for the operation. All recasting of the scrap metal will be performed at this facility.

This facility will convert the ferrous and miscellaneous metal scrap into usable, slightly contaminated, shield blocks by melting the material in an induction furnace. The scrap metal will be processed into shield blocks for use by the Los Alamos National Laboratory's (LANL) High Energy Physics Program.

SEG is able to receive and process radioactive materials under their many licenses and permits as listed below:

Air Pollution Control - 734578P - Metal Melt Facility
Air Pollution Control - 997625P/028422P - CVRF
Air Pollution Control - 028482I - Incinerator
Air Pollution Control - 024342P - Lab
Air Pollution Control - 032284P - Paint Booth, Bldg. 3/4
Air Pollution Control - 0340660P - Oil Fired Boiler
Air Pollution Control - 027747P - Electric Melting Furn.

NESHAPS - Metal Melt Facility
NESHAPS - Incinerator

Radioactive Materials - R-73016-F96 - Metal Melt Facility
Radioactive Materials - R-73006-G94 - Bldg. 3/4/5/6

Radioactive Materials - R-73008-E94 - CVRF
Radioactive Materials - R-73013-F91 - Incinerator

POTW - 16-91 - Bear Creek Facility

Treatability Studies - Bear Creek Facility

Quadrex-Oak Ridge Facility

The Quadrex-Oak Ridge facility will be utilized for the surface decontamination or processing of large pieces of metal for unrestricted release in the U.S.

The Quadrex Corporation is able to receive and process radioactive materials under their State of Tennessee Radioactive Materials License (R-01037, Amendment 59) located in Attachment 8 and Industrial and Commercial User Waste Discharge Permit (5-90).

Decontamination for Free Release

As discussed in Section 2.2 above, the non-ferrous metals will be sorted onsite and shipped directly to Quadrex in Oak Ridge, TN. Upon arrival, the following Quadrex Recycle Center activities will take place.

The shipment will be inspected to ensure compliance with DOT requirements and the radioactive material license. After inspection, the shipment will be accepted for processing.

The container will be unloaded at Building B, the Processing Building, where it will be inspected and the type and extent of the contamination determined. Material which must be sectioned prior to processing will be sorted.

Material requiring sectioning will be cut to size. Sectioning for non-ferrous metals is normally accomplished using mechanical techniques. Flame cutting is avoided.

For processing the materials, water wash represents the simplest approach and is in wide use as a first step. Surfaces cleaned with high pressure water are rarely clean enough for unconditional release, but instead, reduce the dose rates for components to be processed further. Non-ferrous metals normally require chemical decontamination in order to remove tightly adhering oxide layers. The chemicals used are both caustics and acids. The exact cleaning solutions are proprietary.

After chemical processing, which may involve a series of chemical dips and rinses, in-process surveys are performed. If the in-process surveys are positive, the materials are transferred to Building C. In this facility, the materials receive (per the limits listed in the Radioactive Material License) a 100% survey of all surface areas. Materials which do not pass survey are returned to Building B for reprocessing or hot spot removal. The material may also be sent to Radwaste for packaging for disposal. Material passing survey are staged for random sample surveys performed by Quality Assurance (QA). Once released by QA, the material is sold as scrap.

Scrap metal materials that are successfully decontaminated must meet the following State of Tennessee free release requirements:

<20 dpm alpha (removable)

<200 dpm alpha (fixed)

<1000 dpm beta/gamma (removable)

<4000 dpm beta/gamma (fixed)

Materials that meet the above requirements may be released to the public for recycling.

Liquid Waste Management

Chemical decontamination processes transfer radioactive species from metallic surfaces into liquids (acids, water).

Liquids that contain radioactive species must be volume reduced for disposal. Acids or bases are neutralized, filtered, then solids and supernate liquids are treated separately. Solids from filtration are solidified with cement and disposed in strong tight containers. Liquids are filtered through an ion exchange process and released to city sewer, provided municipality standards for discharges are met. Liquid processing must also be done to EPA mandated criteria for hazardous materials generation storage and disposal.

The resulting waste is non-RCRA. The liquid processing is part of a continuous process that does not require an EPA permit.

The cemented waste and metal which cannot be cleaned will be tested, characterized and packaged for burial at NTS.

Principal surface decontamination technologies located at Quadrex-Oak Ridge are High Pressure Water System, Chemical Decontamination, and Dry Abrasive Impingement, some of which are described below.

High Pressure Water System Decontamination

The most attractive attributes of this decontamination process are the minimal amounts of secondary waste generated and the waste form. The system generates approximately 1.5 gallons of water per minute of operation while it cleans metallic surfaces down to white metal at 4-10 ft^2 per minute. The waste water, after processing for particle removal, can be reused as the decontaminating agent. The solids that are removed from the metal surfaces will be recovered either in the settling tank, in filters, or another like process. Any water that should become contaminated can be solidified with the solids collected during the decontamination in a cementing process. All wastes from processing sites will be transported to SEG-Oak Ridge for final processing and volume reduction.

Dry Abrasive Impingement Decontamination

Waste products resulting directly from the abrasive decontamination process consist primarily of spent abrasive, bag filters from the dust collection systems, filters from the HEPA ventilation system, and dry waste such as plastics and gloves. Abrasive is recycled through the system. The system process design inherently minimizes the production of radioactive waste. Any abrasive that becomes contaminated will be replaced. The waste abrasive could be mixed with collected liquids to form a stabilized monolith, crushed to form a stabilized briquette, or used directly to fill voids in over-packed containers following compaction.

2.5 Beneficial Reuse of Scrap Metals (WBS 1.5)

Quadrex will decontaminate the scrap metals in order to allow beneficial reuse of the metals to the extent that is economically and technologically feasible. Generally, the SEG Team will decontaminate large metallics to allow unrestricted release in the U.S. through scrap brokers.

Other materials, such as the steel, which by virtue of its geometry and the economics involved, will be melted for shielding blocks for the high energy physics community. The principal DOE facility where SEG has found a need for these facilities is the Los Alamos National Laboratory (LANL). The requirements for the use of these blocks involve special processing and mold construction by SEG but represent an economic incentive for DOE of millions of dollars, if these products were acquired on the open market, for this purpose.

2.6 Waste Processing (WBS 1.6)

Waste Management Plan

This section gives details of planned waste management for the project.

Waste Disposition

It is estimated that thirty (30) B-25 containers of waste (2800 ft^3), which must be disposed of at NTS, will be generated as a result of processing. This material will be packaged in accordance with NTS acceptance criteria (NVO-325). The personnel packaging the waste are trained to perform these functions.

Solid Wastes

During the course of operations, some low-level solid wastes may be generated. Regulations allow the solid radioactive wastes to be disposed of at approved disposal sites.

Incineration is allowed with specific approval. SEG Team-generated solid wastes will be disposed of by processing them and transporting such wastes to approved disposal sites.

Liquid Wastes

During the decontamination operations, some low-level liquid wastes are also generated. The regulations allow for solidified liquid radioactive wastes to be disposed of at approved disposal sites. Disposal of liquid radioactive wastes will be performed primarily by solidification. Rinse water and other relatively low-level waterborne radioactive wastes will be collected in tanks and filtered or demineralized as necessary. Other liquid radioactive wastes such as liquid effluents from the compaction process, liquids unsuitable for filtration or demineralization, and smaller-volume, higher-activity liquid wastes will be solidified and transported to an approved disposal site.

Evaporation is another form of processing non-RCRA liquid wastes. Evaporation is performed by utilizing SEG's incinerator. Liquids are injected into the incinerator and evaporated while any particulates or residues, from within the liquids, are collected within the approved filtration system.

Metal Melting for Decontamination or Beneficial Reuse

Waste products resulting from the melting of metals consist primarily of the general waste such as plastics, filters, gloves, and the slag that is generated from the refining process. The soft waste will be either incinerated or compacted. The slag will be packaged into containers and volume reduced for disposal at NTS.

Waste Reduction Methods

The SEG Team will process, at its SEG-Oak Ridge facility, nearly all of the secondary waste generated at the FEMP site. The majority of those materials that are amenable to incineration, such as paper, wood, and plastics, will be incinerated in the SEG incinerator or compacted using the SEG ULTRAcompactor. Ash from the incineration process will be stabilized by either vitrification or compaction to form a briquette suitable for either commercial or DOE disposal. Materials that are not capable of being incinerated due to composition or those materials that SEG chooses not to incinerate to prevent isotopic cross contamination will be compacted or melted into a waste ingot and packaged for delivery to NTS. Liquids will be evaporated or grouted and poured over the crushed containers inside of the storage/disposal container to fill void spaces and to ensure

the highest possible disposal densities. Final waste products will be packaged to meet NTS acceptance criteria and DOT regulations, as appropriate.

Primary, secondary, and tertiary wastes that are unable to be decontaminated or turned into a useful commodity will be transported to NTS for disposal. All radioactive waste derived from the scrap metal project will be disposed of at NTS via FEMP licenses.

TRAINING

Required training will be completed prior to initiation of removal activities. A training program schedule is provided. Documentation indicating training received by each employee will be provided to the Company and the records will be maintained in the Project files.

- **General Safety**

  General Safety training will be completed prior to initiation of work.

- **Portable Fire Extinguisher**

  Portable Fire Extinguisher training will be completed prior to initiation of work.

- **You and OSHA**

  You and OSHA training will be completed prior to initiation of work.

- **Radiation Worker Training**

  Radiation Worker training will be completed prior to initiation of work.

- **Radiation Safety Personal Monitoring Training.**

  Radiation Safety Personal Monitoring training will be completed prior to initiation of work.

- **Nuclear Criticality Safety**

  Nuclear Criticality Safety training, provided by FERMCO personnel, will be completed prior to initiation of work.

- **Respirator Training and Fit Testing**

  Respirator training is provided in the SEG three (3) day Radiation Worker training and is also included in the forty (40) hazardous waste site training. SEG will provide documentation of training received.

  Available upon request is the SEG outline used for respirator training. This training complies with 29 CFR 1910.120 and ANSI Z88.2-1980.

Quadrex-Oak Ridge and Southern Alloy Metals will provide documentation of respirator training for their on-site personnel, if available, as well as the outlines used for said training. If the required training is not available, either SEG-Oak Ridge will provide respirator training, or the on-site personnel can participate in the FERMCO respirator training course.

- **Respirator Fit Testing**

  Respirator Fit Testing will be performed by FERMCO personnel on the FEMP site.

- **Energy Control Procedure Awareness**

  Energy Control Procedure Awareness 3-hour training will be performed by FERMCO personnel for contracting supervisors and anyone who operates or services equipment other than computers.

- **Laboratory Chemical Hygiene Plan**

  Any on-site contracting personnel who will be working with chemicals will be required to receive instruction pertaining to this Plan.

- **Health and Safety Training for Hazardous Waste Site Activities (Compliance Training Program Volume II)**

  Employees will be provided forty (40) hours of OSHA Compliance Training Program, Volume II, with an eight (8) hour annual update, if required. Supervisors will also have eight (8) additional hours. These courses will meet the requirements detailed in 29 CFR 1910.120.

- **Field Experience**

  Three (3) days of actual field experience under the direct supervision of a trained and experienced supervisor will be provided.

- **Personal Protective Equipment (PPE) Training**

  PPE training is provided during Hazard Communication training, three (3) day Radiation Worker training, and the forty (40) hazardous waste training. The PPE needed for a specific task will be described in the site Safety and Health Plan and employees will be briefed on the PPE needed for a task before beginning the task.

- **First Aid and CPR**

  The SEG Team will provide selected employees with American Red Cross First Aid and CPR instruction.

- **Procedure Training**

  The SEG Team will provide comprehensive training on all operations procedures and other pertinent procedures (e.g., equipment manufacturer recommended training and relevant HP procedures) to employees involved in this project. They will be certified, if appropriate, upon completion of the indoctrination and applicable testing.

- **General Employee Training (GET)**

  GET, as appropriate, will be completed prior to initiation of work.

- **Hazard Communication Training**

  Available upon request is the SEG Hazard Communication training and test. This training complies with 29 CFR 1910.1200 and 29 CFR 1926.59.

- **Donning and Doffing Anti-Contamination Clothing**

  As an integral part of both the Radiation Worker Training and the SARA/OSHA training, personnel receive instruction concerning the donning and doffing of Anti-Cs.

  Visitors who enter areas where radiation workers are required will either have this training or will be escorted by personnel who have received it.

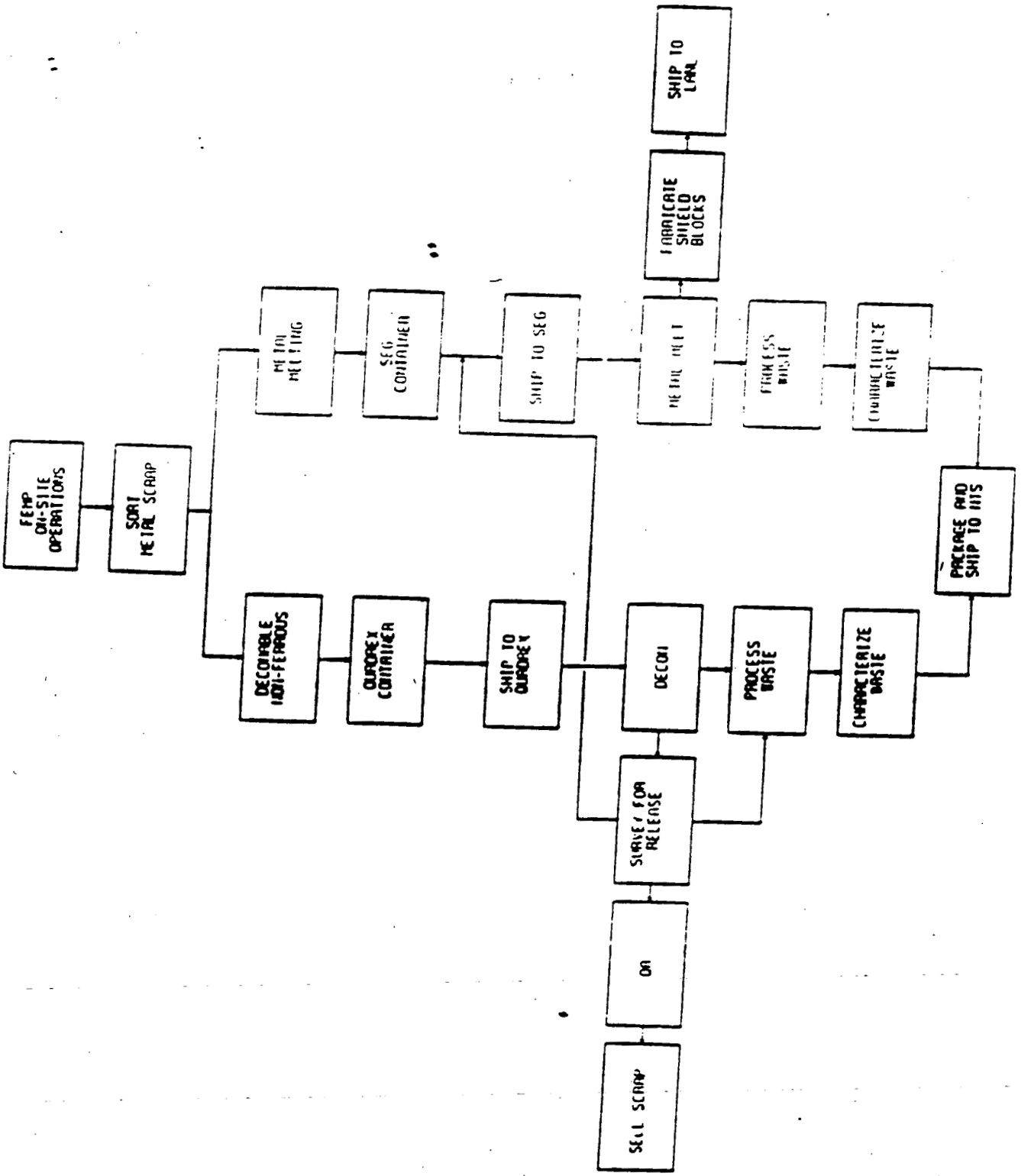
3. Attachments

3.1 Attachment 1 - Onsite Processing Activities
3.2 Attachment 2 - Work Breakdown Structure Dictionary
3.3 Attachment 3 - Shipping Container Drawing SEG-92-005
3.4 Attachment 4 - Work Procedures
3.5 Attachment 5 - Detail of Waste Inventory Tracking System (WITS)
3.6 Attachment 6 - Quadrex Recycle Center Radioactive Waste Activities, Tracking, Classification, and Proration System
3.7 Attachment 7 - SEG Radioactive Materials License
3.8 Attachment 8 - Quadrex Radioactive Materials License

ATTACHMENT 1

FEMP ONSITE OPERATIONS

FEMP ONSITE OPERATIONS



ATTACHMENT 2

WORK BREAKDOWN STRUCTURE DICTIONARY

ATTACHMENT 2

Work Breakdown Structure Dictionary

The WBS dictionary follows its own outline numbering system. The outline numbers should not be confused with paragraph numbering in the technical proposal.

1. Project Planning and Integration

    1.1 Program Management and Administration

        1.1.1 Program Management Staff

        1.1.2 Operations Management Staff

        1.1.3 ES&H Management Staff

        1.1.4 QA Staff

    1.2 Reporting

    1.3 Regulatory

    1.4 Medicals and Baselines

    1.5 Training

        1.5.1 Radiological

        1.5.2 Hazardous Communications

        1.5.3 Asbestos

        1.5.4 Operating

    1.6 Beneficial Reuse Planning

        1.6.1 LANL

        1.6.2 U.S. Scrap Broker

        1.6.3 Other

    1.7 Facilities, Utilities, and Operations

        1.7.1 Main Facilities

            1.7.1.1 SEG-Oak Ridge Facilities

            1.7.1.2 Quadrex-Oak Ridge Facility

1.7.1.3 Analytical Facilities

1.7.1.4 The FEMP Site

1.7.2 Equipment

1.7.2.1 Material Handling and Sectioning

1.7.2.2 Furnaces for Melting

1.7.2.3 Decontamination Equipment

1.7.2.4 Survey Equipment

1.7.2.5 Environmental Compliance Equipment

1.7.2.6 Data Processing Equipment

1.7.2.7 Containers and Transportation

1.7.2.8 Office Furnishing and Equipment

1.7.2.9 Office and Consumables

1.7.2.10 Reproduction Equipment

1.8 Deliverables

1.8.1 Plans, Reports, Schedules, and Forecasts

1.8.2 Historical Documents

1.8.3 ES&H Records

1.8.4 Quality Records

1.8.5 Data Packages

1.9 Operation and Maintenance

1.10 Procedures/Plans

1.10.1 Administrative Procedures

1.10.2 Work Procedures

1.10.3 Environmental/Radiological Procedures

1.10.4 Environmental Compliance Plan

1.10.5 Processing Plans

1.10.6 Temporary Facilities Plans

1.10.7 QA Plan

1.10.8 ES&H Plan

1.10.9 Site Safety Assessment

1.10.10 Hazardous Communication Plan

1.10.11 ALARA Plan

1.10.12 Safety Reports

2. On-Site Processing

2.1 Task Integration

2.1.1 Engineering

2.1.2 Construction

2.1.3 ES&H

2.1.4 QA

2.1.5 Procedures

2.1.6 Acquisition of Existing Metallics Documentation

2.1.7 Periodic Reports

2.2 The FEMP Site

2.2.1 Mobilization and Project Preparation

2.2.1.1 Personnel On-site

2.2.1.2 Indoctrination Training and Medical Examinations

2.2.1.3 Administrative and Logistics

2.2.1.4 Environmental Monitoring

2.2.1.5 Procedures for Job Site

2.2.1.6 SEG to FERMCO Administrative and

2.2.1.7 Equipment Moved On-site

2.2.1.8 Inspection and Approval of On-site Equipment

2.2.1.9 RCA

2.2.1.10 Consumables, Equipment, and Supplies Procurement

2.2.1.11 Field Radiological Laboratory

2.2.2 Outgoing Scrap Inspection

2.2.2.1 Verification of No TSCA Material

2.2.3 Size Reduction and Load-Out of Scrap and Refuse

2.2.3.1 Analysis for Weight-to-Curie Calculations

2.2.3.2 Scrap and Refuse Size Reduction

2.2.3.3 Radiological, ES&H, and Industrial Hygiene Surveillance

2.2.3.4 Scrap Packaging and Load-out

2.2.3.5 Preparation of Loaded Containers for Transportation

2.2.3.6 Transportation of Loaded Containers

2.2.4 Demobilization

2.2.4.1 Post-Project Medical Surveillance

2.2.4.2 Decontamination, Survey, and Removal of SEG-Team Facilities, Equipment, and Supplies; Site Restoration

2.2.4.3 Post-Project Environmental Monitoring

2.2.4.4 Close-Out Documentation

3. Transportation

3.1 Task Integration

3.1.1 Engineering

3.1.2 Construction

3.1.3 ES&H

3.1.4 QA

3.1.5 Procedure Development

3.1.6 Documentation of Materials

3.1.7 Transportation Routing, Carriers and Logistics

3.1.8 Documentation

3.2 Containers

3.2.1 Innerpacks

3.2.2 Roll-on/roll-off

3.2.3 Sea/Land Containers

3.2.4 Waste from On-site Operations

3.3 To SEG-Oak Ridge from the FEMP Site

3.4 Waste from SEG-Oak Ridge to NTS

3.5 Final Product from SEG-Oak Ridge

3.5.1 Shielding Blocks to LANL

3.5.2 Unrestricted Release of Material to Scrap Brokers

4. Processing Facilities

4.1 Task Integration

4.1.1 Engineering

4.1.2 Construction

4.1.3 ES&H

4.1.4 QA

4.1.5 Procedures

4.1.6 Beneficial Reuse Plan

4.1.7 Documentation

4.2 SEG-Oak Ridge facilities

4.2.1 Technologies

4.2.1.1 High Pressure Water System Decontamination

4.2.1.2 Chemical Decontamination

4.2.1.3 Mechanical Decontamination

4.2.1.4 Induction Melt Furnace

4.2.1.5 Survey and Analytical Data

4.2.2 New Facilities

4.2.2.1 Induction Melt Facility

4.3 Quadrex-Oak Ridge

5. Beneficial Reuse of Material

5.1 LANL (Beneficial Reuse as Shielding Blocks)

5.2 Scrap Brokers (Free Release of metallics)

6. Waste Handling and Waste Processing

6.1 Task Integration

6.1.1 Engineering

6.1.2 Construction

6.1.3 ES&H

6.1.4 QA

6.1.5 Procedures

ATTACHMENT 3

SHIPPING CONTAINER DRAWING SEG-92-005

3935

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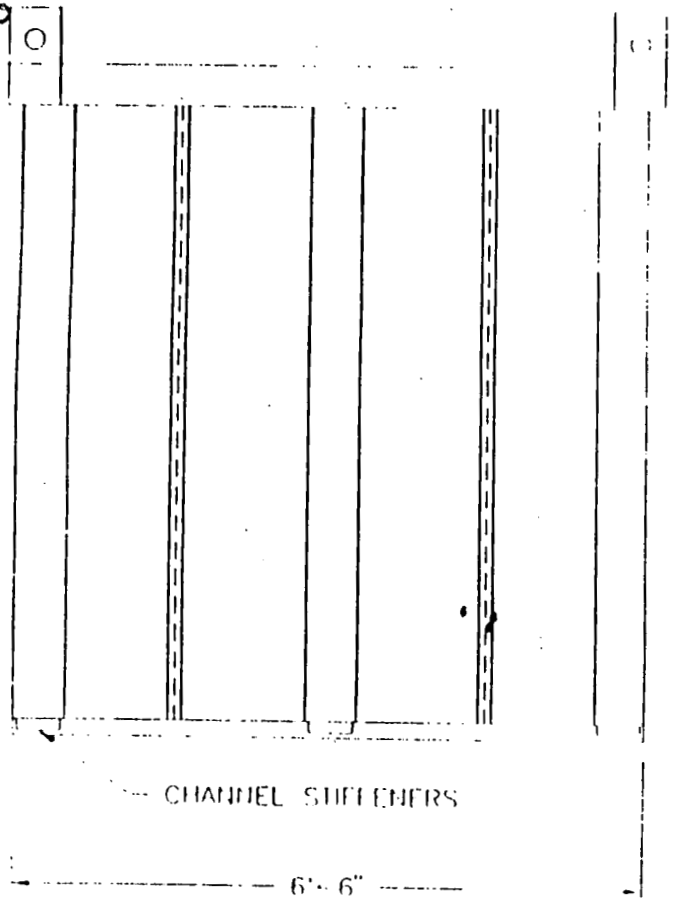
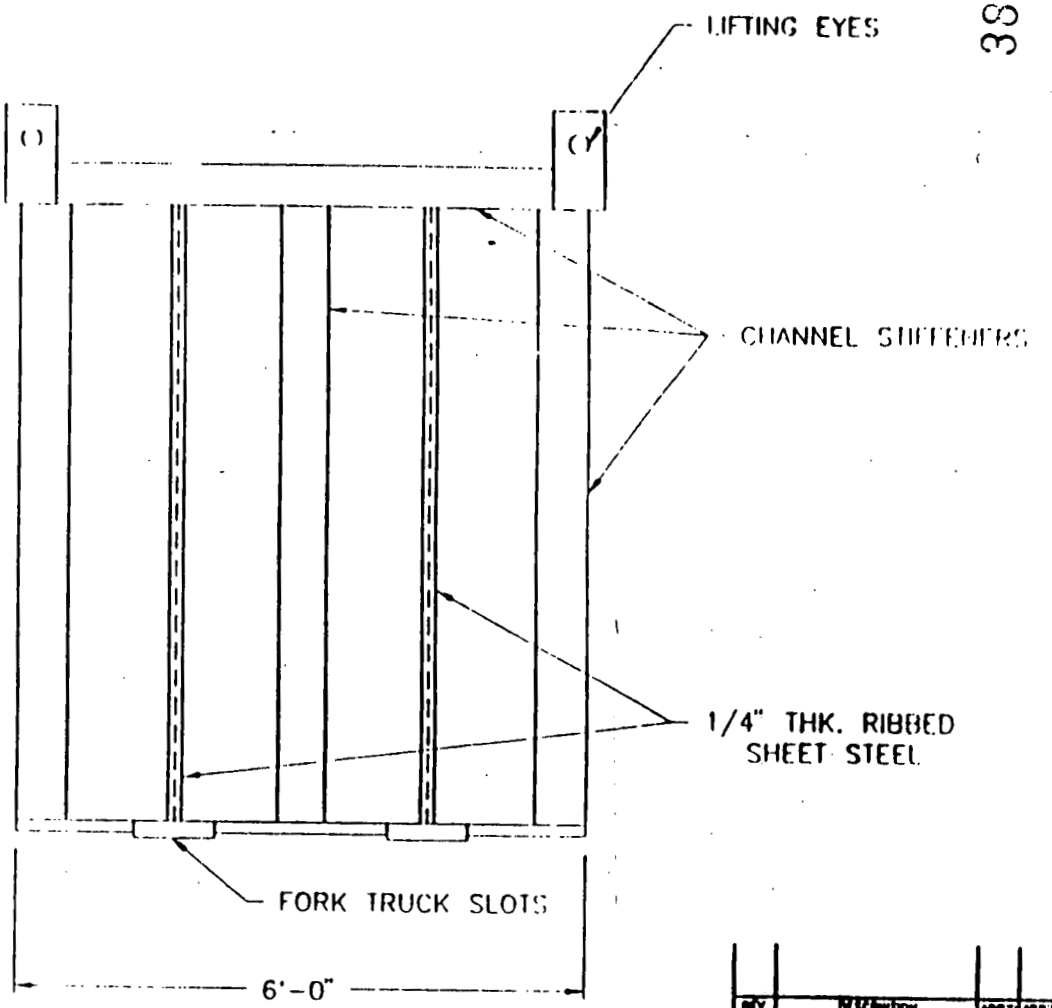


FRONT VIEW



SIDE VIEW

REVISIONS

SCIENTIFIC ECOLOGY GROUP, INC.

CONTAINERS

TOP LOADING SHIPPING CONTAINER

N/A

SEG-92-005

NONE

ATTACHMENT 4

WORK PROCEDURES

LIST OF WORK PROCEDURES

Next 201 Pages Redacted

Contains Proprietary Information