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DOE/RL/12074--28 Rev. 0

CONCEPTUAL DESIGN REPORT FOR THE ENVIRONMENTAL RESTORATION DISPOSAL FACILITY

February 18, 1994

Work Performed Under Master Interagency Agreement
No. DE-AI06-90RL12074
Task Order DE-AT06-93RL12107

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EXPIRES 03-14-95

FEB 1995

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1. Purpose.

Type of Information Release Document
Title Conceptual Design Report for the Environmental Restoration Disposal Facility
Doculment No. DOE/RL/12074--28
Revision No. 0
Brief Description Conceputal Design Report for the W-296 project

Unclassified Category N/A
Previous Clearance Approval Info N/A

2. CENPW Review.

Reviewer	Name/Title	Signature	Date
CENPW Peer Review, Tech Mgr	Greenwald/TM		Feb 7 94
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CENPW Editorial Review	Cpt. Roades		14 Feb 94

3. CENPW Project Manager Request

Responsible Manager/Requester	Name/Title	Signature	Date
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4. DOE-RL Review

Reviewer	Name/Title	Signature	Date
DOE-RL Legal and Patent Review	Southworth/OCC		15 Feb 94
DOE-RL Programmatic Review	~~Foley/ERD~~ COLLINS/PMD		15 Feb 94

5. CENPW Document Clearance Approval

Approved for Release	Name/Title	Signature	Date
CENPW Project Mngr Approval	Cpt. Roades		15 Feb 94

NOTE: Document classification is not required for USACE documents, per DOE-RL Serial Letter No. 93-EPB-027, dated 13 January 1993.

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ACRONYMS AND ABBREVIATIONS

ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ATBCB	and Transportation Barriers Compliance Board
AWS	American Welding Society
AWWA	American Water Works Association
C	Celsius
CAA	Clean Air Act
CAMS	Continuous air monitoring system
CAMU	Corrective Action Management Unit
CDR	Conceptual Design Report
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH	contact-handled
cm	centimeters
cm/hr	centimeters per hour
CPU	central processing units
CRT	Cathode ray tube
CWA	Clean Water Act
D&D	decontamination and decommissioning
DCS	distributed control system
DOE	U.S. Department of Energy
DOP	dioctyl phthalate
DOT	U.S. Department of Transportation
DSHS	Department of Social and Health Services
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
ERDF	Restoration Disposal Facility
F	Fahrenheit
FACP	fire alarm control panel
FCC	Federal Communication Commission
FDC	Functional Design Criteria
FM	Factory Mutual
fpm	feet per minute
ft	feet
ft^2	square feet
GAI	Golder Associates, Inc.
gal	gallon
GFI	ground fault interruption
gpm	gallons per minute
GPS	global positioning system
H:V	horizontal to vertical
hazardous	non-radioactive hazardous
HDPE	high-density polyethylene
HEPA	high-efficiency particulate air
HLAN	Hanford Local Area Network

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HSWA	Hazardous and Solid Waste Act
HVAC	heating, ventilation and air conditioning
Hz	Hertz
IDO	Indefinite Delivery Order
IEEE	Institute of Electrical and Electronics Engineers
in.	inch
in./hr	inches per hour
km	kilometers
km^2	square kilometers
kPa	kilo Pascal
kph	kilometers per hour
kV	kilovolt (
kVA	kilovolt ampere
L	liter
L/min	liters per minute
LCCA	Life Cycle Cost Analysis
LLW	low-level waste
m	meters
m^2	square meters
mi	miles
mi^2	square mile
MMI	man machine interface modules
mph	miles per hour
mpm	meters per minute
MW	mixed waste
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
PCM	process control modules
PDS	premise distribution systems
psi	pounds per square inch
PTC	Project Time and Cost
PVC	polyvinyl chloride
QA	Quality Assurance
RCRA	Resource Conservation and Recovery Act
RH	remote-handled
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SWITS	Hanford Solid Waste Information Tracking System
TPA	Tri-Party Agreement
TRU	transuranic
TSCA	Toxic Substance Control Act
UBC	Uniform Building Code
UFAS	Uniform Federal Accessibility Standard
UL	Underwriters Laboratory
UPC	Uniform Plumbing Code
USACE	U.S. Army Corps of Engineers
V	Volt
WAC	Washington Administrative Codes
WBS	work breakdown structure

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1.0 INTRODUCTION

1.1 ENVIRONMENTAL RESTORATION DISPOSAL FACILITY DESCRIPTION

The U.S. Department of Energy (DOE) has tasked the U.S. Army Corps of Engineers (USACE), Walla Walla District with the development of a conceptual design for a proposed Environmental Restoration Disposal Facility (ERDF), burial ground 618-12, at the Hanford site near Richland, Washington. The production of plutonium and related activities since 1943 have resulted in environmental contamination (primarily soil) on the Hanford site. The proposed ERDF will serve as the burial facility for the majority of wastes excavated during remediation of waste management sites in the 100 Area, 200 Area, and 300 Area of the Hanford site. The primary features of the proposed ERDF include a waste burial trench, leachate collection, rail and tractor/trailer container handling capability, railroads, inventory control systems, and operations offices. Treatment of process wastewater and leachate derived from the proposed ERDF operation will also be provided.

The project has been designated as project W-296 and consists of the design and construction of facilities which will be used for the final management of waste resulting from remediation activities at Hanford. The trench capacity constructed under Project W-296 will accommodate the initial volume of waste from remediation The remainder of the facilities will be designed for the ultimate volume and rate of production of waste expected to be excavated during later years. This report does not establish the operation of the facility but does contain some discussion of the potential modes of operation of the facility, to the extent that the operation may dictate specific details of facility design. The operation of the facility will be by WHC-Solid Waste Disposal. Waste to be placed in the proposed ERDF during the first five years will primarily come from the 100 Area and 300 Area. The USACE has tasked Montgomery Watson to prepare the Conceptual Design Report (CDR) under Delivery Order No. 0024, under the Indefinite Delivery Order (IDO) Contract Number DACW68-92-D-0001 with the Walla Walla District. Golder Associates, Inc. (GAI) and Project Time and Cost (PTC) assisted Montgomery Watson in the preparation of this report.

1.2 CONCEPTUAL DESIGN REPORT PURPOSE

This CDR is a culmination of the conceptual design activities performed to establish the baseline for the proposed ERDF. The purpose of the CDR is to sufficiently develop the design to assure the following:

- Programmatic needs are met
- Operating needs are met
- Proposed design concepts are feasible
- Risks are identified and addressed
- Technical, cost, and schedule baselines are established.

The CDR will be used to establish funding and schedule requirements, obtain concept approval by interested parties, and to document the project baseline.

The CDR contains sufficient detail for endorsement of the project concept and to develop reliable project cost and schedule baselines. The level of detail included in the CDR does not restrict the ability to make technical decisions during definitive design.

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2.0 SUMMARY

The proposed concept for the ERDF that is evaluated in this report calls for burial of environmental restoration (ER) derived waste in a trench approximately 21.3 meters (m) (70 feet [ft]) deep with a Resource Conservation and Recovery Act (RCRA) compliant barrier. However, the specific design requirements of the waste burial trench will be determined in the final Record of Decision (ROD) to be issued by the U.S. Environmental Protection Agency (EPA) under it's Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) authority. Closure of the waste trench will be accomplished through the placement of a final barrier over the trench under another project. This barrier will be specifically designed for this site to prevent infiltration and limit access to the waste. Along with the trench, the proposed ERDF will include waste handling, decontamination facilities, transportation systems, and related support facilities such as the operations building.

It is proposed that the ERDF be located in the 600 Area (near the 200 Area) in the center of the Hanford site. The location of burial ground 618-12 is preferred due to the central location, the favorable geologic conditions, and the historical use associated with this portion of the Hanford site. The proposed site is pending final approval.

Solid wastes occurring at the Hanford site include non-radioactive hazardous (hazardous) waste, low-level waste (LLW), and transuranic (TRU) waste. Both LLW and TRU are subdivided as contact-handled (CH) or remote-handled (RH) based on radiation dose rates, and as mixed waste (MW) if hazardous components are also present. The Preliminary Waste Acceptance Criteria (Appendix A) indicates which wastes will be buried at the proposed ERDF. Non-hazardous non-radioactive wastes will be characterized and managed at a separate site. No TRU waste will be managed at the proposed ERDF.

This CDR utilizes results of the following criteria, engineering studies, and design analysis for the proposed ERDF facilities:

- *Functional Design Criteria* (FDC), *Environmental Restoration Storage and Disposal Facility, Project W-296* (WHC 1993a)
- *Engineering Study for the Decontamination and Wastewater Treatment Facility for the Environmental Restoration Storage and Disposal Facility* (USACE 1993a)
- *Engineering Study for the Volume Reduction System Dewatering and Stabilization System for the Environmental Restoration Storage and Disposal Facility* (USACE 1993b)
- *On-Site Transportation Network Engineering Study for the Environmental Restoration Storage and Disposal Facility* (USACE 1993c)
- *Engineering Study for the Trench and Engineered Barrier Configuration for the Environmental Restoration and Storage and Disposal Facility* (USACE 1993d)
- *Design Memorandum Report for the Environmental Restoration Storage and Disposal Facility* (USACE 1993e). This memorandum contains chapters on "Batch Plant Sizing," "Automation Strategy Development," "Transuranic Waste Storage and Handling," "Evaluation of Applicable Regulations and Department of Energy Orders," "Material Balance Evaluation," and "Site Capability Assessment."

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- *Engineering Study for the Conveyor and Area Fill Systems for the Environmental Restoration and Disposal Facility* (USACE 1993f)

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3.0 JUSTIFICATION

The Hanford Federal Facility Agreement and Consent Order (the Tri-Party Agreement [TPA]) details the approach to cleanup of the Hanford site, pursuant to RCRA, CERCLA, and the State of Washington Hazardous Waste Management Act. Much of the justification cited in this section is derived from the TPA.

The operations of the Hanford site by the Federal Government since 1943 have resulted in approximately 1,000 sites that must be investigated under the TPA, and if necessary, cleaned up. The waste sites have been grouped into 78 operable units. Investigation of the operable units and the examination of the cleanup alternatives have been initiated and the schedule is detailed in the TPA. Preliminary screening of the remedial alternatives in the initial feasibility studies for many of the operable units indicates that the removal of contaminated material from waste sites will be required.

Removal actions, resulting from 100 Area and 300 Area operable unit RODs, are expected to produce large volumes of hazardous, LLW, and MW, beginning approximately September, 1996. Removal actions resulting from 200 Areas may also produce wastes for burial at the proposed ERDF. A waste facility capable of receiving large quantities of these wastes will be needed at Hanford at that time. Technology does not exist to effectively destroy a majority of these wastes and transfer to off-site waste facilities is not cost effective or acceptable for many reasons, one of which is transportation of massive quantities of waste on public highways. The Hanford Future Site Uses Working Group, in the report *The Future for Hanford: Uses and Cleanup*, recommends that waste management activities at the Hanford site be concentrated in the interior portion of the Central Plateau. Therefore, Washington State Department of Ecology (Ecology), EPA, and DOE agree to proceed with the steps necessary to design, approve, construct and operate the proposed ERDF to be located on the Central Plateau.

Timing for the construction and operation of the facility is critical. The proposed plans for the operable units are due beginning in October 1994. Delay in construction of the facility would impact cleanup of the waste sites. The three parties are committed to working together to resolve issues affecting the design, construction, and operation of the facility and to maintain the schedule to support the cleanup program.

The parties agree that a phased approach for construction of the facility is appropriate. Design and construction of the initial phase shall be adequate for waste volumes projected to result from 100 Area and 300 Area RODs for operable units presently under investigation. Incremental future expansion of the facility shall be maintained such that remedial action schedules are not adversely impacted by inadequate Hanford waste capacity. Since the facility will require significant resources, a phased approach should minimize impacts on other operations such as cleanup. A phased approach will minimize the land use requirements since waste units will be brought on line on an "as needed" basis.

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4.0 PROJECT SCOPE

Project W-296 will be designed and constructed for permanent burial of containerized and bulk waste derived from ER and decontamination and decommissioning (D&D) activities of past-practice sites through the end of 2001. This section provides an overview of the proposed ERDF facilities and equipment. Section 5 provides more detail on the proposed facilities and equipment.

The proposed ERDF facilities will be sized to contain all waste derived during the entire 22 year life of environmental remediation. Project W-296 will provide waste facilities, rail and tractor/trailer container handling capability, equipment and personnel decontamination facilities, maintenance facilities, fencing, roads, utilities, inventory control systems, communication systems, administrative offices, and other appurtenances necessary to support the development and operation of the necessary capacity, in accordance with the FDC.

Containers of bulk waste will arrive at the proposed ERDF either on flatbed railcars or flatbed tractor/trailers. It is expected that up to 150 containers per shift will arrive by rail and up to 65 containers per shift will arrive by tractor/trailer. All containers will be off loaded in the railhead area near the north end of the trench. Pneumatic wheeled container handlers will transport the containers to dedicated flatbed tractor/trailers, which will transport the containers to the burial trench. The tractor will back into the trailer tipper and disconnect from the trailer. The trailer tipper will lift and empty the trailer and container. The tractor will reconnect to the trailer and transport the container to the decontamination facility where the container will be removed and the exterior will be decontaminated by a water/detergent wash. The container will then be stored until it is loaded onto a railcar or off-site tractor/trailer for return to the remediation site. After the container is unloaded at the remediation site, the tractor/trailer will return to the railhead to continue the cycle.

After the waste is deposited in the trench, tractor dozers will spread and compact the waste on a continual basis. At the end of each day's operation, the top of the trench fill will be covered with clean operational cover material so that the trailer tipper and dedicated tractor/trailer will always be on clean material. The face of the waste placed in the trench will be coated with a dust suppressant.

In addition to the equipment and facilities mentioned above, a batch plant, leachate collection and leak detection system, environmental monitoring (air and groundwater), operations building, decontamination facility, site fencing, power, water, access roads, and parking facilities are proposed. Facilities to load containers with clean excavated soil for backhaul to the ER sites are also proposed.

Site characterization activities are being conducted and monitoring wells are being installed to meet RCRA requirements. These actions are part of project W-296 but are not included in the facilities described in this CDR. The costs are included in section 8, under "Other Project Costs".

4.1 IMPROVEMENTS TO LAND

The proposed site for Project W-296 extends east of the existing 200 West Area to near the state leased land (the US Ecology area), and south of the proposed 16th Avenue extension (see ES-296-01 and ES-296-02). The dimensions of the proposed site are approximately 3.2 kilometers (km) by 3.2 km (2 miles [mi] by 2 mi). The actual ERDF facilities will only utilize the upper portion of the proposed site and will disturb an area of approximately 2.6 square

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kilometers (km^2) (1 square mile [mi^2]) of the entire site. The disturbed area will be reduced as much as possible to minimize the impact on existing vegetation and wildlife.

4.1.1 Site Preparation

The existing landscape and terrain will be prepared and utilities will be installed for the construction of the proposed ERDF. Earthwork techniques, including cut and fill excavation, grading, and embankment construction will be performed to provide the elevations and grades required for constructing the trench system and for the foundations of major structures. When available, engineered fill material will be provided from excess excavated material, to obtain the required embankment elevations and grades. Road systems, rail track, parking areas, and building facilities will be oriented to allow for proper drainage. Raw and potable water pipelines and electricity will be brought to the needed site locations.

4.1.2 Drainage

The proposed site is unimproved semi-arid land typical of the Hanford site. The natural downward slope is from northeast to southwest. The site is near the top of a plateau and is not located in any river or stream flood plain. The site will be graded to keep all off-site stormwater and snow melt from entering the site. All potentially contaminated on-site stormwater and snow melt will be contained and sampled to determine if treatment is needed. If treatment is not needed, the water will be released.

4.1.3 Landscaping

The area around the operations building will be landscaped to provide a pleasant working environment and an inviting atmosphere for visitors. The landscaping will be designed to blend with the surrounding area by utilizing native plant species wherever possible. The landscaping will include grass sod and/or seed and a variety of trees and shrubs recommended for the local climate. The landscaping will also be designed to provide wind reduction. All landscaped areas will be outside potentially contaminated areas. Prior to planting, the trees will have had at least 2 years of growth in the local climate. The landscaped areas will be provided with an irrigation system.

Areas disturbed during construction that are not subject to repeated disturbances will be seeded with native grasses.

4.1.4 Railroads

Railroad improvements will include:

- Construction of lead track connecting the proposed ERDF to the existing Hanford rail system north of 200 Area West near highway route 11A
- A looped circulation track at the proposed ERDF
- Sidings for container off-loading and on-loading
- Sidings for material haul back
- Upgrade of existing rail between Suzie Switch and the new ERDF lead track as determined during final design.

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4.1.5 Roads, Walks, and Paved Areas

The proposed ERDF road improvements will include off-site and on-site roads as shown on engineering sketch ES-296-02. Seven roads, 2 parking lots, 3 container transfer pads, and miscellaneous sidewalks are proposed to be constructed.

4.1.6 Fences and Gate Control Points

The entire trench and operations area, and portions of the operations building will be protected from inadvertent entry by fencing. Each gate will have a control point with limited entry during operations. During off-shift hours, access will be controlled by the shift manager. Control points will utilize pre-engineered metal and/or factory manufactured buildings.

4.1.7 Security

In addition to the fencing, all building exterior doors will be provided with security locks. The exterior of buildings will be illuminated and the exterior lighting will be automatically controlled by photoelectric sensors.

4.1.8 Fuel Storage and Dispensing Area

A fuel storage and dispensing area will be provided south of the operations building.

4.1.9 Bulk Chemical Storage and Dispensing Area

A bulk chemical storage and dispensing area will be provided adjacent to the fuel storage and dispensing area.

4.2 BUILDINGS

Support facilities will be required for approximately 167 full-time employees (divided between 2 shifts), Hanford site-wide services personnel on a part-time basis, and the container decontamination operations. To accomplish this effectively, 3 main buildings will be constructed. The second floor of the operations building will accommodate managerial, engineering, and administrative staff; the first floor of the operations building will provide working areas for operations personnel. The decontamination facility will provide container decontamination, surveying operations, and working areas for personnel involved in container decontamination. The wastewater treatment facility will include the equipment to treat the combined leachate and decontamination facility wastewater.

The arrangement and design of these buildings will facilitate safe and efficient functional operations, meet programmatic needs, provide flexibility for future expansion, and comply with current building and fire safety codes including, but not limited to, the *Uniform Building Code* (UBC), national fire codes, and DOE Order 6430.1A, (refer to engineering sketches ES-296-10 through ES-296-17).

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4.2.1 Operations Building

The operations building will house managerial, administrative, operations, and maintenance support personnel, including site-wide services personnel that will occupy the facility part-time. This building will also provide a reception area for official and public visitors.

The operations building will accommodate support staff required for effective operation of the proposed ERDF. The staffing needs for the operations building will include the following:

- **ERDF Manager.** The manager will be responsible for the successful completion of the ERDF mission. His management and administrative responsibilities will include overall coordination of waste placement operations with the ER sites. The manager will be assisted by the Hanford site-wide services and personnel for functions exceeding the capability of the ERDF staff.

- **Engineering.** Facility engineering will provide quality assurance for waste placement, waste compaction, cover materials placement and compaction, dust control, and decontamination.

- **Administrative Staff.** This staff will perform general administrative functions directly related to the proposed ERDF operations including record keeping, resource material control, accounting, and procurement. The staff will coordinate their functions and activities with the Hanford site-wide support services organization. The operations building will be adequately sized to also accommodate the Hanford site-wide support personnel on a part-time basis.

- **Shift Management.** Each working shift will be supervised by a manager who is directly accountable to the ERDF Manager. All on-site activities, including waste placement operations, will be performed under the supervision of the shift manager.

- **Others.** The shift manager will be assisted by a dispatcher who will oversee all operations at the railhead, a waste placement coordinator and temporary staff for tracking waste placement operations, a working face supervisor who will oversee all operations at the burial trench, and a decontamination supervisor who will oversee decontamination and reloading of containers onto railcars. Equipment operators will be assigned from the central services resource labor pool. Personnel who will be required to perform preventative maintenance of electronics, instruments, vehicles, and equipment will also be assigned from the central services resource labor pool. Assignment of staff from the Hanford site-wide services organization will occur on a continuing basis.

4.2.2 Decontamination Facility

The decontamination facility will be a multiple wash bay facility that will use pressurized water sprays to wash the exterior of the containers.

The decontamination facility will also include an exterior wash area for washing the exterior of vehicles that leave the site. These vehicles will be washed with high pressure water from a permanently mounted high pressure washer similar to the mobile decontamination unit (see section 5.5.5). This unit will be permanently mounted inside the decontamination facility equipment room with the hose passing through a small portal in the exterior wall. A drainage collection area will be provided with a sump and pump that will pump the liquid to the decontamination wastewater treatment system (see section 4.3.7). In addition to the wash bays,

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the decontamination facility will include a control room, equipment room, separate men's and women's restrooms, and a small personnel decontamination room.

4.2.3 Wastewater Treatment Facility

The wastewater treatment facility will include equipment to treat the combined leachate and decontamination facility wastewater.

4.3 UTILITIES

Most of the required utility service will be provided by connections to existing facility systems. The sanitary sewer collection system will deliver waste to 2 separate septic tank/drain field systems with provisions for future connections to the 200 Area system.

4.3.1 Communication Systems

The communication systems will be connected to existing fiber network in the 200 West Area and will include telephone, pubic address, computer networking (Hanford Local Area Network [HLAN]), and emergency systems.

4.3.2 Electric Transmission and Distribution Systems

A short overhead line will be installed to bring electric power from the existing 13.8 kilovolt (kV) line number C8-L3 that runs north/south along the east border of the 200 West Area.

4.3.3 Alarm Systems

A local emergency fire alarm system will be installed within each building. This system will be comprised of a fire alarm control panel (FACP), with standby battery power and auxiliary relays to activate radio fire alarm signals that will be received at the 200 Area Hanford Fire Department. Each fire suppression system will individually enunciate.

4.3.4 Irrigation Systems

An irrigation system will be installed for landscaping around the operations building. The irrigation system will use raw water.

4.3.5 Sanitary Wastewater

The sanitary wastewater from the operations building and decontamination facility will be collected and treated in new septic tanks located near each facility in noncontaminated areas. The liquid from the septic tanks will be diverted to new drain field systems. Solids that accumulate in the septic tank will be periodically removed and handled by methods acceptable to Ecology and EPA.

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The 2 sanitary wastewater systems will be installed with stub-outs for future connections to a sanitary wastewater treatment facility.

4.3.6 Water Supply, Pumping, Treatment, and Distribution Systems

Two types of water will be utilized at the proposed ERDF. Sanitary (potable) will be used for all sanitary uses such as drinking water, showers, toilets, and laundry. Raw (export) water will be used for fire protection, landscape irrigation, decontamination make-up, batch plant operations, and other non-potable water uses (none currently identified). Sanitary water will only be provided to the operations building, the decontamination facility, and the wastewater treatment building.

4.3.7 Contaminated Wastewater Collection and Treatment Systems

Contaminated wastewater will be comprised of human wastes (sanitary wastewater), trench leachate, and decontamination facility wastewater. Sanitary wastewater collection and treatment are discussed in section 4.3.5. Trench leachate collection is discussed in section 5.4.3.3. This section discusses the treatment of both the decontamination facility wastewater and leachate generated from the trench.

In accordance with the FDC, no effluent will leave the proposed ERDF site. The decontamination facility wastewater and the trench leachate will be combined and treated in the wastewater treatment system. The treated effluent will be stored in tanks for either evaporation or pumping to the batch plant, the decontamination facility, or into the tanker trucks for use in dust control.

4.4 WASTE TRENCH

A single trench with a RCRA compliant liner will be constructed as described in section 5.4. The trench is designed to be expanded to an ultimate burial capacity of up to 21.8 million m^3 (28.5 million yd^3) of waste. Leachate collection and pumping systems, and leak detection and pumping systems will be included. Waste will be stabilized as discussed in section 5.4. The final trench closure will be by a RCRA compliant cover.

4.5 EQUIPMENT

Equipment as described in section 5.5 will be provided by this project.

4.5.1 Special Equipment

Special equipment will include a batch plant, wheeled container handlers, tractor dozers, vibratory compactors, mobile decontamination units, container transport tractor/trailers, cover and grout material transport trucks, grout mixer/transport trucks, road grader, road maintenance water truck, end of shift cover spray truck, front end loaders, trailer tippers, portable lighting, railroad locomotive, container off-loading crane, and equipment maintenance vehicles.

Standard equipment that will be utilized and slightly modified for normal operations at the proposed ERDF include an electronics/instrument service truck, vacuum truck, street

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sweeper, personnel vans, and 2 vacuum trucks. These vehicles will be dedicated to the proposed ERDF.

4.5.2 Containers

Waste transport containers will be required to transport the waste to the proposed ERDF. Additional waste transport containers will be required to meet the time requirements for operating the proposed ERDF. All containers will be provided by others.

4.5.3 Office Furniture and Equipment

All required furniture, storage equipment, workstations, desks, chairs, etc. for the operations building and the decontamination facility will be provided by this project.

4.5.4 Process Equipment

Process equipment is described under either building description or special and standard equipment. No other process equipment will be provided.

4.5.5 Shop Equipment

All shop equipment required for efficient maintenance of equipment at the proposed ERDF will be provided by this project. This equipment includes welders, standard mechanical maintenance tools, standard electronics and electrical equipment, cutting equipment, work benches, work chairs, and storage shelving. Exhausts will be provided for welding and grinding enclosures, and for the garage. The clean maintenance shop will have a sink for cleanup and a drinking fountain.

An overhead traveling hoist will also be provided by this project. The hoist will run from an exterior loading dock to a mechanical shop workbench and a welding enclosure.

4.6 AUTOMATED DATA PROCESSING EQUIPMENT

All automated data processing equipment required for efficient operation of the proposed ERDF will be provided by this project. Equipment is described in section 5.6.

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5.0 PERFORMANCE REQUIREMENTS

This section describes the project in detail and includes the regulatory requirements for this project. Some of the project concerns that were considered during preparation of the CDR include cost analysis, operational performance, public perception, and public acceptability. Some of the major controlling regulatory requirements were DOE orders, Washington State codes, UBC, National Fire Protection Association (NFPA) requirements, Hazardous and Solid Waste Act (HSWA), RCRA, and CERCLA requirements, and regulatory discussions.

5.1 IMPROVEMENTS TO LAND

Even though the designs will minimize disturbances to existing lands, site improvements are quite extensive for this project due to the large area of land affected. The improvements to the land will be designed to meet Performance Category 0 as defined in DOE Order 5480.28. This is based on the facility classification as a low-hazard, nonreactor facility per *Environmental Restoration Storage and Disposal Facility, Project W-296, Hazard Classification, Functional Review Issue* (WHC 1993c). All structures, systems, and components will be designed for the earthquake zone and for appropriate wind loads as defined in UBC and DOE Order 6430.1A. The facilities are above the maximum flood elevation.

5.1.1 Site Preparation

The following sections describe site improvement requirements and related codes, regulations, and DOE orders that are applicable.

5.1.1.1 Project Requirements. Prior to construction of the proposed ERDF, the total site will be surveyed and the area necessary for the operation of project W-296 will be cleared of low growth vegetation. Surveys will establish and layout the elevations and grade lines for buildings, roads, rail track and other support facilities. Earthwork will reshape the existing land contours to provide drainage and establish facility elevations. Obstructions which interfere with building locations, roadways, and railroad tracks will be removed from the site. Utilities will be relocated and extended. All grading, embankment, and excavation work will be coordinated to facilitate transitions in grade, elevation, access, and operational functions. Embankments will be required along the west and south sides of the circulation track.

5.1.1.1.1 Railroad. Excavations, embankments, clearing work, and utility adjustments will be required for a new railroad lead track. This work will begin at the existing rail line north of the 200 West Area, near highway Route 11A, and extend to the new railhead facilities located on the north side of the proposed ERDF facility. Earthwork will be required along the east side of the 200 West Area and in the circulation track along the northern boundary of the proposed ERDF.

Grade adjustments to the existing topography will be required prior to laying rail. A transition from cut to fill is required near the connection of the new lead track near highway 11A. Fill material will be used to establish a nominal track grade of approximately 1 percent in the areas north and south of the northeast corner of the 200 West Area. Placement of embankment materials to bring the grade to elevation will be required along the west and south sides of the circulation track. Excavations will be required along the north and east sides of the circulation track to establish track grade. Track elevation at the northwest and southeast corners of the circulation track near the railhead area will approximate the existing ground elevation.

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Earthwork for the circulation track along the south side of the railhead will establish a grade of less than 0.4 percent, while earthwork along the north and east side of the railhead will establish a grade of less than 1 percent. The siding connecting to the lead track along the south side of the circulation loop will be graded to approximately 0.2 percent.

At the intersection with the existing roads, earthwork will be completed so that the track elevation matches existing road elevations. At the proposed 16th Street extension, the road will pass under the railroad through an underpass.

5.1.1.1.2 Waste Trench. Select surplus soil material, generated from the construction of the waste trench (see section 5.4) will be used as fill material for railroad and roadway grading.

5.1.1.1.3 Road Systems Grading. Grading will be required to establish sub-grades and drainage for 3 haul roads around the proposed ERDF. The first road will be an off-site tractor/trailer haul road which will run from the 200 West Area 16th Street extension and connect to both the incoming (loaded) container transfer area and the decontaminated container transfer areas at the railhead. The second haul road will be an on-site waste haul road. This road will connect the loaded container transfer area to the decontamination facility and to the operations building on-site parking lot. It will also provide access to the tractor/trailer entry ramps for the trench. The third road will be a stockpile haul road. It will provide vehicle access to the daily operational cover and grout material stock piles on the east side of the trench with connections to the batch plant and the on-site waste haul road.

Sub-grade and drainage grading will be required for 4 other roads which will establish access for employee, maintenance, and administrative vehicles. A proposed ERDF access road will provide vehicle access from the Beloit Avenue extension to the stockpile haul road. The access road will connect the proposed ERDF access road to the operations building parking lot. The operations access road will be a continuous loop from the proposed ERDF access road to the operations parking lot, to the operations building, and back to the proposed ERDF access road. The internal maintenance and employee access road will connect the operations building with the on-site waste haul road.

5.1.1.1.4 Support Facilities Grading. Grading, excavation, and embankment work will be required to establish sub-grade for the proposed ERDF support facilities. Earthwork will be performed at the operations building, decontamination facility, wastewater treatment building, and parking areas. The container handler operating pads at the loaded container transfer area and at the decontamination facility receiving and shipping areas will be graded to achieve proper elevation. Other areas that will require site preparation include the chemical storage and transfer facility, and the bulk fuel storage, transfer, and fuel service facility.

5.1.1.1.5 Utilities. Site preparation work will include installation of casings on existing underground utilities, relocation of an above grade steam line at the railroad, and installation of casings for future underground utilities. Also, casings for 2 new water lines and an electricity line will need to be installed. Design of utilities is covered under section 5.3.

5.1.1.2 Codes, Regulations, and DOE Order Requirements. Grading, excavation, embankment, obstruction clearance, and utility relocation associated with railroad facilities will conform to the *American Railway Engineering Association Manual for Railway Engineering*, Volumes I and II, as directed by the FDC.

General site grading, design, and erosion control shall conform to DOE Order 6430.1A, Sections 0260, 0262, 0266, 0270, 0273, 0278, 1540, and 1630-1699.8 and WHC-CM-7-5.

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Design, construction practices, and construction materials associated with grading, embankment and excavation for roadways, parking lots, and container transfer areas shall conform to the *Washington State Department of Transportation Manual,* and WHC-CM-7-5.

Minimum depth of water lines shall be in accordance with Hanford Plant Standards, *Design Criteria*, SDC-3.2.

Survey control and recordkeeping will be done in accordance with DOE Order 6430.1A, Section 0202 and *Code of Federal Regulations* (CFR) 40 §264.309.

5.1.2 Drainage

All site preparation work listed in section 5.1.1 will be integrated into a drainage system meeting the operational and regulatory requirements of the proposed ERDF. Engineering sketch ES-296-03 provides details on the drainage control. Drainage improvement requirements, related code, regulations, and DOE orders are provided below.

5.1.2.1 Project Requirements. Embankment and excavation work will be coordinated to develop a drainage system compatible with runoff volumes. Drainage system development, as well as storage, treatment, and release of liquids associated with the trench construction are presented in section 5.4.

Stormwater runon/runoff systems will be designed to meet the requirements of CFR 40 §264.301. The 25-year design storm is 4 centimeters per hour (cm/hr) (1.56 inches per hour [in./hr]) for 24 hours.

The stormwater runoff from clean areas of the site will be collected and routed through ditches to a detention storage pond. The clean areas include the areas north of the south railroad lead track and clean areas within the proposed ERDF, including portions of the trench that have been filled and closed with an interim cover (see section 5.4.3.7). This water will then be metered and discharged to an existing drainage channel in a controlled manner. Clean drainage systems will be vegetation lined channels where feasible, and asphalt and/or concrete channels where flows are too great for vegetation channels. The retention pond will be unlined and the release system is anticipated to be a concrete structure.

It is anticipated that stormwater runoff in potentially contaminated areas will not require treatment under normal conditions. If spillage of waste material occurs, a vacuum truck will be used to remove the spill. Subsequent stormwater runoff could contain contaminants similar to leachate but in lower concentrations. Since the stormwater runoff has a potential for contamination it may need to be treated. Therefore, stormwater runoff from potentially contaminated areas will be separately collected and routed to RCRA compliant tanks for detention. The collection system will consist of an underground piping system that will drain to detention tanks. The tanks will be the same types of tanks as described in section 5.3.7. The potentially contaminated areas include the container transfer areas, container decontamination facilities, waste haul routes, and parking areas located between the rail lead track and the waste trench. The areas where potentially contaminated run-off can occur will be minimized during definitive design. However, the current estimate for runoff volume is 5,745,000 liters (L) (1,518,000 gallons [gal]). To provide this volume, 5 tanks will be required plus 1 redundant tank. To maintain this volume, each tank should be approximately 0.9 meters (m) (3 feet [ft]) deep and 46 m (150 ft) in diameter. The wastewater contained in these tanks will be sampled and uncontaminated drainage will be released to natural drainage areas near the southwest side of the waste trench. If the sampling indicates that treatment is needed, either lime will be added or

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the water will be pumped to either the wastewater treatment facility, the grout plant, or into tankers for off-site treatment.

The potential sources of radioactive contamination will be due to either accidental spillage of small amounts of materials from the tractor/trailer/container or an accident where a tractor/trailer carrying a full container tips. The containers entering the site will have been decontaminated at the remediation sites so there should not be any waste material that could fall off the containers. The tractor/trailer units will always be operated on either paved roads or clean fill so they will never come in contact with the waste. The containers will be visibly inspected prior to leaving the trench to ensure that no visible amounts of waste are present on the outside of the containers. Therefore, there should be no accidental spillage of waste material in the area. If there is an accident where a tractor/trailer is tipped, the material can be removed using either a front end loader or vacuum trucks. Therefore, the potential for radioactive materials being in the storm runoff is minimal. In addition to these precautions, the clean areas will be separated from the potentially contaminated areas in case some spillage does occur. Due to the expectation that only very low amounts of radioactivity will occur in the runoff, the use of a dedicated treatment system is not justified.

5.1.2.2 Codes, Regulations, and DOE Order Requirements. Design, construction practices, and construction materials associated with drainage for roadways, parking lots, container transfer areas, and drainage structures will conform to the *Washington State Department of Transportation Manual.*

Stormwater runon, runoff and detention design will conform to CFR 40 §264 and *Washington Administrative Codes* (WAC) 173-303.

General site drainage and erosion control shall conform to DOE Order 6430.1A.

Design of stormwater detention capacity will utilize data compiled in the *Climatological Summary for the Hanford Area,* (PNL 1983).

5.1.3 Landscaping

This project includes landscaping which will enhance the operations building and provide some climate mitigation.

5.1.3.1 Project Requirements. The project requires that the facilities and surrounding areas demonstrate the conviction and intention of DOE to protect and improve the environment. Also, it is important to provide pleasant surroundings for workers and visitors.

5.1.3.2 Codes, Regulation, and DOE Order Requirements. DOE Order 6430.1A, Section 0290 requires that landscaping be simple, functional, and economical to maintain. During definitive design, the following site factors will be taken into account in a site analysis: availability and accessibility of irrigation water, visual factors, climatic data including extreme wind, existing vegetation, soils, microclimate, hydrology including flood-flow frequency, geology and seismology, revegetation and restoration of disturbed areas, topography, vehicle and pedestrian circulation patterns, noise factors, utilities, security requirements, maintenance requirements, and erosion and runoff control.

The landscaped areas will be provided with an irrigation system capable of applying a minimum of 2.5 centimeters (cm) (1 inch [in.]) of water within 30 minutes. The system will be controlled automatically by a programmable controller capable of scheduling the time and duration of watering for a minimum of one week. Water will be supplied from the raw water

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system. The irrigation system will be sized to limit the water delivery to ensure adequate water supply and pressure are available to the fire suppression sprinkler systems.

In designing a sprinkler system for landscape irrigation, the following will be considered to determine sprinkler types, sprinkler spacing patterns, sprinkler circuit selection; water requirements of different types of grass, ground cover shrubs, and trees; the terrain and the ability of various types of soil to absorb and hold water; and climatic conditions.

5.1.4 Railroads

A single standard gage railroad lead track will be constructed commencing at the existing rail line north of 200 West Area, near highway Route 11A. Turnout design from the existing track will require analysis of existing track data including coordinates of curve, degree of curve, existing radius and super elevation. The lead track will be placed along the east side of the 200 West Area and will provide access to the railhead area of the proposed ERDF. Design will provide at-grade crossing at existing Route 3 access locations into the 200 West Area. The proposed 16th Avenue extension will pass under the railroad through an underpass at the east crossing.

At the railhead, the lead track will include a circulation route along the northern boundary of the proposed ERDF. The east to west length of the circulation bulb will be sufficient for sidings at the proposed ERDF decontamination facility, loaded container transfer area, and at the trench excavation back-haul area. The north to south length of the circulation bulb will be sufficient to permit a 180 degree change in direction of train movement. This turn will be provided by 2-90 degree turns separated by a tangent section at the proposed 16th Avenue roadway crossings. The north to south dimension will also be of sufficient length to accommodate transition of track elevation between the north and south sides of the circulation bulb.

The lead track will be constructed at a nominal maximum grade of approximately 1 percent. Design speed between existing rail and the proposed ERDF railhead area will be approximately 40 kilometers per hour (kph) (25 miles per hour [mph]). The south side of the lead track circulation bulb, which provides access to sidings, will be laid at a nominal grade of approximately 0.2 percent. The preferred track selection is 115 RE rail. The preferred curvature for the lead track is 6 degrees (equivalent to a number 10 switch).

A by-pass siding will be provided within the circulation track to facilitate storage of 17 railcars plus an engine. This siding will be placed to facilitate temporary storage of trains inbound, outbound, and shuttling between loaded and empty container transfer areas.

The loaded container off-load transfer area will consist of one pass-through siding having the capacity to store 17 container railcars plus an engine. The siding will be constructed on an east to west axis near the center of the trench. The siding will be laid at approximately level grade with the maximum grade not exceeding 0.4 percent. The siding will be separated from the lead track by approximately 7.6 m (25 ft). A switch will be provided at the west end of the siding to permit the off-site engine to return to the lead track and the proposed ERDF engine to advance the railcars to the container loading siding. A paved operating pad approximately 6 railcars long will be constructed along the south side of the siding.

The container loading siding will be an on-line extension of the off-load siding with connection to the lead track at the west end. A paved operating pad approximately 6 railcars long will be constructed along the south side of the loading siding. This siding track will be parallel to the container conveyor exiting the decontamination facility. The track will be

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separated from the conveyor a sufficient distance (approximately 32 m [106 ft]) to permit 180-degree container handler rotation.

The container transfer area will also include operating space for transferring empty containers to off-site remediation tractor/trailers. The design will prevent intermingling of or cross traffic between off-site and dedicated transport tractor/trailers at the decontamination facility.

The backhaul transfer area will be a pass through siding laid on an east to west axis having the capacity to store 17 container railcars plus an engine. The siding will be constructed east of the loaded container transfer area and will be separated from the lead track by approximately 8 m (25 ft).

The container transfer areas and supporting track facilities will be lighted to permit night-time operations. Lighting requirements are further identified in section 7.1. The container transfer area will include a dispatch control area to monitor tractor/trailer and container movements and direct tractor/trailer traffic to appropriate trench locations.

Train transport will require approximately 55 minutes for cycle time. The train cycle begins with a train, loaded with filled containers, traveling from the Suzie Switch to the proposed ERDF, switching the engine to a waiting train loaded with empty containers, and returning to the Suzie Switch. Trains will depart the Suzie Switch every 78 minutes (during 6.5 hours of railroad production time in an 8-hour shift). During normal operation, only 1 train consisting of 15 railcars will be parked on-site. In addition to the 30 containers transported by this train, 6 additional containers will be on-site to support the proposed ERDF container processing cycle. In addition to these 36 containers, 11 more containers will be on-site to support the operating cycle for off-site trucks.

Site preparation requirements are presented in section 5.1.1 above. Requirements for rail and support facility requirements and related codes, regulations, and DOE orders are presented below.

5.1.4.1 Project Requirements. The design of the proposed ERDF facility will incorporate rail transport of waste containers. Due to site restraints and future use of the Hanford site, the location shown on engineering sketch ES-296-01 was selected for new railroad lines.

5.1.4.2 Codes, Regulations, and DOE Order Requirements. Track design, roadbed, track material, clearance requirements, construction specifications, drainage structures, ballast, switchman walkways, and container transfer area layout will conform to the *American Railway Engineering Association Manual for Railway Engineering,* Volumes I and II, as directed by the FDC. Design options permitted by the *American Railway Engineering Association Manual for Railway Engineering,* Volumes I and II, will be developed in accordance with Hanford Standards Specifications, *Railroad Construction*, HPS-558-AC, and Hanford Plant Standards, *Design Criteria,* SDC-3.1. Design, construction practices, and construction materials associated with container transfer area pavements will conform to the *Washington State Department of Transportation Manual.* Railroad crossings for highways will be in accordance with Hanford Plant Standards, *Architectural/Civil*, AC-7-20. Roadways at railroad crossing will be provided with signs, pavement markings and warning devices in accordance with the *Uniform Manual for Traffic Control Devices*, American National Standards Institute (ANSI) D6.1E.

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5.1.5 Roads, Walks and Paved Areas

Six asphalt cement paved roads and one gravel road will be constructed at the proposed ERDF. Each of the 6 paved roads will consist of 2-3.7 m (12 ft) lanes with 1.2 m (4 ft) shoulders. Design speed for the off-site tractor/trailer haul road and the on-site waste haul road will be approximately 48 kph (30 mph). The operations building access road and the internal maintenance and employee access road will all be designed for 40 kph (25 mph), while the design of the proposed ERDF access road will be consistent with Beloit Avenue design. The on-site stockpile haul road will be a 7.3 m (24 ft) wide gravel finish with 1.2 m (4 ft) shoulders. Design speed will be approximately 40 kph (25 mph).

Walkways will be provided around the operations buildings, decontamination facility, and the wastewater treatment facility. Concrete walks with access for the handicapped will be provided for each facility. Railroad switch points on the proposed ERDF lead track will also be equipped with walkways which will provide safe and efficient access to personnel responsible for operating railway switches.

Vehicle parking lots will be constructed both inside and outside the dedicated proposed ERDF fence. The parking lot outside the fence will provide ample parking space for 170 passenger vehicles as well as parking for buses. This parking lot is sized to provide parking for both shifts of the anticipated working staff plus minimal part-time and visiting staff. Parking for both shifts will be required since it is anticipated that shifts will overlap.

The on-site parking lot will be constructed east of the operations building and inside the proposed ERDF fence. It will be dedicated for equipment vehicles, service vehicles, and crew transport vehicles. Paved parking capacity will allow for a minimum of 16 tractor/trailer vehicles, 5 service vehicles, 4 crew transport vehicles, 6 administrative vehicles, and 10 spare spaces.

A loaded container transfer pad will provide access to the off-loading rail sidings and to the backhaul siding. Pavement surfaces will provide access to 17 railcars on each rail siding. Pavement surfaces will support tractor/trailers hauling 24.5 m^3 (32 yd^3) containers as well as the wheeled container handlers while transferring loaded containers.

An empty contaminated container transfer pad will provide access for 4 tractor/trailers and the decontamination facility wheeled container handlers. This pad will also provide storage space for 30 contaminated containers. Pavement surfaces will support wheeled container handlers transferring empty 24.5 m^3 (32 yd^3) containers and tractor/trailers carrying 1 empty container.

A transfer pad will be provided for transferring empty decontaminated containers from the decontamination conveyor system to railcars. This pad will provide access to 17 railcars and 2 tractor/trailers (the loading dock will have storage capacity for 20 decontaminated containers.) Pavement surfaces will support wheeled container handlers transferring 1 empty 24.5 m^3 (32 yd^3) container.

A truck wash down pad at the decontamination facility will provide access to 1 tractor/trailer. Pavement surfaces will support tractor/trailers hauling 1 empty 24.5 m^3 (32 yd^3) container.

Signs indicating speed limits, curves, handicapped areas, visitor parking, building titles, and radiological control zones will be provided.

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5.1.5.1 Project Requirements. The project requires that roads be installed for transport of waste material, removal of clean fill material, and access for personnel. Roads must be of adequate width to permit truck travel and maneuvering.

5.1.5.2 Codes, Regulations, and DOE Order Requirements. Paved areas adjacent to railroad track and switch-person walkways shall provide clearance and access in conformance with the *American Railway Engineering Association Manual for Railway Engineering,* Volumes I and II.

Design, construction practices, and construction materials will conform to the *Washington State Department of Transportation Manual* and DOE Order 6430.1A.

5.1.6 Fences and Gate Control Points

The project requires that personnel and vehicular access to the proposed ERDF be restricted by use of fencing and gates. No unauthorized personnel will be permitted beyond the visitors center in the operations building.

The entire trench and operations area, except portions of the operations building, will be protected from inadvertent entry by an approximately 2 m (7 ft) high fence. Fencing will be chain linked with barbed wire. Lighting will be provided around the entire perimeter of the fenced site. Three main gate entries will be provided. Each gate will have a control point with limited entry during operations. During off-shift hours, access will be controlled by the shift manager. Gate control points will utilize pre-engineered metal and/or factory manufactured buildings approximately 3 m by 3 m (10 ft by 10 ft) in size with heat, air conditioning, electricity, and communication.

5.1.7 Security

Personnel and vehicular access to the proposed ERDF shall be restricted by fences and gates. The referenced criteria for this requirement is DOE Order 6430.1A. Since this facility is designed to handle radioactive wastes, security is paramount to public safety and worker protection. Several references to security measures, procedures, and devices are referenced in the DOE Order 6430.1A. Access control security is discussed in the DOE Order 6430.1A, Section 0110. The intent of this requirement is to prevent any unauthorized personnel from entering the proposed ERDF site. Security alarms and control systems are discussed in Section 0110-99.8.7. Security for doors and windows are discussed in Section 0800. More information on security is provided in Section 1640, which refers to power service for security, communications, and alarm systems. Specific design criteria for interior and exterior communications and alarm systems are discussed in Section 1670.

All building exterior doors will be provided with security locks and the exterior of buildings must be illuminated with exterior lighting controlled by photoelectric sensors. A reference to NFPA 101 is offered for design guidance on emergency exit lighting. DOE Order 5632.6 contains procedures for the physical protection of DOE property and unclassified facilities. Section 6, Paragraphs A through F of this reference describe procedures which will be implemented to protect property and facilities and to institute access controls, physical barriers, and adequate illumination. More information is discussed in Section 1650. It states that maximum use shall be made of high efficiency high-intensity discharge lamps such as metal halide or high-pressure sodium vapor lamps.

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5.1.8 Fuel Storage and Dispensing Area

A fuel storage and dispensing area will be provided south of the operations building. This facility will consist of a containment area with a 56,730 L (15,000 gal) diesel tank, a 1,891 L (500 gal) gasoline tank, and 2-945 L (250 gal) bulk lubricating oil tanks. The tanks will be above ground with spill containment and off-site access for delivery of fuels and oils. The tanks will be equipped to dispense bulk fuels to the on-site fuel truck and to individual vehicles operating within the security fence. The tanks will have storage capacity for one week of double shift operations. The dispensing area will also be provided with spill containment. The storage of flammable and combustible liquids will comply with NFPA 30.

5.1.9 Bulk Chemical Storage and Dispensing Area

An area will be provided near the fuel storage and dispensing area with off-site access for delivery of chemicals and products used for dust control, grout plant operation, and decontamination. There will be a cement silo that will hold 425 m^3 (15,000 ft^3) of bulk cement, a 95,000 L (25,000 gal) tank (approximately 2 months supply at peak capacity) for dust suppressant chemicals, and a pad for storage of 208 L (55 gal) drums of decontamination chemicals. The facility will be equipped to dispense materials to vehicles within the security fence. The area will have storage capacity for one week of double shift operations. Vessels containing hazardous materials will have spill containment.

5.2 BUILDINGS

Three buildings will be required to house support operations for the proposed ERDF. The facilities will accommodate functional and safety requirements. The operations building, the decontamination facility, and the wastewater treatment facility will be permanent structures with a design life of 30 years.

The operations building will include personnel decontamination (personnel showers and change rooms), lunch area, maintenance shops, offices, etc. The decontamination facility will provide a control room for decontamination operations personnel, a personnel decontamination area, non-contaminated restrooms, and a container decontamination, monitoring, and storage area. The wastewater treatment facility will include the equipment to treat the combined leachate and decontamination facility wastewater.

Emergency exit lighting will be provided as required by NFPA 101.

The buildings will be designed to meet the following Performance Category as defined in DOE Order 5480.28, and Hanford Plant Standards, *Design Criteria,* SDC-4.1:

	Performance Category
Operations building	1
Operations building control room	2
Decontamination facility	2
Wastewater treatment building	2

This is based on a facility classification as a low-hazard, nonreactor facility per *Environmental Restoration Storage and Disposal Facility, Project W-296, Hazard*

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Classification, Functional Review Issue (WHC 1993c). The buildings will be designed in accordance with model building codes and for the following loads:

- A 70 mph wind
- UBC zone 2B earthquake
- A 20 lb/ft^2 snow load
- A 20 lb/ft^2 live load.

The buildings will be well above maximum flood elevation. The proposed ERDF will be located outside all floodways. The elevation of all 3 buildings will be approximately 215 meters (700 ft) above mean sea level. The Columbia River elevation, at its entrance to the Hanford site, during the maximum probable flood, would be 136.5 m (448 ft) above mean sea level. Flash flooding in annual streams coming off Rattlesnake Mountain was reviewed as part of the site selection study and it was determined that the proposed ERDF site is outside the flood zone (see *Climatological Summary for the Hanford Area* [PNL 1981]). The site drainage system will be designed to accommodate storm runoff water.

The conceptual design has been based on a visual survey of the proposed site and soil properties obtained from soil evaluations for other building sites at the Hanford site. Prior to definitive design, a site survey and soil foundation evaluation will be performed. The survey will be performed to prepare a surface topography of the construction area for preparation of the excavation and drainage drawings for definitive design. The soil foundation evaluation will provide the following soil properties:

- Bearing capacity
- Angle of internal friction
- Lateral at rest, active, and passive soil pressures
- Soil permeability
- Modulus of subgrade reaction
- Temporary natural and backfill slopes.

These soil properties will be used during definitive design to size the foundations and to calculate the area required for the sanitary drain field.

5.2.1 Operations Building

An operations building will accommodate support and maintenance staff required to maintain the proposed ERDF. The operations building will be an offset double rectangle with approximately 1,490 square meters (m^2) (16,000 square feet [ft^2]) on the main floor and approximately 950 m^2 (10,250 ft^2) on the second floor.

Main functional areas are identified in table 1. The administration area will consist of a lobby and reception area, offices, restrooms, a lunchroom and a conference room. The facility support spaces include a control/computer room, janitor closet, mechanical room, electrical spaces, both uncontaminated and dedicated maintenance shops, and miscellaneous storage rooms.

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Table 1. Operations Building Areas.

Operations Building Area	Size (m^2)	Size (ft^2)
Clean Shop Area	270	2,880
Dedicated Shop Area	224	2,410
Change Room/Restroom (Operations)	173	1,860
Personnel Decontamination Area	35	380
Stairs, Elevators, and Hallways	446	4,800
Building Equipment Rooms	88	950
Building Support Areas (Includes: Communications Room, Laundry Room, Janitor Closets, Computer Network Area, etc.)	90	960
Reception Area (includes Restrooms)	142	1,530
Lunch Room	114	1,230
Conference, Meeting, Training Rooms	157	1,690
Operations Personnel Offices	181	1,950
Administrative/Managerial Offices	205	2,210
Library, File, and Copy Centers	93	1,000
Administrative Restrooms	65	700
Dedicated Storage	111	1,200
Clean Storage	46	500
TOTAL AREA	2,440	26,250

The operations building will be sized to accommodate full-time ERDF personnel and part-time Hanford site personnel. The operating area of the operations building will be designed to allow for future expansion. Structural elements will be designed and sized to accommodate the future expansion area.

The structure will be a rigid beam-column type frame or an equivalent design determined during definitive design to be more cost effective. The building will be constructed on a reinforced concrete floor and foundation. The second story floor will be a composite of wide-span metal decking and concrete.

The exterior of the building will be made up of flat metal wall panels with stucco texture (Butler Texture-Cote or equal) and/or brick panels (Butler Stone BrickWal System or equal). The outside surfaces will be factory prefinished and insulated with a minimum of R-19 insulation. The roof will be constructed from standing seam roof panels with a factory applied finish. The roof insulation will be fiberglass batts providing a minimum of R-32 insulation. All panels will have a Factory Mutual Class 1 fire hazard rating.

Exterior doors and frames will be standard as provided by the building manufacturer. Window frames will be sized as shown on the elevations and factory coated to match door frames. All glass will be double paned insulated, bronzed glass. Interior door frames will be pressed metal and interior doors will be pressed metal and/or hollow core wood.

Partitions will be 1.6 cm (5/8 in.) thick gypsum board on metal studs. Fire rated partitions will be provided where required by NFPA 101, DOE/EP-0108, DOE/RLIP 5480.7A, and WHC-CM-4-41.

Suspended acoustical tile ceiling will be provided in the entire facility except the shop and equipment rooms. Water resistant ceiling tiles will be provided in the restrooms.

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The building will have fire sprinklers connected to the raw water system. Both fire sprinklers and fire alarm pull boxes will trigger fire alarms and signal the fire department when activated.

All areas of the building accessible to the physically handicapped. The Physically Handicapped Assessment is contained in Appendix B.

A heating, ventilation and air conditioning (HVAC) system will be installed to keep the building within the comfort zone for personnel and to control contamination release to either the atmosphere or clean areas of the building.

Each office will be provided with a minimum of 2 telephone outlets, 2 adjacent computer outlets, and 4 electrical outlets. All other areas will be provided with outlets required by the National Electrical Code (NEC) and DOE Order 6430.1A.

All areas of the building and exterior surrounding areas will be audibly accessible to a plant intercom system. This system will be used for general use and for emergency notification and instructions.

The bathrooms will be connected to a septic tank and drainfield as described in section 5.3.5.

5.2.1.1 Architectural/Structural. General design criteria for the building will conform to DOE Order 6430.1A, the UBC, and *Minimum Design Loads for Buildings and Other Structures*, ANSI A58.1.

Concrete members and assemblies will be designed according to the American Concrete Institute (ACI), *Code Requirements for Nuclear Safety Related Concrete Structures,* ACI-349 and UBC, Chapter 26.

Structural steel members and connections will be designed in accordance with the American Institute of Steel Construction (AISC), *Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings*, the American Welding Society (AWS), Standard D1.1, *Structural Welding Code*, and UBC, Chapter 27.

Masonry design will be in accordance with ACI-531, *Building Code Requirements for Concrete Masonry Structures*, and UBC, Chapter 24.

5.2.1.2 Heating, Ventilating, and Air Conditioning. The HVAC systems will be designed to meet the various area's design operating conditions. The HVAC systems will be energy efficient in accordance with DOE Order 6430.1A, Division 15, and Hanford Plant Standards, *Design Criteria,* SDC-5.1. The HVAC system will be designed in accordance with NFPA 90A.

The design philosophy of the HVAC systems will be to provide a dust free and comfortable environment for the occupants and for the operation of the electronic equipment. These areas will be kept at a positive ambient air pressure to keep contaminates out of the room.

The required indoor ambient conditions will be in accordance with Hanford Plant Standards, *Design Criteria* SDC-5.1, for the facility during normal operating conditions.

The building will be heated and cooled from a central variable air volume system located in the equipment room. The central air handling unit will consist of 30 percent American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) rated prefilters, 85 percent ASHRAE rated final filters, electric preheating coil, chilled water cooling coil, adiabatic

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humidifier with water pump, supply fan, and return air fan. Filtration will be in accordance with American Society of Mechanical Engineers (ASME) AG-1 Code.

All ductwork will be lined with sound absorbing material to meet requirements for HVAC system sound control.

The HVAC equipment in the facility will be provided with appropriate vibration isolators. Fans will be provided with structural steel bases and spring vibration isolators. Pumps will be attached to concrete bases. Piping systems will be provided with flexible connections at all pump intakes and discharges.

Ducts penetrating fire-rated walls and floors will be provided with Underwriters Laboratory (UL) listed or Factory Mutual (FM) approved fire dampers. Dampers will be installed in accordance with NFPA 90A. Penetrations will be sealed to maintain the same fire rating as the barrier penetrated.

The HVAC control system will monitor and control the operation of the HVAC system. The system will consist of an "off-the-shelf" control package. A distributed control system will be used to supervise the operation of all HVAC control functions. A central operator console will include alarm and event display, graphic display of HVAC system schematics, data logging and recording, energy use monitoring, trend analysis, predictive maintenance, and optimization control.

The HVAC system will be designed so air will flow toward areas having higher potential contamination, such as the personnel decontamination room, and the decontaminated change rooms.

The dedicated area shops will be provided with a separate system which will maintain negative pressures and provide 100 percent fresh air. This system will be connected to a backup energy source (diesel generator) to provide a more reliable system. Potentially contaminated air that is released into the environment will pass through a high-efficiency particulate air (HEPA) filtration system (refer to ASME AG-1 Code). HEPA filters will be handled in accordance with DOE Order 5480.11, DOE Order 5820.2A, DOE/RL Order 5820.2A, WHC-CM-1-6, and WHC-CM-2-14. HEPA filters will be placed in the proposed ERDF trench. The system will be provided with isokinetic sampling. The basis for placing these items in the trench is that they will be remediation wastes because they will be generated in the management of remediation waste and therefore, qualify for placement in a Corrective Action Management Unit (CAMU).

5.2.1.3 Electrical. The service disconnect switch will be located in the equipment room. The distribution panel, transformers, and panel boards will be located in the electrical room. Electrical systems will be designed and installed in accordance with NFPA 72. Protection of personnel is controlled through NFPA 72E.

Exterior parking lot lighting will be pole-mounted, shoe-box type, with low pressure sodium lamps. Walkway lighting fixtures will be low-pressure sodium with no uplight. Exit doors without canopies will be supplied with low-pressure sodium, wall-pack type lighting fixtures. Power for exterior lighting will be supplied from the building's distribution panel.

Indoor office lighting will be recessed type 277 Volt (V), 0.6 m by 1.2 m (2 ft by 4 ft) fluorescent troffers with parabolic lens for glare reduction. Conference rooms will be supplied with the same type of fixture as the offices, except with double ballasts for dual switching light level control. Conference rooms will also have recessed down-lights over table areas. Lunchrooms, restrooms, corridors, and storage areas will be supplied with 277V, 0.6 m by 1.2 m (2 ft by 4 ft) fluorescent troffers with prismatic lens, and mechanical-room areas will be supplied

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with industrial type 277V fluorescent fixtures with wire guards. All lighting fixtures will be equipped with energy-saving ballasts and low-energy type lamps. Emergency lighting will be provided by fluorescent emergency ballasts having integral batteries.

Toggle switches will be 277V, 20A specification grade.

Convenience receptacles will be provided in all rooms and corridors and will be 125V National Electrical Manufacturers Association (NEMA) configuration 5-20R duplex.

Computer receptacles will be provided adjacent to each HLAN outlet in all offices, secretarial spaces, and reception areas, and will be the same type as the convenience receptacles.

There will be a dry-type transformer and panelboard for the convenience receptacles and computer receptacles located in the electrical rooms on each floor.

The building electrical consumption will comply with energy conservation requirements and is justified by a Life Cycle Cost Analysis (LCCA) as defined in DOE Order 6430.1A, Section 110-12. The Energy Conservation Report is contained in Appendix C.

5.2.1.4 Communications. The telephone instruments will be provided and installed by the Hanford site telephone contractor. In-house wiring will be provided by the construction contractor. Subsequent connection to the area telephone system will be done in coordination with the Hanford site telephone contractor.

The HLAN electronic equipment will be furnished by the government and installed as part of this project. Recommendations regarding the HLAN electronics will be provided no earlier than 240 days prior to the scheduled installation date and no later than 120 days prior to the scheduled installation date. This time frame is intended to ensure that the equipment procured is not obsolete by the facility occupancy date.

Installation of cabling will follow typical telephone industry standards. Cable runs will avoid obvious sources of high frequency energy such as HVAC systems, radio transmitters, and electric motors of any type. Specifically, when the above types of interference cannot be avoided, cables will be placed no closer to the source than 1 m (40 in.).

The communications infrastructure consists of the telecommunication room and associated telecommunication room requirements such as electrical, HVAC, floor covering, fire suppression, etc. The telecommunication infrastructure will also include the common equipment used to distribute and terminate communications cabling.

The HLAN system will follow Institute of Electrical and Electronics Engineers (IEEE) 802.3, 10 Base T Standards. The HLAN will be configured in a physical star topology emanating from the telecommunications room. The number of file servers required will be determined by dividing the building occupancy by 25.

Telecommunication rooms will have electrical power fed by a computer grade isolation transformer and through a dedicated sub-power panel. There will be ready access to a building ground within the room. Telecommunication rooms will be secured with electronic cipher locks.

Cabinets will be provided to house all of the telecommunications and file server equipment for this facility. The cabinets will have smoked Plexiglas front doors. A grounding stud will be included.

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Raceways will be provided throughout the facility for the orderly distribution of communications cabling. Open metallic, ladder-type raceways will be installed in the above ceiling space above hallways. The sizing of the raceways will be sufficient to hold all communications cabling plus 100 percent for growth. The raceways will be secured and be able to support the weight of all telephone and network cabling plus 100 percent for growth. Raceways will be grounded to building ground.

Conduits will be sized to allow for 100 percent growth without exceeding conduit fill ratios. Pull strings will be left in all empty conduits.

Cabling will be run continuously, utilizing conduits and hall raceways, from every outlet location to the nearest telecommunication room. Cable slack will be provided at both ends. The cabling will be labeled at each end with its assigned number which will incorporate the room number and be distinguishable from that labeling used for other cabling.

For office space and computer workrooms, the approximate number of telephone and HLAN outlets will be determined by multiplying office occupancy by 1.5. Odd numbers/ fractions will be rounded up to the nearest even whole number. Each outlet location will be furnished with 2 electrical duplex receptacles located in close proximity.

The minimum number of conductors to the telephone stations from the terminal room will be 8 conductors. Secretarial locations will require a 25 pair cable.

In telecommunications rooms, telephone cabling will terminate on connection strips, modules, and/or distribution blocks as manufactured by Krone, Inc. At outlet locations, the cabling will terminate on one of the outlet jacks as employed in the Universal Wiring Outlet System as manufactured by the AMP Products Division. The modular jack used in the front of the outlet will be AMP model RJ11.

HLAN copper cabling will meet IBM Type 2 cable specifications, including individually shielded data pairs. A pair of fiber optic fibers will be included as a part of each cable.

In telecommunications rooms, HLAN cabling will terminate on distribution blocks as manufactured by Krone, Inc. At outlet locations, both shielded and unshielded cabling will terminate on various outlet jacks used in the Universal Wiring Outlet System by the AMP Products Division. The modular jacks used in the front of the outlet will be AMP model RJ45 connector which converts to premise distribution systems (PDS) standard pin outs. The fibers will be coiled and protected from damage.

5.2.1.5 Fire Protection. Fire protection for the building will be designed in accordance with requirements of DOE Order 6430.1A, DOE/RL Order 5480.4C, DOE/RL Order 5480.7A, American Water Works Association (AWWA) requirements, WHC-CM-4-41, and the *Uniform Fire Code* (as directed by WAC-173-303). A fire hazards analysis will be performed in accordance with DOE Order 5480.7A and WHC-CM-4-41.

An ordinary hazard, hydraulically calculated, wet-pipe automatic fire sprinkler system, comprised of a separate system riser will be installed throughout the building. A service connection will tie into the raw water loop. The system riser and backflow assembly will be located in the equipment room. The sprinkler system, piping supports, and attachments will be designed in accordance with NFPA 13. The methods of attachment of sprinkler system and fire alarm components supports to the structural portions of the building will be seismically engineered to withstand the loads required in the UBC. Adequately spaced fire hydrants from the raw water pipeline will be provided in the yard.

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Non-combustible construction materials will be used where practical. Area separation and fire walls will be installed as needed in accordance with NFPA 101 requirements. Floors and different occupancy areas will be separated with fire barriers in accordance with NFPA 101.

A local emergency fire alarm system will be installed within the facility. This system will be comprised of a FACP, with standby battery power, and auxiliary relays to activate radio fire alarm signals that will be received at the 200 Area Hanford Fire Department. Each fire suppression system will individually enunciate. Manual pull stations will be provided adjacent to the exits. Fire alarm systems, alarm devices, duct smoke detectors, and fire dampers will be installed in accordance with NFPA 90A and NFPA 72. Fire alarm strobes/chimes will be strategically located throughout the building.

5.2.2 Decontamination Facility

The decontamination facility will provide decontamination processes for containers, operations vehicles, and emergency vehicles at the proposed ERDF. The decontamination building will be a rectangle approximately 30 m wide and 67 m long (100 ft wide and 219 ft long), with covered container storage area of approximately 4.6 m wide and 137 m long (15 ft wide and 450 ft long). Main functional areas are identified in table 2.

Table 2. Decontamination Facility Areas.

Decontamination Facility Areas	Size (m^2)	Size (ft^2)
Wash Room (Total of 4)	520	5,600
Air Drying Room (Total of 4)	446	4,800
Radiation Surveying Room	632	6,800
Equipment Room	223	2,400
Control Room	120	1,290
Restroom (Men's and Women's)	40	430
Personnel Decontamination Room	14	150
Hallways	40	430
TOTAL AREA	2,035	21,900

5.2.2.1 Process Description. During the transportation of material to the proposed ERDF and emptying of the containers, the exterior of the containers may become contaminated. The decontamination facility will use high-pressure wash units to decontaminate the exterior of the containers. The following is a description of the Process Flow Diagram for the low-volume, high-pressure water system shown in engineering sketch ES-296-13 (see Appendix G). Decontamination of the containers is discussed further in the *Engineering Study for the Decontamination and Wastewater Treatment Facility for the Environmental Restoration Storage and Disposal Facility* (USACE 1993a).

1. The interior of the container will be accessible for visual inspection at the trench working face for waste build-up, if desired. If the interior has significant amounts of material (greater than 2.5 cm (1.0 in.) thick or 0.3 percent of the rated capacity, which is approximately 0.07 m^3 [0.1 yd^3] in a 24.5 m^3 [32 yd^3] container), it will be cleaned with a mechanized hoe or will be sent to a separate pad for washing. The exterior of the container will be visibly inspected and cleaned if needed. This step will provide the opportunity to survey the container to determine if water decontamination is necessary. After it is visually acceptable, the container will proceed to step 2.

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2. The empty container will be transferred from the tractor/trailer onto a conveyor that will carry it through the automatic decontamination facility. The tractor/trailer then will return to the incoming railhead site to be reloaded with a full container.

3. In the automatic decontamination facility, the exterior of the container will be washed, rinsed twice, and dried with hot air. This process will include washing the underside of the container. The wash liquid may be either water and detergent mix, water and detergent/chemical mix, or water and chemical only. It is recommended that the water and detergent mix be used; however, provisions will be included for the addition of a chemical. The chemical is a proprietary additive that can be used to enhance cleaning, if needed. The first rinse will be recycled water and the second rinse will be either fresh (raw) water or treated wastewater effluent. By doing this, there would be no contamination of the containers from the recycled water. The water will be treated and recycled as discussed in section 5.3.7.

4. There will be 2 air dryers in the air drying room. The first dryer will blow off the majority of the water with room temperature air. The second dryer will use hot air to remove the remaining moisture.

5. After drying, the containers will pass through an automated radiological survey unit to determine if the level of activity is acceptable. Based on a statistical analysis of the containers, only a small percent of the containers will be manually surveyed to verify that the automated radiological survey units are accurate and functioning properly. Surveys for hazardous materials will not be performed at the decontamination facility due to the small quantity of hazardous materials that will be contained in the radioactive waste received at the proposed ERDF and the minimal likelihood of finding hazardous material contamination after decontamination operations are completed.

6. Containers that do not meet decontamination criteria will be returned for a second cleaning.

7. Containers that are acceptable will be stored on a loading dock before being loaded onto either railcars or tractor/trailers for return to the ER sites.

A preliminary site plan for the decontamination facility is shown in engineering sketches ES-296-14 and ES-296-15 and elevations are shown in engineering sketch ES-296-16. The facility is proposed to be located in the northwest corner of the proposed ERDF so that prevailing winds will not influence background readings during surveys and will not contaminate clean containers.

The decontamination facility will be designed to wash the exterior surfaces of the containers to meet the following levels from DOE Order 5480.11:

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Surface Radioactivity Guides

Nuclide	Removable	Total (Fixed Plus Removable)
U-nat, U-235, U-238, and associated decay products	1,000 dpm a/100 cm^2	5,000 dpm a/100 cm^2
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	20 dpm/100 cm^2	300 dpm/100 cm^2
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	200 dpm/100 cm^2	1,000 dpm/100 cm^2
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	1,000 dpm b-G/100 cm^2	5,000 dpm b-G/100 cm^2

The containers will also meet CFR 49 §173, (Subpart I covers Radioactive Materials) as described below:

- Subpart 173.421 requires that the radiation level on the external surface not exceed 0.5 millirem per hour; the nonfixed contamination on the external surface not exceed the limits in 173.443; and the outside of the package be marked "Radioactive."
- Subpart 173.427 defines empty containers as having an internal contamination of less than 100 times the limit in subpart 173.443.
- Subpart 173.443 defines exterior contamination as beta-gamma of 10^{-5} micro Ci/cm^2 and 22 dpm/cm^2; and the alpha of 10^{-6} micro Ci/cm^2 and 2.2 dpm/cm^2, which are higher than DOE Order 5480.11.

5.2.2.2 Water Balance. Based on research on automatic water-washing equipment, as detailed in the *Engineering Study for the Decontamination and Wastewater Treatment Facility for the Environmental Restoration Storage and Disposal Facility* (USACE 1993a), the following water balance was developed:

- A recycling system can reduce water usage by 80 percent. Of the remaining 20 percent, half will either be evaporated by hot air drying or will be carried away on the wet vehicle, and the other half will go into system blowdown water (the water that will be in the bottom of tanks that contains the removed solids).
- Data from 2 manufacturers suggests that a minimum of 110 to 150 L (30 to 40 gal) of water will be required to clean 1 container. Therefore, 190 L (50 gal) per container is a conservative estimate.
- The carry-away/evaporation and the blowdown will each be approximately 20 L (5 gal), requiring a make-up volume of approximately 40 L (10 gal) per container.
- Two shifts per day for 200 operating days per year equals 400 shifts per year.
- With 215 containers per shift, (ignoring the 1.7 percent of containers that may be single-use containers) there will be 86,000 containers per year that will need to be decontaminated.

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- Based on 40 L (10 gal) per container of make-up water, approximately 3,255,000 L (886,000 gal) of water will be needed per year.

The make-up water required for the second rinse cycle will come from either the proposed ERDF raw water supply system or from the wastewater treatment system.

5.2.2.3 Recycling of Decontamination Water. In order to treat the water so that it can be recycled, certain steps are recommended. Package systems that provide this treatment are available. The water and contaminants will flow by gravity into a sand trap where heavy materials will be captured. This sand trap will be cleaned daily using a vacuum truck. The overflow water will be pumped through a cyclone separator to remove the remaining heavy materials and into a settling tank where the remaining suspended particles will be removed. The overflow will be pumped through a filter to remove materials larger than 40 microns and will then be pumped into a storage tank. If needed, make-up water will be added to the storage tank. Provisions will be included for the addition of reverse osmosis for polishing if needed in the future. The water will then be pumped back into the washing units. The solids removed in the cyclone, settling tank, and filters will be stored in the blowdown storage tank. Treatment of this material is discussed in section 5.3.7.

Provisions for future polishing steps will be included in the event radioactivity builds up in the recycled water and must be removed.

5.2.2.4. Additional Considerations. Additional considerations for the design of the decontamination facility are discussed below.

5.2.2.4.1 Container Dimensions. The containers are expected to be 2.6 m (8.5 ft) wide, 6.1 m (20 ft) long, and 2.1 m (7 ft) high, with a locked lid, and a ribbed steel end door that is 2.6 m (8.5 ft) by 2.1 m (7 ft).

5.2.2.4.2 Number of Systems. Based on information provided by vendors, washing will take approximately 2 minutes per container. Including the time required to bring the container into the room, wash it, and move it out of the room on to a continuous conveyor, the total time required to complete one cycle will be approximately 4 minutes per container. At this rate, 78 containers per 5-1/4 hour shift can be cleaned by 1 washing unit. To clean 215 containers per shift, 3 washing units plus 1 stand-by unit for backup will be required.

5.2.2.4.3 Automation. This type of decontamination system can readily be automated, requiring one person to provide oversight and to keep the detergent and chemical-additive tanks full, and one other person to operate the blowdown and treatment system.

5.2.2.4.4 Cold Weather Operations. By enclosing the facility, the process will not be affected by cold weather.

5.2.2.4.5 Principal Hazards and Risks. It is anticipated that this system will meet all regulations for decontaminating containers. However, it may be necessary to return some containers for a second cleaning if they do not pass inspection.

Since the system will recycle used water, some build-up of radioactivity in the wash water will occur over time. A second rinse using fresh water should minimize this build-up. Consideration of additional wastewater treatment steps such as reverse osmosis cannot be recommended until actual data from operation becomes available. Since the containers will have been previously decontaminated at the remediation site, this build-up of radioactivity is expected to be minor.

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Because water will be used for the decontamination process, containers must be dried prior to performing the radiological survey. A dual drying system is proposed, but some hand drying may still be needed to obtain accurate readings.

5.2.2.4.6 Other. Two mobile decontamination units will be provided to decontaminate the dedicated on-site vehicles for maintenance purposes and if occasional radiological surveys dictate. These mobile units will also be used to decontaminate the interior or the exterior of containers as needed.

A separate water wash decontamination facility will be provided to decontaminate dedicated vehicles before they can leave the site to go to the 200 West Area T-Plant (Building 2706) for complete decontamination. This wash will also be used to decontaminate any emergency vehicles that need to leave the site. A fixed high pressure washer with hot water/steam accessories will be provided inside the equipment room.

Groundwater protection will be provided by installing secondary containment under the washing and water storage areas of the facility and the wastewater treatment facility with a sump for collection of any water that is captured. The collection system will be a single layer of membrane that will be installed similarly to the trench liner in section 5.4.3.2. The captured water will be pumped to the wastewater treatment facility for treatment.

Since the containers will be decontaminated at the remediation sites and will accumulate little dust during transport to the proposed ERDF for unloading, it may not be necessary to decontaminate each container. This will not be known until the facility is in operation. If decontamination is not required, the facility can be bypassed and containers loaded directly onto railcars or tractor/trailers. By passing them through the decontamination facility without operating the water wash, the containers can be automatically surveyed for radiation and any contaminated containers returned for washing.

5.2.2.5 Facility Construction. The decontamination building will be a reinforced concrete block structure designed in accordance with DOE Order 6430.1A and the UBC. The building will be installed on a reinforced concrete floor and foundation in accordance with DOE Order 6430.1A and the UBC.

The exterior of the building will be covered with flat metal wall panels with stucco texture (Butler Texture-Cote or equal) and vertically ribbed metal panels. The outside surfaces will be factory prefinished and insulated will a minimum of R-19 insulation. The roof will be covered with a synthetic membrane and will be provided with roof drains. The roof insulation will be spray on interior urethane in wet areas and fiberglass batts providing a minimum of R-32 in dry, heated areas. All panels will have a Factory Mutual Class 1 fire hazard rating.

Exterior doors and frames will be standard metal in accordance with DOE Order 6430.1A, Division 8. Doors and frames in wet areas will be hot dipped galvanized before painting. Window frames will be sized as shown on the elevations and will be factory coated to match door frames. All glass will be double paned insulating bronzed glass. Interior doors and frames will be pressed metal.

Partitions will be 20 cm (8 in.) thick concrete block with water proofing. Fire rated partitions will be provided where required by NFPA 101, DOE/EP-0108, DOE Order 5480.7A, and WHC-CM-4-41. The Fire Hazards Analysis will identify any other applicable requirements.

Suspended acoustical tile ceiling will be provided in control room and restroom only. Water resistant ceiling tiles will be provided in the restrooms.

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The building will have fire sprinklers in all rooms. Both fire sprinklers and pull boxes will trigger fire alarms and signal the fire department when activated.

All areas of the facility will be accessible to the physically handicapped. The Physically Handicapped Assessment is contained in Appendix B.

A HVAC system will be installed to keep the building within the comfort zone for personnel and to control contamination release to the atmosphere or clean areas of the building.

The control room will be provided with a minimum of 2 telephone outlets, 2 adjacent computer outlets, and 4 electrical outlets. All other areas will be provided with outlets required by the NEC and DOE Order 6430.1A.

All areas of the facility will be audibly accessible to a plant intercom system. This system will be used for general use and for emergency notification and instruction.

The bathrooms will be connected to a septic tank and drainfield as described in section 5.3.5.

5.2.2.6 Architectural/Structural. The decontamination building will be constructed from concrete block with metal siding on the outside and a water resistant coating on the inside. This type of construction is proposed to minimize the effects of high humidity on the structural integrity of the facility and to minimize maintenance requirements.

General design criteria for the facility will conform to DOE Order 6430.1A, UBC, and ANSI A58.1.

Concrete members and assemblies will be designed according to the ACI-349 and UBC, Chapter 26.

Structural steel members and connections will be designed in accordance with the AISC, *Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings*, the AWS, Standard D1.1, and UBC, Chapter 27.

Masonry design will be in accordance with ACI-531 and UBC, Chapter 24.

5.2.2.7 Heating, Ventilating, and Air Conditioning. The HVAC system will be similar to the operations building. This system will not be connected to a backup energy source (diesel generator).

The equipment room will be provided with a separate system which will maintain negative pressure and 100 percent fresh air. The room temperature will be maintained between 13 degrees Celsius (C) and 35 degrees C (55 and 95 degrees Fahrenheit [F]).

Each wash room will be provided with a separate system which will maintain negative pressure and 100 percent fresh air will be provided when the door opens to let a container enter the room with a back-up vent system. The room temperature will be maintained above 10 degrees C (50 degrees F). The exhaust air will be dehumidified, and will pass through roughing filters and then HEPA filters. HEPA filters will be handled in accordance with applicable WHC requirements and DOE orders as discussed in section 5.2.1.2, and will be placed in the proposed ERDF trench. The basis for placing these items in the trench is that they will be remediation wastes because they will be generated in the management of remediation waste, and therefore, qualify for placement in a CAMU.

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Each drying room will be provided with a separate system which will maintain negative pressure and 100 percent fresh air will be provided by a separate mechanical system. The exhaust air will be dehumidified and HEPA filtered. The room temperature will be maintained above 10 degrees C (50 degrees F).

The survey room will be provided with a separate system which will maintain negative pressure and 100 percent fresh air will be provided by a separate mechanical system. The exhaust air will not be filtered. The temperature will be maintained above 10 degrees C (50 degrees F).

5.2.2.8 Electrical. The service disconnect switch, distribution panel, transformers, and panel boards will be located in the equipment room. Electrical systems will be designed and installed in accordance with NFPA 72. Protection of personnel is controlled through NFPA 72E.

Exit doors will be supplied with low-pressure sodium, wall-pack type lighting fixtures. Wall mounted, exterior lights will be provided at each entrance door. Power for exterior lighting will be supplied from the building's distribution panel.

Restrooms, equipment rooms, and storage areas will be supplied with 277V, 0.6 m by 1.2 m (2 ft by 4 ft), fluorescent troffers with prismatic lens. The wash, dry, and survey rooms will be supplied with industrial type 277V, fluorescent fixtures with wire guards. All lighting fixtures will be equipped with energy-saving ballasts and low-energy type lamps. Emergency lighting will be provided by fluorescent emergency ballasts having integral batteries.

Toggle switches will be 277V, 20A specification grade.

Convenience receptacles will be provided in all rooms and corridors and will be 125V NEMA configuration 5-20R duplex. All outlets in wet areas will be provided with ground fault interruption (GFI) protection.

Computer receptacles will be provided adjacent to each HLAN outlet in the control room and will be the same type as the convenience receptacles.

There will be a dry-type transformer and panelboard for the convenience receptacles and computer receptacles will be located in the equipment room.

The facility electrical consumption will comply with energy conservation requirements and is justified by a LCCA as defined in DOE Order 6430.1A, Section 110-12. The Energy Conservation Report is contained in Appendix C.

5.2.2.9 Communications. The communication system will be similar to the operations building (see section 5.2.1.4). The facility shall be provided with the following:

- Internal communications (paging system)
- One phone connected to the external communications system
- Transmittal of data to the HLAN via the operations building computer system.

5.2.2.10 Fire Protection. Fire protection for the decontamination facility will be designed in accordance with requirements of DOE Orders 6430.1A and 5480.7A, DOE/RL Order 5480.7A, AWWA requirements, WAC requirements, and other applicable codes and standards.

An ordinary hazard, hydraulically calculated, wet-pipe automatic fire sprinkler system, comprised of a separate system riser will be installed throughout the building. A service connection will tie into the raw water loop. The system riser will be located in the equipment

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room. The sprinkler system, piping supports, and attachments will be designed in accordance with NFPA 13. The methods of attachment of sprinkler system and fire alarm components supports to the structural portions of the building will be seismically engineered to withstand the loads required in the UBC. Adequately spaced fire hydrants from the main raw water line will be provided in the field.

Non-combustible construction materials will be used where practical. Area separation and fire walls will be installed as needed in accordance with NFPA 101 requirements. Different occupancy areas will be separated with fire barriers in accordance with NFPA 101.

A local emergency fire alarm system will be installed within the building. This system will be comprised of a FACP, with standby battery power, and auxiliary relays to activate radio fire alarm signals that will be received at the 200 Area Hanford Fire Department. Each fire suppression system will individually enunciate. Manual pull stations will be provided adjacent to the exits. Fire alarm systems, alarm devices, duct smoke detectors, and fire dampers will be installed in accordance with NFPA 90A and NFPA 72. Fire alarm strobes/chimes will be strategically located throughout the building.

5.2.2.11 Decontamination and Decommissioning. The following items will be included in the design of the decontamination facility to facilitate decontamination, decommissioning, and closure activities:

- Air exhaust HEPA filters in washroom and drying room that will minimize contamination of ventilation ducts.
- Minimized crevices, corners, ledges and/or protrusions that will collect contaminated materials.
- Surfaces that can be easily flushed with a minimum quantity of water or decontamination solution.
- Surface coatings compatible with decontaminating agents, taking into consideration any degradation expected to occur.
- Waterproofed penetrations to provide protection during spraying and hosing-type decontamination efforts.
- Monolithic, nonporous floors sloped towards sumps or drains.
- Continually sloped and trap-free piping systems.
- Physical provisions for cleaning and draining the piping.
- Construction materials resistant to radiation, process solutions, and decontamination agents.
- Wide aisles that will facilitate movement of equipment and materials.
- Skid-mounted equipment or systems with fasteners, piping, and service connections designed for easy access and manipulation.
- Rigging and attachment points that will facilitate removal of skids and/or equipment.
- Piping and service connections designed for easy access.

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5.2.2.12 Conveying Systems. Automated conveying systems will be used to move the containers through the wash, dry, and survey rooms and to the railcar loading area. Throughout the conveying process, the containers will be maintained in an east-west alignment through use of guides.

Multiple conveyors will be utilized in this facility. Each wash bay will include 1 conveyor. This conveyor will move the container at 4.6 meters per minute (mpm) (15 feet per minute [fpm]) through the wash room, drying room, and surveying room and will deposit the container onto a second conveyor. This second conveyor will collect the containers from each of the 4 wash bay conveyors and deposit the containers onto a single conveyor that will transport the containers to the railcar loading area. In the railcar loading area, up to 20 containers will be stored under a roof until the wheeled container loader transfers the containers onto either a railcar or a tractor/trailer for return to the ER sites.

Each conveyor will be a belt-driven roller type conveyor suitable for moving 4,540 kg (10,000 lb) containers. The conveyors will be equipped with guides to keep the containers centered and to keep the containers from turning on the conveyor. The rollers will be a pair of 0.6 m (2 ft) wide rollers with one under each side of the container. The drive belt will be retractable to stop the container as needed for surveying or staging for loading onto the railcars.

At the unloading area, containers will be moved laterally to a staging platform where they will be picked up by a container handler. All in-bound conveyors will include a segment at the west end that can be stopped to permit placement of a container on the conveyor while the remainder of the conveyor remains in motion.

5.2.2.12.1 Project Requirements. Each wash bay will have a separate conveyor that will move the containers at approximately 4.6 mpm (15 fpm). This will provide 2 minutes of washing, 2 minutes of drying, 1 minute of automated survey, 3 minutes of miscellaneous travel, and 3 minutes to manually survey each container. After surveying, the 4 conveyors will place the containers onto a single, approximately 21 m (70 ft) long conveyor that will also travel at 4.6 mpm (15 fpm). The containers will be automatically located and staged so they will not collide with each other. This collector conveyor will place the containers onto a single conveyor, approximately 137 m (450 ft) long that will travel at 9.1 mpm (30 fpm) and will take the containers to the railcar loading area.

5.2.2.12.2 Codes, Regulation, and DOE Order Requirements. All rotating components will be shielded and guarded to conform with Occupational Safety and Health Administration (OSHA) safety and health standards and CFR 29 §1910. Startup devices and emergency stop devices will also be provided. Structural portions of the conveyor system will be designed in accordance with UBC, and DOE Order 6430.1A.

5.2.3 Wastewater Treatment Facility

The wastewater treatment facility will include the equipment to treat the combined leachate and decontamination facility wastewater. The building will be a rectangle approximately 15 m wide and 30 m long (50 ft wide and 100 ft long). A control room of approximately 3 m by 6 m (10 ft by 20 ft) will be included. The remainder of the building will be for process equipment.

5.2.3.1 Process Description. The process description is provided in section 5.3.7. The preliminary location of the wastewater treatment facility is shown in engineering sketch ES-296-2. The facility is proposed to be located adjacent to the decontamination facility where the majority of the wastewater will be generated.

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5.2.3.2 Facility Construction. The structure will be a pre-engineered rigid beam-column type frame or an equivalent design determined during definitive design to be more cost effective. The building will be constructed on a reinforced concrete floor and foundation.

The exterior of the building will be made up of flat metal wall panels. The outside surfaces will be factory prefinished and insulated with a minimum of R-19 insulation. The roof will be constructed from standing seam roof panels with a factory applied finish. The roof insulation will be fiberglass batts providing a minimum of R-32 insulation. All panels will have a Factory Mutual Class 1 fire hazard rating.

Exterior doors and frames will be standard metal in accordance with DOE Order 6430.1A, Division 8. Doors and frames in wet areas will be hot dipped galvanized before painting. Window frames will be sized as shown on the elevations and factory coated to match door frames. All glass will be double paned insulating bronzed glass. Interior doors and frames will be pressed metal.

Partitions will be 1.6 cm (5/8 in.) thick gypsum board on metal studs. Fire rated partitions will be provided where required by NFPA 101, DOE/EP-0108, DOE/RLIP 5480.7, and WHC-CM-4-41. The Fire Hazards Analysis will identify any other applicable requirements.

Suspended acoustical tile ceiling will be provided in control room only.

The building will have fire sprinklers in all rooms. Both fire sprinklers and pull boxes will trigger fire alarms and signal the fire department when activated.

All areas of the facility will be accessible to the physically handicapped. The Physically Handicapped Assessment is contained in Appendix C.

A HVAC system will be installed to keep the building within the comfort zone for personnel.

The control room will be provided with a minimum of 2 telephone outlets, 2 adjacent computer outlets, and 4 electrical outlets. All other areas will be provided with outlets required by the NEC and DOE Order 6430.1A.

All areas of the facility will be audibly accessible to a plant intercom system. This system will be used for general use and for emergency notification and instruction.

No restrooms will be provided in this facility. Restrooms are available in the adjacent decontamination facility.

5.2.3.3 Architectural/Structural. General design criteria for the building will conform to DOE Order 6430.1A, the UBC, and ANSI A58.1.

Concrete members and assemblies will be designed according to ACI-349 and UBC, Chapter 26.

Structural steel members and connections will be designed in accordance with the AISC, *Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings*, the AWS, Standard D1.1, and UBC, Chapter 27.

Masonry design will be in accordance with ACI-531 and UBC, Chapter 24.

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5.2.3.4 Heating, Ventilating, and Air Conditioning. The HVAC system will be similar to the operations building. This system will not be connected to a backup energy source (diesel generator).

5.2.3.5 Electrical. The service disconnect switch, distribution panel, transformers, and panel boards will be located in the control room. Electrical systems will be designed and installed in accordance with NFPA 72. Protection of personnel is controlled through NFPA 72E.

Exit doors will be supplied with low-pressure sodium, wall-pack type lighting fixtures. Wall mounted, exterior lights will be provided at each entrance door. Power for exterior lighting will be supplied from the building's distribution panel.

All lighting fixtures will be fluorescent type, equipped with energy-saving ballasts and low-energy type lamps. Emergency lighting will be provided by fluorescent emergency ballasts having integral batteries.

Toggle switches will be 277V, 20A specification grade.

Convenience receptacles will be provided as required by the NEC and DOE Order 6430.1A and will be 125V NEMA configuration 5-20R duplex. All outlets in wet areas will be provided with GFI protection.

Computer receptacles will be provided adjacent to each HLAN outlet in the control room and will be the same type as the convenience receptacles.

There will be a dry-type transformer and panelboard for the convenience receptacles and computer receptacles will be located in the equipment room.

The building electrical consumption will comply with energy conservation requirements and is justified by a LCCA as defined in DOE Order 6430.1A, Section 110-12. The Energy Conservation Report is contained in Appendix C.

5.2.3.6 Communications. The communication system will be similar to the operations building (see section 5.2.1.4). The facility shall be provided with the following:

- Internal communications (paging system)
- One phone connected to the external communications system
- Transmittal of data to the HLAN via the operations building computer system.

5.2.3.7 Fire Protection. Fire protection for the wastewater treatment facility will be designed in accordance with requirements of DOE Orders 6430.1A and 5480.7A, DOE/RL Order 5480.7A, AWWA requirements, WAC requirements, and other applicable codes and standards.

An ordinary hazard, hydraulically calculated, wet-pipe automatic fire sprinkler system, comprised of a separate system riser will be installed throughout the building. A service connection will tie into the raw water loop. The system riser will be located in the equipment room. The sprinkler system, piping supports, and attachments will be designed in accordance with NFPA 13. The methods of attachment of sprinkler system and fire alarm components supports to the structural portions of the building will be seismically engineered to withstand the loads required in the UBC. Adequately spaced fire hydrants from the main raw water line will be provided in the field.

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Non-combustible construction materials will be used where practical. Area separation and fire walls will be installed as needed in accordance with NFPA 101 requirements. Different occupancy areas will be separated with fire barriers in accordance with NFPA 101.

A local emergency fire alarm system will be installed within the building. This system will be comprised of a FACP, with standby battery power, and auxiliary relays to activate radio fire alarm signals that will be received at the 200 Area Hanford Fire Department. Each fire suppression system will individually enunciate. Manual pull stations will be provided adjacent to the exits. Fire alarm systems, alarm devices, duct smoke detectors, and fire dampers will be installed in accordance with NFPA 90A and NFPA 72. Fire alarm strobes/chimes will be strategically located throughout the building.

5.2.3.8 Decontamination and Decommissioning. The following items will be included in the design of the wastewater treatment facility to facilitate decontamination, decommissioning, and closure activities:

- Surfaces that can be easily flushed with a minimum quantity of water or decontamination solution.
- Panels that can be replaced if decontamination is not feasible.
- Surface coatings compatible with decontaminating agents, taking into consideration any degradation expected to occur.
- Monolithic, nonporous floors sloped towards sumps or drains.
- Continually sloped and trap-free piping systems.
- Physical provisions for cleaning and draining the piping.
- Construction materials resistant to radiation, process solutions, and decontamination agents.
- Wide aisles that will facilitate movement of equipment and materials.
- Skid-mounted equipment or systems with fasteners, piping, and service connections designed for easy access and manipulation.
- Rigging and attachment points that will facilitate removal of skids and/or equipment.
- Piping and service connections designed for easy access.

5.3 UTILITIES

Most of the required utility services will be provided by connection into existing facility systems. The sanitary sewer collection system will deliver waste to 2 separate septic tank/drain field systems with provision for future connections to the 200 Area system.

5.3.1 Communication Systems

The communication system will be connected to fiber from the 200 West Area S-Plant in a handhole on the west side of Beloit Avenue. Telephone electronics will be installed to split the

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HLAN and the telephone. Facility electronics will be included in each facility for the HLAN system. A fiber network will provide communications to each facility.

This project will include manholes spaced at intervals ranging from 150 m (500 ft) to 215 m (700 ft). Fiber will be placed in 10 cm (4 in.) schedule 40 polyvinyl chloride (PVC) conduits. Approximately 4 conduits will be installed to the operations building and 2 conduits to all other facilities within the proposed ERDF.

5.3.2 Electric Transmission and Distribution Systems

Electrical power will be supplied from the existing 13.8 kV overhead line number C8-L3. The line will be tapped 245 m (800 ft) north of the corner where the line turns and runs west. An underground service from the overhead line will be by #4/0 AWG copper, 15 kV concentric neutral cable, through a duct bank with 13 cm (5 in.) ducts, concrete encased for a length of approximately 60 m (200 ft). Electric power will be connected to a 1,500 kilovolt ampere (kVA), 13.8 kV/480-277 V, 3 Phase, 60 Hertz (Hz) transformer. The 480 V secondary distribution will be 3 Phase, 4 wire, using a neutral conductor. The 480 V distribution switchgear will consist of a main breaker and 4 feeder breakers. Feeder breakers will provide protection for distribution feeders to the operations building, the decontamination facility, and the trench area. The 480 V power distribution panels will be supplied by the distribution feeders. Panels will supply local feeders to lights, HVAC, pumps, receptacles, and other miscellaneous uses in the area being served. Electrical systems will meet the requirements of DOE Order 6430.1A and the NEC.

Backup power for the operations building will be provided by a 500 kVA diesel fueled generator located in one of the building equipment rooms. Backup power will only be provided for dedicated areas ventilation and other critical items.

5.3.3 Alarm Systems

A local emergency fire alarm system will be installed within each building. This system will be comprised of a FACP, with standby battery power, and auxiliary relays to activate radio fire alarm signals that will be received at the 200 Area Hanford Fire Department. Each fire suppression system will individually enunciate.

Fire alarm and other emergency systems will be connected to existing systems in the 200 West Area. The lines will be run in a 10 cm (4 in.) PVC conduit in the same trench as the fiber (see section 5.3.1).

5.3.3.1 Project Requirements. The project requires that an emergency procedure plan be implemented and that alarm systems meet the needs of this document.

5.3.3.2 Codes, Regulation, and DOE Order Requirements. Alarm devices will be installed in accordance with NFPA 72 and NFPA 90A. Fire alarm strobes/chimes will be strategically located throughout each building.

5.3.4 Irrigation Systems

An irrigation system using raw water will be installed around the operations building.

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5.3.4.1 Project Requirements. The areas around the operations building will be landscaped and easy to maintain, which requires an automatic sprinkling system with automatic drains.

5.3.4.2 Codes, Regulations, and DOE Order Requirements. The irrigation system will be installed in accordance with DOE Order 6430.1A, Division 15.

5.3.5 Sanitary Wastewater

The sanitary wastewater from the operations building and decontamination facility will be collected and treated in new septic tanks located near each facility in noncontaminated areas. The liquid from the septic tanks will be diverted to new drain field systems. Solids that accumulate in the septic tank will be periodically removed and handled of by methods acceptable to Ecology and EPA.

The 2 sanitary wastewater systems will be installed with stub-outs for future connections to a sanitary wastewater treatment facility.

5.3.5.1 Project Requirements. A septic tank and drainfield will be provided for each of the operation building and decontamination facility. Stub outs will be provided to connect to a future wastewater collection system. The drain fields will be sized after infiltration tests are performed during definitive design.

5.3.5.2 Codes, Regulations, and DOE Order Requirements. The sewage system will be designed in accordance with the following:

- DOE Order 6430.1A, Sections 0273-99 and 0275-99
- WAC 246-272
- State Board of Health "On-Site Sewage System Regulations"
- Department of Social and Health Services (DSHS) "Guidelines for the Use of Pressure Distribution Systems"
- DSHS "Design Guidelines for Larger On-Site Sewage Systems with Design Flows of Greater than 3,500 Gallons per Day"
- DSHS "Guidelines for Sandfilters".

There are no Benton Franklin Health Department guidelines since the site is not in its jurisdiction.

5.3.6 Water Supply, Pumping, Treatment, and Distribution Systems

Two types of water will be utilized at the proposed ERDF. Sanitary (potable) water will be used for all sanitary uses such as drinking water, showers, toilets, and laundry. Raw (export) water will be used for fire protection, landscape irrigation, decontamination make-up, batch plant operations, and other non-potable water uses (none currently identified). Sanitary water will only be provided to the operations building, decontamination facility, and the wastewater treatment building.

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Sanitary water will be provided from the existing 200 West Area sanitary water system. This water is already being pumped and treated so additional pumping and treatment will not be provided at the proposed ERDF. A connection will be made to the existing 30 cm (12 in.) PVC sanitary water line north of the 222S Laboratory. Currently, this source operates at 620 to 760 kilo Pascal (kPa) (90 to 110 pounds per square inch [psi]). It is anticipated that a peak sanitary water use of 457 liters per minute (L/min) (117 gallons per minute [gpm]) will be required. Discussion with WHC indicates that this volume of water can be easily met by the existing system. The anticipated peak flow for sanitary water is based on the following assumptions:

Operations Building	
Drinking water	19 L/min (5 gpm)
Showers	130 L/min (34 gpm)
Laundry	60 L/min (16 gpm)
Wash down hose	80 L/min (20 gpm)
Decontamination Facility	
Wash down hose	80 L/min (20 gpm)
Drinking Water	8 L/min (2 gpm)
Wastewater Treatment Facility	
Wash down hose	80 L/min (20 gpm)

Raw water will be provided from the existing 200 West Area raw water system. This is raw water (Columbia River water) and will be used in facilities that do not require treated water.

A connection will be made to the existing 30 cm (12 in.) PVC raw water pipe north of the 222S Laboratory . Currently, this source operates at 620 to 760 kPa (90 to 110 psi). It is anticipated that a maximum peak flow of 9,500 L/min (2,500 gpm) of raw water will be required. This peak flow is estimated based on a potential fire in the operations building requiring both the fire sprinkler flow of 5,700 L/min (1,500 gpm) and the yard fire hydrants of 3,800 L/min (1,000 gpm). Discussion with WHC indicates that this volume can not be provided by the existing system. However, Project B-604 will be upgrading the pumps and should be complete by the 1996 proposed start-up of the proposed ERDF. The anticipated peak flow for raw water for individual components of the proposed ERDF is based on the following assumptions:

Operations Building	
Landscape irrigation	150 L/min (40 gpm)
Toilets	200 L/min (52 gpm)
Fire sprinkler flow	5,700 L/min (1,500 gpm)
Decontamination Facility	
Make-up water	21 L/min (5.5 gpm)
Toilet	12 L/min (3 gpm)
Fire sprinkler flow	1,510 L/min (400 gpm)
Wastewater Treatment Facility	
Fire sprinkler flow	3,800 L/min (1,000 gpm)
Batch Plant	640 L/min (170 gpm)
Yard Fire Hydrants	3,800 L/min (1,000 gpm)

5.3.6.1 Project Requirements. Distribution piping will be provided within the proposed ERDF. A looped pipeline will be provided for the raw water system. Fire hydrants will only be

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located near the buildings in accordance with NFPA 24 and DOE Order 6430.1A, Section 02664. Fire sprinklers will be provided within the operations building, the decontamination facility, and the wastewater treatment building. Sanitary water will only be provided to the 3 buildings. The water flows were defined above.

5.3.6.2 Codes, Regulations, and DOE Order Requirements. The following codes and standards are applicable to water supply, pumping, treatment, and distribution systems at the proposed ERDF:

- WAC 246-290
  - Section 040 requires plans and specifications to be prepared by a licensed Professional Engineer and a construction report be submitted.
  - Sections 200 through 250 covers design issues that will be included in final design.
  - Section 490 sets the requirements for backflow prevention if cross connections cannot be eliminated.
- DOE/RL Order 5480.4C
- DOE Order 5480.7A, requires the use of 8 in. minimum mains. Other impacts of this code are that the design must meet NFPA.
- DOE Order 6430.1A, Section 0260, provides information on installation of piped utility materials, Section 0266 covers "Water Distribution Systems", Section 1530 "Fire Protection Criteria", and Section 1540 covers "Plumbing/Service Piping".
- DOE/RL Order 5480.7A, requires the use of 12 in. diameter mains. It also defines the locations of valves and redundancy.
- Hanford Plant Standards
  - *Design Criteria* SDC-3.2
  - *Design Criteria* SDC-7.8
  - *Mechanical* HPS-112-M
- WHC-CM-4-41 defines fire protection guidelines and discusses water system for each area.
- The *Uniform Fire Code*, to the extent that it is implemented by WAC-173-303.
- The AWWA, Pacific Northwest Section, *Accepted Procedure and Practice in Cross Connection Control Manual.*
- NFPA 13
- NFPA 24
- NFPA 101
- NFPA 801

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- Factory Mutual, Loss Prevention Data Sheets
- The FDC requires that the automatic fire protection system meets the requirements of Safety Class 3.

5.3.7 Contaminated Wastewater Collection and Treatment Systems

In accordance with the FDC, no effluent will leave the proposed ERDF site. The decontamination facility wastewater is expected to be slightly contaminated with waste materials. The solids will be removed from the bottom of the tank in the blowdown. If for conservative calculations, the carry-away/ evaporation is also included, then 3,255,000 L (860,000 gal) of water per year will be generated. If this wastewater is treated in 2 shifts per day of 6.5 operating hours per shift, the decontamination facility wastewater flow will be 21 L/min (5.5 gpm).

The peak flow of leachate from the trench was estimated in section 5.4.3.3. The leachate storage tank discharge pumps will be sized to empty the 3,030 m^3 (800,000 gal) stored in the tanks in 60 days at 12 operating hours per day. This is an average flow of 70 L/min (18.5 gpm).

Leachate from the trench and the wastewater from the 3 decontamination wash units will be combined in a 1,325 L (350 gal) fiberglass storage tank. Two pumps, each 95 L/min (25 gpm), (one plus a full standby), will pump the wastewater through a flowmeter. A level sensing element in the tank will provide on-off control of the pumps. Separate low level and high level floats will provide emergency pump control and remote alarms. After the flowmeter, the flow will go to a package wastewater treatment plant.

The package wastewater treatment plant will utilize the reverse osmosis process. The resulting brine will be stabilized and placed in the trench. Since actual wastewater is not yet available for study, the leachate will be characterized as part of the expanded *Source Inventory Development Engineering Study for the Environmental Restoration Disposal Facility,* (Draft 1993). The final equipment selection and sizing will be finalized during definitive design when a treatability study can be performed on synthesized wastewater. The reverse osmosis process will be further evaluated during definitive design along with other types of treatment. The reverse osmosis process was selected for this project and appears to be the best candidate process. This process is available from vendors in package units that can be readily obtained and installed. Even though 1 unit will provide sufficient capacity, a redundant unit will be provided.

The treated wastewater will go to evaporation tanks. After the leachate is quantified and characterized during ongoing studies, the quality of the treated wastewater treatment plant can be determined. If the effluent can be reused in the decontamination facility in lieu of raw water, then the size of the evaporation tanks may be reduced. To evaporate the liquid, enough surface area must be provided to evaporate all of the liquid during summer months. A net evaporation rate of 51 cm (20 in.) per year was determined based on climatological records. Therefore, evaporation of 6,280,000 L (1,660,000 gal) would require an area of 12,300 m^2 (133,100 ft^2). Since this is a relatively large area, 7 tanks at 1,654 m^2 (17,800 ft^2) each, plus 1 additional tank to facilitate cleaning, are recommended. Each tank should be approximately 0.9 m (3 ft) deep and 46 m (150 ft) in diameter. These tanks will be Modutanks similar those used at Morton Thiokol near Brigham City, Utah or similar tanks made by Environetics, Inc. or equivalent manufacturers.

Each tank will have double high-density polyethylene (HDPE) liners with leak detection. A pump station and piping will be provided to pump water from any of the tanks to either the grout plant, the decontamination facility for rinse water makeup, or into the site water truck that

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will use the water for dust control. The solids remaining in the tanks after evaporation will be removed and spread in the trench.

5.3.7.1 Project Requirements. A storage tank, 2 pumps, flowmeter, reverse osmosis, storage/evaporation tanks, and pump station will be provided as discussed in section 5.3.7.

5.3.7.2 Codes, Regulation, and DOE Order Requirements. Applicable codes and the relevance of each are provided below:

- DOE Order 6430.1A, Section 237-3 discusses the selection and design of the wastewater treatment system; Section 0270 provides design criteria for wastewater collection systems; and Section 0273-99 provides general sanitary wastewater treatment and disposal guidelines.

- CFR 40 §264 includes the following:
  - Section 192 covers design of new hazardous waste tanks
  - Section 193 covers secondary containment on new hazardous waste tank systems

- CFR 40 §280, Section 20 covers piping materials and installation.

- WAC 172-240 requires that the decontamination wastewater treatment facilities be prepared under the guidance of a registered Professional Engineer and submitted to Ecology for review. This code also requires the preparation of Operation and Maintenance Manuals.

- WAC 173-303, Section 640 will be met during final design.

5.4 WASTE TRENCH

A single waste trench will be constructed to provide final burial capacity of the wastes excavated from the ER sites.

5.4.1 Project Requirements

The facility for Project W-296 will satisfy the following project requirements:

- Provide final burial capacity for 4.6 million m^3 (6 million yd^3) of hazardous, low-level radioactive, and mixed waste. This will be primarily bulk soils, although other waste forms such as containers and demolition debris will be handled.

- Allow phased construction so that initial costs can be minimized and additional capacity can be developed on an as-needed basis over the expected life of the remediation effort. A total capacity of up to 21.8 million m^3 (28.5 million yd^3) may be required; however, facility development beyond the initial phase of 4.6 million m^3 (6 million yd^3) will be performed under other projects.

- Minimize leachate production to limit the size of storage and treatment facilities and reduce operating costs.

- Provide groundwater protection prior to installation of the final closure cover.

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- Minimize the land area required and the impact on the environment, consistent with other objectives.
- Avoid stormwater run-on for up to the 25-year storm event.

5.4.2 Codes, Regulation, and DOE Order Requirements

The proposed ERDF trench will be designed in compliance with the requirements of RCRA Subtitle C for hazardous waste burial facilities as defined in CFR 40 §264.301 and related technical guidance documents. These requirements are incorporated in WAC 173-303. They are also incorporated by general reference in DOE Order 5820.2A and DOE/RL Order 5820.2A.

5.4.3 Waste Facility Description.

A description of the proposed trench evaluated in this report is provided in the sections below. The final design for proposed ERDF will be selected in the ROD to be adopted by EPA pursuant to CERCLA. The design described in this report may not be the final design selected in the ROD.

5.4.3.1 General Layout. The proposed trench for the ERDF will be 305 m (1,000 ft) wide across the floor, to allow effective leachate management as discussed below in section 5.4.3.3. The trench will be approximately 21.3 m (70 ft) deep to minimize the land surface area required, yet remain a reasonable distance above groundwater. The trench will be approximately 2,740 m (9,000 ft) long to accommodate the entire design waste capacity. The long axis of the trench will be oriented east to west as shown on engineering sketch ES-296-02. This orientation is to parallel the railroad loop to minimize tractor/trailer travel and to minimize the impacts on the vegetation south of the trench.

The trench will be constructed entirely below the ground surface, except for a small (up to 3 m [10 ft] high) berm along the south side where the existing topography is lower than that on the north side (see engineering sketch ES-296-08). The berm will be constructed as an engineered fill using excavated soil. The side slopes of the trench will be 3:1 horizontal to vertical (H:V) to facilitate liner construction.

Some excess soil will be reserved to provide material for construction of the final cover (see section 5.4.3.8). The remainder of the excess soil will be available for backhaul to the remediation sites. Temporary stockpiles will initially be established east of the active trench area over the future facility footprint. When a portion of the trench has been filled with waste, stockpiles will be established over the closed portion of the trench. This approach will minimize the land area disturbed by waste management operations.

5.4.3.2 Liner System. The ERDF proposed trench will employ a double liner system satisfying the requirements of RCRA, Subtitle C. This is essentially the same liner system used for the Project W-025 Landfill, which has been approved by the regulatory agencies and is presently under construction, as of November 1993. Testing results for the effects of leachate and radiation on both the geosynthetic and soil liner components are included in Project W-025 Landfill documentation (WHC 1992a, 1992b). From the bottom up, the liner system components (see engineering sketch ES-296-09) will consist of:

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- Compacted subgrade
- A 0.9 m (3 ft) thick layer of low-permeability bentonite-soil mixture having a hydraulic conductivity of 1 x 10^{-7} cm/second(sec) or less.
- A 1.5 millimeter (60 mil) thick HDPE geomembrane (the secondary liner), textured (roughened) to provide a high-friction interface with adjacent components and thus prevent slipping. HDPE was chosen because of its high resistance to chemical deterioration.
- On the sideslopes, a geocomposite leak detection layer consisting of a nonwoven geotextile thermally bonded to each side of an HDPE geonet. This composite material has a high internal shear strength and will interlock with the texturing on the geomembranes to provide high resistance to sliding.
- On the floor of the trench, a gravel leak detection layer. The gravel will have somewhat higher permeability than the geocomposite, to compensate for the lesser slope.
- Above the leak detection layer, a primary HDPE geomembrane similar to the secondary liner discussed above.
- On the sideslopes, a geocomposite drainage layer for leachate collection similar to the leak detection layer described above.
- On the floor of the trench, a gravel layer for leachate collection. Pipes may be included in this layer if high flow capacity is required.
- A 0.9 m (3 ft) thick operations layer to prevent mechanical damage to the liner system from hauling and placing equipment and to protect the low-permeability soil layer from frost damage.

5.4.3.3 Leachate Management. The design and operation of the facility are intended to minimize the generation of leachate to the maximum extent practical. Leachate collected from the lined portion of the trench will be treated. Precipitation in the unlined portion of the trench will be allowed to drain into the subgrade. Surface water which collects following precipitation will be collected by vacuum trucks to minimize the quantity which infiltrates the waste. A daily operational cover consisting of low permeability material will be placed on the surface of the waste to provide protection until the interim cover is placed (see sections 5.4.3.6 and 5.4.3.7). The trench floor will be divided into 152 m (500 ft) square leachate collection areas (cells) as shown on engineering sketch ES-296-07. This size was selected based on (1) the need to limit the amount of "leachate" resulting from precipitation events and (2) the requirement to construct the trench in phases. The liner system in each leachate collection area will slope to a sump area at the toe of the sideslope. There will be 2 separate sumps. The first will be located above the primary liner to collect leachate. The second will be located between the 2 liners to provide leak detection. The sumps will be physically and hydraulically isolated from each other.

Riser pipes will lead from each sump up the side slope of the trench. Submersible pumps will be lowered into position in each sump through the riser pipes. The pumps will discharge into a gravity-drained pipe that will flow to the leachate storage facility. Gravity drainage is reliable and minimizes the possibility of leachate flowing back into the trench. The riser pipes will be located and designed so that leachate pumping can continue after the final closure cover has been installed (see section 5.4.3.8). Leachate levels in the sumps will be monitored and used

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to control the pumps. Each leachate collection area will have an independent control system located at the top of the sideslope. Instrument readings will also be transmitted to a central station in one of the 200 Areas (Project W-199). The pumps can be removed as required for maintenance or replacement. The leachate pumps will have a capacity of 500 L/min (125 gpm) at 26 m (85 ft) of head. The leak detection pumps will have a capacity of 40 L/min (10 gpm) at 29 m (95 ft) of head. Each pump will be equipped with a level switch that automatically starts and stops the pump based on liquid level. A pump control enclosure will be provided on the edge of the trench for each cell. Pump run times and alarms will be located in the enclosures with alarms transmitted to the operations building computer system.

For purposes of sizing the leachate storage tanks, the Hanford site 25-year, 24-hour precipitation event of 4 cm (1.56 in.) was used. This approach is consistent with RCRA guidance for runon and runoff control at hazardous waste facilities, and has been employed previously for the design of the Project W-025 Landfill on the Hanford site. It is estimated that the 25-year storm falling on one nearly empty and 2 half-full cells (the expected maximum active area) could generate up to 3,000 m^3 (800,000 gal) of leachate. Because completed portions of the trench will be closed with an interim cover that includes a low-permeability layer, leachate production from these areas will be much less than from open areas of the trench. Therefore, the single storm event controls the size of the storage tanks.

The gravity pipe will convey the leachate to 3 storage tanks located near the southwest corner of the trench. The tanks will be the same type as used for the decontamination wastewater (see section 5.3.7). Each tank will have the capacity to store 1,500 m^3 (400,000 gal) of leachate. The flow will go into the tanks in series such that tank 1 will be filled first and it will overflow into tank 2 which will overflow into tank 3. Valving will be provided so that either tank 1 or 2 can be the first tank. The tanks will be sized so that 2 tanks can be used to facilitate cleaning and maintenance. The third tank will be a spare. The leachate collection, transport, and storage system is shown on engineering sketch ES-296-07.

The collected leachate will be pumped to the decontamination facility wastewater treatment plant for treatment. Two 76 L/min (20 gpm) pumps will be provided and valved to pump from any of the 3 tanks. This flow will allow the 3,000 m^3 (800,000 gal) of leachate to be pumped in 60 days during a 12 hour per day operation.

5.4.3.4 Waste Placement. The trench will be filled from west to east. Waste will be placed in 2 benches, each 11 m (35 ft) high. The top of each bench will be covered at the end of each working day with a layer of clean soil to provide a traffic surface and prevent contaminated dust emissions. The upper surface of the waste and overlying daily operational cover will be sloped at 2 percent as required for drainage within the final cover (see section 5.4.3.6). A more detailed description of the proposed waste placement sequence is presented in *Trench Operations Sequence Engineering Study* (WHC 1993b).

Waste will be delivered to the trench in containers placed on flatbed tractor/trailers. Bulk soils will be dumped and spread. These soils will be compacted using conventional equipment to about 95 percent of Modified Proctor (ASTM D 1557) density to minimize settlement that might otherwise damage the final cover (see *Engineering Study for the Trench and Engineered Barrier Configuration for the Environmental Restoration Storage and Disposal Facility* [USACE 1993d]). Other forms of waste, such as single-use containers, will be placed on the trench floor or the top of the first waste lift. Irregularly shaped objects such as demolition debris will be flood-grouted, if required, to fill voids that would otherwise cause excessive settlement. During waste placement, dust will be controlled by the use of clean soil covers, dust suppressants, sprays on dumping equipment, or similar measures.

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Additional details of waste placement and associated trench operations are discussed in section 7.5.2.

5.4.3.5 Trench Construction. The trench will be constructed using conventional equipment and techniques that have been proven in similar applications. Based on current estimated waste receipts, a total of 10 cells will be excavated as part of Project W-296 (see engineering sketch ES-296-07). The first 4 cells will be lined. These cells will provide capacity for about 0.8 million m^3 (1.1 million yd^3) of waste.

Trench excavation areas will be accessed from the east side. Construction equipment, materials, stockpiles, and personnel will operate on the south side of the facility. This approach isolates construction operations from waste placement activities. A physical barrier such as a fence will be temporarily installed at the boundary of the construction area within the trench to prevent inadvertent entry into the waste placement area.

At each phase, the liner system at the eastern edge of each cell will extend approximately 6.1 m (20 ft) beyond the crest separating adjacent cells. This will prevent water from unlined areas of the trench from entering either the leachate collection or the leak detection systems. The liner will be temporarily terminated by extending the geotextiles in the liner system to cover the other more vulnerable layers. The entire liner edge will then be covered with a protective layer of soil (see engineering sketch ES-296-09). During the next phase of construction, the existing liner will be exposed and joined with new material.

5.4.3.6 Daily Operational Cover. The upper surface of waste placed in the proposed ERDF trench will be sloped from the center to the edges of the trench at a 2 percent grade, as required for the permanent closure cover. The waste will then be covered with a 0.6 m (2 ft) thick layer of clean soil which will be used as the traffic surface during waste placement. This layer will consist of fine sand excavated from the trench with an assumed hydraulic conductivity of 10^{-4} cm/sec (based on preliminary testing of soil samples from wells in the proposed ERDF vicinity). The cover is referred to as the daily operational cover and will control vectors and minimize infiltration. After waste placement is complete, the surface will be finish graded and traffic will be restricted. The daily operational cover, in completed portions of the trench, will include a low-permeability layer to limit leachate production until the interim cover is installed.

5.4.3.7 Interim Cover. The daily operational cover will include a low-permeability layer to limit leachate production in the completed portions of the trench. To minimize leachate production, a layer of asphalt has been assumed as the low-permeability layer for the interim cover. This cover will be constructed annually. However, other materials such as geomembranes or portions of the final cover may be more cost effective. A final decision on which material to use for the low-permeability layer will be made during definitive design of the proposed ERDF. Biointrusion control will be provided.

5.4.3.8 Closure. The trench will be permanently closed with a RCRA compliant barrier. Construction of the final cover is not part of Project W-296, but a brief description is included because the final cover must be considered during design and operations.

The proposed final cover design will be a 4.5 m (15 ft) thick multilayered cover constructed from natural materials in order to maximize the performance life. A cross section of the proposed final cover is shown on engineering sketch ES-296-09. The upper layers of the proposed final cover will be predominantly silt intended to provide high water storage capacity and evapotranspiration. This will substantially limit the amount of precipitation that will infiltrate to the lower layers of the final cover. The capillary break provided between the silt and sand layer will enable the silt to perform their functions. A thick layer of crushed basalt

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fragments will provide a barrier to intrusion from humans and large animals. Finally, an asphalt layer will serve as the final barrier to moisture.

The proposed final cover affects Project W-296 in 2 primary ways. First, because of its thickness, the proposed final cover will apply a significant load to the top of the waste. This may cause the waste to settle. However, the final cover will be damaged by excessive settlement. For this reason, settlement in the trench will be limited to acceptable levels by compacting the waste as it is placed in the trench (see section 5.4.3.4).

The second effect of the proposed final cover will be use of excavated soil. Based on a preliminary geologic evaluation of the proposed ERDF site, it appears that some of the soil types required for the proposed final cover can be screened from excavated soils. This will be a consideration when designing site facilities such as stockpiles and haul roads, as well as determining the amount of soil available for haulback to the remediation sites. Additional background on use of excavated soils for the proposed final cover is presented in the *Engineering Study for the Trench and Engineered Barrier Configuration Study for the Environmental Restoration Storage and Disposal Facility* (USACE 1993d).

5.5 EQUIPMENT

The required equipment and numbers of vehicles will be determined by the operations plan. The operations plan is summarized in section 7.5.2.

5.5.1 Grout Batch Plant

The majority of the wastes expected at the proposed ERDF will consist of bulk soils that can be placed and compacted to adequately support an appropriate final cover, such as the proposed final cover. However, the burial of metals wastes, wastes from D&D actions, and wastes removed from existing burial grounds may leave voids in the final facility. Eventual migration or collapse of soil into these voids could result in long-term subsidence or differential settlement that may threaten the integrity of the final cover.

A portable grout batch plant and grout truck washdown pad are proposed as part of the ERDF to supply grout to fill voids left during the burial of debris. The batch plant will be permanently located north of the trench. The batch plant will be sized as discussed in *Design Memorandum Report for the Environmental Restoration Storage and Disposal Facility* (USACE, 1993e). Based on the currently expected waste characteristics, the plant should be sized to produce a maximum of 107 m^3 (140 yd^3) of grout per day, and a minimum of 22.9 m^3 (30 yd^3) per day. The batch plant will utilize between 7,600 L and 38,000 L (2,000 and 10,000 gal) per day of water.

The following assumptions were used in the development of this CDR:

- It is assumed that stabilization for waste in single-use containers will be performed at the source, and not at the proposed ERDF. Therefore, the proposed ERDF batch plant will handle only wastes that are to be placed in bulk.

- It is assumed that size-reduction, crushing, or other waste form modification (i.e. treatment) will not be performed at the proposed ERDF.

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- It is assumed that grouting will be accomplished with a flowable, Portland cement grout of suitable workability and quality. For the purposes of this initial estimate of grout quantities, the following mix design is proposed on the basis of typical practice for high-strength grout:

  - Aggregate will be sand, with a weight of approximately 2,400 kg/m^3 (150 lbs/ft^3)
  - Cement content will be 590 kg/m^3 (1,000 lbs/yd^3)
  - Water/cement ratio will be 0.6, on a weight basis
  - Pozzolans, as necessary.

- It is assumed that most of the makeup water used for grout will be treated wastewater from the decontamination facility. This treated wastewater will be protective of worker health and environment.

These proportions can be changed to suit site conditions, with some potential for savings on cement and water. It may be possible to utilize fly ash in the mix, in place of part of the cement, to yield the same mix consistency with reduced strength and greatly reduced cost.

The batch plant will be placed over a buried leak collection liner. The leakage will be pumped and returned either as grout makeup water or for treatment in the wastewater treatment plant.

5.5.2 Wheeled Container Handlers

Wheeled container handlers which will be used for transferring loaded waste containers will have the capability of transferring 45,400 kg (100,000 lb [50 tons]) containers. The design weight of the empty containers used for determining the design capacity of container handlers used to transfer empty waste containers is 4,540 kg (10,000 lb [5 tons]). All handlers are to be wheel driven. Each handler will be capable of transferring containers directly from the railcar to the transport tractor/trailer within the cycle time specified in the operations plan.

5.5.3 Tractor Dozers

The tractor dozers will be standard equipment. Standard equipment for tractor dozers will include lights for night time operation, push blades suitable for movement of soil rubble and demolition waste, tow bars capable of retrieving equivalent dozer units from construction areas as well as towing 18,000 kg (40,000 lb [20 ton]) vibratory compactors, and controls which allow for manual and remote operation. Each dozer will be track driven. Minimum push capacity, cycle time, and operating conditions are specified in the operations plan. Enclosed cabs with HEPA filters and climate control facilities will be provided for dozer operators.

5.5.4 Vibratory Compactors

Vibratory compactors will be standard equipment with a minimum rating of 18,100 kg (40,000 lb [20 ton]). Each compactor will be capable of being towed by the tractor dozer equipment specified in section 5.5.3 and will be equipped with lights for night time operation.

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5.5.5 Mobile Decontamination Units

Two mobile decontamination units will be provided for use in decontaminating dedicated on-site equipment in the field to allow for servicing. Each unit will be a high pressure, low volume water washer with hot water and detergent options. Each will be mounted in the bed of a 450 kg (1,000 lb [0.5 ton]) pickup truck. Each mobile decontamination unit will be a standard pressure washer unit as manufactured by Hotsy, Sioux, or equal. Each unit will be self contained and will be provided with skid mounting for semi-permanent mounting in the pickup.

One unit will normally be located adjacent to the decontamination facility and will be used to wash the interiors of containers that do not pass the visual test for being empty. At the decontamination facility, there will be a pad with a buried sump for collecting and storing the waste which will be washed from the container interiors. The sump will be equipped with a pump that will pump the contents into the decontamination wastewater treatment system.

The second unit will be located primarily in the trench and will be used to decontaminate the dedicated equipment as needed for operator access.

Cleaning of containers that transported hazardous waste should only be performed on the pad adjacent to the decontamination facility.

5.5.6 Container Transport Tractor/Trailers

Each transport tractor/trailer will be equipped to carry 1-45,000 kg (100,000 lb [50 ton]) waste container at a time. Lock down devices will be provided for securing the waste container to the trailer frame. Other standard transport vehicle equipment will include lights for night time operation, vehicle cabs with HEPA filters and climate control devices, and tilt cylinders for raising the bed to empty the container contents. Remote controls for activating the tilt cylinder, operating the lock-down mechanism, and operating the end gate latch will be provided inside the truck cab.

The unloaded transport tractor/trailers must meet U.S. Department of Transportation (DOT) requirements for movement on public roads. In addition tractor/trailers will be capable of maneuvering on gravel roads and 10 percent inclines. Transport tractor/trailers must also be capable of meeting the operation cycle times specified in the operations plan.

Vehicle performance will require operating at speeds of up to 48 kph (30 mph) on paved roads and 24 kph (15 mph) on gravel roads. The trucks will have sufficient power to operate on 10 percent grades and meet the operation cycle times specified in the operations plan.

5.5.7 Cover and Grout Material Transport Trucks

Transport trucks which will be used to haul the daily operational cover and grout material (sand) from stock piles will be standard construction equipment with a capacity of 11.5 m^3 (15 loose yd^3) with the modifications listed below. Rear dump tail gates and locking attachments will be operable with remote mechanisms from inside the truck cab. The tilt cylinder will be operable from a remote actuator located inside the truck cab.

Standard equipment for these trucks must meet FACP requirements for moving on public roads. Cabs will be equipped with HEPA filters and climate control devices.

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Vehicle performance will require operating at speeds of up to 48 kph (30 mph) on paved roads and 24 kph (15 mph) on gravel roads. The trucks will have sufficient power to operate on 10 percent grades and meet the operation cycle times specified in the operations plan.

5.5.8 Grout Mixer/Transport Trucks

Grout transport trucks which will be used to haul grout from the batch plant to the waste trench will be standard over-the-road mixing units with front end discharge capability with the modifications discussed below. The unloading chute will be remotely operated from within the truck cab and will be capable of swing and tilt operations. Trucks will have a minimum of 6.9 m^3 (9 yd^3) wet batch capacity with a self contained water tank for adjusting batch water content. Wash and spray devices for cleaning the unloading chute and mixing drum will be part of the water tank system. The trucks will operate only in clean cover and the wash and spray activities will be restricted to the washdown pad near the batch plant.

Transport trucks will meet DOT requirements for movement on public roads. Truck cabs will be enclosed and equipped with HEPA filters and climate control devices. Vehicle lights will also be sufficient for night time operation.

Vehicle performance will require operating at speeds of up to 48 kph (30 mph) on paved roads and 24 kph (15 mph) on gravel roads. The trucks will have sufficient power to operate on 10 percent grades and meet the operation cycle times specified in the operations plan.

5.5.9 Road Grader

A standard construction model road grader will be used to maintain gravel surface roads. The grader will be equipped with an enclosed cab containing HEPA filter and climate control facilities as well as lights for night time operation. The grader will be capable of performing light grading of gravel roads and will have front wheel tilt and front and rear wheel steering. Wheel and blade control mechanisms will be operable from within the operator cab and will be hydraulically driven. The grader will have sufficient power to meet the operation cycle specified in the operations plan.

5.5.10 Road Maintenance Water Truck

The water truck will have a 11,400 L (3,000 gal) capacity and will be used to maintain gravel roads and granular daily operational cover material. It will be equipped with loading hoses and front operating pressurized spray mechanisms. It will be equipped with a fill valve that closes on high tank level. All spray mechanisms will be operable from within the truck cab. Lights will be provided to allow for night time operations. Vehicle cabs will be enclosed with HEPA filters and climate control facilities.

The water truck will be required to operate on 10 percent grades and will have sufficient power to meet the operation cycle times specified in the operations plan.

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5.5.11 End of Shift Cover Spray Truck

A cover material spray truck which will be used for applying cover to the exposed waste material at the end of the working day, will include an enclosed cab with HEPA filters and climate control facilities.

The truck will be suited for spraying the specified dust control material over the working face of the trench without requiring travel over waste material. Vehicle equipment will include lights for night time operation, loading pumps, loading hoses, and a front operating articulated highly pressurized spray mechanism. All spray mechanisms will be remotely controlled from within the operator's cab.

The spray truck will be required to operate on 10 percent grades and will have sufficient power to meet the operation cycle times specified in the operations plan.

If the specified dust suppressant material has a viscosity similar to water, this vehicle will be configured similar to the road maintenance water truck so each can be used as a backup unit for the other unit.

5.5.12 Front End Loaders

Front end loaders which will be used to load stockpiled materials into transport trucks and the batch plant will be rubber tired 2.7 m^3 (3.5 yd^3) loaders. These will be standard construction equipment similar to Caterpillar, Dresser, or equivalent. Loaders will be equipped with lights for night time operation and the cabs will be enclosed with HEPA filters and climate control facilities. Each loader will have sufficient power and bucket capacity to meet the operation cycle specified in the operations plan.

5.5.13 Trailer Tippers

Trailer tippers which will be used to unload containers within the waste trench, will be capable of dumping a loaded container while the container is mounted on the transport tractor/trailer. The trailer will be equipped with leveling devices which will be used to level the tipping platform. Other equipment will include lights for night time operations and an enclosed cab with HEPA filters and climate control devices.

Tippers will be equipped with water spray nozzles. These devices will be located at the waste discharge point of the tipper and will be used for dust suppression. Variable speed pumps will be capable of delivering 76 to 380 L/min (20 to 100 gpm) of water to the spray nozzles. Water, for the spray nozzles, will be contained in 2 storage tanks. Raw water will be used. Storage tanks will be capable of being towed behind a tractor similar to the waste transport tractors. Each storage tank will have a capacity of 11,356 L (3,000 gal).

Tippers will be designed to ensure clearance of all waste material from the trailer tilting mechanism and platform when waste is dumped into the trench. Tippers will also be designed to be relocated by a truck tractor equivalent to the truck tractors used for transporting waste containers. Each tipper will be capable of maintaining the production rates specified in the operations plan.

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5.5.14 Portable Lighting

Portable lighting units which will be used to light the working areas of the waste trench and the material stock piles will have self contained engines and generator units. These portable lighting units will be on elevated towers and will be relocated using light weight utility trucks, such as a mobile decontamination unit.

5.5.15 Railroad Locomotive

One locomotive will be used for relocation of trains between the container off-loading area and the container on-loading area. This locomotive will be designed to relocate 17 railcars (based on the expected train length of 15 railcars plus provision for future increases in train sizes). Each railcar will contain 2 loaded waste containers. Each container weighs 45,000 kg (100,000 lb [50 tons]). In addition, the locomotive will be designed to meet the process cycle specified in the operations plan.

5.5.16 Container Off-Loading Crane

The container off-loading crane will have a capacity of 45,400 kg (100,000 lb [50 ton]) and will be used for unloading single-use containers into the waste trench. It will be capable of lifting containers directly from the bed of a tractor/trailer and placing them on the floor of the waste trench.

The crane will be equipped with a lifting attachment which will provide a locking mechanism that will attach to the container while the container is being lifted. In addition, the crane will be fitted with lights for night time operation. The container design will include lifting attachments on the top 4 corners of the container to facilitate lifting by the crane.

5.5.17 Tire Maintenance Truck

A tire maintenance truck, meeting DOT requirements for movement on public roads, will be used for providing service on all types of on-site, rubber tired vehicles. The truck will be equipped with an air compressor, tire change tools, a tire lifting hoist, and a truck jack system. Lights will be provided for night time operations. Truck cabs will be enclosed and will include HEPA filters and climate control devices. The truck will have the capability to carry tires for heavy equipment, trucks, or light duty vehicles.

5.5.18 Preventative Maintenance/Fuel Truck

An equipment and vehicle service truck, meeting DOT requirements for movement on public roads, will be used for transporting and dispensing fuel to heavy equipment, trucks, light duty vehicles, and portable lighting facilities. The truck will be equipped with covered and secured storage space for carrying filters, coolants, small parts, and service tools. The truck will include an enclosed cab with HEPA filters and climate control devices. Lights will be provided for night time operations.

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5.5.19 Electronics/Instrument Maintenance Truck

An electronics and instrument service truck, meeting DOT requirements for movement on public roads, will be used for accessing and field maintenance of field located electronics and instruments. The truck will be equipped with covered and secured storage space for carrying small parts and service tools. The truck will include an enclosed cab with HEPA filters and climate control devices. Lights will be provided for night time operations.

5.5.20 Vacuum Trucks

Two vacuum trucks, meeting DOT requirements for movement on public roads, will be used for removing spilled materials. One vehicle will be dedicated to contaminated materials and second will be for clean materials. Each truck will include an enclosed cab with HEPA filters and climate control devices. Lights will be provided for night time operations.

5.5.21 Motor Vehicles

Miscellaneous motor vehicles will be provided for transporting personnel within the site.

5.5.22 Street Sweeper

The street sweeper will be standard equipment with modifications, which will include sealing the cab and installing HEPA filters for incoming air.

5.5.23 Containers

Containers used for the transport of waste materials from and within the proposed ERDF facility will be provided as part of the ER project. Lifting attachments will be located on the top 4 corners of the container to facilitate lifting by the container handler. The lifting attachments provide a means of locking the lifting mechanism to the container while the container is being lifted. Each container will also be equipped with an end gate that opens over the entire end of the container.

5.5.24 Office Furniture and Equipment

All required furniture, storage equipment, workstations, desks, chairs, etc. for the operations building and offices/control rooms in the decontamination facility and wastewater treatment facility, will be provided in accordance with DOE Order 6430.1A, Division 12. This equipment includes the following:

- 26 ergonomically designed workstations
- 24 desks
- 4 round conference tables
- 10 large rectangular conference tables
- 10 folding tables for lunch room
- 50 ergonomically designed chairs with casters
- 100 stackable chairs
- 60 ergonomically designed sled-based conference chairs
- 16 storage cabinets

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- 20 5-drawer file cabinets
- 40 adjustable 6-shelf bookshelves
- 30 IBM compatible 486 computers
- 4 laser printers
- 3 copiers
- 3 network stations.

5.5.25 Process Equipment

Standard process equipment is described under building descriptions or special and standard equipment. No other process equipment will be provided.

5.5.26 Shop Equipment

All shop equipment required for efficient maintenance of equipment at the proposed ERDF will be provided by this project. This equipment includes welders, standard mechanical maintenance tools, standard electronics and electrical equipment, cutting equipment, work benches, work chairs, and storage shelving. Exhausts will be provided for welding and grinding enclosures, and for the garage. The clean maintenance shop will have a sink for cleanup and a drinking fountain.

An overhead traveling hoist will also be provided by this project. The hoist will run from an exterior loading dock to a mechanical shop workbench and a welding enclosure.

5.6 AUTOMATED DATA PROCESSING EQUIPMENT

Automated data processing and control equipment for the proposed ERDF will be designed to meet the basic goals stated in the Automation Strategy Development Technical Memorandum, Appendix B of the *Design Memorandum Report for the Environmental Restoration Storage and Disposal Facility* (USACE 1933e). The automation goals are:

- increased safety
- more complete and consistent documentation
- increased productivity (throughput)
- energy conservation
- minimize operations personnel for cost and safety reasons
- increased reliability
- reduced cost.

5.6.1 System Architecture

To meet the automation goals and to facilitate interface requirements between the various project components and with the Hanford Solid Waste Information Tracking System (SWITS), a distributed control system (DCS) system architecture for the proposed ERDF control and data acquisition system is recommended. Figure 1 is an example how the system could possibly be configured. The system will be comprised of a family of independent functional processors. Each functional processor, referred to as a "drop", will be a configurable module programmed to execute a specific dedicated task. The system will be configured to include:

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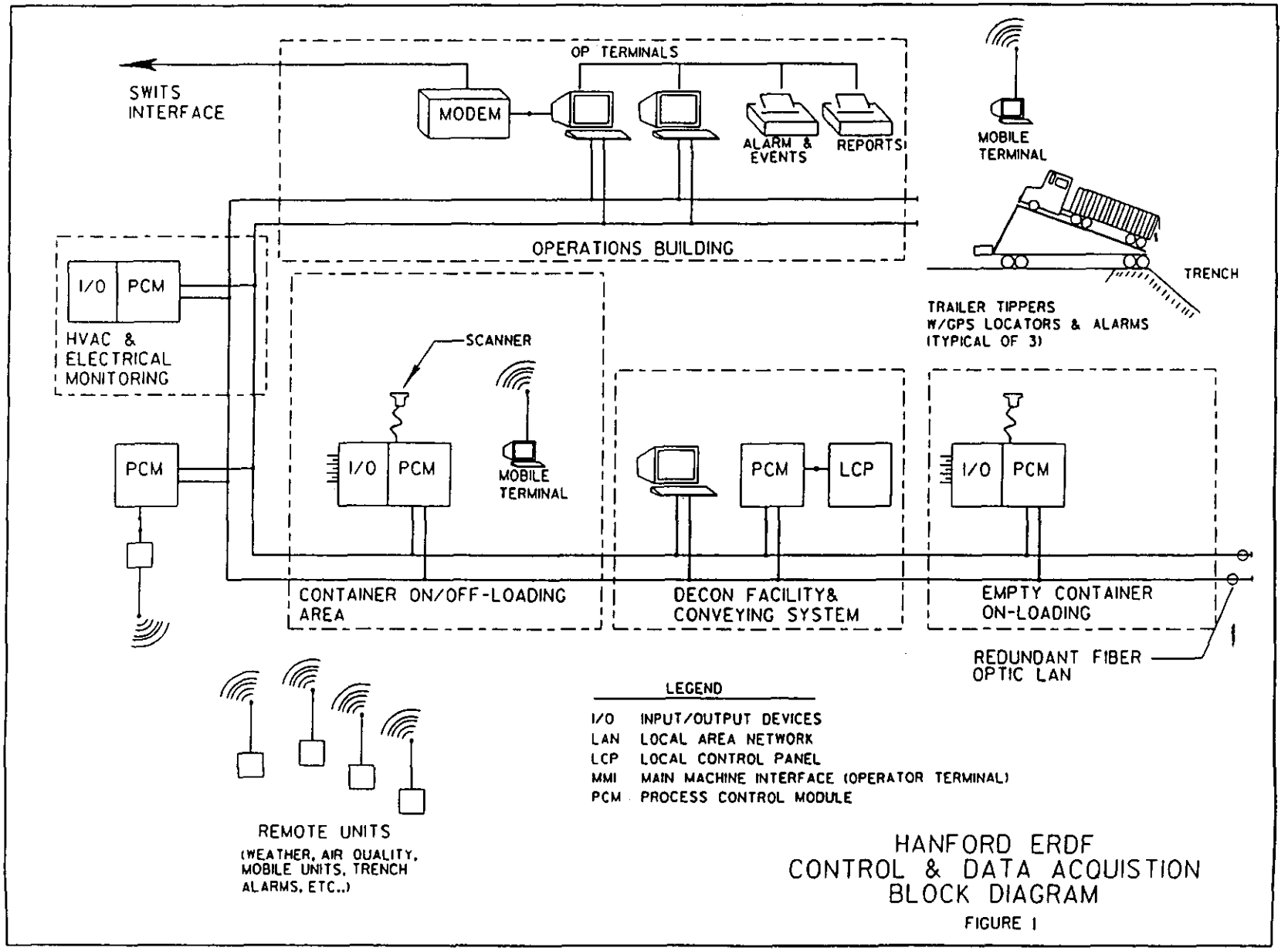

HANFORD ERDF
CONTROL & DATA ACQUISTION
BLOCK DIAGRAM

FIGURE 1

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- Independent redundant process control modules (PCM) utilizing intelligent process I/O hardware, scanners, terminations and signal conditioning as required. The PCMs will be distributed to local control centers or other concentrations of inputs throughout the proposed ERDF, and will perform the necessary continuous, discontinuous, and sequential control and data scanning functions. PCMs may also provide the telemetry interface to mobile or remote controllers or data entry modules.

- Cathode ray tube (CRT) based man machine interface modules (MMI), or operator terminals, including keyboards, printers, and colorgraphic monitors. MMIs will be located at the operations building and at other areas were control, manual data entry, and access to system information is required.

- Programmer/engineer interface consisting of colorgraphic CRTs with keyboards, printers, removable and fixed disks.

- Interface to the global positioning system (GPS) being developed for the ER sites.

- Software compatibility with the system under development for ER sites and thus becoming an integral part of SWITS.

5.6.2 Communications

Communications between the proposed ERDF system drops will primarily be over a high speed redundant fiber optic data highway network. Communications redundancy will be provided in the form of dual data highways (run in separately routed conduits) and interface electronics such that no single failure (electric or mechanical) can degrade communications between drops in any way.

Drops that are too remote for practical linkage to the fiber optic highway will be communicated with via radio telemetry. A drop or drops on the fiber optic highway will function as the polling unit(s). Redundant radios will be employed depending on the criticality of the data involved. It is assumed that the existing Hanford trunk radio system (frequencies) can be utilized for the proposed ERDF. If this assumption is not correct, then low power radios utilizing "spread spectrum" technology will be considered to avoid the necessity of Federal Communication Commission (FCC) licensing.

5.6.3 Reliability

The entire system will be designed to operate in a standard industrial environment with a high degree of reliability. The hardware must be designed with the latest solid state techniques and packaged to operate in the environment required. Equipment must be designed to provide several levels of redundancy. UPS systems will be utilized for power back up.

The distributed architecture described above inherently minimizes the consequence of failure. The system will be designed so that failure of any drop will not affect any other drop in the system. On-line diagnostics will be provided to pinpoint problem areas and to provide operators and maintenance personnel immediate remedial instructions through messages and displays.

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5.6.4 Functional Requirements

The functions of the proposed ERDF DCS will be distributed among the independent drops such that each drop can be reconfigured, modified, or serviced, including removing it from the highway, without affecting any other drop (except for loss of data from the drop being serviced).

The PCMs must have the capability to scan all types of standard input/output signals, and handle serial interfaces from bar code scanners and other devices, convert data into engineering units and store in memory where it is available for use in any or all system programs and for transmission to all parts of the system. PCMs must also perform alarm management and "sequence-of-events" time tagging, basic regulatory and advanced control, and sequential control using both Boolean or Boolean like expressions. The PCMs will have redundant central processing units (CPU) with automatic fail over capability.

The MMIs will be the primary interface between the operators and the process. Graphic displays will provide the basic information interface to the operator. Full graphic display capability will include presentation of custom process and instrumentation diagrams with dynamic information portrayed by a combination of data, colors and graphic symbol changes. Bar charts, trends, and control interfaces may appear on the same screen in any combination. A hierarchy of pass word protection and system configuration will allow only certain operators to perform specific control functions while others will have access to information only.

The MMI/operator terminal computers will have software identical to or totally compatible with software selected or developed for the ER sites. In addition to sharing information between the proposed ERDF and SWITS, the MMIs will provide customized report generation capability for ERDF operational needs.

5.6.4.1 Waste/Container Tracking: A PCM and MMI at the container off-loading area will collect all data associated with the incoming container. Automatic bar code readers, or similar device, will scan the container and will record arrival time. Other related information such as container weight will be automatically entered (unless weighed at the ER sites and the value is already in the database). Operators will also be able to manually enter data, such as results of visual inspections or special monitoring information, at the local MMI. The PCM will transmit this data to the facility host computers where it will be compared to database information received from the SWITS. The information, once verified, will update the SWITS database.

The ERDF/SWITS system will receive information from each trailer tipper, via radio communication, to record the waste deposit location. The "deposit location" will be automatically entered into the database using a GPS beacon mounted on each trailer tipper. (The ER project may be providing a GPS beacon on each container in which case, the GPS beacon on each trailer tipper would be deleted.)

In a similar manner, the PCM will collect all data associated with the empty containers including automatic and manual inspections and radiological surveys.

The PCMs will also provide sequential logic functions required for safety interlocking of equipment and procedures, monitoring equipment status, power and fuel usage and run times.

5.6.4.2 Decontamination. A PCM and MMI will be located at the decontamination facility to monitor and control all activities in this area. Logic and control functions for the container conveying and washing systems, including the wastewater treatment facility, can either be performed in the PCM or by the equipment vendor packaged control system. Vendor supplied packages must interface with the PCM and MMI so that all vital information can be passed to the

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proposed ERDF host and to SWITS. If possible, equipment vendors will be required to furnish control systems of the same make and manufacturer as used on the main ERDF system. On/off control and monitoring of the decontamination facilities will be accomplished from the local MMI.

5.6.4.3 Environmental Monitoring. Environmental monitoring stations will be installed at various location around the facility (some possibly off-site). These stations will monitor some or all of the following parameters:

- Weather - wind direction and velocity, temperature (off the proposed ERDF site)
- Radiological air monitoring
- Groundwater well monitoring (not part of this CDR)
- Trench leachate monitoring
- Continuous air monitoring system (CAMS).

Where practical and cost affective, the monitoring stations will employ automatic sample collection and analysis. Where manual laboratory analysis is required, data will be entered at a MMI terminal. The automatic monitoring stations will either have direct hard wire connections to the proposed ERDF network or have radio telemetry links from a PCM on the network.

Weather forecasting information may be available from SWITS or a phone modem link can be provided to obtain weather information.

5.6.4.4 Miscellaneous Systems. Other specialty systems such as HVAC, fire alarm, and security systems can be included within the proposed ERDF distributed control system. If it is elected to keep these specialty systems as stand alone systems, specific critical data can be shared with the DCS system via serial interface devices.

The system described will provide a highly reliable and flexible system allowing any degree of automation desired for any particular process or function. The system can be implemented in modules and will not require the entire system to be operational before it can be functional. From a database standpoint, it will be integrated with SWITS but from a facility operational standpoint it will be functionally separated.

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6.0 METHODS OF PERFORMANCE

The methods of performance comply with the work breakdown structure (WBS) in Appendix D. The WBS indicates the major phases of work to be accomplished, i.e., engineering, procurement, construction, and other project activities.

6.1 OFF-SITE ARCHITECT-ENGINEER WORK (WBS CF 121, CF 122, CF 123, and CF 124)

USACE Quality Assurance (QA) will provide independent QA oversight. In addition, USACE Construction Division will provide the field inspection services (QA) during construction (WBS CF 121). The off-site architect-engineer (Montgomery Watson/Golder) will provide office engineering services during construction and start-up services (WBS CF 121).

The off-site architect-engineer has provided a number of engineering studies (WBS CF 122) and the Conceptual Design Report (WBS CF 123). The off-site architect-engineer will provide the definitive design (WBS CF 124). Definitive design will include procurement specifications for items to be procured by the operating contractor. An outline of anticipated specifications is included in Appendix E.

6.2 ON-SITE ARCHITECT-ENGINEER WORK

No on-site architect-engineer work is planned.

6.3 PROCUREMENT LISTING

No procurement by the operating contractor (WHC) is planned under this project.

6.4 CONSTRUCTION WORK BY OFF-SITE CONTRACTOR (WBS CF 125)

Three separate off-site contractor bid packages will be prepared. The first bid package will be for the following tasks:

- Site preparation
- Rough grading work for roads, buildings, storm drainage
- Installation of fencing
- Installation of water pipelines
- Trench excavation.

The second bid package will include the following tasks:

- Installation of approximately 8 miles of new railroad from the Suzie Switch to the proposed ERDF
- Utility relocations
- Road and fence relocations
- Road crossing construction
- Railheads
- Railroad yard locomotive will also be provided.

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The third bid package will include the following tasks:

- Construction of underground utilities such as storm drain piping and buried electrical and communication services.
- Construction of landscaping.
- Final grading and paving of all roads including connection to the 16th Avenue extension and to the SR240/200 West Area access road, access to the operations building, access to the decontamination facility, waste trench roads, and employee parking areas.
- Construction of perimeter lighting.
- Construction of the operations building, decontamination facility, and wastewater treatment building. This will include septic tanks and drain fields and piping to connect to the future sewer system.
- Installation of government provided HLAN equipment.
- Construction of the initial trench liner, leachate collection, and storage/treatment system, and leak detection system.

- Procurement and delivery of the following equipment items:

  - One portable grout batch plant
  - Four 45,400 kg (100,000 lb) lifting capacity wheeled container handlers
  - Six 4,540 kg (10,000 lb) lifting capacity wheeled container handlers
  - Eight dozers for moving of waste material
  - One remote control operator vehicle
  - One dozer for clean cover material
  - One vibratory compactor for waste material
  - One vibratory compactor for clean cover material
  - Two mobile decontamination vehicles
  - Eighteen truck tractors for dedicated on-site transfer of waste containers
  - Eighteen flatbed trailers for dedicated on-site transfer of waste containers
  - Four trucks for clean cover material
  - Two mobile grout mixers/transport trucks
  - One motor grader for maintaining gravel roads
  - One gravel road maintenance water truck
  - One end of shift cover binder spray truck
  - One front end loader
  - One front end loader for clean cover material
  - Four hydraulic trailer tippers
  - Portable lighting
  - One 45,400 kg (100,000 lb) capacity container off-loading crane
  - One tire maintenance truck
  - Two preventative maintenance/fuel truck
  - One electronics/instrument service vehicle
  - Two vacuum trucks (one dedicated for clean material, one dedicated for contaminated material)
  - One street sweeper
  - Five dedicated administration vehicles
  - One personnel shuttle vehicle
  - One working face supervisor vehicle
  - One grout crew supervisor vehicle
  - One bulk cement transport truck
  - One grout aggregate transport truck

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6.5 WORK BY FACILITY OPERATOR (WBS CF 111, CF 112, CF 113, and CF 114)

No construction work by the facility operator is planned under this project. The facility operator is providing project management, project oversight, and various parallel studies and installation of groundwater monitoring systems.

6.6 WORK BY ON-SITE CONTRACTOR (WBS CF 125)

The on-site contractor will be utilized for various tasks:

- Providing and installing telephone equipment
- Provide HLAN electronic equipment.

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7.0 REQUIREMENTS AND ASSESSMENTS

The predesign and preconstruction permitting and assessment will be performed by WHC for DOE. Information provided by WHC will be incorporated into the CDR by Montgomery Watson.

7.1 SAFEGUARDS AND SECURITY

All buildings will be operated under standard Hanford site security requirements per applicable DOE orders. All exterior doors of buildings in the facility will be provided with approved security locks. The exterior of the facility will be illuminated; exterior lighting will be automatically controlled by photoelectric sensors.

7.1.1 Impacts from the Project

The project will require a fenced and secured area for operation. This will add to the overall security requirements at Hanford by adding approximately 4 security personnel during normal operations and 2 during non-operational hours.

7.1.2 Special Provisions During Construction

Normal access to the proposed ERDF site will be allowed during construction because there will be no classified or sensitive information stored at the site until operations begin.

7.1.3 DOE Orders and Contractor Requirements

Design of the facility will comply with DOE Order 5632.6 and DOE Order 6430.1A.

7.2 HEALTH AND SAFETY

Health and safety plans will be prepared prior to both construction and operation of the proposed ERDF facility. The construction health and safety plan will be prepared by the selected contractor and approved by WHC. The operations health and safety plan will be prepared by WHC and approved by DOE. Health and safety plans will include, but are not limited to, information discussed in this section.

7.2.1 Construction Risks

During the construction period, contractors will be required to take all reasonable precautions in the performance of their work to protect the health and safety of their employees, subcontractors, operating contractors, and DOE personnel. Compliance with all applicable national requirements, state requirements, DOE orders, and WHC health, safety, and fire protection regulations will be required. The construction area will remain accessible for emergency vehicles and will accommodate emergency personnel evacuation at all times.

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7.2.2 Operations

The proposed ERDF will be designed to meet fire rating, exit, and structural safety requirements of the UBC, NFPA, and DOE Order 6430.1A. Existing WHC administrative and operational health and safety policies and procedures for industrial safety will be implemented.

Four prime areas of safety concern will exist during the operation of this facility:

- Prevention of contamination of, or injury to, operating personnel
- Uncontrolled release of radioactivity to the environment
- Uncontrolled release of regulated constituents
- Damage to the facility or equipment within the facility.

Preventative actions for personnel safety will include HVAC interlocks to assure proper functioning of exhaust systems, administrative controls to limit levels of contamination in the facility, and compliance with codes and standards previously mentioned. Trench equipment will be provided with HEPA filters for protection of operators. The dozer tractors that will operate in the trench will also be equipped with remote capabilities, although normal operation will be manual.

Measures to prevent uncontrolled release of radioactive/hazardous contaminants to the environment during and after trench operations will include:

- RCRA compliant trench liner system with leachate collection and leak detection systems
- Decontamination facility wastewater/leachate treatment system
- The design accounts for a RCRA Compliant Barrier to be provided under a future project
- Dust suppressants sprayed onto the trench face at the end of every shift
- Daily operational cover will be placed each day on completed areas of each lift
- As necessary, water or dust suppressants will be added to the waste as it is dumped
- Annually an impermeable cover will be installed over the placed waste.

Measures to prevent uncontrolled release of radioactive/hazardous contaminants to the environment from the operations building will include:

- HVAC interlocks to assure proper functioning of exhaust systems and maintenance of proper air balance
- Use of multiple HEPA filter stages on dedicated room HVAC systems only
- Monitoring of differential pressures and air exhausted to the environment
- Administrative controls, such as development of an operating procedure to implement periodic dioctyl phthalate (DOP) tests to prevent utilization of faulty filters.

Measures to prevent uncontrolled release of radioactive/hazardous contaminants to the environment from the decontamination facility will include:

- HVAC interlocks to assure proper functioning of exhaust systems and maintenance of proper air balance
- Use of multiple HEPA filter stages
- Monitoring of differential pressures and air exhausted to the environment
- Administrative controls, such as development of an operating procedure to implement periodic DOP tests to prevent utilization of faulty filters
- Leachate/wastewater collection system and treatment

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- Liner under buildings to collect leakage
- Control of dust with non-hazardous surfactants (minimize use of water).

Damage to the facility and equipment within the facility will be prevented by incorporation of administrative controls to provide preventive maintenance and by strict adherence to previously mentioned codes and standards. Prevention of damage to the trench liner will require the development of operating procedures to ensure that operations are performed properly to provide protection of the liner system. The liner system will be compared with similar liners that have already been tested through an EPA 9090 program to evaluate the proposed ERDF liner/leachate compatibility prior to installation.

7.2.3 Accommodations for the Physically Handicapped

All facilities will be accessible to the physically handicapped. Accessibility includes the ability to move into, out of, and throughout a facility; the ability to manipulate objects and equipment within a space; and ease of participation in activities throughout the space, including social activities.

The following codes will be complied with for facility design as related to accessibility and enhancements:

- Parking - Architectural and Transportation Barriers Compliance Board (ATBCB), CFR 36 §1190, and Uniform Federal Accessibility Standard (UFAS) Section 4.6
- Curbing - CFR 36 §1190.70 and UFAS Section 4.7
- Entrances - CFR 36 §1190.120 and UFAS Section 4.14
- Elevators and Platform Lifts - CFR 36 §1190.100, UFAS Section 4.10, and *Providing Accessibilty and Useability for Physically Handicapped People*, ANSI A117.1
- Platforms at Entrances/Exits - CFR 36 §1190.110 and UFAS Section 4.11
- Ramps - CFR 36 §1190.120 and UFAS Section 4.14
- Water Fountains and Coolers - CFR 36 §1190.160 and UFAS Section 4.15
- Public Telephones - CFR 36 §1190.210 and Section UFAS 4.31
- Bathrooms - CFR 36 §1190.150 and Section UFAS 4.23
- Door Hardware - ANSI A117.1.

7.3 DECONTAMINATION AND DECOMMISSIONING

All facilities associated with this project will be designed to ease D&D activities and requirements. Precautions will be taken to minimize contamination of the facilities. The proposed ERDF trench will be utilized for placement of any items that will become contaminated as part of the remedial activities and that cannot be easily or economically decontaminated. The basis for placing these items in the trench is that they will be remediation wastes because they will be generated in the management of remediation waste, and therefore, qualify for placement in a CAMU.

7.3.1 Decontamination During Operation

During operation, some equipment may become contaminated. By always operating the tractor/trailers and trailer tippers on clean cover, the potential of contamination is small. The dozer tractors and compactors in the trench will be the only equipment that will normally contaminated. All other vehicles will not be near the waste and therefore, will not normally be

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contaminated. A portable high-pressure washer will be provided to decontaminate vehicles. The decontamination will be done based on surveys or as needed to maintain the equipment. The equipment in the trench will be removed from the waste material and washed before maintenance is performed. If more extensive maintenance is needed than can be provided in the field, the equipment will be washed, transferred to 200 West Area T-Plant (Building 2706) for complete decontamination and then repaired at an off-site facility.

7.3.2 Decontamination and Decommissioning at End of Facility Life

Once remediation efforts are complete at Hanford, the surface of the proposed ERDF facility will be D&D. The support facilities will either be relocated to other locations or demolished and buried as LLW. The trench will be covered with a closure cover to eliminate infiltration into the trench and provide a clean surface. Fences and/or other protection devices will be utilized to minimize the chance of an inadvertent entry into the waste trench. D&D activities are not a part of this project.

7.4 FALLOUT SHELTERS

There is no provision for a fallout shelter within the scope of this project.

7.5 MAINTENANCE AND OPERATION REQUIREMENTS

The transportation network and operations are presented to explain the concept of waste burial in the proposed ERDF trench. The operations plan and transportation network will be modified as environmental and safety issues are resolved.

7.5.1 On-Site Transportation Network

The transportation network will include:

- Railhead operations
- Waste transfer to the proposed ERDF trucks
- Transport of waste within the proposed ERDF
- Waste placement
- Decontamination operations
- Waste grouting
- Waste cover.

All traffic involved in waste transport from off-site will be accomplished without cross traffic or by use of common travel routes, with the proposed ERDF on-site traffic. On-site transportation equipment will be dedicated to proposed ERDF operations and will not leave the site during normal operation. All vehicles which will operate in the trench and which exit the trench during their operational cycle, will travel over the daily operational cover, on the trench access ramp, or on uncontaminated areas of the trench floor. The transportation elements for these activities are described below.

7.5.1.1 Railhead Operations. Railhead facilities will accommodate delivery of waste materials to the proposed ERDF from the ER sites, and the return of empty containers after external decontamination. Inbound operations will include waste delivery by tractor/trailer or rail, waste container transfer to tractor/trailers for internal ERDF transport, manifest checking, and

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tractor/trailers dispatching to the burial trenches. The railhead will also provide for rail access for clean soil back haul to the ER sites.

7.5.1.2 Waste Container Transfer to ERDF Tractor/Trailers. Containers will be transferred from off-site railcars and tractor/trailers to dedicated ERDF tractor/trailers by wheeled container handlers. Operations at the railhead will be under the supervision of a dispatcher who will have access to both the remediation site and the proposed ERDF automation systems. The dispatcher will direct the tractor/trailer to the appropriate unloading location in the trench.

7.5.1.3 Transport of Waste Within the ERDF. The tractor/trailers will travel along dedicated paved ERDF haul roads between the railhead and the trench and on gravel roads within the trench. Tractor/trailer travel within the trench area will be over compacted the daily operational cover. The tractor/trailers will then deliver the containers to the decontamination facility where the containers will be off-loaded by wheeled container handlers before the tractor returns to the loaded container transfer area.

At the decontamination facility, containers will be transported through the washing system on conveyors to a position for transfer back to railcar. Decontaminated containers will be transferred to railcars or the off-site tractor/trailers using wheeled container handlers.

7.5.1.4 Waste Placement Operations. Waste placement operations will include container unloading, spreading of waste, compaction of the waste, grouting, and placement of the daily operational cover materials.

Waste requiring no grouting or special handling will arrive at the trailer tippers located at the top of the face of the trench working area. The tipper will elevate the trailer and the waste material will be discharged. The trailer tipper will include an appurtenance that sprays dust suppressant materials on the discharging material.

A spreading dozer will push waste material away from the dumping location to facilitate emptying of all waste from the container. The spreading dozer will push waste material into the waste fill area.

Waste materials which will require grouting to fill void spaces in the waste will be delivered to the floor of the trench by tractor/trailer and dumped using the trailer's ram tilt mechanism. The waste will be grouted before the fill advances over the waste.

Single-use containers will be placed on the floor of working area by a crane.

7.5.1.5 Decontamination Operations. The empty containers will be off-loaded from the tractor/trailer at the decontamination facility by wheeled container handlers before the tractor/trailer returns to the loaded container transfer area. The containers will be transported through the washing system on conveyors to a position for transfer back to the railcar. Decontaminated containers will be transferred to either railcars or off-site tractor/trailers using wheeled container handlers.

7.5.1.6 Waste Stabilization. Aggregate materials will be loaded into conventional dump trucks by a front end loader operating at the material stock piles. The truck will travel to the batch plant and deposit the aggregates in a stock pile. The aggregates will be loaded into the batch plant, mixed, and transferred to a mixer/transport truck. The grout mixer/transport truck will deliver the grout to the designated grouting area, unload the grout using the mixer drum and unloading chute, and return to the batch plant.

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7.5.1.7 Daily Operational Cover. Materials will be taken from stock piles, loaded into end-dump type trucks by a conventional front end loader, transported into the trench, and dumped near the working face at the edge of the existing daily operational cover. The daily operational cover will only be placed at the 10.6 m (35 ft) and 21 m (70 ft) horizontal levels. Cover material will be spread and compacted by a dozer unit towing a vibratory roller compactor.

7.5.1.8 End of Shift Waste Cover. At the end of each shift, the exposed working face areas will be covered by a dust suppressant material. Dust suppressant material will be loaded into a cover material spray truck at the bulk chemical storage facility, transported to the trench, and sprayed on the surface of the waste material.

7.5.1.9 Interim Cover The interim cover placement under this plan will be limited to 0.6 m (2 ft) of clean soil (sandy native) and a low-permeability cover.

7.5.2 Operations Plan

The operations plan includes a description of the main operation activities, the equipment, and the personnel which will be required to successfully operate the facility during peak operating conditions. A summary of the operations plan is provided below.

7.5.2.1 Introduction. The proposed ERDF will be designed to ultimately accept approximately 21.8 million m^3 (28.5 million yd^3) of waste. During the first 5 years of operation, it is estimated that approximately 4,595,000 m^3 (6,009,500 yd^3) of waste will be deposited there. Operations are expected to commence in September, 1996 with approximately 499,300 m^3 (653,000 yd^3) of waste being accepted by the end of 1997. During the years from 1998 to 2001, the quantity of waste is expected to vary from 929,200 m^3 (1,215,300 yd^3) to 1,080,200 m^3 (1,412,800 yd^3).

7.5.2.1.1 Processing of Waste. Waste is expected to arrive at the proposed ERDF in both single-use and reusable containers. These containers will arrive at the railhead on either railcars or remediation site tractor/trailers. Once at the proposed ERDF, the containers will be loaded on tractor/trailers which are dedicated to the proposed ERDF operations. The waste will then be transported to the waste trench where the reusable containers will be emptied using trailer tippers. If excessive voids are present in the waste, the waste will be grouted to fill the voids after being placed in the trench. Once empty, the reusable waste containers will be delivered to the decontamination facility for decontamination, placed back on the railcar or remediation site tractor/trailer, and returned to the remediation site. The single-use containers will be placed directly in the trench and buried with the waste.

7.5.2.1.2 Production Rates. To meet the production rates anticipated for the years 1997 to 2011, the proposed ERDF will have a design capacity of 215 containers per shift. Of the 215 containers, 150 containers are expected to arrive by railcar and 65 containers are expected to arrive by truck.

7.5.2.2 Operations. The following plan is descriptive of a single shift processing 215 containers.

7.5.2.2.1 Railhead Operations. Trains are proposed to arrive at an average interval of 78 minutes. The cycle time for a train to go from the Suzie Switch to the container off-loading and loading sidings and back to the Suzie Switch is estimated at 55 minutes. Train operation time per shift is estimated at 6.5 hours per shift.

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A yard locomotive will be provided on a full-time basis to move railcars between container off-loading and loading sidings. This movement will occur 3 times during the unloading of each train. Each movement will advance the train approximately 6 railcar lengths. The first move will place 3 railcars at the container loading area. The second and third movements will each place 6 cars at the container loading area. During the third movement, the next train pulled by an off-site locomotive will arrive from the Suzie Switch. Following the third movement, the yard locomotive and the off-site locomotive will exchange places and the off-site locomotive will then depart for the Suzie Switch.

The cycle time for the off-site tractor/trailers at the proposed ERDF is estimated to range from 21 to 26 minutes. Equipment and personnel delivering waste to the proposed ERDF will be provided by the remediation site operations.

Proposed ERDF equipment requirements for this operation will be:

- One railroad yard engine
- Two radios (voice) for train crew.

Proposed ERDF personnel required for this operation will include:

- One railroad locomotive engineer
- One switch person.

7.5.2.2.2 Waste Container Transfer to ERDF Tractor/Trailers. To transfer containers, each wheeled container handler will remove a container from the railcar or remediation site tractor/trailer, back up to allow the proposed ERDF tractor/trailer to move under the container, and then place the container on the dedicated tractor/trailer. The unloading cycle per waste container is estimated to be 2.4 minutes. This cycle time will allow 3 container loaders to transfer 215 containers in 5.25 hours.

Proposed ERDF equipment requirements for this operation will be:

- Three 45,000 kg (100,000 lb [50 ton]) capacity container handlers for production
- One 45,000 kg (100,000 lb [50 ton]) capacity container handler for standby.

Proposed Personnel required for this operation will include:

- Three container handler operators.

7.5.2.2.3 Manifest Checking/Dispatching. Operations at the railhead will be supervised by a dispatcher. The dispatcher will utilize information from the automation system to direct waste container processing. To process 215 containers per shift, a container must be dispatched every 1.5 minutes.

Proposed ERDF equipment requirements for this operation will be:

- On-line access to HLAN to determine container inventory.

Personnel required for this operation will include:

- One dispatcher.

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7.5.2.2.4 Transport of Waste Within the ERDF. The proposed ERDF tractor/trailers will transport waste containers from the railhead to the waste trench along dedicated haul roads. Main haul roads are paved while the road within the trench area will be a compacted daily operational cover. After emptying the containers, the tractor/trailers will proceed to the decontamination facility where the containers will be off-loaded by wheeled container handlers. Once the containers are off-loaded, the tractor/trailers will return to the loaded container transfer area.

Cycle time for the proposed ERDF tractor/trailers is estimated to be between 19 and 22.5 minutes. Haul time will be dependent upon the point of waste delivery and the method of unloading. A design cycle time, including container transfers and off-loading, is assumed to be 22.5 minutes.

Proposed ERDF equipment requirements for this operation will be:

- Sixteen container transport tractor/trailers with self tipping trailers
- Two maintenance and breakdown replacement container transport tractor/trailers with self tipping trailers.

Personnel required for this operation will include:

- Sixteen container transport tractor/trailer drivers.

7.5.2.2.5 Container Unloading. The method for discharging waste into the waste trench is dependent upon whether or not the waste can be discharged in the as received condition. Waste which does not require special handling will be unloaded from the waste containers at the top of the trench working face. The tractor/trailers will back onto a trailer tipper and disconnect from the trailer. The tipper will elevate the trailer and the waste material will be discharged into the trench. Dust will be controlled by applying dust suppressants during discharge.

Tractor/trailers transporting waste that must be grouted to fill void spaces will be driven to the trench floor. Waste material will be deposited parallel to the toe of the fill by activating the self tipping trailer.

Approximately 2 percent of the waste containers are expected to be single-use containers. Tractor/trailers transporting such containers will deliver the containers to the floor of the trench where the containers will be off-loaded by a crane.

Proposed ERDF equipment requirements for this operation will be:

- Four 45,400 kg (100,000 lb [50 ton]) capacity trailer tippers (includes 1 standby)
- One 45,400 kg (100,000 lb [50 ton]) capacity crane
- One tipping face supervisor vehicle (light-duty truck).

Personnel required for this operation will include:

- One tipping face supervisor
- Three trailer tipper operators
- One crane operator
- One crane rigger.

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7.5.2.2.6 Spreading of Waste and Compaction. Once the waste is deposited in the trench, the material will be spread and compacted. Waste material unloaded at the toe of the fill will be spread as it is being unloaded. Waste unloaded from the top of the trench's working face will be spread by dozer tractors.

Compaction of waste material will be accomplished by operating vibratory compaction equipment over the deposited waste. A dozer with a blade towing a vibratory compactor will perform final surface grading activities prior to placement of the daily operational cover materials. Each dozer tractor will spread up to 380 m^3 (500 yd^3) with an average push of 23 m (75 ft) on a 3:1 H:V downward slope. Compaction equipment will compact up to 840 m^3 (1,100 yd^3) of material per hour to a depth of 0.3 m (1 ft).

Dust will be controlled during unloading and spreading operations through the use of mist and/or dust suppressants. Tractors will be equipped with spray equipment which will be used for dust suppressant application. A binder will also be applied to the waste at the end of each shift. Wind conditions at the proposed ERDF may also be a factor in dust control. Effects of wind will be monitored and waste operations will be stopped if other dust control methods are unable to maintain dust at an acceptable level. Wastes that will be handled through bulk operations will have minimal effects on worker safety as discussed in the *Source Inventory Development Engineering Study for the Environmental Restoration Disposal Facility* (Draft 1993).

Proposed ERDF equipment requirements for this operation will be:

- Seven dozer tractors
- One dozer tractor for emergency standby replacement
- One 18,000 kg (40,000 lb [20 ton]) vibratory compactor.

Personnel required for this operation will include:

- Seven dozer tractor operators.

7.5.2.2.7 Waste Stabilization. It is estimated that an average of 12 percent (26 containers per shift) of the waste material per working shift will require waste stabilization after being mass placed due to the void spaces in the waste material. If not stabilized, excess settling could occur. These voids will be filled with grout. To provide sufficient grout for filling these voids, the batch plant will need to produce 30 m^3 (40 yd^3) to 107 m^3 (140 yd^3) of grout per shift. These estimates do not include the grout fill of single-use containers because these containers will be grout filled at the ER sites.

Grout aggregates will be stored in a clean area and transported to the batch plant by a conventional dump truck. The loader used for loading grout aggregate into the dump truck will be the same loader used for loading the daily operational cover. A dedicated loader will be stationed at the batch plant to feed the aggregate into the batch plant. Cement will be stored in a bulk transport truck.

Proposed ERDF equipment requirements for this operation will be:

- One 23 to 107 m^3 (30 to 140 yd^3) per day capacity portable batch plant
- Two 7 m^3 (9 yd^3) capacity grout mixers
- One 2.3 m^3 (3 yd^3) front end loader (batch plant feed)
- One bulk cement transport truck

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- One grout aggregate transport truck
- One grout crew supervisor vehicle.

Personnel required for this operation will include:

- One batch plant operator
- Two grout mixer drivers
- One front end loader operator
- One grouting supervisor
- One bulk cement transport truck operator
- One grouting aggregate transport truck operator.

7.5.2.2.8 Transport and Placement of Daily Operational Cover. A daily operational cover will be placed at the 10.6 m (35 ft) and 21 m (70 ft) horizontal levels of waste deposits. The nominal depth of the daily operational cover will be 0.7 m (2 ft). Materials for this application will be stockpiled in a clean area and will be transported to the trench by conventional dump trucks. The dump trucks will dump the daily operational cover into the trench near the edge of the existing cover at a point near the current working face. A dozer tractor towing a vibratory compactor will spread and compact the daily operational cover.

Daily operational cover requirements are estimated at 460 m^3 (600 yd^3) of loose granular soil per shift. Placement of this cover will require 1 front end loader and 3 cover material transport trucks.

Proposed ERDF equipment requirements for this operation will be:

- One 2.7 m^3 (3.5 yd^3) front end loader
- Four 3 axle, 11.5 m^3 (15 yd^3) dump trucks (includes 1 standby)
- One dozer, 640 m^3 (840 yd^3) capacity
- One 18,000 kg (40,000 lb [20 ton]) vibratory compactor, towed.

Personnel required for this operation will include:

- One front end loader operator
- Three truck drivers
- One dozer/vibratory roller operator.

7.5.2.2.9 Maintenance of Daily Operational Cover and Dust Control. Maintenance operations will be conducted on the gravel roads surrounding the trench, ramp roads into the trench, traveled surfaces of the trench floor, and traveled surfaces of the daily operational cover. Gravel roads and traveled areas of the daily operational cover will be maintained by surface grading. When necessary, additional cover material will be placed on deteriorated areas and compacted. Dust control will be accomplished by spraying the gravel with dust suppressant chemicals.

Proposed ERDF equipment requirements for this operation will be:

- One motor grader
- One water truck.

Personnel required for this operation will include:

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- One motor grader operator
- One water truck operator.

7.5.2.2.10 End of Shift Cover. At the end of each shift, the exposed working face areas (sloping face) will be covered by dust suppressants. This material will be applied by using high pressure spray equipment operating on clean daily operational cover or clean areas of the trench floor. Production requirement are estimated at 2,300 m^2 (24,766 ft^2) of cover application per shift.

Proposed ERDF equipment requirements for this operation will be:

- One cover material spray truck.

Personnel required for this operation will include:

- One cover material spray truck operator.

7.5.2.2.11 Interim Cover. The interim cover placement under this plan is limited to a low permeability cover of an anticipated 10 cm (4 in.) of asphaltic concrete pavement. This low permeability cover will be installed by contracted services annually.

7.5.2.2.12 Final Trench Cover. The final trench cover will be a RCRA compliant cover. Details of this cover are outside of the scope of work for this project and are not included as a part of this project.

7.5.2.2.13 Decontamination Operations. The decontamination facility will include wash bays, drying and surveying equipment, and wastewater treatment equipment. When empty containers arrive at the decontamination facility, they will be off-loaded and placed on a conveyor system. The conveyor will continuously advance the containers through the decontamination wash bay. Doors will automatically open and close to allow the containers to pass through the various rooms. Approximately 15 containers per hour will be processed through each bay. The estimated time required for decontaminating each container is 10 minutes. It will take another 15 minutes to travel to the end of the loading conveyor.

After washing, the containers will be surveyed for radioactive contamination. If clean, the containers will be transported on conveyors to a storage area where they will be loaded onto railcars by container handlers.

An exterior wash pad will be provided for decontamination vehicles leaving the proposed ERDF. A portable wash unit will be used to decontaminate trucks and other equipment within the proposed ERDF.

Proposed ERDF equipment requirements for this operation will be:

- Five 4,540 kg (10,000 lb [5 ton]) capacity wheeled container handlers.
- One 4,540 kg (10,000 lb [5 ton]) capacity wheeled container handler (standby)
- Two mobile decontamination units
- Four wash bays.

Personnel required for this operation will include:

- Five container handler operators
- Two wash process operators

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- Four radiological survey technicians
- One mobile decontamination technician.

7.5.2.2.14 Material Haul Back. The intent of this operation will be to provide clean soil for use in replacing materials removed from the remediation sites. Surplus material excavated from the trench will be used for this operation. A rail siding will be installed for this operation but no other equipment will be provided under the scope of this operating plan.

7.5.2.2.15 Industrial Safety and Health. The industrial safety and health considerations are a main priority for the proposed ERDF. Engineering controls will be the first line of protection for employees. Personnel protective equipment will be used when necessary to enhance the effectiveness of engineering controls. Training will be provided for all personnel and will cover safety activities applicable to employee work assignments.

7.5.2.2.16 Maintenance. Maintenance operations at the proposed ERDF will include:

- Vehicle and equipment refueling
- Fluids and filter replacement for vehicles and equipment
- Tire service
- Field replacement of electronic/instrument equipment
- Bench repairs of electronic equipment
- Street maintenance and clean water control.

Proposed ERDF equipment requirements for this operation will be:

- Two equipment service/fuel truck
- One tire service truck
- One electronics/instrument service truck
- Two vacuum trucks
- One street sweeper.

Personnel required for this operation will include:

- Three preventative maintenance mechanics
- Two tire maintenance mechanics
- Three electronics/instrumentation technicians
- Two vacuum truck operators
- One street sweeper operator.

7.5.2.2.17 Administration. Administration operations at the proposed ERDF will include engineering activities, recordkeeping, and coordination of operations with other related Hanford site operations.

Proposed ERDF equipment requirements for this operation will be as follows:

- One facility manager vehicle
- One shift manager vehicle
- Two facility engineer vehicles
- One support staff vehicle
- One crew transport vehicle.

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Personnel required for this operation will be as follows:

- One facility manager
- One shift manager
- Two facility engineers
- One secretary
- One procurement clerk
- One personnel clerk
- One record clerk
- One custodian.

7.5.2.2.18 Equipment Requirement Summary. The equipment requirements specified in this section are those that will be necessary to sustain operations for 1 shift. The requirements are based on the assumption that operations will be conducted at the rate of 215 container per 8 hour work shift with a production time per shift of 5.25 hours (6.5 hours for railroad crews). Health physics and security equipment are not considered in the development of equipment requirements.

7.5.2.2.19 Personnel Requirement Summary. The personnel requirements specified in this section are those that will be necessary to sustain operations for 1 shift. The requirements are based on the assumption that operations are conducted at the rate of 215 container per 8-hour work shift with a production time per shift of 5.25 hours (6.5 hours for railroad crews and decontamination facility crews). Health physics and security equipment are not considered in the development of equipment requirements.

7.6 QUALITY ASSURANCE/SAFETY CLASSIFICATION

The quality assurance plan and safety analysis will be completed by WHC and information resulting from these will be incorporated into the design by Montgomery Watson.

7.6.1 Quality Assurance Activities

Quality assurance activities and safety classification for project W-296 will be in accordance with DOE Order 5700.6C and EPA/530-SW-86-031.

Project activities involving design, procurement, construction, and acceptance will be governed by the requirements included in the project FDC. The Project Specific Quality Assurance Program Plan will indicate the project critical characteristics, corresponding safety classifications, and programmatic criteria, as applicable. Additional requirements may be added by appropriate controlling documents. The specific quality requirements, and documentation for programmatic, qualifications, verifications/ inspections, and testing will be established during definitive design and included in construction documents. In particular, the quality assurance activities with the trench liner will be in accordance with EPA/530-SW-86-031.

Project W-296 will be designed as a general facility as defined per DOE Order 6430.1A. The design will meet all additional applicable criteria identified in functional design documents.

Design verification will be performed by the off-site architectural engineer as required by the operating contractor. Procured items and services shall be procured through commercially available sources unless specific exceptions are noted during definitive design.

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7.6.2 Safety Classification

Safety classification of systems, components, and structures are used as the basis for Hanford quality assurance requirements as defined in WHC-CM-1-3, MRP 5.46.

Safety classifications are identified in *Enviromental Restoration Disposal Facilities (Project W-296) Preliminary Safety Evaluation* (WHC 1993d) for those items important to safety or environmental protection so that appropriate efforts will be placed on design, procurement, construction, testing, operation, maintenance, and modifications.

Safety classifications are determined through analysis and consequences of failure reported in the project FDC. Class 3 is the highest level applied to any elements of the proposed facility.

Anticipated safety classes for the proposed project systems, components, or structures are provided below:

System/Component	Safety Class	Remarks
Waste Trench	4	No significant risk expected
Decontamination Facility		
Building Structure - including foundation and roof	4	No significant risk expected
Piping all systems except Fire Protection	4	No significant risk expected
Heating, Ventilating, and Air Conditioning	4	No significant risk expected
Electrical	4	No significant risk expected
Fire Protection	3	No significant risk expected
Operations Building		
Building Structure - including foundation and roof	4	No significant risk expected
Piping all systems except Fire Protection	4	No significant risk expected
Heating, Ventilating, and Air Conditioning		
Controlled rooms	4	No significant risk expected
Uncontrolled rooms	4	No significant risk expected
Electrical	4	No significant risk expected
Fire Protection	3	No significant risk expected

7.7 ENVIRONMENTAL COMPLIANCE

Requirements for environmental compliance will be provided by WHC for incorporation into the definitive design.

WHC Environmental is actively pursuing the National Environmental Policy Act (NEPA) documentation. It is scheduled to be in place prior to start of construction in 1995.

7.7.1 Summary of Requirements

This project will be designed to minimize environmental impact in accordance with WHC-CM-7-5, Part Q.

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7.7.2 Applicable DOE Orders and Regulations

Water Distribution and sanitary wastewater systems associated with the new facilities will comply with the following DOE orders, laws, codes, and regulations when appropriate and applicable:

- EPA 625/1-77-009 *Process Design Manual: Wastewater Treatment Facilities for Sewered Small Communities*
- EPA 265/1-80-012 *Design Manual: On-Site Wastewater Treatment and Disposal Systems*
- DOE Order 5820.2A
- DOE Order 6430.1A, Section - 0266 "Water Distribution Systems," Section - 0270 "Sanitary Wastewater Collection and Stormwater Management System," and Section - 0273 "Water Pollution Controls"
- DOE Order 5400.1
- WAC 246-290-490
- WAC 246-272
- WAC 173-303
- WAC 173-304
- American Society of Civil Engineers (ASCE) Manual 37, Design and Construction of Sanitary and Storm Sewers
- Uniform Plumbing Code (UPC)
- NEPA
- Toxic Substance Control Act (TSCA)
- Safe Drinking Water Act (SDWA)
- Clean Water Act (CWA)
- Clean Air Act (CAA)
- CERCLA
- Superfund Amendments and Reauthorization Act (SARA)

7.8 PERMITS

The following permits will be required to construct and operate this facility:

- WAC-246-272-080 - This section does not require a permit, but does require the submission of plans and specifications for review and approval to DSHS. A requirement is included for an engineer's construction report to be prepared by a professional engineer licensed in the State of Washington.

  Review of the plans, specifications, and the report by DSHS requires a maximum of 30 day turn around time. Construction cannot proceed until DSHS review and approval is complete and granted.

- Environmental Permitting - A submittal is being prepared by WHC for permitting the proposed ERDF. WHC is currently developing the permit application to meet Ecology and EPA regulatory requirements. Any additional permitting requirements will be provided by WHC.

7.8.1 Strategy to Acquire Permits

This information will be provided by WHC.

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8.0 COST AND SCHEDULE

The total project cost and schedule that were developed for the proposed ERDF are included in Appendix D and Appendix F, respectively.

8.1 COST

The total project costs are shown in table 3. These costs include WHC, USACE, and MW costs. These costs are summarized based on the WBS contained in Appendix D. The cost breakdown for all the WBS tasks are presented in Appendix D.

8.2 SCHEDULE

The budget authorized/budget outlay schedule is presented in figure 2. The TPA requires the facility be operational in September, 1996. A 3 month readiness review has been included. This will occur simultaneously with some of the construction completion activities. Construction will be accomplished in accordance with the detailed schedule included in Appendix F. Bidding and award has been included based on 3 months of advertising and 3 months to evaluate and award the bids. An 8-month design period for contract 3 is expected.

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Table 3. Total Project Costs. (a)

WBS Element	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	TOTAL
Estimated Construction Costs						
CF 111 Project Management and Administrative Support (b)	$0	$0	$3,832,563	$3,435,305	$2,375,050	$9,642,918
CF 121 Construction Management	$0	$635,111	$5,735,642	$6,741,030	$3,350,687	$16,462,470
CF 125 Construction	$0	$0	$56,561,576	$45,988,009	$19,968,686	$122,518,271
Subtotal Estimated Construction Costs	$0	$635,111	$66,129,781	$56,164,344	$25,694,423	$148,623,659
Other Project Costs						
CF 111 Project Management and Administrative Support (b)	$1,000,043	$1,610,100	$0	$0	$0	$2,610,143
CF 112 Project Definition & Baseline Support (b)	$0	$718,400	$0	$0	$0	$718,400
CF 113 Regulatory Documentation (b)	$1,722,675	$5,701,000	$0	$0	$0	$7,423,675
CF 114 Operational Readiness (b)	$0	$0	$28,313	$4,552,086	$0	$4,580,399
CF 122 Engineering Studies	$701,835	$763,565	$0	$0	$0	$1,465,400
CF 123 Conceptual Design	$30,259	$559,741	$0	$0	$0	$590,000
CF 124 Definitive Design	$0	$3,136,171	$1,388,536	$0	$0	$4,524,707
Subtotal Other Project Costs	$3,454,812	$12,488,977	$1,416,849	$4,552,086	$0	$21,912,724
Total Project Costs	$3,454,812	$13,124,088	$67,546,630	$60,716,430	$25,694,423	$170,536,383

(a) Refer to Appendix D for details

(b) Estimates provided by WHC

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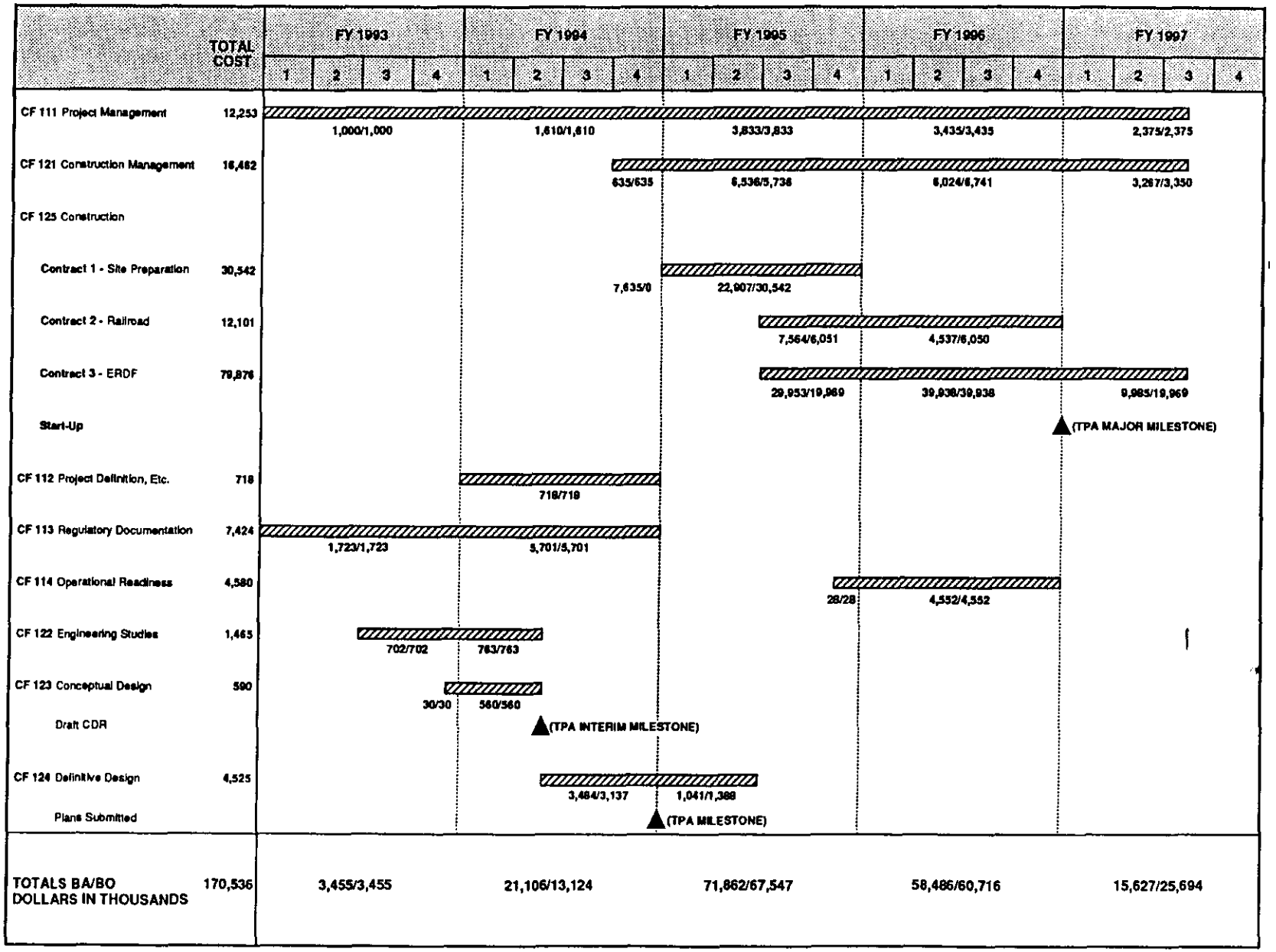
Figure 2. ERDF Budget Authorized/Budget Outlay Schedule



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9.0 IDENTIFICATION AND ANALYSIS OF UNCERTAINTIES

The proposed construction schedule is based upon the completion of all required permitting activities and the necessary permits issued prior to construction or start-up. Any delays in receipt of necessary permits or additional environmental studies that may be required could delay construction and the facility operational date accordingly.

The railhead will be designed to handle 150 containers per shift arriving by rail and 65 containers per shift arriving by tractor/trailer. The rail facilities cannot accommodate more than 150 containers per shift.

The wastewater treatment process will be based on using the reverse osmosis process. During definitive design, a synthesized wastewater will be pilot tested to determine removal efficiency and equipment sizing requirements. Alternative treatment processes such as ion exchange may be simultaneously pilot tested. The flow requirements will be compared to standard equipment sizes available from vendors. It may be cost effective to provide slightly larger equipment with a large surge tank and only operate 1 shift per day than to use smaller equipment and operate 2 shifts per day.

It is anticipated that dedicated containers will be utilized for haulback. This is so that the interior of the dedicated containers used to transport LLW do not have to be decontaminated.

Radiological and chemical contamination may exist within the proposed ERDF border. The railroad alignment crosses known areas of contamination. Existence of contamination will require respiratory protection and special disposition arrangements. The estimate does not include funds for this. The existence of radiological and chemical contamination cannot be confirmed until construction.

From previous DOE experiences, incorporation of metric systems could have a cost and schedule impact on engineering design, procurement, and construction.

Current knowledge of site utilities and their impact on proposed improvements needs to be verified. No utilities are known to exist at the proposed ERDF site. Some utilities are known to exist under the proposed railroad alignment. A site subsurface survey will be required to determine the location of utilities and piping.

A performance assessment to demonstrate trench compliance with the performance objectives of DOE Order 5820.2A will be prepared. The results of the performance assessment will be incorporated into the definitive design and may have a cost and schedule impact on engineering design, procurement, and construction.

The observational approach to characterization of waste may result in uncertainties of waste types. Also, volumes of waste have been estimated based on very limited data. Therefore, the quantity of waste anticipated could vary substantially. Decontamination wastewater characteristics and the amount of wastewater generated could vary as waste types vary and decontamination procedures are refined. Leachate characteristics and amount of leachate generation could vary as waste types vary.

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10.0 REFERENCES

10.1 DEPARTMENT OF ENERGY ORDERS

Number	Title
5400.1 Chg. 1	General Environmental Protection Program
5480.7A	Fire Protection (Errata Sheet)
5480.11 Chg. 3	Radiation Protection for Occupational Workers
5480.28	Natural Phenomena Hazards Mitigation
5632.6 Chg. 1	Physical Protection of DOE Property and Unclassified Facilities
5820.2A	Radioactive Waste Management
5700.6C	Quality Assurance
6430.1A	General Design Criteria

10.2 DOE/RL ORDERS AND DOE/RL IMPLEMENTING PROCEDURES

NUMBER	Title
5480.4C	Environmental Protection, Safety and Health Protection Standard for RL
5480.7A	Fire Protection
5820.2A	Radiation Waste Management

10.3 WASHINGTON ADMINISTRATIVE CODES

Number	Title
172-240	Submission of Plans and Reports for Construction of Wastewater
173-303	Dangerous Waste Regulations, 1992
173-304	Minimum Functional Standards for Solid Waste Handling, 1992
246-272	On-Site Sewage System
246-290	Public Water Supplies
248-54-285	Public Water Supplies, "Cross-Connection Control" (recoded to 246-290-490)

10.4 CODE OF FEDERAL REGULATIONS

Number	Title
CFR 29 §1910	Occupational Safety and Health Administration, Department of Labor
CFR 36 §1190	ADA Accessibility Guidelines for Building and Facilities
CFR 40 §264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
CFR 40 §280	Land Disposal Restrictions
CFR 49 §173	Research and Special Programs, December 31, 1991

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10.5 DOE CODES AND STANDARDS

Number	Title
DOE/EP-0108	Standard for Fire Protection of AEC Electric Computer/Data Processing Systems
HPS-558-AC	Hanford Standard Specifications, Railroad Construction
HPSACM	Hanford Plant Standards Architectural/Civil
HPSSDC	Hanford Plant Standards Design Criteria
HPSMSM	Hanford Plant Standards Mechanical
NEPA GUIDE	NEPA Compliance Guide I and II

10.6 WESTINGHOUSE HANFORD COMPANY DOCUMENTS

Number	Title
WHC-CM-1-3	Management Requirements and Procedures, February 1, 1994
WHC-CM-1-6	WHC Radiological Control Manual, February 1, 1994
WHC-CM-2-14	Hazardous Material Packaging and Shipping, February 1, 1994
WHC-CM-4-41	Fire Protection Program Manual, February 1, 1994
WHC-CM-7-5	Environmental Compliance Manual, February 1, 1994
WHC - Not issued	WHC, 1992a, *Geosynthetic Liner/Leachate Compatibility Testing in the Support of Project W-025, Radioactive Mixed Waste Disposal Facility.*
WHC - Not issued	WHC, 1992b, *Soil Liner/Leachate Compatibility Testing in Support of Project W-025 Radioactive Mixed Waste Disposal Facility.*
WHC-SD-W296-FDC-001 Rev. 1	WHC, 1993a, *Functional Design Criteria, Environmental Restoration Storage and Disposal Facility, Project W-296*, Westinghouse Hanford Co., Richland, Washington, September 24, 1993.
WHC-SD-W296-ES-01	WHC, 1993b, *Trench Operations Sequence Engineering Study*, Westinghouse Hanford Company, Richland, Washington, December 1993.
WHC-SD-W296-HC-001	WHC, 1993c, *Environmental Restoration Storage and Disposal Facility, Project W-296, Hazard Classification, Functional Review Issue*
WHC-SD-W296-PSE-001 Rev. 0	WHC, 1993d, *Environmental Restoration Storage and Disposal Facility (Project W-296) Preliminary Safety Evaluation*, Westinghouse Hanford Company, Richland, Washington, December 1993.

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10.7 OTHER DOCUMENTS

Number	Title
802.3, 10 Base T Standards	Institute of Electrical and Electronics Engineers Standard Guide
ACI-349	Code Requirements for Nuclear Safety Related Concrete Structures
ACI-531	Building Code Requirements for Concrete Masonry Structures
AISC	Specification for the Design, Fabrication, and Erection of Structural Steel Buildings
ANSI A58.1	Minimum Design Loads for Buildings and Other Structures
ANSI A117.1	Providing Accessibility and Useability for Physically Handicapped People
ANSI D6.1E	Manual of Uniform Traffic Control Devices for Streets and Highways
AREA 1993 Manual for Railway Engineering	American Railway Engineering Association Manual for Railway Engineering, Volumes I and II
ASME AG-1 Code	Code on Nuclear Air and Gas Treatment, 1991
ASCE Manual 37	Design and Construction of Sanitary and Storm Sewers
ATBCB	Architectural and Transportation Barriers Compliance Board
AWS Standard D1.1	Structural Welding Code
DSHS Guideline	Guidelines for the Use of Pressure Distribution Systems, September 1984
DSHS Guideline	Design Guidelines for Larger On-Site Sewage Systems with Design Flows of Greater than 3,500 Gallons per Day, 1987
DSHS Guideline	Guidelines for Sandfilters, August 2, 1989
DOE/RL/12074--10 Rev. 0	USACE, 1993a, *Engineering Study for the Decontamination and Wastewater Treatment Facility for the Environmental Restoration Storage and Disposal Facility*, U.S. Army Corps of Engineers, Walla Walla District, Walla Walla Washington (July 23, 1993).
DOE/RL/12074--11 Rev. 0	USACE, 1993b, *Engineering Study for the Volume Reduction System Dewatering and Stabilization System for the Environmental Restoration and Disposal Facility*, U.S. Army Corps of Engineers, Walla Walla District, Walla Walla, Washington (July 29, 1993).
DOE/RL/12074--12 Rev. 0	USACE, 1993c, *On-Site Transportation Network Engineering Study for the Environmental Restoration and Disposal Facility*, U.S. Army Corps of Engineers, Walla Walla District, Walla Walla, Washington (August 13, 1993).
DOE/RL/12074--13 Rev. 0	USACE, 1993d, *Engineering Study for the Trench and Engineered Barrier Configuration for the Environmental Restoration Storage and Disposal Facility*, U.S. Army Corps of Engineers, Walla Walla District, Walla Walla, Washington (August 6, 1993).
DOE/RL/12074--14 Rev. 0	USACE, 1993e, *Design Memorandum Report for Environmental Restoration Storage and Disposal Facility*, U.S. Army Corps of Engineers, Walla Walla District, Walla Walla, Washington (September 1, 1993).

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Number	Title
DOE/RL/12074--15 Rev. 0	USACE, 1993f, *Engineering Study for the Conveyor and Area Fill Systems for the Environmental Restoration Storage and Disposal Facility*, U.S. Army Corps of Engineers, Walla Walla District, Walla Walla, Washington (October 7, 1993).
DOE/EL/12074--29 Rev. 0 Draft	USACE, not released, *Source Inventory Development Engineering Restoration Disposal Facility*, U.S. Army Corps of Engineers, Walla Walla District, Walla Walla, Washington.
DOT M 41-10	Washington State Department of Transportation Manual
EPA/265/1-77-009	*Process Design Manual: Wastewater Treatment Facilities for Several Small Communities*
EPA/530-SW-86-031	*Construction Quality Assurance for Land Disposal Facilities.*
EPA/625/1-80-012	*Design Manual: On-Site Wastewater Treatment and Disposal Systems*
Hanford Future Sites Users Working Group	The Future for Hanford: Uses and Cleanups, December, 1992
NEC	National Electric Code
NFPA 13	Installation of Sprinkler Systems, February, 6, 1989
NFPA 24	Installation of Private Fire Service Mains and their Appurtenances
NFPA 30	Flammable and Combustible Liquids, August 20, 1993
NFPA 72	The National Electrical Code, August 14, 1992
NFPA 72E	Electrical Safety Requirements for Employee Workplace, June 28, 1988
NFPA 90A	Standard for the Installation of Air Conditioning and Ventilation Systems, January 15, 1993
NFPA 101	Life Safety Code, February 8, 1991
NFPA 801	Facilities Handling Radioactive Materials, February 8, 1991
PNL-4219	PNL, 1981, *Flood Analysis of Cold Creek Near the Hanford Site*, Skaggs and Walters.
PNL-4622	PNL, 1983, *Climatological Summary for the Hanford Area*, June, 1983.
State Board of Health Regulation	On-Site Sewage System Regulation, November, 1989
Tri-Party Agreement	"Hanford Federal Facility Agreement and Consent Order," U.S. Department of Energy, Richland Field Office, Washington State Department of Ecology, and U.S. Environmental Protection Agency, 1989.
UBC	Uniform Building Code, 1991
UFC	Uniform Fire Code
UFAS	Uniform Federal Accessibilty Standard
UPC	Uniform Plumbing Code

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Appendix A
Preliminary Waste Acceptance Criteria

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PRELIMINARY WASTE ACCEPTANCE CRITERIA

The waste acceptance criteria are being developed by others. This preliminary waste acceptance criteria is based on the Hanford Site Solid Waste Acceptance Criteria, WHC-EP-0063-4 and provides the outer bounds of the types of wastes that will be disposed at the Environmental Restoration Disposal Facility (ERDF). The waste acceptance criteria are important to ensure the proper equipment and liner materials are utilized. For the purposes of this conceptual design report (CDR), the following preliminary waste acceptance criteria was developed:

Volume of waste:

- approximately 21.8 million cubic meters (m^3) (28.5 million cubic yards [yds^3])

Type of waste:

- no waste higher than category 3 (per Table 4-1 of WHC-EP-0063) will be accepted
- no transuranic (TRU) waste will be accepted
- no waste containing free liquids will be accepted
- no waste containing decomposable material in concentrations greater than 10 percent of the waste volume will be accepted
- waste that is compatible with the liner system considering a 30-year performance rating for the liner
- single-use container of debris will not contain more than 10 percent volume of voids and decomposable material
- soil material in single use containers shall be compacted to approximately 95 percent modified proctor (assumed to be achieved by placing soil into the container in 2-foot maximum thickness lifts and compacting by tamping the material thoroughly with the backhoe bucket)
- the void space between the surface of the waste and the top of the single-use container shall be grouted to fill all voids.

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Appendix B
Physically Handicapped Assessment

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RECORD KEEPING/DOCUMENTATION ON ACCOMODATIONS OF PHYSICALLY HANDICAPPED IN THE DESIGN, CONSTRUCTION OR ALTERATION OF BUILDINGS AND FACILITIES

PROJECT: NO._____ TITLE _____

LOCATION: AREA_____ BUILDING NO. & NAME _____

TYPE OF PROJECT

- ☐ NEW BUILDING (OR BUILDING ADDITION)
- ☐ BUILDING ALTERATION
- ☐ LEASED BUILDING
- ☐ BUILDING FINANCED IN WHOLE OR IN PART BY FEDERAL GRANT OR LOAN
- ☐ SITE DEVELOPMENT (GRADING, WALKS, PARKING LOTS)

APPLICATION OF STANDARDS

☐ ANSI A117.1 (R 1971) STANDARDS ARE APPLICABLE TO AND HAVE BEEN OR WILL BE INCORPORATED IN THE DESING, CONSTRUCTION, OR ALTERATION.

- ☐ ALL STANDARDS
- ☐ LIMITED APPLICATION (REMARKS ON STANDARDS TO BE INCORPORATED):

_____
_____
_____
_____
_____

EXCEPTIONS

☐ THE PROJECT IS WITHIN ONE (OR MORE) OF THE EXCEPTIONS SET OUT IN FPMR SUBPART 101-19.604 AS SHOWN BELOW:

- ☐ EXCEPTION (a) NOT INTENDED FOR OCCUPANCY OR USED BY THE HANDICAPPED
- ☐ EXCEPTION (b) ALTERATION NOT INVOLVING EXISTING STAIRS, DOORS, ELEVATORS, TOILETS, ETC.
- ☐ EXCEPTION (c) NOT STRUCTURALLY POSSIBLE

GENERAL COMMENTS

_____
_____
_____
_____
_____

PREPARED BY _____ _____ DATE

APPROVED BY _____ _____ DATE

REFERENCES:

FPMR SUBPART 101-19.6 (AMENDMENT D-47, JUNE 1974) "ACCOMODATIONS FOR THE PHYSICALLY HANDICAPPED"

ANSI 117.1 (R1971) "AMERICAN STANDARD SPECIFICATIONS FOR MAKING BUILDINGS AND FACILITIES ACCESSIBLE TO AND USABLE BY THE PHYSICALLY HANDICAPPED"

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Project Time & Cost

PROJECT

The project includes construction of the Environmental Restoration Disposal Facility. The project will provide disposal facilities, rail and tractor-trailer container handling capability, equipment and personnel decontamination facilities, maintenance facilities, fencing, roads, utilities, inventory control systems, communication systems, and administration offices. In addition, the project will provide a grout batch plant, leachate collection and leak detection system, and parking facilities.

Operation of the landfill is planned to begin by September 1996. Operations include dumping and placing waste material. All activities associated with operations, including unloading, dumping and decontamination of equipment, are not a part of this cost estimate. However, the equipment necessary to complete these tasks is included. Presently the equipment cost is included with other direct costs in the estimate.

The construction project will be competitively bid to major contractors. The project is split into 3 contracts.

- Contract 1 includes clearing and grubbing, storm drainage, fencing and gate control points, perimeter lighting and excavation of 10 cells.
- Contract 2 includes all railroad work.
- Contract 3 includes lining 4 cells, support buildings, leachate treatment, roads and paved areas, and other miscellaneous items.

OWNER

United States, Department of Energy
Richland Field Office

DEVELOPER OF CONCEPTUAL DESIGN

United States Corps of Engineers
Walla Walla District

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DESIGNERS

Montgomery Watson Americas, Inc.
Richland, Washington

BASIS OF ESTIMATE

The estimate is based on the following:

- Drawings and the Draft Conceptual Design report received from Montgomery Watson
- Conversations with designers
- Estimator judgement and assumptions (see Project Notes section below for detailed assumptions)

PROJECT TIME & COST ESTIMATING TEAM

Project Leader	Michelle Bryan, Kevin Faller
Architectural	Walter Jones
Structural	Walter Jones
Mechanical	Kevin Faller
Electrical	Darryl Wood
Civil	Kevin Faller, Michelle Bryan

PROJECT NOTES

All construction pricing is based on non-hazardous working conditions. No decontamination, personal protective equipment, health & safety work plans, radiation protection personnel, monitoring equipment, medical surveillance, or related personnel, material, equipment or services are included. The Designer indicates that the physical distance maintained between landfill construction operations and landfill waste placement operations (100-200 feet) will keep the construction contractor in a safe working zone. It is possible that the 100 - 200 foot separation between the hazardous and non-hazardous operations will not be sufficient to keep the contractor's operations from being classified solely non-hazardous. Should that be the case, the cost of the construction operations will be significantly increased.

Cost of Westinghouse supervising or managing the project is not included.

Perimeter fencing includes 3 gate control points (small heated buildings). Fencing will be installed in one phase for this cost estimate.

Normal access to the site will be permitted as there is no classified or sensitive information stored at the site.

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PROJECT NOTES Continued

All equipment price quotations include delivery to the landfill site.

Container handling equipment is priced according to standard ISO-ANSI configuration and sizing.

Included in the Operations building is the cost of one emergency generator, no other emergency generators are included in this cost estimate.

To provide an accurate cost estimate certain areas, sizes, and allowances have been assumed. Sizing and allowances are noted in the line item description.

The Data Processing allowance from Montgomery Watson is assumed to be all inclusive, i.e. equipment, raceway, wiring, etc.

Public address was included in all areas, despite the narrative only mentioning a requirement in the Operations building.

An allowance was included for an electric substation near the Operations building, no details are available.

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ENV. RESTORATION DISPOSAL FAC.
Richland, Washington

Designed By: Montgomery Watson
Estimated By: Project Time & Cost

Prepared By: M. Ray, D. Wood K. Faller,
M. Bryan, W. Jones

Date: 02/08/94
Est Construction Time: 1825 Days

M C A C E S G O L D E D I T I O N
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U.S. Army Corps of Engineers
PROJECT MW-WBS: ENV. RESTORATION DISPOSAL FAC. - Richland, Washington
Conceptual Design Report Cost Estimate
** PROJECT INDIRECT SUMMARY - LEVEL 1 **

	QUANTITY UOM	TOTAL DIRECT	OVERHEAD	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT
1 CF 125.1 Contract 1		18,681,771	2,162,114	521,097	1,495,549	171,454	23,031,985	
2 CF 125.2 Contract 2		7,460,265	863,406	208,092	597,223	68,467	9,197,453	
3 CF 125.3 Contract 3		46,578,884	5,390,755	1,299,241	3,728,822	427,483	57,425,185	
ENV. RESTORATION DISPOSAL FAC.		72,720,921	8,416,275	2,028,430	5,821,594	667,404	89,654,624	

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	QUANTITY UOM	TOTAL DIRECT	OVERHEAD	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT
1 CF 125.1 Contract 1								
1. 1 CF 125.1.1 Site Preparation								
1. 1. 1 Site Preparation								
1. 1. 1. 1 Clear And Grub		798,949	92,465	22,285	63,959	7,332	984,991	
1. 1. 1. 2 Drainage Control		910,665	105,395	25,401	72,902	8,358	1,122,721	
1. 1. 1. 3 Fences & Gate Control Points		886,180	102,561	24,719	70,942	8,133	1,092,534	
1. 1. 1. 4 Perimeter Lighting		216,242	25,027	6,032	17,311	1,985	266,596	
Site Preparation		2,812,035	325,448	78,437	225,114	25,808	3,466,843	
CF 125.1.1 Site Preparation		2,812,035	325,448	78,437	225,114	25,808	3,466,843	
1. 3 CF 125.1.2 Utilities								
1. 3. 1 Utilities								
1. 3. 1. 1 Water Supply, Potable & Raw		1,242,000	143,741	34,644	99,427	11,399	1,531,211	
Utilities		1,242,000	143,741	34,644	99,427	11,399	1,531,211	
CF 125.1.2 Utilities		1,242,000	143,741	34,644	99,427	11,399	1,531,211	
1. 5 CF 125.1.3 Trench Rough Grading/								
1. 5. 1 Trench Rough Grading/Excavation								
1. 5. 1. 1 Cells 1 through 10		14,627,736	1,692,925	408,017	1,171,007	134,248	18,033,932	
Trench Rough Grading/Excavation		14,627,736	1,692,925	408,017	1,171,007	134,248	18,033,932	
CF 125.1.3 Trench Rough Grading/		14,627,736	1,692,925	408,017	1,171,007	134,248	18,033,932	
CF 125.1 Contract 1		18,681,771	2,162,114	521,097	1,495,549	171,454	23,031,985	
2 CF 125.2 Contract 2								
2. 1 CF 125.2.1 Railroad								
2. 1. 1 Demolition								
2. 1. 1. 1 Road Relocation		111,511	12,906	3,110	8,927	1,023	137,477	
2. 1. 1. 2 Fence Relocation		80,307	9,294	2,240	6,429	737	99,007	
2. 1. 1. 3 Utility Relocation		40,000	4,629	1,116	3,202	367	49,314	

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	QUANTITY UOM	TOTAL DIRECT	OVERHEAD	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT
Demolition		231,818	26,829	6,466	18,558	2,128	285,799	
2. 1. 2 Lead Railroad								
2. 1. 2. 1 Lead Railroad		5,842,374	676,161	162,963	467,705	53,619	7,202,822	
Lead Railroad		5,842,374	676,161	162,963	467,705	53,619	7,202,822	
2. 1. 3 Underpass								
2. 1. 3. 1 Underpass		55,998	6,481	1,562	4,483	514	69,038	
Underpass		55,998	6,481	1,562	4,483	514	69,038	
2. 1. 4 Road Crossing								
Road Crossing		130,075	15,054	3,628	10,413	1,194	160,364	
2. 1. 5 Equipment								
2. 1. 5. 1 Equipment		1,200,000	138,881	33,472	96,065	11,013	1,479,431	
Equipment		1,200,000	138,881	33,472	96,065	11,013	1,479,431	
CF 125.2.1 Railroad		7,460,265	863,406	208,092	597,223	68,467	9,197,453	
CF 125.2 Contract 2		7,460,265	863,406	208,092	597,223	68,467	9,197,453	
3 CF 125.3 Contract 3								
3. 1 CF 125.3.1 Disposal Facility								
3. 1. 1 Grading for Trench Liner								
3. 1. 1. 1 Fine Grading		190,733	22,074	5,320	15,269	1,750	235,146	
Grading for Trench Liner		190,733	22,074	5,320	15,269	1,750	235,146	
3. 1. 2 Trench Lining								
3. 1. 2. 1 Lining Cells 1 - 4		11,436,605	1,323,603	319,005	915,545	104,961	14,099,718	
Trench Lining		11,436,605	1,323,603	319,005	915,545	104,961	14,099,718	

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	QUANTITY UOM	TOTAL DIRECT	OVERHEAD	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT
3. 1. 3 Leachate Storage and Pumping								
3. 1. 3.01 Leachate Collection & Storage		954,385	110,455	26,621	76,402	8,759	1,176,622	
Leachate Storage and Pumping		954,385	110,455	26,621	76,402	8,759	1,176,622	
3. 1. 4 Electrical								
3. 1. 4. 1 Electrical		7,415	858	207	594	68	9,142	
Electrical		7,415	858	207	594	68	9,142	
3. 1. 5 Equipment								
3. 1. 5. 1 Equipment		13,436,200	1,555,024	374,781	1,075,620	123,312	16,564,937	
Equipment		13,436,200	1,555,024	374,781	1,075,620	123,312	16,564,937	
CF 125.3.1 Disposal Facility		26,025,338	3,012,014	725,934	2,083,430	238,850	32,085,566	
3. 3 CF 125.3.2 Support Facilities								
3. 3. 1 Landscaping and Irrigation								
3. 3. 1. 1 Landscaping & Irrigation		69,958	8,097	1,951	5,600	642	86,248	
Landscaping and Irrigation		69,958	8,097	1,951	5,600	642	86,248	
3. 3. 2 Roads, Walks and Paved Areas								
3. 3. 2.01 Roads & Walks		654,768	75,779	18,264	52,417	6,009	807,236	
3. 3. 2.02 Parking Lot		183,993	21,294	5,132	14,729	1,689	226,838	
3. 3. 2.03 Container Unloading		793,056	91,783	22,121	63,487	7,278	977,726	
3. 3. 2.04 Container Reloading		734,835	85,045	20,497	58,826	6,744	905,948	
3. 3. 2.05 Backhaul Pad		770,453	89,168	21,491	61,678	7,071	949,860	
3. 3. 2.06 Truck washdown pad	167.23 M2	6,489	751	181	519	60	8,000	47.84
3. 3. 2.07 Site Lighting	10.00 EA	30,892	3,575	862	2,473	284	38,085	3808.52
Roads, Walks and Paved Areas		3,174,486	367,396	88,547	254,130	29,134	3,913,693	
3. 3. 3 Operations Building								
3. 3. 3. 1 Operations Building	2772.42 M2	2,882,139	333,561	80,392	230,726	26,451	3,553,270	1281.65
Operations Building		2,882,139	333,561	80,392	230,726	26,451	3,553,270	

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	QUANTITY UOM	TOTAL DIRECT	OVERHEAD	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT
3. 3. 4 Decontamination Facility								
3. 3. 4. 1 Decontamination Facility	2034.58 M2	6,196,983	717,201	172,855	496,093	56,873	7,640,005	3755.07
3. 3. 4. 2 W.Water Collection/Trmt System	2034.58 M2	1,105,315	127,922	30,831	88,485	10,144	1,362,698	669.77
3. 3. 4. 3 Wastewater Treatment Plant		1,000,000	115,734	27,893	80,054	9,178	1,232,859	
Decontamination Facility		8,302,298	960,857	231,579	664,631	76,195	10,235,561	
3. 3. 5 Container Storage Shed								
3. 3. 5. 1 Container Storage Shed	1289.03 M2	1,848,866	213,976	51,571	148,009	16,968	2,279,391	1768.29
Container Storage Shed		1,848,866	213,976	51,571	148,009	16,968	2,279,391	
3. 3. 7 Automated Data Processing Equip.								
3. 3. 7. 1 Automated Data Processing Equipm		2,247,000	260,054	62,676	179,881	20,622	2,770,234	
Automated Data Processing Equip.		2,247,000	260,054	62,676	179,881	20,622	2,770,234	
3. 3. 8 Fuel and Chemical Storage								
3. 3. 8. 1 Fuel & Chemical Storage		41,003	4,745	1,144	3,282	376	50,551	
Fuel and Chemical Storage		41,003	4,745	1,144	3,282	376	50,551	
3. 3. 9 Sanitary Waste Systems								
3. 3. 9. 1 Sanitary Waste Systems		106,798	12,360	2,979	8,550	980	131,667	
Sanitary Waste Systems		106,798	12,360	2,979	8,550	980	131,667	
CF 125.3.2 Support Facilities		18,672,548	2,161,047	520,840	1,494,810	171,369	23,020,614	
3. 9 CF 125.3.5 Miscellaneous								
3. 9. 1 Secondary Containment								
3. 9. 1.01 Secondary Containment System		20,625	2,387	575	1,651	189	25,428	
Secondary Containment		20,625	2,387	575	1,651	189	25,428	
3. 9. 3 Site Communications								
3. 9. 3. 1 Site Communications Distribution		745,388	86,267	20,791	59,671	6,841	918,958	

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	QUANTITY UOM	TOTAL DIRECT	OVERHEAD	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT
Site Communications		745,388	86,267	20,791	59,671	6,841	918,958	
3. 9. 4 Site Electrical								
3. 9. 4. 1 Site Electrical Distribution		784,933	90,843	21,894	62,837	7,204	967,712	
Site Electrical		784,933	90,843	21,894	62,837	7,204	967,712	
3. 9. 5 Substation/Equipment								
3. 9. 5. 1 Substation/Equipment		190,995	22,105	5,327	15,290	1,753	235,470	
Substation/Equipment		190,995	22,105	5,327	15,290	1,753	235,470	
3. 9. 6 Site Lighting								
3. 9. 6. 1 General Site Lighting		139,057	16,094	3,879	11,132	1,276	171,438	
Site Lighting		139,057	16,094	3,879	11,132	1,276	171,438	
CF 125.3.5 Miscellaneous		1,880,999	217,695	52,467	150,581	17,263	2,319,006	
CF 125.3 Contract 3		46,578,884	5,390,755	1,299,241	3,728,822	427,483	57,425,185	
ENV. RESTORATION DISPOSAL FAC.		72,720,921	8,416,275	2,028,430	5,821,594	667,404	89,654,624	

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** CONTRACTOR INDIRECT SUMMARY **

	TOTAL DIRECT	OVERHEAD	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT
AA General Contractor							
AC Building Subcontractor	5,405,009	540,501	0	475,641	0	6,421,151	
AT Acoustical Tile	43,717	6,558	0	5,027	0	55,302	55301.82
CA Carpet	21,884	3,283	0	2,517	0	27,683	
EL Electrical/Instrumentation	4,567,602	319,732	0	244,367	0	5,131,701	5131701
EV Elevator	41,550	6,232	0	4,778	0	52,560	52560.30
FE Fence	751,492	75,149	0	66,131	0	892,773	892773
FP Fire Protection	59,503	8,925	0	6,843	0	75,272	75271.67
GL Glass And Glazing	78,420	11,763	0	9,018	0	99,201	99201.03
GW Gypsum Wallboard	120,836	18,125	0	13,896	0	152,858	152858
HV HVAC	652,195	97,829	0	75,002	0	825,027	825027
LR Liner Subcontractor	3,749,565	262,470	0	200,602	0	4,212,636	4212636
MA Masonry	120,439	18,066	0	13,851	0	152,356	152356
MR Membrane Roofing	41,579	6,237	0	4,782	0	52,598	52597.70
PL Plumbing	295,314	29,531	0	25,988	0	350,834	350834
PR Preformed Roofing and Siding	251,814	25,181	0	22,160	0	299,155	299155
PS Painting and Sealants	100,964	15,145	0	11,611	0	127,719	127719
RF Resilient Flooring	2,311	347	0	266	0	2,924	2923.57
RR Railroad Subcontractor	4,935,908	493,591	0	542,950	0	5,972,449	5972449
SE Special Equipment	1,377,378	137,738	0	151,512	0	1,666,627	
SM Site Mechanical	932,004	93,200	0	82,016	0	1,107,221	1107221
SS Structural Steel	717,346	57,388	0	46,484	0	821,218	821218
TI Tile	40,978	6,147	0	4,713	0	51,838	51837.72
Subtotal Subcontract Work	24,307,809	2,233,138	0	2,010,153	0	28,551,099	28551099
Indirect on Subcontracts	28,551,099	3,304,330	796,386	2,285,627	262,031	35,199,473	35199473
Indirect on Own Work	44,169,821	5,111,945	1,232,044	3,535,967	405,373	54,455,151	54455151
AA General Contractor	72,720,921	8,416,275	2,028,430	5,821,594	667,404	89,654,624	89654624

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Appendix C
Energy Conservation Report

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Energy Conservation Certification Report
Form ECM-1 Cover Sheet--Project Overview

Project No. : W-296	ECR No. : DOE/RL/12074-28	REV. : 0

Project Title: Environmental Restoration Disposal Facility	Project Description: See Attachment	
Project Location: Between 200 East and 200 West	Start Date: 10/1/94	End Date: 5/16/97
Category Type(s)/Category Description(s): 1/New buildings		
Projected Base Case Annual Energy Usage (Btu/ft²/yr):	Projected Modified Energy Usage (Btu/ft²/yr):	
Total Floor Area (ft²): Operations Building = 26,200 sq.ft. Decontamination Facility = 21,900 sq.ft.	Total Energy Usage (million Btu/yr):	
Estimated Project Budget (thousand $): $115,640 K		

Reporting Approach:

☐ Direct ☒ Short form, complete Form ECM-S-1

☐ Integrated, complete Form ECM-I-1 ☐ Phase _____ (See table 1 for compliance form descriptions.)

Prescriptive Method: (See table 2 for checklist and worksheet descriptions.)

☐ Interior Lighting 3.3.4 ☐ Exterior Lighting 3.3.4

☒ Building Envelope 3.5.4 ☒ HVAC Systems 3.7.4

☒ Service Water Heating 3.9.4 ☒ Other Energy-Using Systems 3.13.4

System Performance Method: (See table 2 for checklist and worksheet descriptions.)

☐ Lighting Interior 3.3.4 ☒ Lighting Exterior 3.3.5

☐ Building Envelope 3.5.5 ☐ Other Energy-Using Systems 3.13.4

Compliance Alternative Method: (See table 1 for compliance form descriptions.)

☐ Building Energy Cost Complete Form ECM-BEC-3.11 ☐ Building Energy Use Complete Form ECM-BEU-3. ☐ Life-Cycle Cost Analysis Complete Form ECM-LCCA-3.14

Computer Software Used/Version: ☐ ENVSTD Version ____ ☐ LTGSTD Version ____

Building Simulation Program (DOE, BLAST, ASEAM, etc.): _____ Version _____

Life-Cycle Cost Analysis Program Used: ☐ BLCC Version ____ ☐ Other _____ Version ____

Applications for Variance Required? ☐ Yes ☐ No If yes, attach Form ECM-V-1 for each.

Commissioning of HVAC equipment required? ☐ Yes ☐ No If yes, attach commissioning report.

Acceptance tests been performed? ☐ Yes ☐ No If yes, attach Form ECM-AT.

Winter performance tests been performed? ☐ Yes ☐ No If yes, attach Form ECM-PT-W.

Summer performance tests been performed? ☐ Yes ☐ No If yes, attach Form ECM-PT-S.

Private Sector Energy Experts Design Review Required? ☐ Yes ☐ No If yes, attach Form ECM-R-1.

Existing Building Energy Survey Required ? ☐ Yes ☐ No If yes, attach Form ECM-ES-3.15.

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Energy Conservation Certification Report
Form ECM-1 Cover Sheet--Project Overview

Project No. : W-296	ECR No. : DOE/RL/12074--28	REV. : 0

Documentation Author(s):	Telephone(s):
Pam K. Ankrum	(509) 943-0100

I have reviewed the information on attached forms and certify ECM compliance is met.

Preparer's Signature:	Print Name:	Form No./Discipline:	Date:
	Pam Ankrum	ECM-1	2/16/94
	Pam Ankrum	ECM-S-1	2/16/94

I have reviewed the information on attached forms and certify ECM compliance is met

Designated Certifier _____ Date _____

Comments

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ENERGY CONSERVATION REPORT
ENVIRONMENTAL RESTORATION DISPOSAL FACILITY
PROJECT W-296

1.0 SUMMARY

This portion of the Energy Conservation Report was prepared as an attachment to the ECM-1 Form provided in the *Energy Conservation Manual* (ECM) (WHC 1993). The ECM combines the energy conservation compliance requirements of the Code of Federal Regulations (CFR) 10 CFR 435, Subpart A, the project management procedures of Department of Energy (DOE) Order 4700.1, and the general design criteria of DOE Order 6430.1A. The purpose of the Energy Conservation Report is to show compliance with applicable codes and orders, and to investigate and identify major energy conservation alternatives which have a high initial cost, but can be justified through a Life Cycle Cost Analysis (LCCA).

2.0 PROJECT DESCRIPTION

The proposed Environmental Restoration Disposal Facility (ERDF) will serve as the burial facility for the majority of wastes excavated during remediation of waste management sites in the 100 Area, 200 Area, and 300 Area of the Hanford site. Project W-296 will provide waste facilities, rail and tractor/trailer container handling capability, equipment and personnel decontamination facilities, maintenance facilities, fencing, roads, utilities, inventory control systems, communication systems, administrative offices, and other appurtenances necessary to support placement of Environmental Restoration (ER) derived wastes. The primary facilities of the proposed ERDF include a container unloading and reloading area, the waste burial trench, the decontamination facility, the wastewater treatment facility, and the operations building.

Containers of bulk waste will arrive at the ERDF either on flatbed railcars or flatbed tractor/trailers. It is expected that up to 150 containers per shift will arrive by rail and up to 65 containers per shift will arrive by tractor/trailer. All containers will be offloaded in the railhead area near the north end of the trench. Pneumatic wheeled container handlers will transfer the containers to dedicated flatbed tractor/trailers, which will transport the containers to the disposal trench. After arriving at the disposal trench, the tractor/trailer will back into the trailer tipper and the trailer tipper will lift the tractor/trailer and empty the container. The tractor will then transport the container to the decontamination facility where the container will be removed, the exterior of the container decontaminated by a water/detergent wash, and stored until loaded onto a railcar or off-site tractor/trailer for return to the remediation site. After the container is removed from the tractor/trailer, the tractor/trailer will return to the railhead to continue the cycle.

After the waste is deposited in the trench, tractor dozers will spread and compact the waste on a continual basis. At the end of each day's operation, the top of the trench fill will be covered with clean daily operational cover material so that the trailer tipper and dedicated tractor/trailer will always be on clean material. The face of the waste placed in the trench will be coated with a dust control agent.

In addition to the equipment and facilities mentioned above, a portable grout batch plant, leachate collection and leak detection system, environmental monitoring (air and groundwater),

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operations building, decontamination facility, site fencing, power, water, access roads, and parking facilities are proposed. Facilities to load containers with clean excavated soil for backhaul to the ER sites are also proposed.

The primary energy utilizing buildings that will be provided are the operations building and the decontamination facility. All of the buildings constructed as part of the ERDF will be built in accordance with the requirements of the federal and state environmental regulations and DOE Orders, except as discussed in the ECM (WHC 1994).

2.1 BUILDINGS

Three buildings will be required to house support operations for the ERDF. The facilities will accommodate functional and safety requirements. The operations building, the decontamination facility, and the wastewater treatment facility will be permanent structures with a design life of 30 years.

The operations building will include personnel decontamination (personnel showers and change rooms), lunch area, shop, offices, etc. The decontamination facility will provide a control room, a personnel decontamination area, non-contaminated restrooms, and a container decontamination, monitoring, and storage area. The wastewater treatment facility will include the equipment to heat the combined leachate and decontamination facility wastewater.

2.1.1 Operations Building

The operations building will accommodate support and maintenance staff required to maintain the ERDF. The operations building will be an offset double rectangle with approximately 1,490 square meters (m^2) (16,000 square feet [ft^2]) on the main floor and approximately 950 m^2 (10,250 ft^2) on the second floor. Main functional areas are identified in Table 1. The administration area will consist of a lobby and reception area, offices, restrooms, a lunch room, and a conference room. The facility support spaces include a control/computer room, janitor closet, mechanical room, electrical spaces, both uncontaminated and dedicated maintenance rooms, and miscellaneous storage rooms.

Table 1. Operations Building Areas.

Operations Building Area	Size (m^2)	Size (ft^2)
Clean Shop Area	270	2,880
Dedicated Shop Area	224	2,410
Change Room/Restroom (Operations)	173	1,860
Personnel Decontamination Area	35	380
Stairs, Elevators, and Hallways	446	4,800
Building Equipment Rooms	88	950
Building Support Areas (Includes: Communications Room, Laundry Room, Janitor Closets, Computer Network Area, etc.)	90	960
Reception Area (includes Restrooms)	142	1,530
Lunch Room	114	1,230
Conference, Meeting, Training Rooms	157	1,690
Operations Personnel Offices	181	1,950
Administrative/Managerial Offices	205	2,210
Library, File, and Copy Centers	93	1,000

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Table 1. Operations Building Areas (Continued).

Operations Building Area	Size (m^2)	Size (ft^2)
Administrative Restrooms	65	700
Dedicated Storage	111	1,200
Clean Storage	46	500
TOTAL AREA	2,440	26,250

The structure will be a rigid beam-column type frame or as determined to be most economical during definitive design. The building will be installed on a reinforced concrete floor and foundation. The second story floor will be a composite of wide-span metal decking and concrete.

The exterior of the building will be made up of flat metal wall panels with stucco texture (Butler Texture-Cote or equal) and/or brick panels (ButlerStone BrickWal System or equal). The outside surfaces will be factory prefinished and insulated with a minimum of R-19 insulation. The roof will be constructed from standing seam roof panels with a factory applied finish. The roof insulation will be fiberglass batts providing a minimum of R-32 insulation. All panels will have a Factory Mutual Class 1 fire hazard rating.

Exterior doors and frames will be standard metal doors with glazing as shown on elevations. Window frames will be sized as shown on the elevations and factory coated to match door frames. All glass will be double paned, insulated, bronzed glass. Interior door frames will be pressed metal and interior doors will be pressed metal and/or hollow core wood.

Partitions will be 1.6 centimeter (cm) (5/8 inch [in.]) thick gypsum board on metal studs. Fire rated partitions will be provided where required.

Suspended acoustical tile ceiling will be provided in the entire facility except the shop and equipment rooms. Water resistant ceiling tiles will be provided in the restrooms.

A heating, ventilation and air conditioning (HVAC) system will be installed to keep the building within the comfort zone for personnel and to control contamination release to either the atmosphere or clean areas of the building.

The building will be heated and cooled from a central variable air volume system located in the equipment room. The central air handling unit will consist of 30 percent American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) rated prefilters, 85 percent ASHRAE rated final filters, electric preheating coil, chilled water cooling coil, adiabatic humidifier with water pump, supply fan, and return air fan. Filtration will be in accordance with ASME AG-1.

The HVAC control system will monitor and control the operation of the HVAC system. The system will consist of an "off-the-shelf" control package. A distributed control system will be used to supervise the operation of all HVAC control functions. A central operator console will include alarm and event display, graphic display of HVAC system schematics, data logging and recording, energy use monitoring, trend analysis, predictive maintenance, and optimization control.

The HVAC system will be designed so air will flow toward areas having higher potential contamination, such as the personnel decontamination room, and the decontaminated change rooms.

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The dedicated area shops will be provided with a separate HVAC system which will maintain negative pressures and provide 100 percent fresh air. This system will be connected to a backup energy source (diesel generator) to provide a more reliable system. Potentially contaminated air that is released into the environment will pass through a high-efficiency particulate air (HEPA) filtration system (refer to ASME AG-1 Code).

Exterior parking lot lighting will be pole-mounted, shoe-box type, with low pressure sodium lamps. Walkway lighting fixtures will be low-pressure sodium with no uplight. Exit doors without canopies will be supplied with low-pressure sodium, wall-pack type lighting fixtures. Power for exterior lighting will be supplied from the building's distribution panel.

Indoor office lighting will be recessed type 277 Volt (V), 0.6 m by 1.2 m (2 ft by 4 ft) fluorescent troffers with parabolic lens for glare reduction. Conference rooms will be supplied with the same type of fixture as the offices, except with double ballasts for dual switching light level control. Conference rooms will also have recessed down-lights over table areas. Lunchrooms, restrooms, corridors, and storage areas will be supplied with 277V, 0.6 m by 1.2 m (2 ft by 4 ft) fluorescent troffers with prismatic lens, and mechanical room areas will be supplied with industrial type 277V fluorescent fixtures with wire guards. All lighting fixtures will be equipped with energy-saving ballasts and low-energy type lamps. Emergency lighting will be provided by fluorescent emergency ballasts having integral batteries.

Computer receptacles will be provided adjacent to each Hanford Local Area Network (HLAN) outlet in all offices, secretarial spaces and reception areas, and will be the same type as the convenience receptacles.

There will be a dry-type transformer and panelboard for the convenience receptacles and computer receptacles located in the electrical rooms on each floor.

The building electrical consumption will comply with energy conservation requirements and will be justified during preliminary design by a Life Cycle Cost Analysis (LCCA) as defined in DOE Order 6430.1A, GDC Section 110-12. The anticipated energy consumption is approximately 150 kilowatt (kw).

Telecommunication rooms will have electrical power fed by a computer grade isolation transformer and through a dedicated sub-power panel. There will be ready access to a building ground within the room. Telecommunication rooms will be secured with electronic cipher locks.

2.1.2 Decontamination Facility

The decontamination facility will provide decontamination systems for containers, operations vehicles, and emergency vehicles at the ERDF. The decontamination building will be a rectangle approximately 30 m wide and 67 m long (100 ft wide and 219 ft long), with a covered container storage area of approximately 4.6 m wide and 137 m long (15 ft wide and 450 ft long). Main functional areas are identified in Table 2.

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Table 2. Decontamination Building Areas.

Decontamination Building Areas	Size (m^2)	Size (ft^2)
Wash Room (Total of 4)	520	5,600
Air Drying Room (Total of 4)	446	4,800
Radiation Surveying Room	632	6,800
Equipment Room	223	2,400
Control Room	120	1,290
Restroom (Men's and Women's)	40	430
Personnel Decontamination Room	14	150
Hallways	40	430
TOTAL AREA	2,035	21,900

The decontamination building will be a reinforced concrete block structure designed in accordance with DOE Order 6430.1A, GDC Division 4 and the UBC. The building will be installed on a reinforced concrete floor and foundation in accordance with DOE Order 6430.1A, GDC Division 2 and 3, and the UBC.

The exterior of the building will be covered with flat metal wall panels with stucco texture (Butler Texture-Cote or equal) and vertically ribbed metal panels. The outside surfaces will be factory prefinished and insulated with a minimum of R-19 insulation. The roof will be supported by steel members, covered with a synthetic membrane and provided with roof drains. The roof insulation will be spray on interior urethane in wet areas and fiberglass batts providing a minimum insulation value of R-32 in dry, heated areas. All panels will have a Factory Mutual Class 1 fire hazard rating.

Exterior doors and frames will be standard metal in accordance with DOE Order 6430.1A, GDC Division 8. Doors and frames in wet areas will be hot dipped galvanized before painting. Window frames will be sized as shown on the elevations and factory coated to match door frames. All glass will be double paned insulating bronzed glass. Interior doors and frames will be pressed metal.

Partitions will be 20 cm (8 in.) thick concrete block with water proofing. Fire rated partitions will be provided where required by NFPA 101, *Life Safety Code*; DOE/EP-0108, *Standard for Fire Protection of DOE Electric Computer/Data Processing Systems*; DOE/RLIP 5480.7 *Fire Protection*; and WHC-CM-4-41, *Fire Protection Program Manual*. The Fire Hazards Analysis will identify any other applicable requirements.

Suspended acoustical tile ceiling will be provided in control room and restroom only. Water resistant ceiling tiles will be provided in the restrooms.

A HVAC system will be installed to keep the building within the comfort zone for personnel and to control contamination release to the atmosphere or clean areas of the building.

The control room will be provided with a minimum of two telephone outlets, two adjacent computer outlets, and four electrical outlets. All other areas will be provided with outlets required by the NEC and DOE Order 6430.1A.

All areas of the facility will be audibly accessible to a plant intercom system. This system will be used for general use and for emergency notification and instruction.

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The electrical system will be similar to the operations building system. It is anticipated that this facility will use approximately 150 kw during normal operations.

Automated conveying systems will be used to move the containers through the wash, dry, and survey rooms and to the railcar loading area. Throughout the conveying process, the containers will be maintained in an east-west alignment through use of guides.

Multiple conveyors will be utilized in this facility. Each wash bay will include one conveyor. This conveyor will move the container at 4.6 meters per minute (mpm) (15 feet per minute [fpm]) through the wash room, drying room, and surveying room and will deposit the container onto a second conveyor. This second conveyor will collect the containers from each of the four wash bay conveyors and deposit the containers onto a single conveyor that will transport the containers to the railcar loading area.

Each conveyor will be a belt-driven roller type conveyor suitable for moving 4,540 kilogram (kg) (10,000 pound [lb]) containers. The conveyors will be equipped with guides to keep the containers centered and to keep the containers from turning on the conveyor. The rollers will be a pair of 0.6 m (2 ft) wide rollers with one under each side of the container. The drive belt will be retractable to stop the container as needed for surveying or staging for loading onto the railcars.

2.1.3 Wastewater Treatment Facility

The wastewater treatment facility will provide the equipment to treat the combined leachate and decontamination facility wastewater. The building is a rectangle approximately 15 m wide and 30 m long (50 ft wide and 100 ft long). A control room of approximately 3 m by 6 m (10 ft by 20 ft) will be included. The remainder of the building will be for process equipment.

The structure will be a rigid beam-column type frame or as determined to be most economical during definitive design. The building will be installed on a reinforced concrete floor and foundation.

The exterior of the building will be made up of flat metal wall panels. The outside surfaces will be factory prefinished and insulated with a minimum of R-19 insulation. The roof will be constructed from standing seam roof panels with a factory applied finish. The roof insulation will be fiberglass batts providing a minimum of R-32 insulation. All panels will have a Factory Mutual Class 1 fire hazard rating.

Exterior doors and frames will be standard metal in accordance with DOE Order 6430.1A, GDC Division 8. Doors and frames in wet areas will be hot dipped galvanized before painting. Window frames will be sized as shown on the elevations and factory coated to match door frames. All glass will be double paned insulating bronzed glass. Interior doors and frames will be pressed metal.

Partitions will be 1.6 cm (5/8 in.) thick gypsum board on metal studs. Fire rated partitions will be provided where required by NFPA 101, *Life Safety Code*; DOE/EP-0108, *Standard for Fire Protection of DOE Electric Computer/Data Processing Systems*; DOE/RLIP 5480.7 *Fire Protection*; and WHC-CM-4-41, *Fire Protection Program Manual*. The Fire Hazards Analysis will identify any other applicable requirements.

Suspended acoustical tile ceiling will be provided in control room only.

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A HVAC system will be installed to keep the building within the comfort zone for personnel and to control contamination release to the atmosphere or clean areas of the building.

The electrical system will be similar to the operations building. The anticipated energy consumption for this facility is 30 to 50 kw.

2.2 UTILITIES

Utilities will be provided as part of the ERDF. The utility requirements are a substantial portion of Project W-296 and may have impacts on ERDF energy consumption.

2.2.1 Communication Systems

The communication system will be connected to fiber from the 200S Plant in a handhole on the west side of Beloit Avenue. Telephone electronics will be installed to split the HLAN and the telephone. Facility electronics will be included in each facility for the HLAN system. A fiber network will provide communications to each facility.

This project will include manholes spaced at intervals ranging from 150 m (500 ft) to 215 m (700 ft). Fiber will be placed in 10 cm (4 in.) schedule 40 polyvinyl chloride (PVC) conduits. Approximately four conduits will be installed to the operations building and two conduits out to all other facilities within the ERDF.

2.2.2 Electric Transmission and Distribution Systems

Electrical power will be supplied from the existing 13.8 kV overhead line number C8-L3. The line will be tapped 245 m (800 ft) north of the corner where the line turns and runs west. An underground service from the overhead line will be by #4/0 AWG copper, 15 kV concentric neutral cable, through a duct bank with 13 cm (5 in.) ducts, concrete encased for a length of approximately 60 m (200 ft). Electric power will be connected to a 1,500 kilovolt ampere (kVA), 13.8 kV/480-277 V, 3 Phase, 60 Hertz (Hz) transformer. The 480 V secondary distribution will be 3 Phase, 4 wire, using a neutral conductor. The 480 V distribution switchgear will consist of a main breaker and four feeder breakers. Feeder breakers will provide protection for distribution feeders to the operations building, the decontamination facility, and the trench area. The 480 V power distribution panels will be supplied by the distribution feeders. Panels will supply local feeders to lights, HVAC, pumps, receptacles, and other miscellaneous uses in the area being served. Electrical systems will meet the requirements of DOE Order 6430.1A, GDC and the NEC.

Emergency backup power for the operations building will be provided by a 500 kVA diesel fueled generator located in one of the building equipment rooms. Backup power will only be provided for dedicated areas ventilation and other critical items.

2.2.3 Alarm Systems

A local emergency fire alarm system will be installed within each building. This system will be comprised of a fire alarm control panel (FACP), with standby battery power, and auxiliary relays to activate radio fire alarm signals that will be received by the 200 Area Hanford Fire Department. Each fire suppression system will individually enunciate.

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Fire alarm and other emergency systems will be connected to existing systems in the 200 West Area. The lines will be run in a 10 cm (4 in.) PVC conduit in the same trench as the fiber.

2.2.4 Irrigation Systems

An irrigation system using raw water will be installed around the operations building.

2.2.5 Sanitary Wastewater

The sanitary wastewater from the operations building and decontamination facility will be collected and treated in new septic tanks located near each facility in noncontaminated areas. The liquid from the septic tanks will be disposed of in new drain field systems. Solids that accumulate in the septic tank will be periodically removed and disposed of by methods acceptable to Washington State Department of Ecology (Ecology) and U.S. Environmental Protection Agency (EPA).

The two sanitary wastewater systems will be installed with stub-outs for future connections to a sanitary wastewater treatment facility.

2.2.6 Water Supply, Pumping, Treatment, and Distribution Systems

Two types of water will be utilized at the ERDF. Sanitary (potable) water will be used for all sanitary uses such as drinking water, showers, toilets, and laundry. Raw (export) water will be used for fire protection, landscape irrigation, decontamination make-up, batch plant, and other non-potable water uses. Sanitary water will only be provided to the operations building and the decontamination facility.

Sanitary water will be provided from the existing 200 West Area sanitary water system. This water is already being pumped and treated so additional pumping and treatment will not be provided at the ERDF unless required to maintain adequate pressure. A connection will be made to the existing 30 cm (12 in.) PVC sanitary water line north of the 222S Laboratory. It is anticipated that a peak sanitary water use of 457 liters per minute (L/min) (117 gallons per minute [gpm]) will be required.

Raw water will be provided from the existing 200 West Area raw water system. This is untreated surface water (Columbia River water) and will be used in systems that do not require treated water. A connection will be made to the existing 30 cm (12 in.) PVC raw water pipe north of the 222S Laboratory . Currently, this source operates at 620-760 kPa (90-110 pounds per square inch [psi]). It is anticipated that a maximum peak flow of 9,500 L/min (2,500 gpm) of raw water will be required.

Distribution piping will be provided within the ERDF. A looped pipeline will be provided for each water system. Fire hydrants will only be located near the two buildings in accordance with NFPA 24 and DOE Order 6430.1A, Section 0266-4. Fire sprinklers will be provided within the operations building and the decontamination facility.

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2.2.7 Contaminated Wastewater Collection and Treatment Systems

The leachate storage tank discharge pumps will be sized to empty the 3,030 m^3 (800,000 gal) of water stored in the tanks in 60 days at 12 operating hours per day. This is an average flow of 70 L/min (18.5 gpm).

Leachate from the trench and the wastewater from the three decontamination wash units will be combined in a 1,325 L (350 gal) fiberglass storage tank. Two each 95 L/min (25 gpm) pumps (one plus a full standby) will pump the wastewater through a flowmeter. A level sensing element in the tank will provide on-off control of the pumps. Separate low level and high level floats will provide emergency pump control and remote alarms. After the flowmeter, the flow will go to a package wastewater treatment plant.

The proposed package wastewater treatment plant will utilize the reverse osmosis process. The resulting brine will be pumped into a tanker truck and spread once a day in the trench. The treated wastewater will go to evaporation tanks.

Each tank will have double HDPE liners with leak detection. A pump station and piping will be provided to pump water from any of the tanks to either the grout plant, the decontamination facility for rinse water makeup, or into the site water truck that will use the water for dust control. The solids remaining in the tanks after evaporation will be removed and spread in the trench.

2.3 WASTE TRENCH

A single waste trench will be constructed to provide final burial capacity of the wastes excavated from the ER sites. The proposed trench for the ERDF will be 305 m (1,000 ft) wide across the floor. The trench will be approximately 21.3 m (70 ft) deep to minimize the land surface area required, yet remain a reasonable distance above groundwater. The trench will be approximately 2,740 m (9,000 ft) long to accommodate the entire design waste capacity. The trench will be constructed entirely below the ground surface, except for a small (up to 3 m [10 ft] high) berm along the south side where the existing topography is lower than that on the north side (see Engineering Sketch ES-296-06).

The design and operation of the facility are intended to minimize the generation of leachate to the maximum extent practical. Leachate collected from the lined portion of the trench will be treated. The liner system in each leachate collection area will slope to a sump area at the toe of the sideslope. There will be two separate sumps. The first will be located above the primary liner to collect leachate. The second will be located between the two liners to provide leak detection. The sumps will be physically and hydraulically isolated from each other.

Riser pipes will lead from each sump up the side slope of the trench. Submersible pumps will be lowered into position in each sump through the riser pipes. The pumps will discharge into a gravity-drained pipe that will flow to the leachate storage facility. Gravity drainage is reliable and minimizes the possibility of leachate flowing back into the trench. Leachate levels in the sumps will be monitored and used to control the pumps. Each leachate collection area will have an independent control system located at the top of the sideslope. Instrument readings will also be transmitted to a central station in one of the 200 Areas (Project W-199). The pumps can be removed as required for maintenance or replacement. The leachate pumps will have a capacity of 500 L/min (125 gpm) at 26 m (85 ft) of head. The leak detection pumps will have a capacity of 40 L/min (10 gpm) at 29 m (95 ft) of head.

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The gravity pipe will convey the leachate to three storage tanks located near the southwest corner of the trench. The collected leachate will be pumped to the decontamination facility wastewater treatment plant for treatment. Two 76 L/min (20 gpm) pumps will be provided and valved to pump from any of the three tanks.

2.4 EQUIPMENT

The required equipment and numbers of vehicles were determined by the preliminary operations plan. As the operations plan is refined, the types and quanitity of equipment may vary.

2.4.1 Operations Equipment

The following equipment will be provided for waste movement operations and for maintenance of vehicle movement pathways at the ERDF:

- One grout batch plant (capacity for a maximum of 107 m^3 [140 yd^3] of grout per day)
- Four 45,400 kg (100,000 lb) lifting capacity wheeled container handlers
- Six 4,540 kg (10,000 lb) lifting capacity wheeled container handlers
- Eight dozers for moving of waste material
- One remote control operator vehicle
- One dozer for clean cover material
- One vibratory compactor for waste material
- One vibratory compactor for clean cover material
- Two mobile decontamination vehicles
- Eighteen truck tractors for dedicated on site transfer of waste containers
- Eighteen flatbed trailers for dedicated on site transfer of waste containers
- Four trucks for clean cover material
- Two mobile grout mixers/transport trucks
- One motor grader for maintaining gravel roads
- One gravel road maintenance water truck
- One end of shift cover binder spray truck
- One front end loader
- One front end loader for clean cover material
- Four hydraulic trailer tippers
- Portable lighting
- One 45,400 kg (100,000 lb) capacity container off-loading crane
- One tire maintenance truck
- Two preventative maintenance/fuel truck
- One electronics/instrument service vehicle
- Two vacuum trucks (one dedicated for clean material, one dedicated for contaminated material)
- One street sweeper
- Five dedicated administration vehicles
- One personnel shuttle vehicle
- One working face supervisor vehicle
- One grout crew supervisor vehicle
- One bulk cement transport truck
- One grout aggregate transport truck

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2.4.2 Administrative Equipment

All required furniture, storage equipment, workstations, desks, chairs, etc. for the operations building and offices in the decontamination facility will be provided in accordance with GDC Division 12. This equipment includes the following:

- 26 ergonomically designed workstations
- 24 desks
- 4 round conference tables
- 10 large rectangular conference tables
- 10 folding tables for lunch room
- 50 ergonomically designed chairs with casters
- 100 stackable chairs
- 60 ergonomically designed sled-based conference chairs
- 16 storage cabinets
- 20 five drawer file cabinets
- 40 six adjustable shelf bookshelves
- 30 IBM compatible 486 computers
- 4 laser printers
- 3 copiers
- 3 network stations.

2.4.3 Shop Equipment

All shop equipment required for efficient maintenance of equipment at the ERDF will be provided by this project. This equipment includes welders, standard mechanical maintenance tools, standard electronics and electrical equipment, cutting equipment, work benches, work chairs, and storage shelving. Exhausts will be provided for welding and grinding enclosures, and for the garage. The clean maintenance shop will have a sink for clean up and a drinking fountain. An overhead traveling hoist or a small crane system will also be provided by this project. The hoist or crane will run from an exterior loading dock to a mechanical shop workbench and a welding enclosure.

2.4.4 Automated Data Processing Equipment

To facilitate interface requirements between the various project components and the Hanford Solid Waste Information Tracking System (SWITS), a distributed control system (DCS) system for the ERDF control and data acquisition system is proposed. The system will be comprised of a family of independent functional processors. Each functional processor, referred to as a "drop", will be a configurable module programmed to execute a specific dedicated task. The system will be configured to include:

- Independent redundant process control modules (PCMs) utilizing intelligent process I/O hardware, scanners, terminations and signal conditioning as required. The PCMs will be distributed to local control centers or other concentrations of inputs throughout the ERDF, and will perform the necessary continuous, discontinuous, and sequential control and data scanning functions. PCMs may also provide the telemetry interface to mobile or remote controllers or data entry modules.

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- CRT based man machine interface modules (MMIs), or operator terminals, including keyboards, printers, and colorgraphic monitors. MMIs will be located at the Operations Center and at other areas were control, manual data entry, and access to system information is required.

- Programmer/engineer interface consisting of colorgraphic CRTs with keyboards, printers, removable and fixed disks.

- Redundant "Host" computers. The host will provide data storage and retrieval functions, higher level calculations, and will be the primary interface with SWITS.

3.0 ENERGY CONSERVATION FEATURES

This section identifies energy conservation features to be investigated during preliminary design. These features are included in the contingency portion of the conceptual cost estimate. The features identified in Section 2.0 have been included in the construction cost estimate.

3.1 BUILDING ENERGY CONSERVATION FEATURES

The buildings will utilize a variety of features that are determined to be cost effective during preliminary design. Some of the features that will be investigated are discussed below:

- Investigate modifying the thermal mass for the building envelope.

- Investigate shading of the buildings using trees, overhangs, and any other methods that become available.

- Investigate methods to control ventilation, such as pressurizing the building, using higher ventilation as a substitute for mechanical cooling, using operable windows to allow for occupant-controlled ventilation, using nonmechanical ventilation, and/or using vestibules at entrances.

- Investigate various external finishes to minimize heating/cooling loads while maintaining an aesthetically pleasing appearance.

- Slant windows to optimize glass area receiving direct sunlight. This will provide full heat transmission in the winter months and will minimize heat gain in the summer months.

- Utilize daylighting whenever possible. Determine if skylights will minimize energy consumption.

- Determine the type of window treatments that will control direct solar penetration and luminance extremes, while still maintaining view and daylight penetration.

- Provide higher or lower efficiency glazing to optimize energy conservation.

- Investigate the types of mechanical refrigeration systems and types of heating systems available.

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- Determine if abiabatically cooled air economizers on the central station air handlers in conjunction with mechanical cooling are more efficient.
- Determine which types of automatic temperature controls are most economical.
- Determine if computer room air conditioning units are needed and if they are more economical than increased air flow from the main HVAC unit.
- Investigate high efficiency lighting systems that will meet the other lighting objectives of the installation.
- Use task lighting, whenever possible, to accommodate the need for higher lighting levels due to task visual difficulty, glare, intermittently changing requirements, or individual visual differences.
- Investigate motion sensor on/off devices in fenestration areas and intermittent use areas.
- Reduce the use of electric lighting energy resulting from the use of automatic lighting control devices in conjunction with fenestration.
- Determine if high efficiency water heaters are cost effective.
- For exterior lighting, investigate the use of automatic switching by timer, photocell, or a combination.
- Investigate the use of an energy management system, programmable controls, shared tenant services that affect interior environments or "intelligent building" systems.
- Consideration will be given to the use of waste heat, energy recovery, or heat tape systems to conserve energy. It may be economical to utilize heat produced from computers and other equipment during winter months.
- The automatic elevator and conveying systems will incorporate schedule controls and efficient motor controls, such as solid state control devices.
- Showerheads will be designed to provide and maintain user comfort and energy savings.
- Point-of-use water heaters will be considered where their use will reduce energy consumption and they are life-cycle cost effective.
- A heat exchanger will be considered for use in condensate return lines to heat or preheat the service water, cool the condensate, and prevent flashing.
- Piping insulation will be considered for all piping systems. Insulation will be utilized where determined to be life-cycle cost effective.
- Optimize water flows to lavatories, toilets, and showers.
- An evaluation will be made of the potential for the use of condenser heat, waste energy, solar energy, or off-peak heating with thermal storage to reduce water heating energy costs.

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3.2 ELECTRICAL POWER AND DISTRIBUTION

The electrical power and distribution systems will utilize a variety of features that are determined to be cost effective during preliminary design. Some of the features that will be investigated are discussed below:

- Transformers and generating units should be sized as close as possible to the actual anticipated load so that fixed thermal losses are minimized. Future growth of the facility and the risk of sizing to currently anticipated loads should also be considered in the design.
- Transformers will be selected to minimize the combination of no-load, part-load, and full-load losses, without compromising the electrical system operating and reliability requirements.
- Electrical power should be distributed at the highest practical voltage. The use of distribution system transformers should be minimized.
- Motors shall be designed and selected based on optimum efficiency.

3.3 OTHER ENERGY CONSERVATION FEATURES

The utilities and trench operations will utilize a variety of features that are determined to be cost effective during preliminary design. Some of the features that will be investigated are discussed below:

- Investigate high efficiency lighting systems for perimeter fence and night time operations in the trench that will meet the other lighting objectives of the installation.
- Determine whether smoother piping will be more cost effective based on conserving pumping capacity. Utilization of fiberglass or other similar piping may be utilized in lieu of metal piping systems.
- Minimize the number of bends and valves in piping systems.
- Minimize the lengths of runs of piping systems.
- Utilize gravity fed lines whenever feasible to minimize pumping requirements.
- Investigate higher efficiency motor vehicles for use at the ERDF to minimize consumption of fuels.
- Minimize the travel paths for vehicles within the ERDF.
- Utilize high efficiency equipment when determined to be life-cycle cost effective and feasible for use.

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Energy Conservation Certification Report		
Project No. : W-296	ECR No. : DOE/RL/12074--28	REV. : 0

Form ECM-S-1
SHORT FORM

This form should be used when applying the minimum and prescriptive or system performance requirements without a detailed analysis.

Check and attach the applicable checklists. See section 4.4 for ECM checklists.

☒	FORM ECM-CL-3.2	Principles of Effective Energy Building Design
☒	FORM ECM-CL-3.3.2	Lighting--Principles of Design
☒	FORM ECM-WS-3.3-1	Lighting Summary
☒	FORM ECM-WS-3.3-2	Exterior Lighting Power Worksheet
☒	FORM ECM-WS-3.3-3	Prescriptive Interior Lighting Power Worksheet
☒	FORM ECM-WS-3.3-4	System Performance Interior Power Worksheet
☒	FORM ECM-WS-3.3-5	Lighting Control Points Worksheet
☒	FORM ECM-CL-3.4	Auxiliary Systems and Equipment
☒	FORM ECM-CL-3.5.2	Building Envelope--Principles of Design
☒	FORM ECM-WS-3.5-1	Building Envelope Summary
☒	FORM ECM-WS-3.5-2	Fenestration Worksheet
☒	FORM ECM-WS-3.5-3	Opaque Surface Worksheet
☒	FORM ECM-WS-3.5-4	Skylight Exemption Worksheet
☒	FORM ECM-CL-3.6.2	Power and Distribution Systems--Principles of Design
☒	FORM ECM-WS-3.6-1	Electrical Summary
☒	FORM ECM-WS-3.6.3-1	Transformer Loss Worksheet
☒	FORM ECM-CL-3.7.2	HVAC Systems--Principles of Design
☒	FORM ECM-WS-3.7-1	HVAC Systems Summary
☒	FORM ECM-WS-3.7-2	HVAC Systems Prescriptive Worksheet
☒	FORM ECM-WS-3.7-3	Fan Power Worksheet
☒	FORM ECM-CL-3.8.2	HVAC Equipment--Principles of Design
☒	FORM ECM-WS-3.8-1	HVAC Equipment Summary
☒	FORM ECM-WS-3.8-2	HVAC Equipment Efficiency Worksheet
☒	FORM ECM-CL-3.9.2	Service Water Heating--Principles of Design
☒	FORM ECM-WS-3.9-1	Water Heating Summary
☒	FORM ECM-WS-3.9-2	SWH Equipment Efficiency Worksheet
☒	FORM ECM-CL-3.10.2	Energy Management Systems--Principles of Design
☒	FORM ECM-CL-3.10.3	Energy Management Systems--Minimum Requirements
☒	FORM ECM-CL-3.13	Other Energy - Using Systems

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Energy Conservation Certification Report		
Project No. : W-296	ECR No. : DOE/RL/12074--28	REV. : 0

Form ECM-S-1
SHORT FORM

Has a energy file system numbering system for all energy conservation calculation been created? Attach the calculation number index as described in subsection 2.1.1.1.2, Other Energy-Using Systems.

List the minimum requirements that have been incorporated into the project. List the prescriptive requirements that have been incorporated into the project.

Explain the reasons for the decision not to analyze this system or component any further.

For category 2 (building and building systems alterations), complete and attach Form ECM-ES-3.15, Existing Building Energy Survey. See section 2.5 for category 2 requirements and section 3.15 for existing building survey requirements.

For projects over 10,000 ft^2 have all cost-effective energy conservation features listed in the private sector energy experts design review been incorporated into the final design? Attach the completed Form ECM-R-1 if required.

In phase 4, have all acceptance tests been performed? Complete and attach Form ECM AT-1.

In phase 4, has all energy conservation compliance documentation been turned over to the building or facility manager? Complete and attach Form ECM-D-1.

Has commissioning of HVAC systems been conducted? Attach commissioning report.

Has the winter performance test been conducted? Complete Form ECM-PT-W. See section 2.9 for energy testing requirements.

Has the summer performance test been conducted? Complete Form ECM-PT-W. See section 2.9 for energy testing requirements.

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ENERGY CONSERVATION REPORT
ENVIRONMENTAL RESTORATION DISPOSAL FACILITY
PROJECT W-296

The forms indicated on Form ECM-S-1 will be completed and submitted during preliminary design as requred in the Energy Conservation Manual (WHC 1993).

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Appendix D
Work Breakdown Structure/Cost Estimate

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Appendix D1
Work Breakdown Structure

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Appendix D2
CF 111, CF 112, CF 113, CF 114

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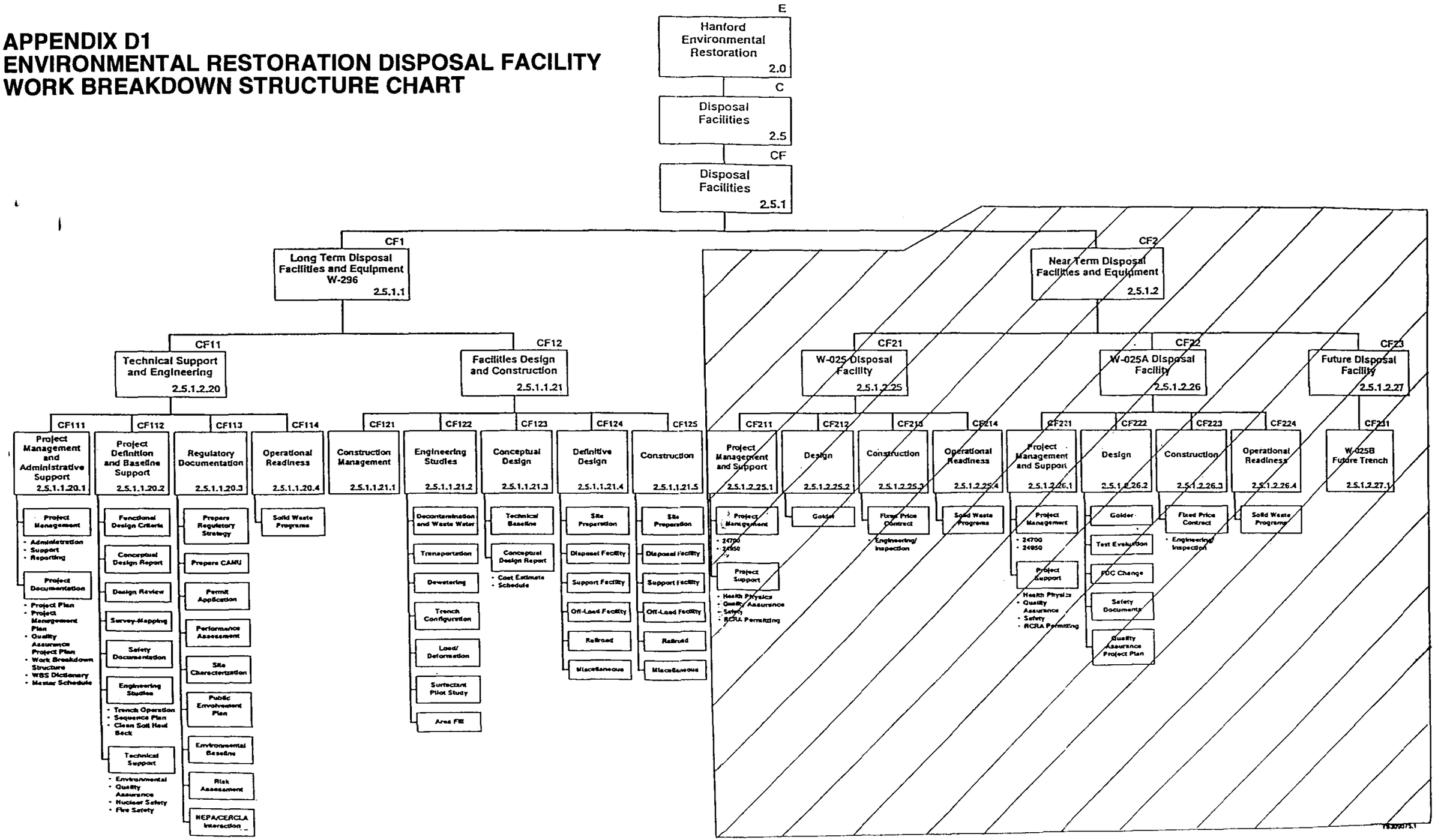
APPENDIX D1
ENVIRONMENTAL RESTORATION DISPOSAL FACILITY WORK BREAKDOWN STRUCTURE CHART



NOTE: CROSSHATCHED AREAS ARE PART OF PROJECT W-025.

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Costs Provided by Westinghouse Hanford Company (a)

CF 111 - Project Management and Administrative Support	$12,253,061
CF 112 - Project Definition and Baseline Support	$718,400
CF 113 - Regulatory Documentation	$7,423,675
CF 114 - Operational Readiness	$4,580,399

(a) Provided by WHC Projects Organization

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Appendix D3
CF 121

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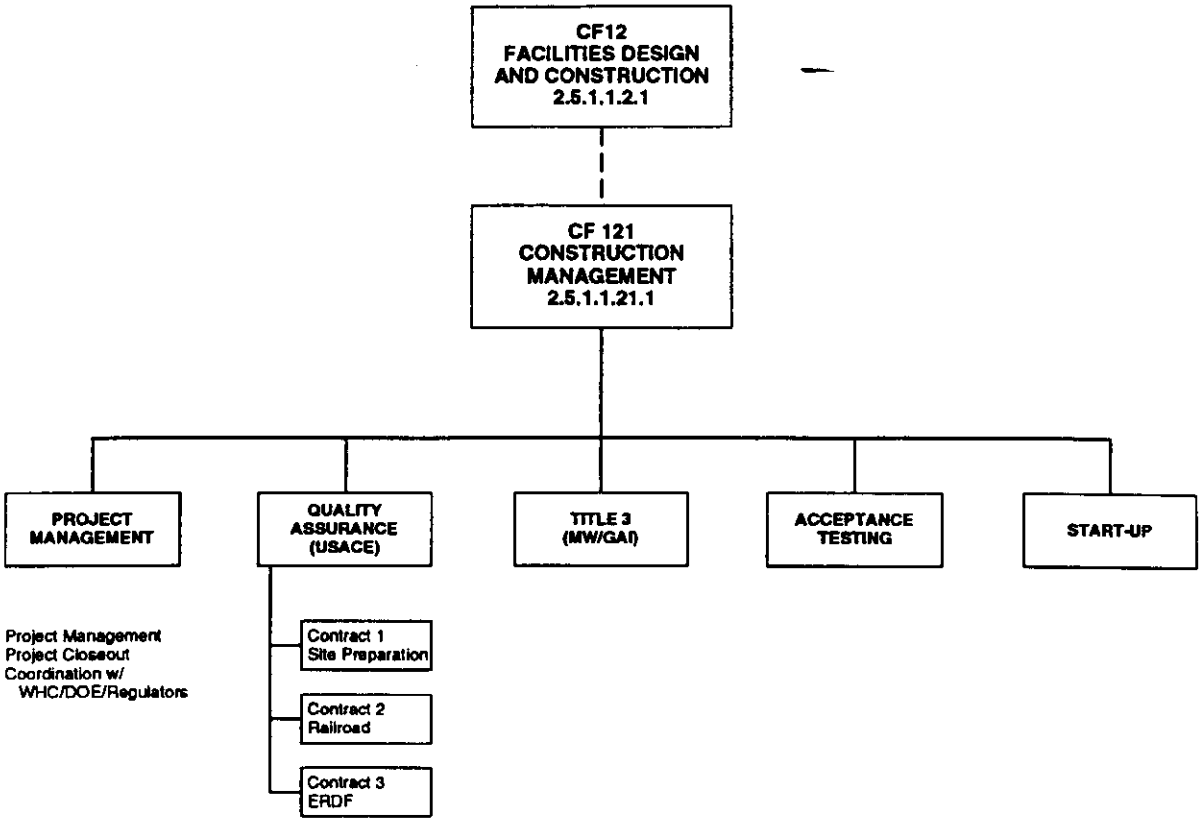

Project Management
Project Closeout
Coordination w/
WHC/DOE/Regulators

Project Management
Monthly Reports
Project Closeout
Coordination
Monthly Meetings with
Regulators

Full Time QA Engineer
Weekly Meetings w/
Each Contractor
ECN Preparation
NCR Preparation
Record Drawings
Change Order Preparation
Maintain Correspondence Logs
Maintain Shop Drawing Logs

Full Time On-Site Engineer
Shop Drawing Review
Review Vendor Information
Respond to ECN's
Review NCR
Review Change Orders
Attend Monthly Meeting
w/Each Contractor
Prepare Record Drawings
Coordination w/USACE QA
Engineer
Assist in Resolving ATP
Exceptions
Assist in Implementing
Inspection Plan
Respond to Field Questions

Operations Readiness Review
ATP
Liner QA (GAI)
Assist in Preparation of
O&M Procedures
Assist in Training

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CF121 Title 3					
Montgomery Watson and Golder Associates, Inc. CMS Costs					
Title 3 Services	**FY 1994**	**FY 1995**	**FY 1996**	**FY 1997**	**Total**
A. Project Management	$0	$104,000	$108,000	$0	$212,000
B. Resolve Construction Field Questions	$0	$142,000	$87,000	$0	$229,000
C. Shop Drawing Review	$0	$192,000	$130,000	$0	$322,000
D. Vendor Information	$0	$0	$0	$0	$0
E. Change Order Pricing and Evaluation	$0	$33,000	$65,000	$0	$98,000
F. ATP Exceptions	$0	$4,000	$28,000	$17,000	$49,000
G. As-builts	$0	$32,000	$32,000	$162,000	$226,000
H. Inspection Plan	$0	$5,000	$34,000	$10,000	$49,000
I. Answer Questions	$0	$116,000	$144,000	$0	$260,000
J. Project Status Meetings	$0	$80,000	$87,000	$0	$167,000
K. Onsite Office Engineer	$0	$154,000	$154,000	$28,000	$336,000
L. Resident Inspection - USACE	N/A	N/A	N/A	N/A	N/A
M. Liner QA	$0	$555,000	$1,265,000	$0	$1,820,000
Subtotal	$0	$1,417,000	$2,134,000	$217,000	$3,768,000
Profit @ 10%	$0	$141,700	$213,400	$21,700	$376,800
MW /GAI Total	$0	$1,558,700	$2,347,400	$238,700	$4,144,800
US Army Corps of Engineers CMS Costs					$12,317,670
Grand Total CMS					$16,462,470

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Golder Associates Inc.

4104-148th Avenue, NE
Redmond, WA 98052
Telephone (206) 883-0777
Fax (206) 882-5498

Golder Associates

January 27, 1994

Our ref: 923-A024

U.S. Army Corps of Engineers
P.O. Box 550
Richland, Washington 99352-0550

ATTENTION: Mr. Wendell Greenwald, MSIN A5-20

RE: CONSTRUCTION QUALITY ASSURANCE COST ESTIMATES FOR THE ERDF PROJECT

Dear Wendell:

Attached, per your request, are our cost estimates for construction quality assurance (CQA) observation and testing for the Environmental Restoration Disposal Facility (ERDF) project. These costs were prepared based on several different construction schedules. The attached spread sheets should be self-explanatory. A list of our assumptions used in preparing these cost estimates is also attached. If you have any questions regarding these cost estimates, please give us a call.

Sincerely,

GOLDER ASSOCIATES INC.

Clifford C. Knitter
Associate

CCK:cg

Attachments

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ERDF CQA COST ESTIMATE ASSUMPTIONS

The level of Construction Quality Assurance (CQA) effort and costs are based on the following assumptions:

- Excavation of the first ten cells as shown on drawing number ES-296-05 of the Conceptual Design of the Environmental Restoration Disposal Facility (ERDF).
- Construction of Cells 1, 2, 3, and 4 as shown on drawing number ES-296-05 of the Conceptual Design of the Environmental Restoration Disposal Facility (ERDF).

Construction Schedules

Several alternatives were looked at in preparing the cost of the CQA effort. These alternatives are:

Alternative 1: Excavate ten cells over a 12 month period from October 1994 to October 1995 and lining of four cells during a 4 month period from April 1996 through July 1996. Both construction activities would work double shifts. The CQA agency would supply all personnel for performing CQA/QC activities.

Alternative 1a: Excavate ten cells over a 12 month period from October 1994 to October 1995 and lining of four cells during a 4 month period from April 1996 through July 1996. The Corps of Engineers would supply construction quality assurance and there would be an independent CQA agency which would review the CQC and CQA activities and documentation. The CQA agency would be responsible for the offsite permeability and conformance testing.

Alternative 2: Excavate ten cells and line four cells concurrently over a 15 month period. The CQA agency would supply all personnel for performing CQA/QC activities. N/A

Alternative 2a: Excavate ten cells and line four cells concurrently over a 15 month period. The Corps of Engineers would supply construction quality assurance and there would be an independent CQA agency which would review the CQC and CQA activities and documentation. The CQA agency would be responsible for the offsite permeability and conformance testing.

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Quantities and Assumptions

- Excavation - 10 million cubic yards (10 Cells)
- Soil Liner - 200,000 cubic yards (4 Cells)
- Drainage Gravel - 76,000 cubic yards (4 Cells)
- Cover Soil - 200,000 cubic yards (4 Cells)
- Smooth HDPE - 2,000,000 ft^2 (4 Cells)
- Textured HDPE - 1,540,000 ft^2 (4 Cells)
- Geocomposite - 1,540,000 ft^2 (4 Cells)
- Geotextile - 3,000,000 ft^2 (4 Cells)

- The contractor will work 10 hours per day, six days per week, and will double shift during excavation.

- Onsite soils laboratory to perform all soils testing except for permeability and slake durability tests.

- Destructive seam testing to be performed onsite.

- Concrete testing if required will be subcontracted.

- Trailer, power, and water to be supplied by contractor.

Offsite Testing Frequencies

- The offsite tests to be performed are based on the testing requirements in the Construction Quality Assurance Plan for Project W-025 Radioactive Mixed Waste(RMW) Land Disposal Facility - Non-Drag-Off, prepared by Golder Associates Inc., dated May 21, 1993.

- The number of offsite tests are based upon the following frequencies:

  Soil Liner: Preconstruction - One recompacted permeability test for every 20,000 cubic yards of soil liner admixed.
  Construction - One shelby tube sample permeability test for every 5,000 cubic yards of soil liner placed and compacted.

  Gravel: Preconstruction - One permeability test and slake durability test per source material.
  Construction - One permeability test for every 3,000 cubic yards of gravel placed.

  Geosynthetic: Conformance Testing: One series of conformance tests for every 100,000 ft^2 of geosynthetic material delivered to the site.

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CQA Personnel Scheduling

- Hours worked per month are based on 4.28 weeks per month and 60 hours worked per week, which equals 257 hours per month.
- CQA survey time is based on 1 day per layer per cell, using a two man crew.

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ENVIRONMENTAL RESTORATION DISPOSAL FACILITY – CONCEPTUAL DESIGN
COST ESTIMATE – CONSTRUCTION QUALITY ASSURANCE EXCAVATION OF 10,000,000 CUBIC YARDS OVER A 12 MONTH PERIOD
Date: 25 January 1994
Prepared by: AGM
Project No.: 923-A024

SUBTASK	UNITS	TYPICAL RATE	MONTHLY UNITS 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL UNITS	TOTAL COST
PROJECT MANAGEMENT																
Project Manager	hours	$100	32	16	16	16	16	16	16	16	16	16	16	16	208	$20,800
QA Officer	hours	$100	40		8		8		8		8		8	8	88	$8,800
Health and Safety	hours	$100	16												16	$1,600
Clerical	hours	$35	8	4	4	4	4	4	4	4	4	4	4	4	52	$1,820
Drafting	hours	$40	8												8	$320
Communication, Reproduction	LS	$250	1	1	1	1	1	1	1	1	1	1	1	1	12	$3,000
Subtotal																$36,340
FIELD CQA																
Project Manager	hours	$100	20	20	20	20	20	20	20	20	20	20	20	20	240	$24,000
CQA Engineer	hours	$70	257	257	257	257	257	257	257	257	257	257	257	257	3084	$215,880
CQA Technician	hours	$40	257	257	257	257	257	257	257	257	257	257	257	257	3084	$123,360
Trucks	month	$35	2	2	2	2	2	2	2	2	2	2	2	2	24	$840
Hotel	day	$47	60	60	60	60	60	60	60	60	60	60	60	60	720	$33,840
Per Diem	day	$30	60	60	60	60	60	60	60	60	60	60	60	60	720	$21,600
Travel (includes car rental)	trip	$600	1	1	1	1	1	1	1	1	1	1	1	1	12	$7,200
Computer	month	$500	1	1	1	1	1	1	1	1	1	1	1	1	12	$6,000
Troxler moisture-density gauge	month	$1,000	1	1	1	1	1	1	1	1	1	1	1	1	12	$12,000
Soils Lab Equipment	month	$600				1	1	1	1	1	1	1	1	1	9	$5,400
Tensiometer	month	$1,100													0	$0
Shipping, Handling, misc.	LS	$1,000	1	1	1	1	1	1	1	1	1	1	1	1	12	$12,000
Surveyor (sub)	hours	$145		10	10	10	10	10	10	10	10	10	10		100	$14,500
Weld, Electric, Structural (sub)	hours	$100				80	80	40							200	$20,000
Subtotal																$496,620

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ENVIRONMENTAL RESTORATION DISPOSAL FACILITY – CONCEPTUAL DESIGN
COST ESTIMATE – CONSTRUCTION QUALITY ASSURANCE EXCAVATION OF 10,000,000 CUBIC YARDS OVER A 12 MONTH PERIOD
Date: 25 January 1994
Prepared by: AGM
Project No.: 923-A024

SUBTASK	UNITS	TYPICAL RATE	MONTHLY UNITS 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL UNITS	TOTAL COST
OFFSITE LABORATORY TESTING																
Admix Permeability	Test	$460													0	$0
Gravel Permeability	Test	$115													0	$0
Slake Durability	Test	$60													0	$0
Geomembrane																
Specific Gravity	Test	$55													0	$0
Carbon Black Content	Test	$90													0	$0
Carbon Black Dispersion	Test	$60													0	$0
Thickness	Test	$45													0	$0
Tensile	Test	$165													0	$0
Friction Angle	Test	$1,950													0	$0
Geotextiles																$0
Mass per Unit Area	Test	$35													0	$0
Grab Strength	Test	$65													0	$0
Tear Strength	Test	$60													0	$0
Burst Strength	Test	$60													0	$0
Puncture Strength	Test	$60													0	$0
Thickness	Test	$45													0	$0
Permittivity	Test	$180													0	$0
AOS	Test	$290													0	$0
Geocomposite																
AOS	Test	$290													0	$0
Friction Angle	Test	$1,950													0	$0
Subtotal																$0
REPORT																
Project Manager	hours	$100												40	40	$4,000
QA Engineer	hours	$70												160	160	$11,200
CQA Lead Technician	hours	$40												40	40	$1,600
Clerical	hours	$35												20	20	$700
Drafting	hours	$40												40	40	$1,600
Computer	month	$500												2	2	$1,000
Reproduction	LS	$2,200												1	1	$2,200
Subtotal																$22,300
TOTAL																$555,260

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ENVIRONMENTAL RESTORATION DISPOSAL FACILITY – CONCEPTUAL DESIGN
COST ESTIMATE – CONSTRUCTION QUALITY ASSURANCE INSTALL ALL LINER COMPONENTS IN 4 MONTHS
Date: 25 January 1994
Prepared by: AGM
Project No.: 923-A024

SUBTASK	UNITS	TYPICA RATE	MONTHLY UNITS 1	2	3	4	5	TOTAL UNITS	BURDENED COST
PROJECT MANAGEMENT									
Project Manager	hours	$100	40	40	40	40		160	$16,000
QA Officer	hours	$100	40	8	8	8		64	$6,400
Health and Safety	hours	$100	16					16	$1,600
Clerical	hours	$35	8	8	8	8		32	$1,120
Drafting	hours	$40	8					8	$320
Communication, Reproduction	LS	$250	1	1	1	1		4	$1,000
Subtotal									$26,440
FIELD CQA									
Project Manager	hours	$100	40	40	40	40		160	$16,000
CQA Engineer	hours	$70	300	300	300	300		1200	$84,000
CQA Lead Technician	hours	$40	300	300	300	300		1200	$48,000
CQA Lab Technician	hours	$35	600	600	600	600		2400	$84,000
CQA Technician	hours	$35	600	600	600	600		2400	$84,000
CQA Technician	hours	$35	600	600	600	600		2400	$84,000
CQA Technician	hours	$35	600	600	600	600		2400	$84,000
CQA Technician	hours	$35	600	600	600	600		2400	$84,000
CQA Technician	hours	$35	600	600	600	600		2400	$84,000
CQA Technician	hours	$35	600	600	600	600		2400	$84,000
CQA Technician	hours	$35	600	600	600	600		2400	$84,000
Trucks	month	$1,100	9	9	9	9		36	$39,600
Hotel	day	$47	540	540	540	540		2160	$101,520
Per Diem	day	$30	540	540	540	540		2160	$64,800
Travel (includes car rental)	trip	$600	1	2	2	2		7	$4,200
Computer	month	$500	2	2	2	2		8	$4,000
Troxler moisture-density gauge	month	$1,000		1	1	1		3	$3,000
Soils Lab Equipment	month	$600	1	1	1	1		4	$2,400
Tensiometer	month	$1,100		1	1	1		3	$3,300
Shipping, Handling, misc.	LS	$2,000	1	1	1	1		4	$8,000
Surveyor (sub)	hours	$145	50	50	50	50		200	$29,000
Weld, Electric, Structural (sub)	hours	$100	50	50	50	50		200	$20,000
Subtotal									$1,099,820

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ENVIRONMENTAL RESTORATION DISPOSAL FACILITY – CONCEPTUAL DESIGN
COST ESTIMATE – CONSTRUCTION QUALITY ASSURANCE INSTALL ALL LINER COMPONENTS IN 4 MONTHS
Date: 25 January 1994
Prepared by: AGM
Project No.: 923-A024

SUBTASK	UNITS	TYPICA RATE	MONTHLY UNITS 1	2	3	4	5	TOTAL UNITS	BURDENED COST
OFFSITE LABORATORY TESTING									
Admix Permeability	Test	$460	10		40			50	$23,000
Gravel Permeability	Test	$115	4		13	13		30	$3,450
Slake Durability	Test	$60	4					4	$240
Geomembrane									
Specific Gravity	Test	$55			36			36	$1,980
Carbon Black Content	Test	$90			36			36	$3,240
Carbon Black Dispersion	Test	$60			36			36	$2,160
Thickness	Test	$45			36			36	$1,620
Tensile	Test	$165			36			36	$5,940
Friction Angle	Test	$1,950			8			8	$15,600
Geotextiles									
Mass per Unit Area	Test	$35			30			30	$1,050
Grab Strength	Test	$65			30			30	$1,950
Tear Strength	Test	$60			30			30	$1,800
Burst Strength	Test	$60			30			30	$1,800
Puncture Strength	Test	$60			30			30	$1,800
Thickness	Test	$45			30			30	$1,350
Permittivity	Test	$180			30			30	$5,400
AOS	Test	$290			30			30	$8,700
Geocomposite									
AOS	Test	$290			32			32	$9,280
Friction Angle	Test	$1,950			8			8	$15,600
Subtotal									$105,960
REPORT									
Project Manager	hours	$100					80	80	$8,000
QA Engineer	hours	$70					160	160	$11,200
CQA Lead Technician	hours	$40					160	160	$6,400
Clerical	hours	$35					40	40	$1,400
Drafting	hours	$40					60	60	$2,400
Computer	month	$500					2	2	$1,000
Reproduction	LS	$2,200					1	1	$2,200
Subtotal									$32,600
TOTAL									$1,264,820

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ENVIRONMENTAL RESTORATION DISPOSAL FACILITY – CONCEPTUAL DESIGN
COST ESTIMATE – CONSTRUCTION QUALITY ASSURANCE EXCAVATION OF 10,000,000 CUBIC YARDS OVER A 12 MONTH PERIOD
Date: 25 January 1994
Prepared by: AGM
Project No.: 923-A024

SUBTASK	UNITS	TYPICAL RATE	MONTHLY UNITS 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL UNITS	TOTAL COST
PROJECT MANAGEMENT																
Project Manager	hours	$100	32	16	16	16	16	16	16	16	16	16	16	16	208	$20,800
QA Officer	hours	$100	40		8		8		8		8		8	8	88	$8,800
Health and Safety	hours	$100	16												16	$1,600
Clerical	hours	$35	8	4	4	4	4	4	4	4	4	4	4	4	52	$1,820
Drafting	hours	$40	8												8	$320
Communication, Reproduction	LS	$250	1	1	1	1	1	1	1	1	1	1	1	1	12	$3,000
Subtotal																$36,340
FIELD CQA																
Project Manager	hours	$100	20	20	20	20	20	20	20	20	20	20	20	20	240	$24,000
CQA Engineer	hours	$70	257	257	257	257	257	257	257	257	257	257	257	257	3084	$215,880
Trucks	month	$35	1	1	1	1	1	1	1	1	1	1	1	1	12	$420
Hotel	day	$47	30	30	30	30	30	30	30	30	30	30	30	30	360	$16,920
Per Diem	day	$30	30	30	30	30	30	30	30	30	30	30	30	30	360	$10,800
Travel (includes car rental)	trip	$600	1	1	1	1	1	1	1	1	1	1	1	1	12	$7,200
Computer	month	$500	1	1	1	1	1	1	1	1	1	1	1	1	12	$6,000
Troxler moisture–density gauge	month	$1,000	1	1	1	1	1	1	1	1	1	1	1	1	12	$12,000
Soils Lab Equipment	month	$600				1	1	1	1	1	1	1	1	1	9	$5,400
Tensiometer	month	$1,100													0	$0
Shipping, Handling, misc.	LS	$1,000	1	1	1	1	1	1	1	1	1	1	1	1	12	$12,000
Surveyor (sub)	hours	$145		10	10	10	10	10	10	10	10	10	10		100	$14,500
Weld, Electric, Structural (sub)	hours	$100				80	80	40							200	$20,000
Subtotal																$345,120

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ENVIRONMENTAL RESTORATION DISPOSAL FACILITY - CONCEPTUAL DESIGN
COST ESTIMATE - CONSTRUCTION QUALITY ASSURANCE EXCAVATION OF 10,000,000 CUBIC YARDS OVER A 12 MONTH PERIOD
Date: 25 January 1994
Prepared by: AGM
Project No.: 923-A024

SUBTASK	UNITS	TYPICAL RATE	MONTHLY UNITS 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL UNITS	TOTAL COST
OFFSITE LABORATORY TESTING																
Admix Permeability	Test	$460													0	$0
Gravel Permeability	Test	$115													0	$0
Slake Durability	Test	$60													0	$0
Geomembrane																
Specific Gravity	Test	$55													0	$0
Carbon Black Content	Test	$90													0	$0
Carbon Black Dispersion	Test	$60													0	$0
Thickness	Test	$45													0	$0
Tensile	Test	$165													0	$0
Friction Angle	Test	$1,950													0	$0
Geotextiles																$0
Mass per Unit Area	Test	$35													0	$0
Grab Strength	Test	$65													0	$0
Tear Strength	Test	$60													0	$0
Burst Strength	Test	$60													0	$0
Puncture Strength	Test	$60													0	$0
Thickness	Test	$45													0	$0
Permittivity	Test	$180													0	$0
AOS	Test	$290													0	$0
Geocomposite																
AOS	Test	$290													0	$0
Friction Angle	Test	$1,950													0	$0
Subtotal																$0
REPORT																
Project Manager	hours	$100												40	40	$4,000
QA Engineer	hours	$70												160	160	$11,200
CQA Lead Technician	hours	$40													0	$0
Clerical	hours	$35												20	20	$700
Drafting	hours	$40												40	40	$1,600
Computer	month	$500												2	2	$1,000
Reproduction	LS	$2,200												1	1	$2,200
Subtotal																$20,700
TOTAL																$402,160

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ENVIRONMENTAL RESTORATION DISPOSAL FACILITY - CONCEPTUAL DESIGN
COST ESTIMATE - CONSTRUCTION QUALITY ASSURANCE INSTALL LINER COMPONENTS IN 4 MONTHS
Date: 25 January 1994
Prepared by: AGM
Project No.: 923-A024

SUBTASK	UNITS	TYPICA RATE	MONTHLY UNITS 1	2	3	4	5	TOTAL UNITS	TOTAL COST
PROJECT MANAGEMENT									
Project Manager	hours	$100	40	24	24	24		112	$11,200
QA Officer	hours	$100	40	8	8	8		64	$6,400
Health and Safety	hours	$100	16					16	$1,600
Clerical	hours	$35	8	8	8	8		32	$1,120
Drafting	hours	$40	8					8	$320
Communication, Reproduction	LS	$250	1	1	1	1		4	$1,000
Subtotal									$21,640
FIELD CQA									
Project Manager	hours	$100	40	40	40	40		160	$16,000
CQA Engineer	hours	$70	300	300	300	300		1200	$84,000
CQA Lead Technician	hours	$40	300	300	300	300		1200	$48,000
CQA Lab Technician	hours	$35	300	300	300	300		1200	$42,000
CQA Technician	hours	$35	300	300	300	300		1200	$42,000
Trucks	month	$1,100	3	3	3	3		12	$13,200
Hotel	day	$47	120	120	120	120		480	$22,560
Per Diem	day	$30	120	120	120	120		480	$14,400
Travel (includes car rental)	trip	$600	1	2	2	2		7	$4,200
Computer	month	$500	1	1	1	1		4	$2,000
Troxler moisture-density gauge	month	$1,000		1	1	1		3	$3,000
Soils Lab Equipment	month	$600	1	1	1	1		4	$2,400
Tensiometer	month	$1,100		1	1	1		3	$3,300
Shipping, Handling, misc.	LS	$2,000	1	1	1	1		4	$8,000
Surveyor (sub)	hours	$145	50	50	50	50		200	$29,000
Weld, Electric, Structural (sub)	hours	$100	50	50	50	50		200	$20,000
Subtotal									$354,060

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ENVIRONMENTAL RESTORATION DISPOSAL FACILITY - CONCEPTUAL DESIGN
COST ESTIMATE - CONSTRUCTION QUALITY ASSURANCE INSTALL LINER COMPONENTS IN 4 MONTHS
Date: 25 January 1994
Prepared by: AGM
Project No.: 923-A024

SUBTASK	UNITS	TYPICA RATE	MONTHLY UNITS 1	2	3	4	5	TOTAL UNITS	TOTAL COST
OFFSITE LABORATORY TESTING									
Admix Permeability	Test	$460	10		40			50	$23,000
Gravel Permeability	Test	$115	4		13	13		30	$3,450
Slake Durability	Test	$60	4					4	$240
Geomembrane									
Specific Gravity	Test	$55			36			36	$1,980
Carbon Black Content	Test	$90			36			36	$3,240
Carbon Black Dispersion	Test	$60			36			36	$2,160
Thickness	Test	$45			36			36	$1,620
Tensile	Test	$165			36			36	$5,940
Friction Angle	Test	$1,950			8			8	$15,600
Geotextiles									
Mass per Unit Area	Test	$35			30			30	$1,050
Grab Strength	Test	$65			30			30	$1,950
Tear Strength	Test	$60			30			30	$1,800
Burst Strength	Test	$60			30			30	$1,800
Puncture Strength	Test	$60			30			30	$1,800
Thickness	Test	$45			30			30	$1,350
Permittivity	Test	$180			30			30	$5,400
AOS	Test	$290			30			30	$8,700
Geocomposite									
AOS	Test	$290			32			32	$9,280
Friction Angle	Test	$1,950			8			8	$15,600
Subtotal									$105,960
REPORT									
Project Manager	hours	$100					80	80	$8,000
QA Engineer	hours	$70					160	160	$11,200
CQA Lead Technician	hours	$40					160	160	$6,400
Clerical	hours	$35					40	40	$1,400
Drafting	hours	$40					60	60	$2,400
Computer	month	$500					2	2	$1,000
Reproduction	LS	$2,200					1	1	$2,200
Subtotal									$32,800
TOTAL									$514,260

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ENVIRONMENTAL RESTORATION DISPOSAL FACILITY - CONCEPTUAL DESIGN
COST ESTIMATE - CONSTRUCTION QUALITY ASSURANCE
Date: 25 January 1994
Prepared by: AGM
Project No.: 923-A024

SUBTASK	UNITS	TYPICAL RATE	MONTHLY UNITS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	TOTAL UNITS	TOTAL COST
PROJECT MANAGEMENT																							
Project Manager	hours	$100	40	24	24	24	24	24	24	24	24	24	24	24	24	24	24					378	$37,800
QA Officer	hours	$100	40	8	8	8	8	8	8	8	8	8	8	8	8	8	8					152	$15,200
Health and Safety	hours	$100	16																			16	$1,600
Clerical	hours	$35	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8					120	$4,200
Drafting	hours	$40	8																			8	$320
Communication, Reproduction	LS	$250	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					15	$3,750
Subtotal																							$62,670
FIELD CQA																							
Project Manager	hours	$100	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20					300	$30,000
CQA Engineer	hours	$70	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257					3855	$269,850
CQA Lead Technician	hours	$40						257	257	257	257	257	257	257	257	257	257					2570	$102,800
CQA Lab Technician	hours	$35					257	257	257	257	257	257	257	257	257	257						2570	$89,950
CQA Technician	hours	$35	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257					3855	$134,925
CQA Technician	hours	$35						257	257	257	257	257	257	257	257	257	257					2570	$89,950
CQA Technician	hours	$35							257	257	257	257	257	257	257	257						2056	$71,960
CQA Technician	hours	$35							257	257	257	257	257	257	257	257						2056	$71,960
CQA Technician	hours	$35							257	257	257	257	257	257								1542	$53,970
CQA Technician	hours	$35							257	257	257	257										1028	$35,980
CQA Technician	hours	$35							257	257	257	257										1028	$35,980
Trucks	month	$1,100	2	2	2	2	3	4	7	7	7	7	5	5	4	4	3					64	$70,400
Hotel	day	$47	60	60	60	60	90	150	300	300	300	300	240	240	210	210	120					2700	$126,900
Per Diem	day	$30	60	60	60	60	90	150	300	300	300	300	240	240	210	210	120					2700	$81,000
Travel (includes car rental)	trip	$600	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					15	$9,000
Computer	month	$500	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1					27	$13,500
Troxler moisture-density gauge	month	$1,000		1	1	1	1	1	1	1	1	1	1	1	1	1	1					14	$14,000
Soils Lab Equipment	month	$800					1	1	1	1	1	1	1	1	1	1	1					11	$8,800
Tensiometer	month	$1,100							1	1	1	1	1	1	1	1	1					9	$9,900
Shipping, Handling, misc.	LS	$2,000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					15	$30,000
Surveyor (sub)	hours	$145		20	20	20	20	20	20	20	20	20	20	20	20	20	20					280	$40,600
Weld, Electric, Structural (sub)	hours	$100				40	40	40	40	40	40	40	40	40	40	40						440	$44,000
Subtotal																							$1,433,225

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ENVIRONMENTAL RESTORATION DISPOSAL FACILITY - CONCEPTUAL DESIGN
COST ESTIMATE - CONSTRUCTION QUALITY ASSURANCE
Date: 25 January 1994
Prepared by: AGM
Project No.: 923-A024

SUBTASK	UNITS	TYPICAL RATE	MONTHLY UNITS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	TOTAL UNITS	TOTAL COST
310 PROJECT MANAGEMENT																							
Project Manager	hours	$100	24	16	16	16	16	16	16	16	16	16	16	16	16	16	16					248	$24,800
QA Officer	hours	$100	24	4	4	4	4	4	4	4	4	4	4	4	4	4	4					80	$8,000
Health and Safety	hours	$100	16																			16	$1,600
Clerical	hours	$35	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8					120	$4,200
Drafting	hours	$40	8																			8	$320
Communication, Reproduction	LS	$250	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					15	$3,750
Subtotal																							$42,670
320 FIELD CQA																							
Project Manager	hours	$100	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20					300	$30,000
CQA Engineer	hours	$70	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257					3855	$269,850
CQA Lead Technician	hours	$40					257	257	257	257	257	257	257	257	257	257	257					2827	$113,080
CQA Lab Technician	hours	$35						214	214	214	214	214	214	214	214							1712	$59,920
CQA Technician	hours	$35							257	257	257	257	257	257	257	257						2056	$71,960
Trucks	month	$1,100	1	1	1	1	2	2	3	3	3	3	3	3	3	3	2					34	$37,400
Hotel	day	$47	30	30	30	30	60	90	120	120	120	120	120	120	120	90	60					1260	$59,220
Per Diem	day	$30	30	30	30	30	60	90	120	120	120	120	120	120	120	90	60					1260	$37,800
Travel (includes car rental)	trip	$600	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					15	$9,000
Computer	month	$500	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					15	$7,500
Troxler moisture-density gauge	month	$1,000		1	1	1	1	1	1	1	1	1	1	1	1	1	1					14	$14,000
Soils Lab Equipment	month	$600			1	1	1	1	1	1	1	1	1	1	1	1						12	$7,200
Tensiometer	month	$1,100							1	1	1	1	1	1	1	1						8	$8,800
Shipping, Handling, misc.	LS	$2,000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					15	$30,000
Surveyor (sub)	hours	$145					20	20	20	20	20	20	20	20	20	20	20					220	$31,900
Weld, Electric, Structural (sub)	hours	$100												40	40	40						120	$12,000
Subtotal																							$799,830

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ENVIRONMENTAL RESTORATION DISPOSAL FACILITY - CONCEPTUAL DESIGN
COST ESTIMATE - CONSTRUCTION QUALITY ASSURANCE
Date: 25 January 1994
Prepared by: AGM
Project No.: 923-A024

SUBTASK	UNITS	TYPICA RATE	MONTHLY UNITS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	TOTAL UNITS	TOTAL COST
OFFSITE LABORATORY TESTING																							
Admix Permeability	Test	$460				10	10	10	10	10												50	$23,000
Gravel Permeability	Test	$115				4				4	4	4	4	4	4	2						30	$3,450
Slake Durability	Test	$60				4																4	$240
Geomembrane																							
Specific Gravity	Test	$55						36														36	$1,980
Carbon Black Content	Test	$90						36														36	$3,240
Carbon Black Dispersion	Test	$60						36														36	$2,160
Thickness	Test	$45						36														36	$1,620
Tensile	Test	$165						36														36	$5,940
Friction Angle	Test	$1,950						8														8	$15,600
Geotextiles																							
Mass per Unit Area	Test	$35						30														30	$1,050
Grab Strength	Test	$65						30														30	$1,950
Tear Strength	Test	$60						30														30	$1,800
Burst Strength	Test	$60						30														30	$1,800
Puncture Strength	Test	$60						30														30	$1,800
Thickness	Test	$45						30														30	$1,350
Permittivity	Test	$180						30														30	$5,400
AOS	Test	$290						30														30	$8,700
Geocomposite																							
AOS	Test	$290						32														32	$9,280
Friction Angle	Test	$1,950						8														8	$15,600
Subtotal																							$105,960
REPORT																							
Project Manager	hours	$100																			40	40	$4,000
QA Engineer	hours	$70																			160	160	$11,200
CQA Lead Technician	hours	$40																			40	40	$1,600
Clerical	hours	$35																			20	20	$700
Drafting	hours	$40																			40	40	$1,600
Computer	month	$500																			2	2	$1,000
Reproduction	LS	$2,200																			1	1	$2,200
Subtotal																							$22,300
TOTAL																							$1,624,155

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ENVIRONMENTAL RESTORATION DISPOSAL FACILITY – CONCEPTUAL DESIGN
COST ESTIMATE – CONSTRUCTION QUALITY ASSURANCE
Date: 25 January 1994
Prepared by: AGM
Project No.: 923-A024

SUBTASK	UNITS	TYPICAL RATE	MONTHLY UNITS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	TOTAL UNITS	TOTAL COST
330 OFFSITE LABORATORY TESTING																							
Admix Permeability	Test	$460				10	10	10	10	10												50	$23,000
Gravel Permeability	Test	$115				4				4	4	4	4	4	4	2						30	$3,450
Stake Durability	Test	$60				4																4	$240
Geomembrane																							
Specific Gravity	Test	$55						36														36	$1,980
Carbon Black Content	Test	$90						36														36	$3,240
Carbon Black Dispersion	Test	$60						36														36	$2,160
Thickness	Test	$45						36														36	$1,620
Tensile	Test	$165						36														36	$5,940
Friction Angle	Test	$1,950						8														8	$15,600
Geotextiles																							
Mass per Unit Area	Test	$35						30														30	$1,050
Grab Strength	Test	$65						30														30	$1,950
Tear Strength	Test	$60						30														30	$1,800
Burst Strength	Test	$60						30														30	$1,800
Puncture Strength	Test	$60						30														30	$1,800
Thickness	Test	$45						30														30	$1,350
Permittivity	Test	$180						30														30	$5,400
AOS	Test	$290						30														30	$8,700
Geocomposite																							
AOS	Test	$290						32														32	$9,280
Friction Angle	Test	$1,950						8														8	$15,600
Subtotal																							$105,960
340 REPORT																							
Project Manager	hours	$100																			40	40	$4,000
QA Engineer	hours	$70																			160	160	$11,200
CQA Lead Technician	hours	$40																			40	40	$1,600
Clerical	hours	$35																			20	20	$700
Drafting	hours	$40																			40	40	$1,600
Computer	month	$500																			2	2	$1,000
Reproduction	LS	$2,200																			1	1	$2,200
Subtotal																							$22,900
TOTAL																							$970,560

* The unit rates will be increased by 4 percent for work done in 1995.

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Appendix D4
CF 122

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CF 122

Engineering Study Costs

Engineering Study Title
On-Site Transportation Network Engineering Study for the Environmental Restoration Storage and Disposal Facility, DOE/RL/12074--12 Rev. 0, August 13, 1993
Source Inventory Development Engineering Study, DOR/RL/12074--20 Rev. 0, December 17, 1993
Engineering Study for the Decontamination and Wastewater Treatment Facility for the Environmental Restoration Storage and Disposal Facility, DOE/RL/12074--10 Rev. 0, July 23, 1993
Engineering Study for the Volume Reduction System Dewatering and Stabilization System for the Environmental Restoration and Disposal Facility, DOE/RL/12074--11 Rev. 0, July 29, 1993
Engineering Study for the Trench and Engineered Barrier Configuration for the Environmental Restoration Storage and Disposal Facility, DOE/RL/12074--13 Rev. 0, August 6, 1993
Design Memorandum Report for the Environmental Restoration Storage and Disposal Facility, DOE/RL/12074--14 Rev. 0, September 1, 1993
Engineering Study for the Conveyor and Area Fill Systems for the Environmental Restoration and Disposal Facility, DOE/RL/12074--15 Rev. 0, October 7, 1993
Engineering Study: Load Deformation Characteristics of Potential Waste Soils for the Environmental Restoration Disposal Facility, DOE/RL/12074--31 Rev. 0, December 17, 1993
Dust Suppressant Pilot Study for the Environmental Restoration Disposal Facility, DOE/RL/12074--30 Rev. 0, January 28, 1994
TOTAL COST: $1,465,400

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Appendix D5
CF 123

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CF 123

CONCEPTUAL DESIGN

Technical Baseline and Conceptual Design Report	$590,000

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Appendix D6
CF 124

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CF124

	FY 1994	FY 1995
Project Management	$91,353	$60,901
Site Preparation Design	$565,435	$0
Railroad Design	$545,347	$0
Facilities Design	$1,411,341	$1,064,695
Subtotal	$2,613,476	$1,125,596
Escalation (2.8%)		$31,517
Contingency (20%)	$522,695	$231,423
	$3,136,171	$1,388,535

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Contingency Analysis - Calculation Sheet

PROJECT TITLE: Hanford Environmental Restoration Disposal Facility

WBS ELEMENT: 2.5.1.1.21.4 / CF 124

ELEMENT DESCRIPTION: ERDF Definitive Design Contract

PREPARED BY: Date:

REVIEWED BY: Date:

APPROVED BY: Date:

NORMAL MAXIMUM CONTINGENCY

Determine the Normal Maximum Contingency from the table below. Enter the appropriate percentage based on estimate type in the space provided.

Remedial Actions
(see note f. below)

Estimate Type	Normal Max. Contingency Assessment	Normal Max. Contingency Remediation
Planning	N/A	100%
Preliminary	70%	60%
Detailed	55%	25%

Construction Projects
(see note g. below)

Estimate Type	Normal Max. Contingency
Study	50%
Conceptual	40%
Definitive	25%

Normal Maximum Contingency used for this estimate: 40%

DELIVERABLE	BASE COST (a)	SCORE RATIO (b)	CONTINGENCY PERCENT (c)	CONTINGENCY DOLLARS (d)
PROJECT MANAGEMENT	$152,254.52	0.51	21%	$31,262.93
SITE PREP AND TRENCH EXCAVATION	$565,434.58	0.55	22%	$125,203.37
RAILROADS	$545,346.79	0.26	11%	$57,404.93
ERDF FACILITIES	$2,476,037.06	0.54	22%	$533,757.40
Totals	$3,739,072.95		0.2000 (e)	$747,628.63

Notes:

a - Base cost = estimated cost excluding contingency.
b - Score ratio is brought forward from scoring sheet(s).
c - Contingency percentage = score ratio x normal maximum contingency.
d - Contingency dollars = contingency percentage x base costs.
e - The total contingency percentage is a weighted average for this estimate = total contingency dollars/total base cost.
f - See EM-40 CAT Handbook for descriptions of estimate types and expected contingency ranges, and for more information about ranges for detailed estimates of remedial actions and equipment.
g - See RL 5700.3 for descriptions of estimate types and expected contingency ranges, and for more information about ranges for detailed estimates of construction and equipment procurement.

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Environmental Restoration Disposal Facility

Richland, Washington

Conceptual Design Report Cost Estimate

Total Contract Cost with Contingency

	Estimated Cost	Contingency Amount	Total Cost
Conract 1	$23,861,136	$6,681,118	$30,542,254
Contract 2	$9,528,561	$2,572,711	$12,101,272
Contract 3	$61,691,876	$18,182,869	$79,874,745
Total Construction Cost	$95,081,573	$27,436,698	$122,518,271

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Contingency Analysis - Calculation Sheet

PROJECT TITLE: Hanford Environmental Restoration Disposal Facility

WBS ELEMENT: 2.5.1.1.21.5 / CF 125

ELEMENT DESCRIPTION: ERDF Construction Contract

PREPARED BY: Date:

REVIEWED BY: Date:

APPROVED BY: Date:

NORMAL MAXIMUM CONTINGENCY

Determine the Normal Maximum Contingency from the table below. Enter the appropriate percentage based on estimate type in the space provided.

Remedial Actions
(see note f. below)

Estimate Type	Normal Max. Contingency	
	Assessment	Remediation
Planning	N/A	100%
Preliminary	70%	60%
Detailed	55%	25%

Construction Projects
(see note g. below)

Estimate Type	Normal Max. Contingency
Study	50%
Conceptual	40%
Definitive	25%

Normal Maximum Contingency used for this estimate: 40%

DELIVERABLE	BASE COST (a)	SCORE RATIO (b)	CONTINGENCY PERCENT (c)	CONTINGENCY DOLLARS (d)
Contract 1	$23,861,136	0.70	28%	$6,681,118
Contract 2	$9,528,561	0.68	27%	$2,572,711
Contract 3	$61,691,876	0.74	29%	$18,182,869
Totals	$95,081,573		29%	$27,436,698

Notes:

a - Base cost = estimated cost excluding contingency.
b - Score ratio is brought forward from scoring sheet(s).
c - Contingency percentage = score ratio x normal maximum contingency.
d - Contingency dollars = contingency percentage x base costs.
e - The total contingency percentage is a weighted average for this estimate = total contingency dollars/total base cost.
f - See EM-40 CAT Handbook for descriptions of estimate types and expected contingency ranges, and for more information about ranges for detailed estimates of remedial actions and equipment.
g - See RL 5700.3 for descriptions of estimate types and expected contingency ranges, and for more information about ranges for detailed estimates of construction and equipment procurement.

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Narrative For ERDF Contingency Analysis

Contract 1 - Site Preparation/Trench Excavation

a) Encountering Unexpected Hazardous Materials - Hazardous chemicals or asbestos may be encountered during construction activities. This will require modifications to the contract and specialized subcontractors to conduct the work.

b) Waste Acceptance Criteria - A change in the waste acceptance criteria may result in additional process equipment in the waste treatment plant, or modifications to the material handling equipment. There may also be a need for a larger grout plant.

c) Changed Conditions - Subsurface conditions or weather may be other than expected, resulting in claims for extra compensation.

d) Changes In Quantities - Changes in quantities such as trench excavation, imported materials, or in other activities will result in cost impacts to the project.

Contract 2 - Railroad

a) Encountering Unexpected Hazardous Materials - Hazardous chemicals or asbestos may be encountered during construction activities. This will require modifications to the contract and specialized subcontractors to conduct the work.

b) Changed Conditions - Subsurface conditions or weather may be other than expected, resulting in claims for extra compensation.

c) Changes In Quantities - Changes in quantities such as trench excavation, imported materials, or in other activities will result in cost impacts to the project.

Contract 3 - ERDF Facilities

a) Encountering Unexpected Hazardous Materials - Hazardous chemicals or asbestos may be encountered during construction activities. This will require modifications to the contract and specialized subcontractors to conduct the work.

b) Changed Conditions - Subsurface conditions or weather may be other than expected, resulting in claims for extra compensation.

c) Changes In Quantities - Changes in quantities such as trench excavation, imported materials, or in other activities will result in cost impacts to the project.

d) Waste Acceptance Criteria - A change in the waste acceptance criteria may result in additional process equipment in the waste treatment plant, or modifications to the material handling equipment. There may also be a need for a larger grout plant.

e) Performance Assessment - A change in the performance assessment may require modifications to the engineered barrier utilized to contain the waste.

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Contingency Analysis - Scoring Sheet

PROJECT TITLE: Hanford Environmental Restoration Disposal Facility

WBS ELEMENT: 2.5.1.1.21.4 / CF 124

ELEMENT DESCRIPTION: ERDF Definitive Design Contract

PREPARED BY:

Risk Factors By Deliverable	RELATIVE WEIGHT	PROBABILITY SCORE	WEIGHTED SCORE	SCORE RATIO
PROJECT MANAGEMENT				
Create phased bid packages	5	0.7	3.5	
Regulatory uncertainty	6	0.5	3.0	
Waste acceptance criteria	4	0.3	1.2	
Totals	15		7.7	0.51
SITE PREP AND TRENCH EXCAVATION				
Create phased bid packages	7	0.7	4.9	
Change in production volumes	4	0.7	2.8	
Relocate spoil storage area	2	0.1	0.2	
Change dust suppression process	2	0.2	0.4	
Regulatory uncertanty	7	0.6	4.2	
Endangered species	6	0.5	3.0	
Totals	28		15.5	0.55
RAILROADS				
Realignment	9	0.2	1.8	
Create phased bid packages	2	0.4	0.8	
Change in grades	8	0.3	2.4	
Totals	19.0		5.0	0.26
ERDF FACILITIES				
Create phased bid packages	7	0.7	4.9	
Change in production volumes	6	0.9	5.4	
Wastewater treatment processes	7	0.3	2.1	
Waste acceptance criteria	4	0.2	0.9	
Performance assessment requirements	2	0.3	0.7	
Totals	26		14.0	0.54

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Contingency Analysis - Scoring Sheet

PROJECT TITLE: Hanford Environmental Restoration Disposal Facility

WBS ELEMENT: 2.5.1.1.21.5 / CF 125

ELEMENT DESCRIPTION: ERDF Construction Contract

PREPARED BY:

Risk Factors By Deliverable	RELATIVE WEIGHT	PROBABILITY SCORE	WEIGHTED SCORE	SCORE RATIO
Contract 1				
Encountering Unexpected Hazardous Materials	8	0.8	6.4	
Waste Acceptance Criteria	8	0.6	4.8	
Changed Conditions	7	0.7	4.9	
Changes In Quantities	4	0.7	2.8	
Totals	27		18.9	0.70
Contract 2				
Encountering Unexpected Hazardous Materials	8	0.7	5.6	
Changed Conditions	4	0.6	2.4	
Changes In Quantities	4	0.7	2.8	
Totals	16		10.8	0.68
Contract 3				
Encountering Unexpected Hazardous Materials	8	0.8	6.4	
Changed Conditions	7	0.9	6.3	
Changes In Quantities	5	0.9	4.5	
Waste Acceptance Criteria	9	0.6	5.4	
Performance Assessment	9	0.6	5.4	
Totals	38		28	0.74

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CF12
FACILITIES DESIGN AND CONSTRUCTION
2.5.1.1.2.4

CF 124
DEFINITIVE DESIGN
2.5.1.1.21.4

PROJECT MANAGEMENT

1. Project Management
2. Quality Assurance
3. Project Closeout
4. Coordination w/ WHC/DOE/Regulators

Project Management
Monthly Reports

Quality Assurance

Project Closeout

Coordination
Biweekly Meetings
Public Hearings (3 per Quarter)

C1 SITE PREPARATION TRENCH EXCAVATION

1. Work Plan
2. Facility Layout
3. Site Preparation
4. Rough Grading
5. Security Fence and Gate Control Points
6. Potable Water Pipeline
7. Raw Water Pipeline
8. Trench Excavation

Project Progress Meetings

Conduct Criteria Review Meeting

60% Drawings
60% Specifications
60% Design Analysis
60% Cost Estimate
60% Schedule
60% Submittal
60% Design Review Meeting
60% Disposition of Review Comments

90% Drawings
90% Specifications
90% Design Analysis
90% Cost Estimate
90% Schedule
90% Submittal
90% Design Review Meeting
90% Disposition of Review Comments
Submit Acceptance Test Procedures
Submit Inspection Plan

100% Drawings
100% Specifications
100% Design Analysis
100% Cost Estimate
100% Schedule
Review Acceptance Test Procedures
Review Inspection Plan

C2 RAILROADS

1. Work Plan
2. Railroad: Lead Track
   Loop Track
   Connection to Existing
   One Overpass
   Two Surface Road Crossings
3. Relocate 200 W Fence and Loop Road
4. Cross Site Transfer Pipe Crossings
5. Relocate Steam Line (100')

Project Progress Meetings

Conduct Criteria Review Meeting

60% Drawings
60% Specifications
60% Design Analysis
60% Cost Estimate
60% Schedule
60% Submittal
60% Design Review Meeting
60% Disposition of Review Comments

90% Drawings
90% Specifications
90% Design Analysis
90% Cost Estimate
90% Schedule
90% Submittal
90% Design Review Meeting
90% Disposition of Review Comments
Submit Acceptance Test Procedures
Submit Inspection Plan

100% Drawings
100% Specifications
100% Design Analysis
100% Cost Estimate
100% Schedule
Review Acceptance Test Procedures
Review Inspection Plan

C3 ERDF FACILITIES

1. Work Plan
2. Drainage (Storm Water Collection)
3. Landscaping
4. Roads, Walks, and Paved Areas
   a. Roads
   b. Parking Lots
   c. Container Unloading
   d. Container Reloading
   e. Backhaul Pad
5. Fuel Storage
6. Bulk Chemical Storage
7. Operations Building
   a. Foundation Investigation
   b. Fire Protection
8. Decontamination Building
9. Wastewater Treatment
10. Communications
11. Electric System
12. Instrumentation System (CAMS, etc.)
13. Irrigation
14. Sanitary Drainfields
15. Trench Linings
16. Leachate Collection
17. Leachate Storage
18. Equipment (Including Grout Plant)
19. Dust Control

Project Progress Meetings

Conduct Criteria Review Meeting

60% Drawings
60% Specifications
60% Design Analysis
60% Cost Estimate
60% Schedule
60% Submittal
60% Design Review Meeting
60% Disposition of Review Comments

90% Drawings
90% Specifications
90% Design Analysis
90% Cost Estimate
90% Schedule
90% Submittal
90% Design Review Meeting
90% Disposition of Review Comments
Submit Acceptance Test Procedures
Submit Inspection Plan

100% Drawings
100% Specifications
100% Design Analysis
100% Cost Estimate
100% Schedule
Review Acceptance Test Procedures
Review Inspection Plan

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WORK BREAKDOWN STRUCTURE
for Definitive Design
Environmental Restoration Disposal Facility

1.3 DEFINITIVE DESIGN
- 1.3.1 Project Management
  - 1.3.1.1 Preparation of ERDF Work Plan Rev. 2
  - 1.3.1.2 Technical Management
    - 1.3.1.2.1 Preparation of Monthly Progress Reports
    - 1.3.1.2.2 Coordination with WHC, DOE, and Regulators
    - 1.3.1.2.3 Project Closeout
  - 1.3.1.3 Quality Assurance
- 1.3.2 Site Preparation and Trench Excavation
  - 1.3.2.1 Preparation of Site Prep and Trench Excavation Work Plan
  - 1.3.2.2 Project Progress Meetings
  - 1.3.2.3 Conduct Criteria Review Meeting
  - 1.3.2.4 60 Percent Design
    - 1.3.2.4.1 Preparation of 60% Design Drawings, Specifications, and Design Analysis
      - 1.3.2.4.1.1 Facility Layout
      - 1.3.2.4.1.2 Site Preparation
      - 1.3.2.4.1.3 Rough Grading
      - 1.3.2.4.1.4 Security Fence and Gate Control Points
      - 1.3.2.4.1.5 Water Pipelines
      - 1.3.2.4.1.6 Trench Excavation
      - 1.3.2.4.1.7 Preparation of Design Media
    - 1.3.2.4.2 Preparation of 60% Cost Estimate and Construction Schedule
    - 1.3.2.4.3 Milestone: Submit 60% Design Media
    - 1.3.2.4.4 Milestone: Submit 60% Cost Estimate and Construction Schedule
    - 1.3.2.4.5 60% Design Review
      - 1.3.2.4.5.1 Review of 60% Design Media
      - 1.3.2.4.5.2 60% Design Media Review Meeting
      - 1.3.2.4.5.3 60% Design Media Response Memo
      - 1.3.2.4.5.4 Review of 60% Cost Estimate and Construction Schedule
  - 1.3.2.5 90 Percent Design
    - 1.3.2.5.1 Preparation of 90% Design Drawings, Specifications, and Design Analysis
      - 1.3.2.5.1.1 Facility Layout
      - 1.3.2.5.1.2 Site Preparation
      - 1.3.2.5.1.3 Rough Grading
      - 1.3.2.5.1.4 Security Fence and Gate Control Points
      - 1.3.2.5.1.5 Water Pipelines
      - 1.3.2.5.1.6 Trench Excavation
      - 1.3.2.5.1.7 Preparation of Design Media
    - 1.3.2.5.2 Preparation of 90% Cost Estimate and Construction Schedule
    - 1.3.2.5.3 Milestone: Submit 90% Design Media
    - 1.3.2.5.4 Milestone: Submit 90% Cost Estimate and Construction Schedule

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1.3.2.5.5 90% Design Review
1.3.2.5.5.1 Review of 90% Design Media
1.3.2.5.5.2 90% Design Media Review Meeting
1.3.2.5.5.3 90% Design Media Response Memo
1.3.2.5.5.4 Review of 90% Cost Estimate and Construction Schedule
1.3.2.5.6 Preparation of Acceptance Test Procedures
1.3.2.5.7 Preparation of Inspection Plan
1.3.2.6 100 Percent Design
1.3.2.6.1 Preparation of 100% Design Drawings, Specifications, and Design Analysis
1.3.2.6.1.1 Facility Layout
1.3.2.6.1.2 Site Preparation
1.3.2.6.1.3 Rough Grading
1.3.2.6.1.4 Security Fence and Gate Control Points
1.3.2.6.1.5 Water Pipelines
1.3.2.6.1.6 Trench Excavation
1.3.2.6.1.7 Preparation of Design Media
1.3.2.6.2 Preparation of 100% Cost Estimate and Construction Schedule
1.3.2.6.3 Milestone: Submit 100% Design Media
1.3.2.6.4 Milestone: Submit 100% Cost Estimate and Construction Schedule
1.3.2.6.5 Revision of Acceptance Test Procedures
1.3.2.6.6 Revision of Inspection Plan
1.3.2.7 Prepare Contractor Bid Documents (CBD) Announcement and Invitation to Bid
1.3.3 Railroads
1.3.3.1 Preparation of Railroad Work Plan
1.3.3.2 Project Progress Meetings
1.3.3.3 Conduct Criteria Review Meeting
1.3.3.4 60 Percent Design
1.3.3.4.1 Preparation of 60% Design Drawings, Specifications, and Design Analysis,
1.3.3.4.1.1 Railroad
1.3.3.4.1.2 Relocation of 200 W Fence and Loop Road
1.3.3.4.1.3 Cross Site Transfer Pipe Crossing
1.3.3.4.1.4 Relocate Steam Line (100 ft)
1.3.3.4.1.5 Preparation of Design Media
1.3.3.4.2 Preparation of 60% Cost Estimate and Construction Schedule
1.3.3.4.3 Milestone: Submit 60% Design Media
1.3.3.4.4 Milestone: Submit 60% Cost Estimate and Construction Schedule
1.3.3.4.5 60% Design Review
1.3.3.4.5.1 Review of 60% Design Media
1.3.3.4.5.2 60% Design Media Review Meeting
1.3.3.4.5.3 60% Design Media Response Memo
1.3.3.4.5.4 Review of 60% Cost Estimate and Construction Schedule

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1.3.3.5 90 Percent Design
- 1.3.3.5.1 Preparation of 90% Design Drawings, Specifications, and Design Analysis
  - 1.3.3.5.1.1 Railroad
  - 1.3.3.5.1.2 Relocation of 200 W Fence and Loop Road
  - 1.3.3.5.1.3 Cross Site Transfer Pipe Crossing
  - 1.3.3.5.1.4 Relocate Steam Line (100 ft)
  - 1.3.3.5.1.5 Preparation of Design Media
- 1.3.3.5.2 Preparation of 90% Cost Estimate and Construction Schedule
- 1.3.3.5.3 Milestone: Submit 90% Design Media
- 1.3.3.5.4 Milestone: Submit 90% Cost Estimate and Construction Schedule
- 1.3.3.5.5 90% Design Review
  - 1.3.3.5.5.1 Review of 90% Design Media
  - 1.3.3.5.5.2 90% Design Media Review Meeting
  - 1.3.3.5.5.3 90% Design Media Response Memo
  - 1.3.3.5.5.4 Review of 90% Cost Estimate and Construction Schedule
- 1.3.3.5.6 Preparation of Acceptance Test Procedures
- 1.3.3.5.7 Preparation of Inspection Plan

1.3.3.6 100 Percent Design
- 1.3.3.6.1 Preparation of 100% Design Drawings, Specifications, and Design Analysis
  - 1.3.3.6.1.1 Railroad
  - 1.3.3.6.1.2 Relocation of 200 W Fence and Loop Road
  - 1.3.3.6.1.3 Cross Site Transfer Pipe Crossing
  - 1.3.3.6.1.4 Relocate Steam Line (100 ft)
  - 1.3.3.6.1.5 Preparation of Design Media
- 1.3.3.6.2 Preparation of 100% Cost Estimate and Construction Schedule
- 1.3.3.6.3 Milestone: Submit 100% Design Media
- 1.3.3.6.4 Milestone: Submit 100% Cost Estimate and Construction Schedule
- 1.3.3.6.5 Revision of Acceptance Test Procedures
- 1.3.3.6.6 Revision of Inspection Plan

1.3.3.7 Prepare Contractor Bid Documents (CBD) Announcement and Invitation to Bid

1.3.4 ERDF Facilities
- 1.3.4.1 Preparation of ERDF Facilities Work Plan
- 1.3.4.2 Project Progress Meetings
- 1.3.4.3 Conduct Criteria Review Meeting
- 1.3.4.4 60 Percent Design
  - 1.3.4.4.1 Preparation of 60% Design Drawings, Specifications, and Design Analysis
    - 1.3.4.4.1.1 Drainage (storm water collection)
    - 1.3.4.4.1.2 Landscaping
    - 1.3.4.4.1.3 Roads, walks, and Paved Areas
    - 1.3.4.4.1.4 Fuel Storage
    - 1.3.4.4.1.5 Bulk Chemical Storage
    - 1.3.4.4.1.6 Operations Building
    - 1.3.4.4.1.7 Decontamination Building

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1.3.4.4.1.8 Wastewater Treatment
1.3.4.4.1.9 Communications
1.3.4.4.1.10 Electric Systems
1.3.4.4.1.11 Instrumentation Systems
1.3.4.4.1.12 Irrigation
1.3.4.4.1.13 Sanitary Drainfields
1.3.4.4.1.14 Trench Lining
1.3.4.4.1.15 Leachate Collection
1.3.4.4.1.16 Leachate Storage
1.3.4.4.1.17 Equipment (Including Grout Plant)
1.3.4.4.1.18 Dust Control
1.3.4.4.1.19 Preparation of Design Media

1.3.4.4.2 Preparation of 60% Cost Estimate and Construction Schedule

1.3.4.4.3 Milestone: Submit 60% Design Media

1.3.4.4.4 Milestone: Submit 60% Cost Estimate and Construction Schedule

1.3.4.4.5 60% Design Review

1.3.4.4.5.1 Review of 60% Design Media
1.3.4.4.5.2 60% Design Media Review Meeting
1.3.4.4.5.3 60% Design Media Response Memo
1.3.4.4.5.4 Review of 60% Cost Estimate and Construction Schedule

1.3.4.5 90 Percent Design

1.3.4.5.1 Preparation of 90% Design Drawings, Specifications, and Design Analysis

1.3.4.5.1.1 Drainage (storm water collection)
1.3.4.5.1.2 Landscaping
1.3.4.5.1.3 Roads, walks, and Paved Areas
1.3.4.5.1.4 Fuel Storage
1.3.4.5.1.5 Bulk Chemical Storage
1.3.4.5.1.6 Operations Building
1.3.4.5.1.7 Decontamination Building
1.3.4.5.1.8 Wastewater Treatment
1.3.4.5.1.9 Communications
1.3.4.5.1.10 Electric Systems
1.3.4.5.1.11 Instrumentation Systems
1.3.4.5.1.12 Irrigation
1.3.4.5.1.13 Sanitary Drainfields
1.3.4.5.1.14 Trench Lining
1.3.4.5.1.15 Leachate Collection
1.3.4.5.1.16 Leachate Storage
1.3.4.5.1.17 Equipment (Including Grout Plant)
1.3.4.5.1.18 Dust Control
1.3.4.5.1.19 Preparation of Design Media

1.3.4.5.2 Preparation of 90% Cost Estimate and Construction Schedule

1.3.4.5.3 Milestone: Submit 90% Design Media

1.3.4.5.4 Milestone: Submit 90% Cost Estimate and Construction Schedule

1.3.4.5.5 90% Design Review

1.3.4.5.5.1 Review of 90% Design Media
1.3.4.5.5.2 90% Design Media Review Meeting
1.3.4.5.5.3 90% Design Media Response Memo

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1.3.4.5.5.4 Review of 90% Cost Estimate and Construction Schedule
1.3.4.5.6 Preparation of Acceptance Test Procedures
1.3.4.5.7 Preparation of Inspection Plan
1.3.4.6 100 Percent Design
1.3.4.6.1 Preparation of 100% Design Drawings, Specifications, and Design Analysis
1.3.4.6.1.1 Drainage (storm water collection)
1.3.4.6.1.2 Landscaping
1.3.4.6.1.3 Roads, walks, and Paved Areas
1.3.4.6.1.4 Fuel Storage
1.3.4.6.1.5 Bulk Chemical Storage
1.3.4.6.1.6 Operations Building
1.3.4.6.1.7 Decontamination Building
1.3.4.6.1.8 Wastewater Treatment
1.3.4.6.1.9 Communications
1.3.4.6.1.10 Electric Systems
1.3.4.6.1.11 Instrumentation Systems
1.3.4.6.1.12 Irrigation
1.3.4.6.1.13 Sanitary Drainfields
1.3.4.6.1.14 Trench Lining
1.3.4.6.1.15 Leachate Collection
1.3.4.6.1.16 Leachate Storage
1.3.4.6.1.17 Equipment (Including Grout Plant)
1.3.4.6.1.18 Dust Control
1.3.4.6.1.19 Preparation of Design Media
1.3.4.6.2 Preparation of 100% Cost Estimate and Construction Schedule
1.3.4.6.3 Milestone: Submit 100% Design Media
1.3.4.6.4 Milestone: Submit 100% Cost Estimate and Construction Schedule
1.3.4.6.5 Revision of Acceptance Test Procedures
1.3.4.6.6 Revision of Inspection Plan
1.3.4.7 Prepare Contractor Bid Documents (CBD) Announcement and Invitation to Bid

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Montgomery Watson Definitive Design Cost Estimate

WBS Element	
1.3.1 Project Management	$152,254.52
1.3.2 Site Preparation and Trench Excavation	$565,434.58
1.3.3 Railroads	$545,346.58
1.3.4 ERDF Facilities	$2,476,037.06
Total for 1.3 DEFINITIVE DESIGN	$3,739,072.74

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Appendix D7
CF 125

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General Contractor	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
General Contractor											
Overhead Items - AA											
Project Manager					0.00	8333.00	0.00	0.00	0.00	8333.00	
	63.00	MON		0.00	0	524,979	0	0	0	524,979	8333.00
General Superintendent					0.00	6667.00	0.00	0.00	0.00	6667.00	
	60.00	MON		0.00	0	400,020	0	0	0	400,020	6667.00
Project Engineer					0.00	6250.00	0.00	0.00	0.00	6250.00	
	63.00	MON		0.00	0	393,750	0	0	0	393,750	6250.00
Clerical/Secretary					0.00	2583.00	0.00	0.00	0.00	2583.00	
	60.00	MON		0.00	0	154,980	0	0	0	154,980	2583.00
Survey Crew					0.00	12917.00	0.00	0.00	0.00	12917.00	
	84.00	MO		0.00	0	1,085,028	0	0	0	1,085,028	12917.00
Sedan (2 ea)					0.00	0.00	0.00	0.00	900.00	900.00	
	60.00	MON		0.00	0	0	0	0	54,000	54,000	900.00
Pickup truck (7 ea)					0.00	0.00	0.00	0.00	3500.00	3500.00	
	60.00	MON		0.00	0	0	0	0	210,000	210,000	3500.00
Flatbed					0.00	0.00	0.00	0.00	1600.00	1600.00	
	60.00	MON		0.00	0	0	0	0	96,000	96,000	1600.00
Office Space including furnishing and computers					0.00	0.00	0.00	0.00	551.65	551.65	
	371.61	M2		0.00	0	0	0	0	205,000	205,000	551.65
Storage					0.00	0.00	0.00	0.00	161.46	161.46	
	139.36	M2		0.00	0	0	0	0	22,500	22,500	161.46
Temporary gravel pavement					0.00	0.00	0.00	0.00	8.37	8.37	
	1672.26	M2		0.00	0	0	0	0	14,000	14,000	8.37
Temporary Fence					0.00	0.00	0.00	0.00	19.68	19.68	
	304.80	M		0.00	0	0	0	0	6,000	6,000	19.68
Install temporary utilities					0.00	0.00	0.00	0.00	6000.00	6000.00	
	3.00	BLD		0.00	0	0	0	0	18,000	18,000	6000.00
Elec/water/phone					0.00	0.00	0.00	0.00	1275.00	1275.00	
	60.00	MON		0.00	0	0	0	0	76,500	76,500	1275.00
Signage					0.00	0.00	0.00	0.00	1500.00	1500.00	
	1.00	LS		0.00	0	0	0	0	1,500	1,500	1500.00
Office supplies					0.00	0.00	0.00	0.00	1500.00	1500.00	
	60.00	MO		0.00	0	0	0	0	90,000	90,000	1500.00

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General Contractor	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Portable toilets (8 ea)					0.00	0.00	0.00	0.00	600.00	600.00	
	60.00	MON		0.00	0	0	0	0	36,000	36,000	600.00
Office Manager					0.00	3333.50	0.00	0.00	0.00	3333.50	
	60.00	MO		0.00	0	200,010	0	0	0	200,010	3333.50
Excavation Superintendent					0.00	6250.00	0.00	0.00	0.00	6250.00	
	54.00	MO		0.00	0	337,500	0	0	0	337,500	6250.00
Excavation Shift supervisor					0.00	6083.00	0.00	0.00	0.00	6083.00	
	108.00	MO		0.00	0	656,964	0	0	0	656,964	6083.00
Excavation Engineer					0.00	5667.00	0.00	0.00	0.00	5667.00	
	54.00	MO		0.00	0	306,018	0	0	0	306,018	5667.00
Support Facilities Supervisor					0.00	6250.00	0.00	0.00	0.00	6250.00	
	36.00	MO		0.00	0	225,000	0	0	0	225,000	6250.00
Support Facilities Engineer					0.00	5667.00	0.00	0.00	0.00	5667.00	
	36.00	MO		0.00	0	204,012	0	0	0	204,012	5667.00
Janitorial Service					0.00	3917.00	0.00	0.00	0.00	3917.00	
	60.00	MO		0.00	0	235,020	0	0	0	235,020	3917.00
Office Engineer					0.00	5667.00	0.00	0.00	0.00	5667.00	
	60.00	MO		0.00	0	340,020	0	0	0	340,020	5667.00
Engineering Technicians					0.00	4583.00	0.00	0.00	0.00	4583.00	
	96.00	MO		0.00	0	439,968	0	0	0	439,968	4583.00
Engineers Office Clerk					0.00	0.00	0.00	0.00	0.00	0.00	
	60.00	MO		0.00	0	0	0	0	0	0	0.00
QA/QC Engineer					0.00	5667.00	0.00	0.00	0.00	5667.00	
	60.00	MO		0.00	0	340,020	0	0	0	340,020	5667.00
QA/QC Technicians					0.00	4583.00	0.00	0.00	0.00	4583.00	
	120.00	MO		0.00	0	549,960	0	0	0	549,960	4583.00
QA/QC Clerk					0.00	2583.00	0.00	0.00	0.00	2583.00	
	60.00	MO		0.00	0	154,980	0	0	0	154,980	2583.00
Safety Engineer					0.00	5667.00	0.00	0.00	0.00	5667.00	
	60.00	MO		0.00	0	340,020	0	0	0	340,020	5667.00
Miscellaneous Submittals					0.00	0.00	0.00	0.00	50000.00	50000.00	
	1.00	LS		0.00	0	0	0	0	50,000	50,000	50000.00
Vans (3 ea)					0.00	0.00	0.00	0.00	1500.00	1500.00	
	60.00	MO		0.00	0	0	0	0	90,000	90,000	1500.00

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General Contractor	QUANTY UOM CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Temporary lights @ yard			0.00	0.00	0.00	2500.00	0.00	2500.00	
	12.00 EA	0.00	0	0	0	30,000	0	30,000	2500.00
Equipment maintenance building			0.00	0.00	0.00	0.00	161.46	161.46	
	222.97 M2	0.00	0	0	0	0	36,000	36,000	161.46
QA/QC Lab			0.00	0.00	0.00	0.00	538.19	538.19	
	23.23 M2	0.00	0	0	0	0	12,500	12,500	538.19
Mobilization/Demobilization			0.00	0.00	0.00	0.00	125000.00	125000.00	
	1.00 LS	0.00	0	0	0	0	125,000	125,000	125000
Insurance			0.00	0.00	0.00	0.00	355000.00	355000.00	
	1.00 LS	0.00	0	0	0	0	355,000	355,000	355000
Overhead Items - AA			0	6,888,249	0	30,000	1,498,000	8,416,249	

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CF 125.1.1 Site Preparation	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
CF 125.1 Contract 1											
CF 125.1.1 Site Preparation											
Site Preparation											
Clear And Grub											
Site Clearing											
Clear and Grub					84.00	2078.90	1005.85	0.00	0.00	3084.75	
Shrubs/vegetation on site includes erosion control	259.00	HEC	COMCA	0.07	21,756	538,434	260,515	0	0	798,949	3084.75
Site Clearing					21,756	538,434	260,515	0	0	798,949	
Clear And Grub					21,756	538,434	260,515	0	0	798,949	
Drainage Control											
Drainage											
Large drainage structure					4.92	121.79	26.96	278.38	0.00	427.13	
	152.40	M	UOEHC	1.22	750	18,561	4,109	42,425	0	65,095	427.13
Grade clean run-off storage areas					0.02	0.61	0.69	0.00	0.00	1.29	
	133781	M2	CODSL4	468.23	3,143	80,971	91,995	0	0	172,967	1.29
Small drainage structure					4.14	102.56	22.70	278.38	0.00	403.65	
	30.48	M	UOEHC	1.45	126	3,126	692	8,485	0	12,303	403.65
400000 gal. storage tanks					0.00	15000.00	0.00	95050.00	0.00	110050.00	
	6.00	EA		0.00	0	90,000	0	570,300	0	660,300	110050
Drainage					4,019	192,658	96,796	621,210	0	910,665	
Drainage Control					4,019	192,658	96,796	621,210	0	910,665	
Fences & Gate Control Points											
Fences & gates											
10'(3M)H Galvanized Fencing					1.06	26.75	10.43	44.13	0.00	81.31	
With Barbed Wire	8354.60	M	ULABN	3.76	8,886	265,516	103,525	437,973	0	807,014	96.60
12'x 10' Double Galv Steel Gate					4.75	119.57	46.62	207.34	0.00	373.52	
For 10'(3M) High Fence	5.00	EA	ULABN	0.84	24	710	277	1,232	0	2,219	443.75
Fences & gates	8354.60	M			8,910	266,226	103,801	439,205	0	809,233	96.86

CF 125.1.1 Site Preparation	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Gate control points											
Gate control points					0.00	0.00	0.00	0.00	21590.00	21590.00	
Material price quote includes shipping by BIG Custom Co. Porter Norton(818)448-1449	3.00	EA		0.00	0	0	0	0	76,947	76,947	25648.92
Gate control points	3.00	EA			0	0	0	0	76,947	76,947	25648.92
Fences & Gate Control Points					8,910	266,226	103,801	439,205	76,947	886,180	
Perimeter Lighting											
Perimeter Lighting											
Allowance for lighting along perimeter fence					34.99	1052.17	197.43	1500.00	0.00	2749.60	
	70.00	EA	EELEJ	0.14	2,449	82,748	15,527	117,968	0	216,242	3089.18
Perimeter Lighting	70.00	EA			2,449	82,748	15,527	117,968	0	216,242	3089.18
Perimeter Lighting					2,449	82,748	15,527	117,968	0	216,242	
Site Preparation					37,135	1,080,066	476,640	1,178,383	76,947	2,812,035	
CF 125.1.1 Site Preparation					37,135	1,080,066	476,640	1,178,383	76,947	2,812,035	

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CF 125.1.2 Utilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
CF 125.1.2 Utilities											
Utilities											
Water Supply, Potable & Raw											
Potable Water Supply											
12" Sanitary (potable) water					0.00	82.02	0.00	114.83	0.00	196.85	
installed	2651.77	M		0.00	0	217,500	0	304,500	0	522,000	196.85
6" Sanitary (potable) water					0.00	49.21	0.00	49.21	0.00	98.42	
installed	304.80	M		0.00	0	15,000	0	15,000	0	30,000	98.42
Potable Water Supply					0	232,500	0	319,500	0	552,000	
Raw Water Supply											
12" Raw water fire loop (fire)					0.00	82.02	0.00	114.83	0.00	196.85	
installed	3505.21	M		0.00	0	287,500	0	402,500	0	690,000	196.85
Raw Water Supply					0	287,500	0	402,500	0	690,000	
Water Supply, Potable & Raw					0	520,000	0	722,000	0	1,242,000	
Utilities					0	520,000	0	722,000	0	1,242,000	
CF 125.1.2 Utilities					0	520,000	0	722,000	0	1,242,000	

CF 125.1.3 Trench Rough Grading/	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
CF 125.1.3 Trench Rough Grading/											
Excavation											
Trench Rough Grading/Excavation											
Cells 1 through 10											
Excavation Cells 1-10											
Excavate Landfill Trench					0.02	0.46	1.66	0.00	0.00	2.11	
(Price includes running two eight hour shifts per day)	6924121	M3	CODSL1	1741.68	115,015	3,157,026	11470710	0	0	14,627,736	2.11
Excavation Cells 1-10	6924121	M3			115,015	3,157,026	11470710	0	0	14,627,736	2.11
Cells 1 through 10					115,015	3,157,026	11470710	0	0	14,627,736	
Trench Rough Grading/Excavation					115,015	3,157,026	11470710	0	0	14,627,736	
CF 125.1.3 Trench Rough Grading/					115,015	3,157,026	11470710	0	0	14,627,736	
CF 125.1 Contract 1					152,150	4,757,093	11947349	1,900,383	76,947	18,681,771	

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CF 125.2.1 Railroad	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
CF 125.2 Contract 2											
CF 125.2.1 Railroad											
Demolition											
Road Relocation											
Road Relocation											
Abandon existing roadway and construct new.											
Prepare Subgrade					0.04	0.99	0.40	0.48	0.00	1.87	
Prepare and Roll Subbase	6689.05	M2	XSGRA	156.77	256	6,595	2,699	3,200	0	12,494	1.87
4"(10cm) Crushed Agg Base Course					0.03	0.86	0.39	2.87	0.00	4.12	
Grader, Roller and Water Truck	6689.05	M2	XSABA	235.16	227	5,759	2,615	19,200	0	27,574	4.12
Bituminous Hot Mix Surf Course					0.53	13.30	4.76	28.66	0.00	46.72	
3" Surface	1197.49	MT	XASPA	22.68	634	15,922	5,702	34,320	0	55,945	46.72
2"(5cm) Leveling Course					0.02	0.61	0.28	1.44	0.00	2.32	
Grader, Roller and Water Truck	6689.05	M2	XSABA	333.93	160	4,056	1,842	9,600	0	15,498	2.32
Road Relocation					1,277	32,333	12,858	66,320	0	111,511	
Road Relocation					1,277	32,333	12,858	66,320	0	111,511	
Fence Relocation											
Fence Relocation											
Remove Chain Link Fence					0.21	5.11	0.03	0.00	0.00	5.14	
	1158.24	M	ULABB	11.81	245	5,921	37	0	0	5,958	5.14
10'(3M)H Galvanized Fencing					1.06	26.75	10.43	44.13	0.00	81.31	
With Barbed Wire	914.40	M	ULABN	3.76	973	24,462	9,538	40,350	0	74,349	81.31
Fence Relocation					1,218	30,382	9,574	40,350	0	80,307	
Fence Relocation					1,218	30,382	9,574	40,350	0	80,307	
Utility Relocation											
Utility Relocation											
Allowance to Relocate					0.00	0.00	0.00	40000.00	0.00	40000.00	
Aboveground Steam Line	1.00	LS		0.00	0	0	0	40,000	0	40,000	40000.00
Utility Relocation					0	0	0	40,000	0	40,000	

CF 125.2.1 Railroad

	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Utility Relocation					0	0	0	40,000	0	40,000	
Demolition					2,495	62,715	22,433	146,670	0	231,818	

CF 125.2.1 Railroad	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Lead Railroad											
Lead Railroad											
Lead track											
Railroad Work, 115# Rail					2.01	49.03	4.51	45.00	0.00	98.54	
In Place, Compl, ARA-A and ARAE	41717	TF	UOEHD	2.74	83,647	2,475,021	227,629	2,271,491	0	4,974,141	119.24
Railroad Work,115# No.10 Turnout					1527.78	37359.72	3435.96	19000.00	0.00	59795.68	
In Place, Compl, ARA-A and ARAE	12.00	EA	UOEHD	0.00	18,333	542,463	49,890	275,880	0	868,233	72352.77
Lead track	12715	TM			101,980	3,017,484	277,519	2,547,371	0	5,842,374	459.49
Lead Railroad					101,980	3,017,484	277,519	2,547,371	0	5,842,374	
Lead Railroad					101,980	3,017,484	277,519	2,547,371	0	5,842,374	

CF 125.2.1 Railroad	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Underpass											
Underpass											
Underpass											
R/R Underpass					0.00	0.00	0.00	0.00	45000.00	45000.00	
	1.00	LS		0.00	0	0	0	0	45,000	45,000	45000.00
Underpass					0	0	0	0	45,000	45,000	
Site Lighting											
Allowance for site lighting					34.99	1052.17	197.43	1500.00	0.00	2749.60	
along concrete loading platform	4.00	EA	EELEJ	0.14	140	4,209	790	6,000	0	10,998	2749.60
Site Lighting	4.00	EA			140	4,209	790	6,000	0	10,998	2749.60
Underpass					140	4,209	790	6,000	45,000	55,998	
Underpass					140	4,209	790	6,000	45,000	55,998	

CF 125.2.1 Railroad	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Road Crossing											
Asphalt Railroad Crossing					0.00	0.00	0.00	50000.00	0.00	50000.00	
Including Gates and Lights	2.00	EA		0.00	0	0	0	121,000	0	121,000	60500.00
Asphalt Railroad Crossing W/out					0.00	0.00	0.00	2500.00	0.00	2500.00	
Gates and Lights	3.00	EA		0.00	0	0	0	9,075	0	9,075	3025.00
Road Crossing					0	0	0	130,075	0	130,075	

CF 125.2.1 Railroad	QUANTY UOM CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Equipment									
Equipment									
Equipment									
Railroad Yard Switcher Engine 1500HP, up to 100 cars @100 Tons each	1.00 EA	0.00	0.00 0	0.00 0	1200000 1,200,000	0.00 0	0.00 0	1200000.00 1,200,000	1200000
Equipment			0	0	1,200,000	0	0	1,200,000	
Equipment			0	0	1,200,000	0	0	1,200,000	
Equipment			0	0	1,200,000	0	0	1,200,000	
CF 125.2.1 Railroad			104,615	3,084,408	1,500,741	2,830,116	45,000	7,460,265	
CF 125.2 Contract 2			104,615	3,084,408	1,500,741	2,830,116	45,000	7,460,265	

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CF 125.3.1 Disposal Facility	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
CF 125.3 Contract 3											
CF 125.3.1 Disposal Facility											
Grading for Trench Liner Placement											
Fine Grading											
Grading Cells 1-4											
Fine grade trench					0.02	0.61	0.69	0.00	0.00	1.30	
	146323	M2	CODSL4	464.52	3,465	89,303	101,430	0	0	190,733	1.30
Grading Cells 1-4					3,465	89,303	101,430	0	0	190,733	
Fine Grading					3,465	89,303	101,430	0	0	190,733	
Grading for Trench Liner					3,465	89,303	101,430	0	0	190,733	

CF 125.3.1 Disposal Facility	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Trench Lining											
Lining Cells 1 - 4											
Lining of the remaining 6 cells will be completed by Operations.											
Floor liner											
Quotation provided by Gundle lining company, Rick Cannon (800)435-2008.											
3' Compacted Admix					0.05	1.21	2.97	29.43	0.00	33.60	
12% bentonite, Assume bentonite compatible soil is available on site.	87501	M3	CODSL5	354.76	3,948	105,976	259,458	2,575,013	0	2,940,447	33.60
3' Operations Layer					0.04	1.01	2.74	0.00	0.00	3.75	
	87501	M3	CODSL3	375.40	3,262	88,100	240,186	0	0	328,285	3.75
Drainage Gravel					0.05	1.19	0.90	19.62	0.00	21.72	
	48611	M3	CODTF	152.91	2,225	57,966	43,959	953,700	0	1,055,625	21.72
Geotextile separator 8 oz. geotextile,Delivery & Installation Included	105260	M2		0.00	0.00 0	0.00 0	0.00 0	0.00 0	2.48 292,773	2.48 292,773	2.78
Geotextile cushion 8 oz geotextile, delivery & Installation Included	105260	M2		0.00	0.00 0	0.00 0	0.00 0	0.00 0	2.48 292,773	2.48 292,773	2.78
Primary HDPE geomembrane Gundline 60 mil HD, Delivery & Installation Included	100382	M2		0.00	0.00 0	0.00 0	0.00 0	0.00 0	4.31 485,577	4.31 485,577	4.84
Geotextile cushion 8 oz geotextile, Delivery & Installation Included	105260	M2		0.00	0.00 0	0.00 0	0.00 0	0.00 0	2.48 292,773	2.48 292,773	2.78
Geotextile cushion 8 oz geotextile, Delivery & Installation Included	105260	M2		0.00	0.00 0	0.00 0	0.00 0	0.00 0	2.48 292,773	2.48 292,773	2.78
Secondary HDPE geomembrane Gundline 60 mil HDT, Delivery & Installation Included	100475	M2		0.00	0.00 0	0.00 0	0.00 0	0.00 0	4.74 534,629	4.74 534,629	5.32
Floor liner	95691	M2			9,435	252,042	543,603	3,528,713	2,191,297	6,515,654	68.09

CF 125.3.1 Disposal Facility	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Sideslope liner											
Quotation provided by Gundle lining company, Rick Cannon (800)435-2008.											
3' Compacted Admix					0.05	1.21	2.97	29.43	0.00	33.60	
	78225	M3	CODSL5	354.76	3,530	94,742	231,954	2,302,043	0	2,628,738	33.60
3' Operations Layer					0.04	1.01	2.74	0.00	0.00	3.75	
	78225	M3	CODSL3	375.40	2,916	78,761	214,724	0	0	293,485	3.75
Primary drainage geocomposite Double sided fabra-net 8 oz, Delivery & Installation Included	85547	M2		0.00	0.00 0	0.00 0	0.00 0	0.00 0	6.14 589,687	6.14 589,687	6.89
Primary HDPE geomembrane Gundline 60 mil HD, Delivery & Installation Included	89824	M2		0.00	0.00 0	0.00 0	0.00 0	0.00 0	4.31 434,506	4.31 434,506	4.84
Secondary drainage geocomposite Double sided fabri-net 6 oz, Delivery & Installation Included	85547	M2		0.00	0.00 0	0.00 0	0.00 0	0.00 0	5.17 496,578	5.17 496,578	5.80
Secondary HDPE geomembrane Gundline 60 mil HDT, Delivery & Installation Included	89824	M2		0.00	0.00 0	0.00 0	0.00 0	0.00 0	4.74 477,957	4.74 477,957	5.32
Sideslope liner	85547	M2			6,446	173,502	446,678	2,302,043	1,998,727	4,920,950	57.52
Lining Cells 1 - 4					15,881	425,544	990,281	5,830,755	4,190,024	11,436,605	
Trench Lining					15,881	425,544	990,281	5,830,755	4,190,024	11,436,605	

CF 125.3.1 Disposal Facility	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Leachate Storage and Pumping											
Leachate Collection & Storage											
Sideslope riser											
10" Double wall HDPE collection pipe					0.00	0.00	0.00	0.00	246.06	246.06	
	316.99	M		0.00	0	0	0	0	92,664	92,664	292.32
Sideslope riser	316.99	M			0	0	0	0	92,664	92,664	292.32
Leachate transfer pipe											
10" Double wall HDPE collection pipe					0.00	0.00	0.00	0.00	246.06	246.06	
	1380.75	M		0.00	0	0	0	0	403,623	403,623	292.32
Leachate transfer pipe	1380.75	M			0	0	0	0	403,623	403,623	292.32
Pump control enclosure											
Pump control enclosure					0.00	250.00	0.00	2250.00	0.00	2500.00	
	4.00	EA		0.00	0	1,188	0	10,692	0	11,880	2970.00
Pump control enclosure	4.00	EA			0	1,188	0	10,692	0	11,880	2970.00
Pumps-leachate/leak detection											
50-125 GPH Submersible pump					20.00	607.54	81.05	1049.00	0.00	1737.60	
	8.00	EA	MPLUS	0.18	160	5,774	770	9,970	0	16,514	2064.26
Pumps-leachate/leak detection	8.00	EA			160	5,774	770	9,970	0	16,514	2064.26
Leachate storage tanks & pumps											
350 gal. storage tank(cleaning)					8.00	100.00	0.00	700.00	0.00	800.00	
	1.00	EA		0.00	8	119	0	832	0	950	950.40
25 GPM Pump					4.52	137.19	18.30	221.46	0.00	376.95	
	2.00	EA	MPLUS	0.78	9	326	43	526	0	896	447.82
400000 gal. storage tanks					0.00	15000.00	0.00	95050.00	0.00	110050.00	
	3.00	EA		0.00	0	53,460	0	338,758	0	392,218	130739
Valve allowance					0.00	0.00	0.00	30000.00	0.00	30000.00	
	1.00	LS		0.00	0	0	0	35,640	0	35,640	35640.00

CF 125.3.1 Disposal Facility	QUANTY UOM CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Leachate storage tanks & pumps	3.00 EA		17	53,905	43	375,756	0	429,704	143235
Leachate Collection & Storage			177	60,867	814	396,418	496,287	954,385	
Leachate Storage and Pumping			177	60,867	814	396,418	496,287	954,385	

CF 125.3.1 Disposal Facility	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Electrical											
Electrical											
Site Lighting											
Allowance for site lighting					14.00	421.04	79.01	600.00	0.00	1100.05	
includes circuitry only for connection of moveable lighting	6.00	EA	EELEJ	0.36	84	2,838	533	4,045	0	7,415	1235.91
Site Lighting	6.00	EA			84	2,838	533	4,045	0	7,415	1235.91
Electrical					84	2,838	533	4,045	0	7,415	
Electrical					84	2,838	533	4,045	0	7,415	

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CF 125.3.1 Disposal Facility	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Equipment											
Equipment											
Administration Equipment											
Five Dedicated Administration vehicles. Ford Taurus or F-150 Pickup quote, by Troy Cooper, Beauty Ford 404-659-3673.	5.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	18000.00 90,000	18000.00 90,000	18000.00
Crew Transport Vehicle, 15 pass. van,Quote by Troy Cooper Beauty Ford 404-659-3673	1.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	23000.00 23,000	23000.00 23,000	23000.00
Administration Equipment					0	0	0	0	113,000	113,000	
Waste Container Transfer											
Wheeled Container Handlers, 45,000kg(100,000lb), Quote by Gallo Eq. Co. Joe Ray, 312-374-5515	4.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	550000.00 2,200,000	550000.00 2,200,000	550000
Waste Container Transfer					0	0	0	0	2,200,000	2,200,000	
Transport of Waste Within ERDF											
Truck Tractors w/ HEPA Filters for dedicated on site tsf of waste containers, Freightliner, Quote by Dick Kykendall 404-366-8044.	18.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	78500.00 1,413,000	78500.00 1,413,000	78500.00
Flatbed Trailers for Dedicated on site tsf of waste containers (15'or20'), Quote by Gary Stotz Accurate Industries 800-220-2228	18.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	35500.00 639,000	35500.00 639,000	35500.00
Transport of Waste Within ERDF					0	0	0	0	2,052,000	2,052,000	
Container Unload Op./Stabilize											
Hydraulic trailer tippers w/HEPA Filters Quote by Ken Bratlie Columbia company 503-531-0600.	4.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	256000.00 1,024,000	256000.00 1,024,000	256000

CF 125.3.1 Disposal Facility	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
100,000 pound crain,w/HEPA Filters,American #9260 125T w/container attachment. Dataquest	1.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	837000.00 837,000	837000.00 837,000	837000
Dozers for moving of waste material D-8 $355,000ea,+remote controls$100,000 1st,$50,000ea after,+HEPA Filters $5,000 1st, $2,000ea after,Quote by Stan Lester & Paul Pemberton Yancy brothers 800-282-1562.	8.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	414000.00 3,312,000	414000.00 3,312,000	414000
Vibratory compactor for waste material 84' self propelled, sheeps foot,w/ HEPA Filter,Quote by Stan Lester Yancy Brothers 800-282-1562,Not able To Get Firm Quotes For Pull type	1.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	147000.00 147,000	147000.00 147,000	147000
Remote Control Operator Vehicle Ford Aerostar van, Quote by Troy Cooper Beaudy Ford 404-659-3673	1.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	18000.00 18,000	18000.00 18,000	18000.00
Tipping face supervisor vehicle Ford F-150 Pick-up truck,Quote by Troy Cooper Beauty Ford 404-659-3673.	1.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	18000.00 18,000	18000.00 18,000	18000.00
Grout Batch Mixer Truck,9CY bridge axle,w/HEPA Filters Quote by Julious Parrish McNeilus trucking co. 404-459-5151	2.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	109000.00 218,000	109000.00 218,000	109000
Front End Loader 3.5cy RT,w/HEPA Filters, Quote by Stan Lester Yancy Brothers 800-282-1562	1.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	167000.00 167,000	167000.00 167,000	167000
Grout crew supervisor vehicle '94 Aerostar van,Quote by Troy Cooper Beauty Ford 404-659-3673.	1.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	18000.00 18,000	18000.00 18,000	18000.00
Bulk cement transport truck tractor w/ 1,000CF trailer w/ off loading blower,Quote by Ralf @ Fruehauf trucking 404-895-0323.	1.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	130000.00 130,000	130000.00 130,000	130000

LABOR ID: HANFRD EQUIP ID: HANFRD Currency in DOLLARS CREW ID: HANFRD UPB ID: PTC93D

CF 125.3.1 Disposal Facility	QUANTY UOM CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Grout aggregate tsp truck End dump trailer 30'frame, 28'dump body, 2 axle $30,000; Freightliner tractor $72,500 Quotes by Ralf @ Fruehauf 404-361-3511 & Dick @ Freightliner 404-366-8044	1.00 EA	0.00	0.00 0	0.00 0	0.00 0	0.00 0	103000.00 103,000	103000.00 103,000	103000
Container Unload Op./Stabilize			0	0	0	0	5,992,000	5,992,000	
Interim Cover Placemt/Maint									
Front End Loader (stockpile to truck),4cy crawler,w/HEPA Filter,Quote by Stan Lester Yancy Brothers 800-282-1562	1.00 EA	0.00	0.00 0	0.00 0	0.00 0	0.00 0	317000.00 317,000	317000.00 317,000	317000
Dump Trucks Ford 15CY,w/HEPA Filters,Quote by Art @ Peachstate Ford 404-449-5300.	4.00 EA	0.00	0.00 0	0.00 0	0.00 0	0.00 0	91000.00 364,000	91000.00 364,000	91000.00
Dozer for clean cover material D-8 Quote by Stan Lester Yancy Brothers 800-282-1562.	1.00 EA	0.00	0.00 0	0.00 0	0.00 0	0.00 0	355000.00 355,000	355000.00 355,000	355000
Vibratory roller,for clean cover material. 84' self propelled sheeps foot,Quote by Stan Lester Yancy Brothers 800-282-1562,Not Able To Get Firm Quotes For Pull Type.	1.00 EA	0.00	0.00 0	0.00 0	0.00 0	0.00 0	141000.00 141,000	141000.00 141,000	141000
Motor Grader,14-G,w/HEPA Filters, Quote by Stan Lester Yancy Brothers 800-282-1562	1.00 EA	0.00	0.00 0	0.00 0	0.00 0	0.00 0	281000.00 281,000	281000.00 281,000	281000
Water Truck, w/HEPA Filters	1.00 EA	0.00	0.00 0	0.00 0	0.00 0	0.00 0	56000.00 56,000	56000.00 56,000	56000.00
Binder Spray Truck,w/HEPA Filters	1.00 EA	0.00	0.00 0	0.00 0	0.00 0	0.00 0	61000.00 61,000	61000.00 61,000	61000.00
Interim Cover Placemt/Maint			0	0	0	0	1,575,000	1,575,000	

CF 125.3.1 Disposal Facility	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Equipment Maintenance											
Equipment Service Fuel Truck,w/ HEPA Filters	2.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	66000.00 132,000	66000.00 132,000	66000.00
Tire Maintenance Truck,w/HEPA Filters	1.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	66000.00 66,000	66000.00 66,000	66000.00
Electronics\Instrument Service Truck,w/HEPA Filters,Allowance	1.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	56000.00 56,000	56000.00 56,000	56000.00
Street Sweeper,Self Prop,w/HEPA Filters	1.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	43000.00 43,000	43000.00 43,000	43000.00
Vacuum Trucks,w/HEPA Filters 2,000 gal, 75'hose single axle truck Quote by Brian Giglione, Keith Huber co. 800-334-8237	2.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	56500.00 113,000	56500.00 113,000	56500.00
Equipment Maintenance					0	0	0	0	410,000	410,000	
Decontanimation Operations											
Wheeled Container Handler 15,000 lb Capacity Handlers, Std Size, Quote by Gallo Eq. Co. Joe Gray	5.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	159000.00 795,000	159000.00 795,000	159000
Mobile Decontamination Vehicle, F-250 P.U.($20,000)w/ Sioux pressure washer, 2000psi, 200 gal water tank($11,000), Quotes by Troy Cooper Beauty Ford 404-659-3673,Shelby @ Sioux Steam Cleaner 605-763-2776	2.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	31000.00 62,000	31000.00 62,000	31000.00
Decontanimation Operations					0	0	0	0	857,000	857,000	
Misc. Equipment											
Grout Batch Plant Automated batch plant, incl. 1,600CF silo Quote by Mike @ Jamison Eq. co./Connoco mfg. 404-476-0280.	1.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	119000.00 119,000	119000.00 119,000	119000
Portable light tower Armida LT 5080 D-4, 15.5 HP,8Kw Quote by Sunbelt rentals (404-447-1552).	4.00	EA		0.00	0.00 0	0.00 0	0.00 0	0.00 0	17550.00 70,200	17550.00 70,200	17550.00

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CF 125.3.1 Disposal Facility	QUANTY UOM CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Movable light stand(trench area)			0.00	0.00	0.00	0.00	8000.00	8000.00	
	6.00 EA	0.00	0	0	0	0	48,000	48,000	8000.00
Misc. Equipment			0	0	0	0	237,200	237,200	
Equipment			0	0	0	0	13436200	13,436,200	
Equipment			0	0	0	0	13436200	13,436,200	
CF 125.3.1 Disposal Facility			19,607	578,552	1,093,058	6,231,217	18122511	26,025,338	

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
CF 125.3.2 Support Facilities											
Landscaping and Irrigation											
Landscaping & Irrigation											
Landscaping											
Landscaping Allowance					0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS		0.00	0	0	0	10,000	0	10,000	10000.00
Seeding					0.00	0.00	0.00	4447.88	0.00	4447.88	
	8.09	HEC		0.00	0	0	0	36,000	0	36,000	4447.88
Landscaping					0	0	0	46,000	0	46,000	
Irrigation											
Irrigation area at building					0.00	0.00	0.00	59201.31	0.00	59201.31	
	0.40	HEC		0.00	0	0	0	23,958	0	23,958	59201.31
Irrigation					0	0	0	23,958	0	23,958	
Landscaping & Irrigation					0	0	0	69,958	0	69,958	
Landscaping and Irrigation					0	0	0	69,958	0	69,958	

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CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Roads, Walks and Paved Areas											
Roads & Walks											
Paved roads											
Prepare Subgrade					0.04	0.99	0.40	0.48	0.00	1.87	
Prepare and Roll Subbase	40860	M2	XSGRA	156.77	1,564	40,287	16,488	19,547	0	76,322	1.87
Includes Shoulders											
4"(10cm) Crushed Agg Base Course					0.03	0.86	0.39	2.87	0.00	4.12	
Grader, Roller and Water Truck	40860	M2	XSABA	235.16	1,388	35,180	15,975	117,283	0	168,438	4.12
Includes Shoulders											
Bituminous Hot Mix Surf Course					0.53	13.30	4.76	28.66	0.00	46.72	
3" Surface	5486.66	MT	XASPA	22.68	2,903	72,953	26,127	157,248	0	256,328	46.72
2"(5cm) Leveling Course					0.02	0.61	0.28	1.44	0.00	2.32	
Grader, Roller and Water Truck	30645	M2	XSABA	333.93	733	18,582	8,437	43,981	0	71,000	2.32
Paved roads					6,588	167,002	67,027	338,060	0	572,089	
Gravel roads											
Prepare Subgrade					0.04	0.99	0.40	0.48	0.00	1.87	
Prepare and Roll Subbase	2675.62	M2	XSGRA	156.77	102	2,638	1,080	1,280	0	4,998	1.87
4"(10cm) Crushed Agg Base Course					0.03	0.86	0.39	2.87	0.00	4.12	
Grader, Roller and Water Truck	2675.62	M2	XSABA	235.16	91	2,304	1,046	7,680	0	11,030	4.12
2"(5cm) Leveling Course					0.02	0.61	0.28	1.44	0.00	2.32	
Grader, Roller and Water Truck	2675.62	M2	XSABA	333.93	64	1,622	737	3,840	0	6,199	2.32
Gravel roads					257	6,564	2,862	12,800	0	22,227	
Haul roads											
Graded Crushed Aggregate Roadway					0.39	9.93	4.51	6.54	0.00	20.98	
3'D, 24'W, 1000'L	2039.09	M3	XSABA	20.39	800	20,249	9,196	13,335	0	42,781	20.98
Haul roads					800	20,249	9,196	13,335	0	42,781	
Sidewalks											
4"(10cm) CIP Conc Walk w/Mesh					0.39	10.33	0.08	8.61	0.00	19.02	
No Base	929.03	M2	ACMAE	7.66	364	9,596	76	8,000	0	17,672	19.02

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Sidewalks					364	9,596	76	8,000	0	17,672	
Roads & Walks					8,009	203,412	79,161	372,195	0	654,768	
Parking Lot											
Parking											
Prepare Subgrade					0.04	0.99	0.40	0.48	0.00	1.87	
Prepare and Roll Subbase	11037	M2	XSGRA	156.77	422	10,882	4,454	5,280	0	20,616	1.87
4"(10cm) Crushed Agg Base Course					0.03	0.86	0.39	2.87	0.00	4.12	
Grader, Roller and Water Truck	11037	M2	XSABA	235.16	375	9,503	4,315	31,680	0	45,498	4.12
Bituminous Hot Mix Surf Course					0.53	13.30	4.76	28.66	0.00	46.72	
3" Surface Course	1975.85	MT	XASPA	22.68	1,045	26,272	9,409	56,628	0	92,309	46.72
2"(5cm) Leveling Course					0.02	0.61	0.28	1.44	0.00	2.32	
Grader, Roller and Water Truck	11037	M2	XSABA	333.93	264	6,692	3,039	15,840	0	25,571	2.32
Parking					2,107	53,349	21,216	109,428	0	183,993	
Parking Lot					2,107	53,349	21,216	109,428	0	183,993	
Container Unloading											
Loaded container transfer pad											
6"(15cm) Crushed aggregate base					0.05	1.29	0.59	3.95	0.00	5.82	
course	20438	M2	XSABA	156.77	1,044	26,395	11,987	80,665	0	119,047	5.82
12"(30cm) Concrete pavement					0.24	6.11	1.14	23.86	0.00	31.11	
	20438	M2	COKCF	49.87	4,918	124,821	23,354	487,658	0	635,832	31.11
Prepare Subgrade					0.04	0.99	0.40	0.48	0.00	1.87	
Prepare and Roll Subbase	20438	M2	XSGRA	156.77	782	20,152	8,247	9,778	0	38,177	1.87
Loaded container transfer pad	20439	M2			6,744	171,367	43,589	578,101	0	793,056	38.80
Container Unloading					6,744	171,367	43,589	578,101	0	793,056	

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Container Reloading											
Container Reloading pad											
6"(15cm) Crushed aggregate base					0.05	1.29	0.59	3.95	0.00	5.82	
course	18785	M2	XSABA	156.77	959	24,260	11,018	74,141	0	109,419	5.82
12"(30cm) Concrete pavement					0.25	6.37	1.19	23.86	0.00	31.42	
	18785	M2	COKCF	47.79	4,716	119,713	22,397	448,217	0	590,327	31.42
Prepare Subgrade					0.04	0.99	0.40	0.48	0.00	1.87	
Prepare and Roll Subbase	18785	M2	XSGRA	156.77	719	18,522	7,580	8,987	0	35,089	1.87
Container Reloading	18785	M2			6,394	162,495	40,996	531,345	0	734,835	39.12
Container Reloading					6,394	162,495	40,996	531,345	0	734,835	
Backhaul Pad											
Backhaul Pad											
6"(15cm) Crushed aggregate base					0.05	1.29	0.59	3.95	0.00	5.82	
course	19696	M2	XSABA	156.77	1,006	25,436	11,552	77,735	0	114,722	5.82
12"(30cm) Concrete pavement					0.25	6.37	1.19	23.86	0.00	31.42	
	19696	M2	COKCF	47.79	4,944	125,516	23,483	469,942	0	618,941	31.42
Prepare Subgrade					0.04	0.99	0.40	0.48	0.00	1.87	
Prepare and Roll Subbase	19696	M2	XSGRA	156.77	754	19,420	7,948	9,422	0	36,790	1.87
Backhaul Pad					6,704	170,371	42,983	557,099	0	770,453	
Backhaul Pad					6,704	170,371	42,983	557,099	0	770,453	
Truck washdown pad											
12"(30cm) Concrete pavement					0.24	6.11	1.14	23.86	0.00	31.11	
	167.23	M2	COKCF	49.87	40	1,021	191	3,990	0	5,202	31.11
6"(15cm) Crushed aggregate base					0.05	1.29	0.59	3.95	0.00	5.82	
course	167.23	M2	XSABA	156.77	9	216	98	660	0	974	5.82
Prepare Subgrade					0.04	0.99	0.40	0.48	0.00	1.87	
Prepare and Roll Subbase	167.23	M2	XSGRA	156.77	6	165	67	80	0	312	1.87
Truck washdown pad	167.23	M2			55	1,402	357	4,730	0	6,489	38.80

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Site Lighting											
Site Lighting											
Allowance for site lighting					34.99	1052.17	197.43	1500.00	0.00	2749.60	
along concrete loading platform	10.00	EA	EELEJ	0.14	350	11,821	2,218	16,853	0	30,892	3089.18
Site Lighting	10.00	EA			350	11,821	2,218	16,853	0	30,892	3089.18
Site Lighting	10.00	EA			350	11,821	2,218	16,853	0	30,892	3089.18
Roads, Walks and Paved Areas					30,363	774,217	230,519	2,169,750	0	3,174,486	

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CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Operations Building											
Operations Building											
Substructure											
Trench, 2-1/2 CY Hyd Excavator					0.07	1.72	0.13	0.00	0.00	1.85	
113 CY/Hr (86M3)/Hr	247.26	M3	CODEK	86.30	17	505	39	0	0	545	2.20
Trim Slopes/Sides of Excavation					0.18	4.33	0.20	0.00	0.00	4.53	
Hand Labor	136.57	M2	ULABE	6.97	25	703	33	0	0	736	5.39
Cont Wall Footing Forms, 2 Uses					0.98	25.31	0.58	7.43	0.00	33.32	
Plywd Forms, Form & Strip w/Acc	136.57	M2	ACARL	5.11	134	4,107	94	1,205	0	5,406	39.59
Gr 60 Resteel,Ftgs & Slabs,#3-#6					0.01	0.43	0.00	0.49	0.00	0.92	
	1200.21	KG	SIWRC	283.95	17	610	5	692	0	1,306	1.09
Pour Cont Ftgs,Shlw,Direct Chute					0.48	11.82	4.56	71.94	0.00	88.32	
Place 4000 PSI Conc Foundations	39.34	M3	ALABI	16.82	19	552	213	3,362	0	4,127	104.92
Concrete Floor Finishes, Screed					0.12	3.18	0.02	0.00	0.00	3.19	
	136.57	M2	ACMAA	10.45	16	516	3	0	0	518	3.80
Conc Curing, Sprayed Membrane					0.02	0.55	0.00	0.32	0.00	0.87	
Curing Compound	136.57	M2	ULABB	110.32	3	89	1	52	0	142	1.04
Backfill Trenches by Hand					1.01	24.30	0.15	0.00	0.00	24.44	
Without Compaction	146.11	M3	ULABA	1.24	147	4,217	25	0	0	4,243	29.04
Compaction, 6" Layers w/Air Tamp					0.16	3.88	0.30	0.00	0.00	4.19	
By Hand, (15cm) Layers	146.11	M3	CODEK	38.23	23	674	52	0	0	726	4.97
2'-0" Wide Continuous Footing	224.03	M			400	11,973	465	5,311	0	17,749	79.23
Pier/Foundation Exc, Normal Soil					1.31	31.59	0.19	0.00	0.00	31.78	
Hand Piled to 2' Deep	45.87	M3	ULABA	0.96	60	1,721	10	0	0	1,732	37.75
Trim Slopes/Sides of Excavation					0.18	4.33	0.20	0.00	0.00	4.53	
Hand Labor	22.30	M2	ULABE	6.97	4	115	5	0	0	120	5.39
Clmn Spread Footing Forms,4 Uses					1.00	25.90	0.60	5.81	0.00	32.31	
Plywd Forms, Form & Strip w/Acc	44.59	M2	ACARL	4.99	45	1,372	32	308	0	1,712	38.39
Gr 60 Resteel,Ftgs & Slabs,#3-#6					0.01	0.43	0.00	0.49	0.00	0.92	
	544.31	KG	SIWRC	283.95	8	276	2	314	0	592	1.09
Pour Sprd Ftg,< 5CY,Direct Chute					1.01	25.22	9.73	71.94	0.00	106.88	
< (5M3) Place 4000 PSI Conc Fdns	10.21	M3	ALABI	7.88	10	306	118	872	0	1,296	126.97

CF 125.3.2 Support Facilities

	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Concrete Floor Finishes, Screed					0.12	3.18	0.02	0.00	0.00	3.19	
	22.30	M2	ACMAA	10.45	3	84	0	0	0	85	3.80
Conc Curing, Sprayed Membrane					0.02	0.55	0.00	0.32	0.00	0.87	
Curing Compound	22.30	M2	ULABB	110.32	1	14	0	9	0	23	1.04
Backfill Trenches by Hand					1.01	24.30	0.15	0.00	0.00	24.44	
Without Compaction	29.82	M3	ULABA	1.24	30	861	5	0	0	866	29.04
Compaction, 6" Layers w/Air Tamp					0.16	3.88	0.30	0.00	0.00	4.19	
By Hand, (15cm) Layers	29.82	M3	CODEK	38.23	5	138	11	0	0	148	4.97
4'-0" x 4'-0" Spread Footing	15.00	EA			165	4,888	184	1,502	0	6,574	438.24
Grade Beam Forms, 3 Uses					0.71	18.26	0.42	7.21	0.00	25.89	
Plywd Forms, Form & Strip w/Acc	273.14	M2	ACARL	7.08	193	5,925	136	2,340	0	8,401	30.76
Gr 60 Resteel,Ftgs & Slabs,#3-#6					14.11	428.23	3.33	467.38	0.00	898.94	
	6.67	MT	SIWRC	0.28	94	3,392	26	3,702	0	7,121	1067.94
Pour Grade Beam, Reg, Conc Pump					1.01	25.22	9.73	71.94	0.00	106.88	
Place 4000 PSI Conc Foundations	39.34	M3	ALABI	7.88	40	1,178	455	3,362	0	4,995	126.97
1'-0" x2'-0" Concrete Grade Beam	224.03	M			327	10,496	617	9,404	0	20,517	91.58
Trm & Shpe f/Slab on Grd by Hand					0.18	4.31	0.03	0.00	0.00	4.34	
Finish Grade	1525.66	M2	ULABA	7.00	273	7,813	47	0	0	7,860	5.15
Soil Poisoning					0.02	0.58	0.00	0.08	0.00	0.66	
	1525.66	M2	ULABA	52.26	36	1,048	6	137	0	1,190	0.78
4"(10cm) Capillary Water Barrier					0.14	3.45	0.27	16.09	0.00	19.81	
Compacted Thickness	251.11	M3	CODEK	43.01	35	1,030	80	4,799	0	5,909	23.53
Fine Grd Gravel Bedding by Hand					0.09	2.17	0.01	0.00	0.00	2.18	
Finish Grade	1525.66	M2	ULABA	13.94	136	3,927	23	0	0	3,951	2.59
6 Mil Polyethylene Vapor Barrier					0.03	0.82	0.01	0.22	0.00	1.04	
	1678.23	M2	ACARB	85.94	49	1,627	21	429	0	2,077	1.24
Weld Wire Fab in Slabs, 6x6x#6					0.07	2.25	0.02	0.97	0.00	3.23	
42 #/CSF, (W 2.9 x W 2.9),< 5 To	1678.23	M2	SIWRB	33.68	125	4,485	32	1,931	0	6,449	3.84
24 Ga Galv Stl Keyed Jnt, 3-1/2"					0.16	4.60	0.06	1.05	0.00	5.71	
(8.8 cm) Cold Expan or Ctrl Jnt	300.33	M	ACARB	15.24	49	1,641	21	375	0	2,037	6.78
Pour Slab on Gr, < 6", Dir Chute					0.43	10.67	4.12	71.94	0.00	86.72	
< (15 cm) Place 4000 PSI Conc	251.11	M3	ALABI	18.64	108	3,183	1,228	21,460	0	25,871	103.02

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Concrete Floor Finishes, Screed					0.12	3.18	0.02	0.00	0.00	3.19	
	1525.66	M2	ACMAA	10.45	182	5,761	29	0	0	5,790	3.80
Conc Floor Finishes, Stl Trowel					0.17	4.56	0.23	0.00	0.00	4.79	
	1525.66	M2	ACMAC	6.39	263	8,262	419	0	0	8,682	5.69
Conc Curing, Sprayed Membrane Curing Compound					0.02	0.55	0.00	0.32	0.00	0.87	
	1525.66	M2	ULABB	110.32	34	991	6	585	0	1,582	1.04
4" Thick Concrete Slab on Grade	1525.66	M2			1,290	39,768	1,913	29,717	0	71,398	46.80
Substructure	1525.66	M2			2,182	67,125	3,179	45,934	0	116,238	76.19
Superstructure											
Weld Wire Fab in Slabs, 6x6x#10 21 #/CSF, (W 1.4 x W 1.4),< 5					0.06	1.86	0.01	0.54	0.00	2.41	
	1111.56	M2	SIWRB	40.65	68	2,460	17	711	0	3,188	2.87
Conc Curing, Sprayed Membrane Curing Compound					0.02	0.55	0.00	0.32	0.00	0.87	
	1010.51	M2	ULABB	110.32	23	657	4	381	0	1,042	1.03
Pour Elev Slab, < 6", Conc Pump < (15 cm) Place 4000 PSI Conc					0.38	9.46	3.65	71.94	0.00	85.04	
	166.32	M3	ALABI	21.03	63	1,868	721	14,214	0	16,803	101.03
Conc Floor Finishes, Stl Trowel					0.17	4.56	0.23	0.00	0.00	4.79	
	1010.51	M2	ACMAC	6.39	174	5,472	278	0	0	5,750	5.69
Beams,Girders,Clmns,1-2 Sty Bldg A-36 Rolled Strl Steel Members					8.20	227.16	55.49	1102.31	0.00	1384.95	
	108.54	MT	SIWSM	0.98	890	28,226	6,895	136,972	0	172,093	1585.50
H or J Open Web Joist,30-50'Span (10-15M),Steel,Horz Bridging					5.23	144.71	35.35	716.50	0.00	896.56	
	9.87	MT	SIWSM	1.53	52	1,635	399	8,094	0	10,128	1026.38
1-1/2"x20Ga Composite Metal Deck Galvanized, Non-Cellular					0.10	2.82	0.09	8.50	0.00	11.42	
	1111.56	M2	SIWSD	88.26	114	3,594	112	10,821	0	14,527	13.07
Floor Construction - Concrete	1010.51	M2			1,384	43,913	8,426	171,192	0	223,532	221.21
Rigid Steel Frame With Purlins					0.32	8.94	2.19	37.67	0.00	48.80	
	1525.66	M2	SIWSM	24.77	493	15,621	3,816	65,800	0	85,237	55.87
Roof Construction - Steel	1525.66	M2			493	15,621	3,816	65,800	0	85,237	55.87
Metal Stair,4'-0"W Mtl Pan Tread (1.2M)Cement Filled,Picket Rail					0.90	24.93	0.78	108.00	0.00	133.71	
	40.00	EA	SIWSD	10.00	36	1,142	36	4,946	0	6,123	153.07

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Landing - Steel Pan,Conventional					2.42	67.09	2.09	307.85	0.00	377.03	
	3.72	M2	SIWSD	3.72	9	285	9	1,310	0	1,604	431.63
Stair Construction	40.00	RSR			45	1,427	45	6,255	0	7,727	193.17
Superstructure	2772.42	M2			1,922	60,961	12,287	243,247	0	316,496	114.16
Exterior Closure											
Insul Siding Panel,2"Polystyrene					0.54	14.44	0.25	30.68	0.00	45.37	
Factory Assy, 24 Ga Galv Steel	1331.77	M2	MSHMG	7.43	717	22,851	393	48,535	0	71,780	53.90
Exterior Wall	1331.77	M2			717	22,851	393	48,535	0	71,780	53.90
Oil Base Caulk&Seal,1/4"x1/4" Jt					152.57	4278.01	33.93	131.23	0.00	4443.18	
	0.11	KM	ARFCA	0.01	17	617	5	19	0	641	5620.62
3'x7'x6-3/4"DP Steel Door Frame					3.33	93.47	1.22	69.11	0.00	163.80	
16 Ga Frame for 1-3/4"Door	11.00	EA	ACARB	0.75	37	1,221	16	903	0	2,141	194.59
3'x 7'x 2"x 18Ga Metal Door					2.22	62.31	0.82	160.00	0.00	223.13	
(Unrated)	11.00	EA	ACARB	1.13	24	814	11	2,091	0	2,916	265.02
4"x 4" Steel Butt Hinges					0.50	14.02	0.18	6.35	0.00	20.55	
SD Ball Bearing, Finish Hdwe	16.50	PR	ACARB	5.00	8	275	4	124	0	403	24.42
Lockset, Cipher - Mechanical					1.50	42.17	0.55	300.00	0.00	342.72	
	1.00	EA	ACARB	1.66	2	50	1	356	0	407	407.15
Door Bumper, Bronze Floor Type					0.25	7.01	0.09	2.44	0.00	9.54	
Finish Hardware	11.00	EA	ACARB	10.00	3	92	1	32	0	125	11.34
Door Closer,Int Surface Mounted					1.54	43.14	0.56	46.27	0.00	89.97	
Finish Hardware	11.00	EA	ACARB	1.63	17	564	7	605	0	1,176	106.89
10"x34" Door Kick Plate					0.67	18.69	0.24	15.82	0.00	34.76	
Finish Hardware	11.00	EA	ACARB	3.75	7	244	3	207	0	454	41.29
Rubber Door Silencers					0.25	7.01	0.09	0.09	0.00	7.19	
Type L03011	33.00	EA	ACARB	10.00	8	275	4	4	0	282	8.54
Aluminum Threshold w/ Grit					1.09	30.66	0.40	59.22	0.00	90.29	
	10.06	M	ACARB	2.29	11	366	5	708	0	1,079	107.26
Paint Int Metal Door & HM Frame					2.00	48.94	0.60	2.55	0.00	52.09	
	11.00	EA	APTRA	0.63	22	681	8	35	0	725	65.89

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
3' x 7' Hollow Metal Door With	11.00	EA			157	5,199	64	5,084	0	10,347	940.68
Oil Base Caulk&Seal,1/4"x1/4" Jt	0.04	KM	ARFCA	0.01	152.57 6	4278.01 198	33.93 2	131.23 6	0.00 0	4443.18 206	5620.62
6'x7'x6-3/4"DP Steel Door Frame 16 Ga Frame for 1-3/4"Door	3.00	EA	ACARB	0.63	4.00 12	112.16 400	1.47 5	79.11 282	0.00 0	192.74 687	228.97
Pair 3'x 7'x 2"x 18Ga Metal Door (Unrated)	3.00	EA	ACARB	0.63	4.00 12	112.16 400	1.47 5	320.00 1,140	0.00 0	433.63 1,545	515.15
4"x 4" Steel Butt Hinges SD Ball Bearing, Finish Hdwe	9.00	PR	ACARB	5.00	0.50 5	14.02 150	0.18 2	6.35 68	0.00 0	20.55 220	24.42
Door Bumper, Bronze Floor Type Finish Hardware	6.00	EA	ACARB	10.00	0.25 2	7.01 50	0.09 1	2.44 17	0.00 0	9.54 68	11.34
Door Closer,Int Surface Mounted Finish Hardware	6.00	EA	ACARB	1.63	1.54 9	43.14 307	0.56 4	46.27 330	0.00 0	89.97 641	106.89
10"x34" Door Kick Plate Finish Hardware	6.00	EA	ACARB	3.75	0.67 4	18.69 133	0.24 2	15.82 113	0.00 0	34.76 248	41.29
Rubber Door Silencers Type L03011	18.00	EA	ACARB	10.00	0.25 5	7.01 150	0.09 2	0.09 2	0.00 0	7.19 154	8.54
Aluminum Threshold w/ Grit	5.49	M	ACARB	2.29	1.09 6	30.66 200	0.40 3	59.22 386	0.00 0	90.29 588	107.26
Paint Int Metal Door & HM Frame	6.00	EA	APTRA	0.63	2.00 12	48.94 371	0.60 5	2.55 19	0.00 0	52.09 395	65.89
1-3/4"x 13 Ga Aluminum Astragal	6.40	M	ACARB	7.92	0.32 2	8.85 67	0.12 1	6.96 53	0.00 0	15.92 121	18.91
Pr 3' x 7' Hollow Metal Dr With	3.00	PR			73	2,427	30	2,417	0	4,873	1624.49
10'H x10'W Coiling Service Door Manual Oper,Incl Stl Frame& Hdwe	3.00	EA	SIWSB	0.24	10.25 31	310.71 1,107	3.93 14	892.50 3,181	0.00 0	1207.14 4,302	1434.08
10' x 10' Overhead Service Doors	3.00	EA			31	1,107	14	3,181	0	4,302	1434.08
Alum Casement Windows,Operable Standard Brush Finish	263.38	M2	SIWSB	2.32	1.08 284	32.61 10,866	0.41 138	99.35 33,101	0.00 0	132.38 44,105	167.46

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
1"Tinted Insul Glass,30 to 50 SF					2.87	80.48	0.38	84.50	0.00	165.36	
(2.8-4 6M2)1/4"Lites,1/2"Air Sp	263.38	M2	AGLAB	0.87	756	26,816	128	28,152	0	55,096	209.19
30 Sf (2.8M2) To 50 Sf (4.6M2)											
Metal Window With Insulated	263.38	M2			1,040	37,682	265	61,254	0	99,201	376.64
Fixed Ornamental Louver, >10 SF					2.83	85.43	1.07	182.99	0.00	269.49	
(1.2-3.0 M2) Incl Frame,Painted	8.73	M2	MSHMA	0.44	25	854	11	1,829	0	2,694	308.51
Aluminum Louvers	8.73	M2			25	854	11	1,829	0	2,694	308.51
Exterior Closure	1331.77	M2			2,042	70,120	778	122,300	0	193,198	145.07
Roofing											
6"Foil 1 Side,R21 Fbgs Insul					0.09	2.52	0.03	2.69	0.00	5.24	
	1601.93	M2	ACARB	27.87	143	4,787	64	5,121	0	9,972	6.22
4"Unfaced Batt,R11 Fbgs Insul					0.09	2.52	0.03	2.05	0.00	4.59	
	1601.93	M2	ACARB	27.87	143	4,787	64	3,892	0	8,743	5.46
24 Ga 2"Standing Seam Roof Panel					0.17	4.71	0.98	25.30	0.00	30.99	
Painted	1601.93	M2	SIWSH	34.84	276	8,968	1,868	48,139	0	58,975	36.82
Standing Seam Metal Roof With	1601.93	M2			562	18,543	1,995	57,152	0	77,690	48.50
Cont Vaulted Semi-Circ Skylight					1.72	46.22	0.79	376.74	0.00	423.75	
Single Glazed, over 20'(6M) Wide	15.24	M2	MSHMG	2.32	26	837	14	6,819	0	7,670	503.41
Skylights	15.24	M2			26	837	14	6,819	0	7,670	503.41
Roofing	1601.93	M2			588	19,379	2,010	63,971	0	85,360	53.29
Interior Construction											
3-5/8" Metal Stud Channel, 16"OC					0.36	9.92	0.10	7.00	0.00	17.01	
(92mm)Cold Roll,w/Tracks/Runners	1858.07	M2	ALATA	3.48	666	23,309	235	16,445	0	39,989	21.52
5/8" Drywall,One Layer, One Face					0.32	9.03	0.12	2.69	0.00	11.84	
On Metal Studs or Furring,(16mm)	3716.14	M2	ACARB	7.77	1,196	42,438	557	12,650	0	55,645	14.97
3-5/8" Metal Studs @ 16 OC With	1858.07	M2			1,862	65,747	792	29,095	0	95,634	51.47

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
5/8" Drywall,One Layer, One Face					0.32	9.03	0.12	2.69	0.00	11.84	
On Metal Studs or Furring,	2675.62	M2	ACARB	7.77	861	30,556	401	9,108	0	40,064	14.97
Fire Rated											
6" Metal Framing Stud - 25 Ga					0.40	11.02	0.11	9.15	0.00	20.28	
(15 cm) w/Tracks & Runners	668.90	M2	ALATA	3.14	266	9,324	94	7,742	0	17,159	25.65
6" Metal Studs @ 16" OC With	668.90	M2			1,128	39,879	495	16,850	0	57,224	85.55
Oil Base Caulk&Seal,1/4"x1/4" Jt					152.57	4278.01	33.93	131.23	0.00	4443.18	
	0.48	KM	ARFCA	0.01	73	2,580	20	79	0	2,679	5620.62
3'x7'x6-3/4"DP Steel Door Frame					3.33	93.47	1.22	69.11	0.00	163.80	
16 Ga Frame for 1-3/4"Door	46.00	EA	ACARB	0.75	153	5,108	67	3,777	0	8,951	194.59
3'x 7'x 2"x 18Ga Metal Door					2.22	62.31	0.82	160.00	0.00	223.13	
(Unrated)	46.00	EA	ACARB	1.13	102	3,405	45	8,744	0	12,193	265.07
4"x 4" Steel Butt Hinges					0.50	14.02	0.18	6.35	0.00	20.55	
SD Ball Bearing, Finish Hdwe	69.00	PR	ACARB	5.00	35	1,149	15	521	0	1,685	24.42
Hvy Duty Cylinderical Lockset					0.43	12.19	0.16	82.77	0.00	95.12	
Finish Hardware	46.00	EA	ACARB	5.75	20	666	9	4,523	0	5,198	113.00
Door Bumper, Bronze Floor Type					0.25	7.01	0.09	2.44	0.00	9.54	
Finish Hardware	46.00	EA	ACARB	10.00	12	383	5	133	0	521	11.34
Rubber Door Silencers					0.25	7.01	0.09	0.09	0.00	7.19	
Type L03011	138.00	EA	ACARB	10.00	35	1,149	15	15	0	1,179	8.54
Paint Int Metal Door & HM Frame					2.00	48.94	0.60	2.55	0.00	52.09	
	46.00	EA	APTRA	0.63	92	2,848	35	148	0	3,031	65.89
3' x 7' Hollow Metal Door With	46.00	EA			521	17,288	211	17,940	0	35,439	770.41
Oil Base Caulk&Seal,1/4"x1/4" Jt					152.57	4278.01	33.93	131.23	0.00	4443.18	
	0.04	KM	ARFCA	0.01	6	198	2	6	0	206	5620.62
6'x7'x6-3/4"DP Steel Door Frame					4.00	112.16	1.47	79.11	0.00	192.74	
16 Ga Frame for 1-3/4"Door	3.00	EA	ACARB	0.63	12	400	5	282	0	687	228.97
Pair 3'x 7'x 2"x 18Ga Metal Door					4.00	112.16	1.47	320.00	0.00	433.63	
(Unrated)	3.00	EA	ACARB	0.63	12	400	5	1,140	0	1,545	515.15
4"x 4" Steel Butt Hinges					0.50	14.02	0.18	6.35	0.00	20.55	
SD Ball Bearing, Finish Hdwe	9.00	PR	ACARB	5.00	5	150	2	68	0	220	24.42

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Hvy Duty Cylinderical Lockset					0.43	12.19	0.16	82.77	0.00	95.12	
Finish Hardware	3.00	EA	ACARB	5.75	1	43	1	295	0	339	113.00
Door Bumper, Bronze Floor Type					0.25	7.01	0.09	2.44	0.00	9.54	
Finish Hardware	6.00	EA	ACARB	10.00	2	50	1	17	0	68	11.34
Rubber Door Silencers					0.25	7.01	0.09	0.09	0.00	7.19	
Type L03011	18.00	EA	ACARB	10.00	5	150	2	2	0	154	8.54
Paint Int Metal Door & HM Frame					2.00	48.94	0.60	2.55	0.00	52.09	
	6.00	EA	APTRA	0.63	12	371	5	19	0	395	65.89
1-3/4"x 13 Ga Aluminum Astragal					0.32	8.85	0.12	6.96	0.00	15.92	
	6.40	M	ACARB	7.92	2	67	1	53	0	121	18.91
Pr 3' x 7' Hollow Metal Dr With	3.00	PR			55	1,829	23	1,883	0	3,735	1244.97
Interior Construction	2772.42	M2			3,566	124,744	1,520	65,768	0	192,031	69.26
Interior Finishes											
Floor Hardener,Metallic,Hvy Duty					0.15	3.86	0.20	2.91	0.00	6.96	
0.65 #/SF	824.98	M2	ACMAC	7.55	120	4,026	204	3,033	0	7,263	8.80
Concrete Floor Sealer	824.98	M2			120	4,026	204	3,033	0	7,263	8.80
2"x2"Cer Mosaic Flr Tile,Cem Bed					1.08	28.64	0.19	29.28	0.00	58.11	
Cushion Edge, Face Mounted	267.84	M2	ATIFA	1.16	289	9,704	65	9,920	0	19,688	73.51
Ceramic Floor Tile	267.84	M2			289	9,704	65	9,920	0	19,688	73.51
.125"Thk Vinyl Sht Goods, Backed					0.17	4.40	0.03	16.15	0.00	20.58	
	112.32	M2	ATIFA	7.55	19	625	4	2,294	0	2,924	26.03
Vinyl Composition Floor Tile	112.32	M2			19	625	4	2,294	0	2,924	26.03
Carpet Flooring					0.30	7.22	0.04	8.49	0.00	15.76	
	1388.81	M2	ULABB	8.36	415	12,686	79	14,918	0	27,683	19.93
Carpet Flooring	1388.81	M2			415	12,686	79	14,918	0	27,683	19.93
Ceramic Wall Tile					1.20	31.82	0.21	18.62	0.00	50.66	
	501.68	M2	ATIFA	1.04	600	20,197	135	11,818	0	32,149	64.08

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Ceramic Wall Tile	501.68	M2			600	20,197	135	11,818	0	32,149	64.08
Interior Roller Work					0.12	2.83	0.03	1.94	0.00	4.80	
One Coat Primer-Two Coats Paint	3846.20	M2	APTRA	10.80	447	13,779	168	9,427	0	23,373	6.08
Paint Walls	3846.20	M2			447	13,779	168	9,427	0	23,373	6.08
2'x 2'x 3/4" Fbgs Acous Ceil Pnl					0.12	3.43	0.05	4.41	0.00	7.89	
(Suspension System Not Included)	2325.74	M2	ACARB	20.44	285	10,089	133	12,984	0	23,206	9.98
T Bar Ceil Susp System 2'x 2'					0.13	3.77	0.05	2.80	0.00	6.62	
	2325.74	M2	ACARB	18.58	313	11,100	146	8,234	0	19,479	8.38
Acoustical Ceiling With	2325.74	M2			598	21,189	279	21,218	0	42,685	18.35
3/4"Thick Glass Cloth Faced Fbgs					0.15	4.31	0.06	11.09	0.00	15.45	
Fiberglass Acoustical Ceil Pnls	267.84	M2	ACARB	16.26	41	1,461	19	3,756	0	5,236	19.55
T Bar Ceil Susp System 2'x 2'					0.13	3.77	0.05	2.80	0.00	6.62	
	267.84	M2	ACARB	18.58	36	1,278	17	948	0	2,243	8.38
Water Resistant Acoustical	267.84	M2			77	2,739	36	4,705	0	7,480	27.93
Interior Finishes	2772.42	M2			2,566	84,944	970	77,332	0	163,246	58.88
Specialties											
1-1/2"D(37mm)Wld Pipe Hdrl,2Rail					0.49	13.63	0.43	59.05	0.00	73.11	
3'H (.92M)w/Shop Paint,Stair Mtd	36.58	M	SIWSD	18.29	18	571	18	2,473	0	3,061	83.70
Metal Railings	36.58	M			18	571	18	2,473	0	3,061	83.70
2-Drawer/2-Door Cabinet,30-36"W					2.15	60.32	0.79	160.50	0.00	221.61	
	24.38	M	ACARB	1.16	52	1,747	23	4,649	0	6,420	263.27
Dbl Door Wall Cabinet,36"-42"W					2.02	56.61	0.74	117.52	0.00	174.87	
36"Hi x 13"Dp,Prefinished	12.19	M	ACARB	1.24	25	820	11	1,702	0	2,533	207.75
Cabinet Acc,Lam Plas Counter Top					1.09	30.66	0.40	41.01	0.00	72.08	
Custom Made With Back Splash	39.62	M	ACARB	2.29	43	1,444	19	1,931	0	3,393	85.63
Millwork Cabinets	24.38	M			120	4,011	52	8,282	0	12,345	506.29

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Built-In-Place 2-Drawer/2-Door					10.94	306.65	4.01	114.83	0.00	425.49	
Cabinet, to 30" w	6.10	M	ACARB	0.23	67	2,221	29	832	0	3,081	505.48
Millwork Reception Counters	6.10	M			67	2,221	29	832	0	3,081	505.48
Marker Board					1.98	55.63	0.73	400.00	0.00	456.36	
	4.00	EA	ACARB	1.26	8	264	3	1,901	0	2,169	542.16
Marker Boards	4.00	EA			8	264	3	1,901	0	2,169	542.16
Painted Steel Partition					2.86	80.11	1.05	233.00	0.00	314.16	
Floor Mtd w/Door & Side Divider	19.00	EA	ACARB	0.88	54	1,808	24	5,259	0	7,091	373.23
Toilet Partitions	19.00	EA			54	1,808	24	5,259	0	7,091	373.23
Urinal Screen, Floor Mtd					3.33	93.47	1.22	80.00	0.00	174.69	
Painted Steel	3.00	EA	ACARB	0.75	10	333	4	285	0	623	207.53
Urinal Screens	3.00	EA			10	333	4	285	0	623	207.53
Porcelain Enamel Shower-Sgl Opng					6.67	181.09	2.56	1150.00	0.00	1333.65	
Steel Compartment, Floor Mtd	9.00	EA	MSHMB	0.38	60	1,936	27	12,296	0	14,259	1584.38
Shower Partitions	9.00	EA			60	1,936	27	12,296	0	14,259	1584.38
Vinyl Cnr Guard 2-3/4"x2-3/4"x4'					0.21	5.10	0.06	6.50	0.00	11.66	
	30.00	EA	APTRA	6.00	6	193	2	247	0	443	14.75
Wall And Corner Guards					6	193	2	247	0	443	
3"x8" Hard Plastic Door Sign					0.50	12.08	0.07	7.50	0.00	19.65	
Adhesive w/o Frame	60.00	EA	ULABA	2.50	30	861	5	535	0	1,400	23.34
Signage					30	861	5	535	0	1,400	
Computer Access Flooring					0.72	17.33	0.11	118.40	0.00	135.84	
	13.94	M2	ULABB	3.48	10	287	2	1,960	0	2,249	161.38
Access Flooring	13.94	M2			10	287	2	1,960	0	2,249	161.38
18"x15"x72" Sgl Tier Box Locker					1.04	31.42	0.39	98.25	0.00	130.06	
	125.00	EA	MSHMA	1.20	130	4,665	58	14,590	0	19,314	154.51

CF 125.3.2 Support Facilities

	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Metal Lockers	125.00	EA			130	4,665	58	14,590	0	19,314	154.51
Hardwood Bench w/Iron Legs					0.33	9.89	0.12	41.34	0.00	51.36	
	24.38	M	MSHMA	3.81	8	287	4	1,198	0	1,488	61.01
Locker Benches	24.38	M			8	287	4	1,198	0	1,488	61.01
Wire Mesh Wall Pnl,10'(3m) High					1.11	31.16	0.41	78.30	0.00	109.86	
	24.00	EA	ACARB	2.25	27	888	12	2,232	0	3,132	130.52
Wire Mesh Partitions	86.40	M2			27	888	12	2,232	0	3,132	36.25
8" x 16" x 38" Aluminum Fire Extinguisher Cabinet (Fire Extinguisher By Others)					2.50	70.10	0.92	135.80	0.00	206.82	
	8.00	EA	ACARB	1.00	20	666	9	1,291	0	1,966	245.70
Fire Extinguisher Cabinets	8.00	EA			20	666	9	1,291	0	1,966	245.70
Surf.Mtd Sgl Clothes Hook					0.42	11.68	0.15	3.20	0.00	15.04	
	19.00	EA	ACARB	6.00	8	264	3	72	0	339	17.86
Surf.Mtd 18"(46cm)L Towel Bar					0.67	18.69	0.24	7.20	0.00	26.14	
	9.00	EA	ACARB	3.75	6	200	3	77	0	279	31.05
Surf.Mtd 2 Roll Toil. Paper Hold					0.42	11.68	0.15	15.00	0.00	26.84	
	19.00	EA	ACARB	6.00	8	264	3	339	0	606	31.88
Surf.Mtd Globe Soap Dispenser					0.67	18.69	0.24	7.69	0.00	26.63	
	17.00	EA	ACARB	3.75	11	378	5	155	0	538	31.63
Surf.Mtd 18"x24" Mirror & Shelf					0.67	18.69	0.24	35.00	0.00	53.94	
	17.00	EA	ACARB	3.75	11	378	5	707	0	1,089	64.08
Surf.Mtd 48" Grab Bar					0.50	14.02	0.18	40.00	0.00	54.20	
	12.00	EA	ACARB	5.00	6	200	3	570	0	773	64.39
Recessed Towel Disp & Receptacle					1.00	28.04	0.37	167.35	0.00	195.76	
	6.00	EA	ACARB	2.50	6	200	3	1,193	0	1,395	232.56
Surf.Mtd Sanit. Napkin Dispenser w/Receptor - Free					1.00	28.04	0.37	188.10	0.00	216.51	
	3.00	EA	ACARB	2.50	3	100	1	670	0	772	257.21
Surf.Mtd Sanit Napkin Receptacle					0.83	23.37	0.31	21.00	0.00	44.67	
	11.00	EA	ACARB	3.00	9	305	4	274	0	584	53.07

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Chrome Plated Shower Curtain Rod					0.42	11.68	0.15	5.00	0.00	16.84	
	9.00	EA	ACARB	6.00	4	125	2	53	0	180	20.00
24"Long SST Mop Holder,3 Holders					0.42	11.68	0.15	27.00	0.00	38.84	
	2.00	EA	ACARB	6.00	1	28	0	64	0	92	46.14
110V Elect. Hand Dryer, Surf.Mtd					2.50	70.10	0.92	263.35	0.00	334.37	
	6.00	EA	ACARB	1.00	15	500	7	1,877	0	2,383	397.23
Toilet and Bath Accessories					88	2,940	38	6,053	0	9,031	
Specialties	2772.42	M2			657	21,932	288	59,432	0	81,653	29.45
Plumbing											
Plumbing fixtures					0.00	750.00	0.00	750.00	0.00	1500.00	
	65.00	EA		0.00	0	57,915	0	57,915	0	115,830	1782.00
Roof drainage					0.00	4.31	0.00	4.31	0.00	8.61	
	1601.93	M2		0.00	0	8,194	0	8,194	0	16,388	10.23
Plumbing	2772.42	M2			0	66,109	0	66,109	0	132,218	47.69
HVAC											
HVAC-office space					0.00	118.40	0.00	43.06	0.00	161.46	
	1705.71	M2		0.00	0	255,479	0	92,902	0	348,381	204.24
Shop Exhaust Allowance For Separate System in Each Area					0.00	10.76	0.00	10.76	0.00	21.53	
	1066.72	M2		0.00	0	14,525	0	14,525	0	29,049	27.23
Shop heating, 3200 Watt E heater Ceiling Hung Unit, No Fan Reqd Allowance For Separate Systems in Each Area.					3.33	90.55	1.28	820.00	0.00	911.83	
	100.00	EA	MSHMB	0.75	333	11,454	162	103,730	0	115,346	1153.46
HEPA Filter W/Housing Allowance For Two Filters in Each Area.					0.00	240.00	4.12	260.00	0.00	504.12	
	12.00	EA		0.00	0	3,643	63	3,947	0	7,653	637.71
HVAC	2772.42	M2			333	285,101	224	215,103	0	500,429	180.50
Fire Protection											
Complete System Included											
Fire protection					0.00	6.46	0.00	5.92	0.00	12.38	
	2772.42	M2		0.00	0	22,650	0	20,763	0	43,413	15.66

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Fire Protection	2772.42	M2			0	22,650	0	20,763	0	43,413	15.66
Electrical											
Allowance for complete interior electrical system, (includes Service & Distribution, Lighting, Power, Telephone, HLAN system, Security, Fire Alarm, and Public Address. See estimate backup for breakdown of costs.)					0.00	85.03	0.00	68.89	0.00	153.92	
	2772.42	M2		0.00	0	264,867	0	214,576	0	479,443	172.93
Electrical	2772.42	M2			0	264,867	0	214,576	0	479,443	172.93
Equip., Furnishings, Conveying											
Refrigerator					1.67	46.73	0.61	1000.00	0.00	1047.34	
	2.00	EA	ACARB	1.50	3	111	1	2,376	0	2,488	1244.25
Refrigerator	2.00	EA			3	111	1	2,376	0	2,488	1244.25
Microwave Oven					1.25	35.05	0.46	1182.27	0.00	1217.78	
	2.00	EA	ACARB	2.00	3	83	1	2,809	0	2,893	1446.72
Microwave	2.00	EA			3	83	1	2,809	0	2,893	1446.72
HD Range, w/34"Open Top Oven-Min					2.00	55.16	0.00	725.87	0.00	781.03	
	1.00	EA	EELEC	1.63	2	66	0	862	0	928	927.87
Range	1.00	EA			2	66	0	862	0	928	927.87
Dishwasher					2.00	55.97	0.73	700.00	0.00	756.70	
	1.00	EA	ACARB	1.25	2	66	1	832	0	899	898.96
Dishwasher	1.00	EA			2	66	1	832	0	899	898.96
Workstations					5.00	140.20	1.83	1500.00	0.00	1642.03	
	22.00	EA	ACARB	0.50	110	3,664	48	39,204	0	42,916	1950.74
Workstations	22.00	EA			110	3,664	48	39,204	0	42,916	1950.74

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
6 x 6 Projection Screen					2.50	70.10	0.92	250.00	0.00	321.02	
	3.00	EA	ACARB	1.00	8	250	3	891	0	1,144	381.37
6 x 6 Projection Screen	3.00	EA			8	250	3	891	0	1,144	381.37
Rubber Dock Blocks, 36" x 10"					0.63	17.53	0.23	44.35	0.00	62.10	
4-1/2" Thick	4.00	EA	ACARB	4.00	3	83	1	211	0	295	73.78
Dock Bumpers	4.00	EA			3	83	1	211	0	295	73.78
Indus Hoists,HD 5000#(2268Kg)Cap					33.28	886.32	84.49	38800.00	0.00	39770.81	
	2.00	EA	ESELG	0.13	67	2,106	201	92,189	0	94,495	47247.72
Steel Monorail					8.20	227.16	55.49	1102.31	0.00	1384.95	
A-36 Rolled Strl Steel Members	4.54	MT	SIWSM	0.98	37	1,180	288	5,724	0	7,192	1585.50
Hoists With Monorails	2.00	EA			104	3,285	489	97,913	0	101,687	50843.56
Horizontal Window Blinds					0.15	4.31	0.06	26.91	0.00	31.28	
	348.39	M2	ACARB	16.26	54	1,785	23	11,138	0	12,945	37.16
Horizontal Window Blinds	348.39	M2			54	1,785	23	11,138	0	12,945	37.16
Desks					5.00	140.20	1.83	200.00	0.00	342.03	
	24.00	EA	ACARB	0.50	120	3,997	52	5,702	0	9,752	406.34
Desks	24.00	EA			120	3,997	52	5,702	0	9,752	406.34
Round Conference Table					5.00	140.20	1.83	500.00	0.00	642.03	
	4.00	EA	ACARB	0.50	20	666	9	2,376	0	3,051	762.74
Round Conference Tables	4.00	EA			20	666	9	2,376	0	3,051	762.74
Large Rectangular Conf. Table					5.00	140.20	1.83	600.00	0.00	742.03	
	10.00	EA	ACARB	0.50	50	1,666	22	7,128	0	8,815	881.54
Large Rectangular Conf. Table	10.00	EA			50	1,666	22	7,128	0	8,815	881.54
Folding Tables For Lunch Room					0.50	14.02	0.18	100.00	0.00	114.20	
	10.00	EA	ACARB	5.00	5	167	2	1,188	0	1,357	135.67
Folding Tables For Lunch Room	10.00	EA			5	167	2	1,188	0	1,357	135.67

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Ergonomically Designed Chairs					2.50	70.10	0.92	300.00	0.00	371.02	
With Casters	50.00	EA	ACARB	1.00	125	4,164	54	17,820	0	22,038	440.77
Ergonomically Designed Chairs	50.00	EA			125	4,164	54	17,820	0	22,038	440.77
Stackable Chairs					0.30	8.41	0.11	35.00	0.00	43.52	
	100.00	EA	ACARB	8.33	30	999	13	4,158	0	5,170	51.70
Stackable Chairs	100.00	EA			30	999	13	4,158	0	5,170	51.70
Ergonomically Designed					0.30	8.41	0.11	175.00	0.00	183.52	
Sled-Based Conference Chairs	60.00	EA	ACARB	8.33	18	600	8	12,474	0	13,081	218.02
Ergonomically Designed Sled-	60.00	EA			18	600	8	12,474	0	13,081	218.02
Storage Cabinets					2.50	70.10	0.92	500.00	0.00	571.02	
	16.00	EA	ACARB	1.00	40	1,332	17	9,504	0	10,854	678.37
Storage Cabinets	16.00	EA			40	1,332	17	9,504	0	10,854	678.37
Unrated 5-Drawer File Cabinet					2.50	70.10	0.92	700.00	0.00	771.02	
	20.00	EA	ACARB	1.00	50	1,666	22	16,632	0	18,319	915.97
Unrated 5-Drawer File Cabinets	20.00	EA			50	1,666	22	16,632	0	18,319	915.97
Six-Shelf Adjustable Bookshelves					5.00	140.20	1.83	150.00	0.00	292.03	
	40.00	EA	ACARB	0.50	200	6,662	87	7,128	0	13,877	346.94
Six-Shelf Adjustable Bookshelves	40.00	EA			200	6,662	87	7,128	0	13,877	346.94
IBM Compatible 486 Computer					2.50	70.10	0.92	2200.00	0.00	2271.02	
With Monitor and Keyboard	30.00	EA	ACARB	1.00	75	2,498	33	78,408	0	80,939	2697.97
IBM Compatible 486 Computers	30.00	EA			75	2,498	33	78,408	0	80,939	2697.97
Laser Printers					2.50	70.10	0.92	1600.00	0.00	1671.02	
	4.00	EA	ACARB	1.00	10	333	4	7,603	0	7,941	1985.17
Laser Printers	4.00	EA			10	333	4	7,603	0	7,941	1985.17
Copier					2.50	70.10	0.92	2000.00	0.00	2071.02	
	3.00	EA	ACARB	1.00	8	250	3	7,128	0	7,381	2460.37

CF 125.3.2 Support Facilities

	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Copier	3.00	EA			8	250	3	7,128	0	7,381	2460.37
Network Stations					2.50	70.10	0.92	6000.00	0.00	6071.02	
	3.00	EA	ACARB	1.00	8	250	3	21,384	0	21,637	7212.37
Network Stations	3.00	EA			8	250	3	21,384	0	21,637	7212.37
Shop Equipment					40.00	1121.60	14.68	110000.00	0.00	111136.28	
	1.00	LS	ACARB	0.06	40	1,332	17	130,680	0	132,030	132030
Shop Equipment					40	1,332	17	130,680	0	132,030	
Exhausts Systems					32.00	858.72	14.76	2000.00	0.00	2873.48	
	1.00	LS	MSHMG	0.13	32	1,020	18	2,376	0	3,414	3413.69
Exhausts Systems					32	1,020	18	2,376	0	3,414	
Hydraulic Passenger Elevator, 2 Stop, 3500 LB Capacity, 150 FPM					53.13	1414.78	134.87	40000.00	0.00	41549.65	
	1.00	EA	ESELG	0.08	53	1,790	171	50,600	0	52,560	52560.30
Hydraulic Elevator (2 Stop)	1.00	EA			53	1,790	171	50,600	0	52,560	52560.30
Equip., Furnishings, Conveying	2772.42	M2			1,170	38,786	1,104	538,525	0	578,415	208.63
Operations Building	2772.42	M2			15,025	1,126,721	22,359	1,733,059	0	2,882,139	1039.57
Operations Building					15,025	1,126,721	22,359	1,733,059	0	2,882,139	

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Decontamination Facility											
Decontamination Facility											
Substructure											
Trench, 2-1/2 CY Hyd Excavator					0.07	1.72	0.13	0.00	0.00	1.85	
113 CY/Hr (86M3)/Hr	273.16	M3	CODEK	86.30	19	558	43	0	0	602	2.20
Trim Slopes/Sides of Excavation					0.18	4.33	0.20	0.00	0.00	4.53	
Hand Labor	177.82	M2	ULABE	6.97	32	915	43	0	0	958	5.39
Cont Wall Footing Forms, 2 Uses					0.98	25.31	0.58	7.43	0.00	33.32	
Plywd Forms, Form & Strip w/Acc	177.82	M2	ACARL	5.11	174	5,348	123	1,569	0	7,039	39.59
Gr 60 Resteel,Ftgs & Slabs,#3-#6					0.01	0.43	0.00	0.49	0.00	0.92	
	1041.81	KG	SIWRC	283.95	15	529	4	600	0	1,133	1.09
Pour Cont Ftgs,Shlw,Direct Chute					0.47	11.56	4.46	71.94	0.00	87.95	
Place 4000 PSI Conc Foundations	82.92	M3	ALABI	17.20	39	1,139	439	7,087	0	8,665	104.49
Concrete Floor Finishes, Screed					0.12	3.18	0.02	0.00	0.00	3.19	
	177.82	M2	ACMAA	10.45	21	671	3	0	0	675	3.80
Conc Curing, Sprayed Membrane					0.02	0.55	0.00	0.32	0.00	0.87	
Curing Compound	177.82	M2	ULABB	110.32	4	116	1	68	0	184	1.04
Backfill Trenches by Hand					1.01	24.30	0.15	0.00	0.00	24.44	
Without Compaction	175.61	M3	ULABA	1.24	177	5,069	30	0	0	5,099	29.04
Compaction, 6" Layers w/Air Tamp					0.16	3.88	0.30	0.00	0.00	4.19	
By Hand, (15cm) Layers	175.61	M3	CODEK	38.23	28	810	63	0	0	873	4.97
3'x 1.5' Wide Continuous Footing	194.46	M			508	15,155	749	9,324	0	25,229	129.73
Pier/Foundation Exc, Normal Soil					1.31	31.59	0.19	0.00	0.00	31.78	
Hand Piled to 2' Deep	152.91	M3	ULABA	0.96	200	5,738	34	0	0	5,772	37.75
Trim Slopes/Sides of Excavation					0.18	4.33	0.20	0.00	0.00	4.53	
Hand Labor	74.32	M2	ULABE	6.97	13	383	18	0	0	400	5.39
Clmn Spread Footing Forms,4 Uses					1.00	25.90	0.60	5.81	0.00	32.31	
Plywd Forms, Form & Strip w/Acc	148.65	M2	ACARL	4.99	149	4,574	105	1,026	0	5,706	38.39
Gr 60 Resteel,Ftgs & Slabs,#3-#6					0.01	0.43	0.00	0.49	0.00	0.92	
	1814.37	KG	SIWRC	283.95	26	921	7	1,045	0	1,974	1.09
Pour Sprd Ftg,< 5CY,Direct Chute					1.01	25.22	9.73	71.94	0.00	106.88	
< (5M3) Place 4000 PSI Conc Fdns	34.02	M3	ALABI	7.88	35	1,019	393	2,908	0	4,320	126.97

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Concrete Floor Finishes, Screed					0.12	3.18	0.02	0.00	0.00	3.19	
	74.32	M2	ACMAA	10.45	9	281	1	0	0	282	3.80
Conc Curing, Sprayed Membrane					0.02	0.55	0.00	0.32	0.00	0.87	
Curing Compound	74.32	M2	ULABB	110.32	2	48	0	29	0	77	1.04
Backfill Trenches by Hand					1.01	24.30	0.15	0.00	0.00	24.44	
Without Compaction	99.39	M3	ULABA	1.24	100	2,869	17	0	0	2,886	29.04
Compaction, 6" Layers w/Air Tamp					0.16	3.88	0.30	0.00	0.00	4.19	
By Hand, (15cm) Layers	99.39	M3	CODEK	38.23	16	459	36	0	0	494	4.97
4'-0" x 4'-0" Spread Footing	50.00	EA			548	16,292	612	5,008	0	21,912	438.24
Grade Beam Forms, 3 Uses					0.71	18.26	0.42	7.21	0.00	25.89	
Plywd Forms, Form & Strip w/Acc	355.63	M2	ACARL	7.08	251	7,715	177	3,047	0	10,939	30.76
Gr 60 Resteel,Ftgs & Slabs,#3-#6					14.11	428.23	3.33	467.38	0.00	898.94	
	5.79	MT	SIWRC	0.28	82	2,944	23	3,214	0	6,181	1067.94
Pour Grade Beam, Reg, Conc Pump					0.32	8.00	3.09	71.94	0.00	83.02	
Place 4000 PSI Conc Foundations	82.92	M3	ALABI	24.85	27	788	304	7,087	0	8,179	98.63
1'-6" x3'-0" Concrete Grade Beam	194.46	M			359	11,447	504	13,347	0	25,299	130.10
Slab on Gr Edge Forms,7" to 12"H					0.30	7.80	0.18	2.23	0.00	10.21	
(18cm to 31cm)H, Based on 4 Uses	194.46	M	ACARL	16.57	59	1,803	41	515	0	2,360	12.14
6" High Keyed Joint Forms,4 Uses					0.22	5.75	0.13	1.21	0.00	7.10	
(15 cm) High	571.81	M	ACARL	22.48	127	3,909	90	825	0	4,823	8.44
Trm & Shpe f/Slab on Grd by Hand					0.18	4.31	0.03	0.00	0.00	4.34	
Finish Grade	2034.58	M2	ULABA	7.00	364	10,420	62	0	0	10,482	5.15
Soil Poisoning					0.02	0.58	0.00	0.08	0.00	0.66	
	2034.58	M2	ULABA	52.26	48	1,397	8	182	0	1,587	0.78
4"(10cm) Capillary Water Barrier					0.14	3.45	0.27	16.09	0.00	19.81	
Compacted Thickness	334.88	M3	CODEK	43.01	47	1,374	106	6,400	0	7,880	23.53
Fine Grd Gravel Bedding by Hand					0.09	2.17	0.01	0.00	0.00	2.18	
Finish Grade	2034.58	M2	ULABA	13.94	182	5,237	31	0	0	5,268	2.59
6 Mil Polyethylene Vapor Barrier					0.03	0.82	0.01	0.22	0.00	1.04	
	2238.04	M2	ACARB	85.94	65	2,169	29	572	0	2,770	1.24
Gr 60 Resteel,Ftgs & Slabs,#3-#6					14.11	428.23	3.33	467.38	0.00	898.94	
	39.73	MT	SIWRC	0.28	561	20,214	157	22,063	0	42,434	1067.94

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Pour Slab on Gr,>= 6", Dir Chute					0.32	7.93	3.06	71.94	0.00	82.92	
>= (15 cm) Place 4000 PSI Conc	334.88	M3	ALABI	25.09	107	3,153	1,216	28,619	0	32,988	98.51
Concrete Floor Finishes, Screed					0.12	3.18	0.02	0.00	0.00	3.19	
	2034.58	M2	ACMAA	10.45	243	7,683	39	0	0	7,722	3.80
Conc Floor Finishes, Stl Trowel					0.17	4.56	0.23	0.00	0.00	4.79	
	2034.58	M2	ACMAC	6.39	350	11,018	559	0	0	11,578	5.69
Conc Curing, Sprayed Membrane					0.02	0.55	0.00	0.32	0.00	0.87	
Curing Compound	2034.58	M2	ULABB	110.32	46	1,322	8	781	0	2,110	1.04
6" Thick Concrete Slab on Grade	2034.58	M2			2,198	69,699	2,348	59,957	0	132,004	64.88
60 Mil Hdpe Liner					0.00	0.00	0.00	0.00	4.84	4.84	
	4155.10	M2		0.00	0	0	0	0	22,612	22,612	5.44
Leak Collection Liner	2612.91	M2			0	0	0	0	22,612	22,612	8.65
Substructure	2034.58	M2			3,614	112,594	4,213	87,636	22,612	227,055	111.60
Superstructure											
Beams,Girders,Clmns,1-2 Sty Bldg					8.20	227.16	55.49	1102.31	0.00	1384.95	
A-36 Rolled Strl Steel Members	218.54	MT	SIWSM	0.98	1,793	56,832	13,882	275,782	0	346,496	1585.50
1-1/2"x20Ga Open Type Metal Deck					0.09	2.50	0.08	8.18	0.00	10.75	
Galvanized,Over 5000 SF (465 M2)	2238.04	M2	SIWSD	99.87	202	6,395	199	20,959	0	27,553	12.31
H or J Open Web Joist,0-30'Span					5.88	162.80	39.77	771.62	0.00	974.18	
(0-10M),Steel,Horz Bridging	19.87	MT	SIWSM	1.36	117	3,703	904	17,550	0	22,157	1115.24
Roof Construction - Steel	2034.58	M2			2,112	66,930	14,985	314,292	0	396,206	194.74
Superstructure	2034.58	M2			2,112	66,930	14,985	314,292	0	396,206	194.74
Exterior Closure											
Insul Siding Panel,2"Polystyrene					0.54	14.44	0.25	30.68	0.00	45.37	
Factory Assy, 24 Ga Galv Steel	1896.72	M2	MSHMG	7.43	1,021	32,544	560	69,124	0	102,229	53.90
Exterior Wall	1896.72	M2			1,021	32,544	560	69,124	0	102,229	53.90
Oil Base Caulk&Seal,1/4"x1/4" Jt					152.57	4278.01	33.93	131.23	0.00	4443.18	
	0.03	KM	ARFCA	0.01	5	168	1	5	0	175	5620.62

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
3'x7'x6-3/4"DP Steel Door Frame					3.33	93.47	1.22	69.11	0.00	163.80	
16 Ga Frame for 1-3/4"Door	3.00	EA	ACARB	0.75	10	333	4	246	0	584	194.59
3'x 7'x 2"x 18Ga Metal Door					2.22	62.31	0.82	160.00	0.00	223.13	
(Unrated)	3.00	EA	ACARB	1.13	7	222	3	570	0	795	265.07
4"x 4" Steel Butt Hinges					0.50	14.02	0.18	6.35	0.00	20.55	
SD Ball Bearing, Finish Hdwe	4.50	PR	ACARB	5.00	2	75	1	34	0	110	24.42
Lockset, Cipher - Mechanical					1.50	42.17	0.55	300.00	0.00	342.72	
	1.00	EA	ACARB	1.66	2	50	1	356	0	407	407.15
Door Bumper, Bronze Floor Type					0.25	7.01	0.09	2.44	0.00	9.54	
Finish Hardware	3.00	EA	ACARB	10.00	1	25	0	9	0	34	11.34
Door Closer,Int Surface Mounted					1.54	43.14	0.56	46.27	0.00	89.97	
Finish Hardware	3.00	EA	ACARB	1.63	5	154	2	165	0	321	106.89
10"x34" Door Kick Plate					0.67	18.69	0.24	15.82	0.00	34.76	
Finish Hardware	3.00	EA	ACARB	3.75	2	67	1	56	0	124	41.29
Rubber Door Silencers					0.25	7.01	0.09	0.09	0.00	7.19	
Type L03011	9.00	EA	ACARB	10.00	2	75	1	1	0	77	8.54
Aluminum Threshold w/ Grit					1.09	30.66	0.40	59.22	0.00	90.29	
	2.74	M	ACARB	2.29	3	100	1	193	0	294	107.26
Paint Int Metal Door & HM Frame					2.00	48.94	0.60	2.55	0.00	52.09	
	3.00	EA	APTRA	0.63	6	186	2	10	0	198	65.89
3' x 7' Hollow Metal Door With	3.00	EA			44	1,454	18	1,646	0	3,118	1039.38
Oil Base Caulk&Seal,1/4"x1/4" Jt					152.57	4278.01	33.93	131.23	0.00	4443.18	
	0.01	KM	ARFCA	0.01	2	66	1	2	0	69	5620.62
6'x7'x6-3/4"DP Steel Door Frame					4.00	112.16	1.47	79.11	0.00	192.74	
16 Ga Frame for 1-3/4"Door	1.00	EA	ACARB	0.63	4	133	2	94	0	229	228.97
Pair 3'x 7'x 2"x 18Ga Metal Door					4.00	112.16	1.47	320.00	0.00	433.63	
(Unrated)	1.00	EA	ACARB	0.63	4	133	2	380	0	515	515.15
4"x 4" Steel Butt Hinges					0.50	14.02	0.18	6.35	0.00	20.55	
SD Ball Bearing, Finish Hdwe	3.00	PR	ACARB	5.00	2	50	1	23	0	73	24.42
Door Bumper, Bronze Floor Type					0.25	7.01	0.09	2.44	0.00	9.54	
Finish Hardware	2.00	EA	ACARB	10.00	1	17	0	6	0	23	11.34
Door Closer,Int Surface Mounted					1.54	43.14	0.56	46.27	0.00	89.97	
Finish Hardware	2.00	EA	ACARB	1.63	3	102	1	110	0	214	106.89

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
10"x34" Door Kick Plate					0.67	18.69	0.24	15.82	0.00	34.76	
Finish Hardware	2.00	EA	ACARB	3.75	1	44	1	38	0	83	41.29
Rubber Door Silencers					0.25	7.01	0.09	0.09	0.00	7.19	
Type L03011	6.00	EA	ACARB	10.00	2	50	1	1	0	51	8.54
Aluminum Threshold w/ Grit					1.09	30.66	0.40	59.22	0.00	90.29	
	1.83	M	ACARB	2.29	2	67	1	129	0	196	107.26
Paint Int Metal Door & HM Frame					2.00	48.94	0.60	2.55	0.00	52.09	
	2.00	EA	APTRA	0.63	4	124	2	6	0	132	65.89
1-3/4"x 13 Ga Aluminum Astragal					0.32	8.85	0.12	6.96	0.00	15.92	
	2.13	M	ACARB	7.92	1	22	0	18	0	40	18.91
Pr 3' x 7' Hollow Metal Dr With	1.00	PR			24	809	10	806	0	1,624	1624.49
10' x10' Automatic Service Door					15.01	454.68	5.76	2000.00	0.00	2460.44	
(See Interior Construction for Additional Service Doors)	4.00	EA	SIWSB	0.17	60	2,161	27	9,504	0	11,692	2923.00
10'x10' Automatic Service Doors	4.00	EA			60	2,161	27	9,504	0	11,692	2923.00
20' x10' Automatic Service Door					25.00	757.50	9.59	3500.00	0.00	4267.09	
	1.00	EA	SIWSB	0.10	25	900	11	4,158	0	5,069	5069.30
20'x10' Automatic Service Doors	1.00	EA			25	900	11	4,158	0	5,069	5069.30
Exterior Closure	1896.72	M2			1,174	37,868	627	85,238	0	123,733	65.24
Roofing											
6"Foil 1 Side,R21 Fbgs Insul					0.09	2.52	0.03	2.69	0.00	5.24	
	183.95	M2	ACARB	27.87	16	585	8	626	0	1,219	6.63
4"Unfaced Batt,R11 Fbgs Insul					0.09	2.52	0.03	2.05	0.00	4.59	
	183.95	M2	ACARB	27.87	16	585	8	476	0	1,069	5.81
2" Foam Spray,R15.4 Urethane Ins					0.54	14.38	1.19	5.92	0.00	21.49	
	1850.64	M2	APLAE	5.52	1,006	33,668	2,782	13,859	0	50,309	27.18
Synthetic Membrane Roofing With	2034.58	M2			1,039	34,839	2,797	14,961	0	52,598	25.85
Roofing	2034.58	M2			1,039	34,839	2,797	14,961	0	52,598	25.85

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Interior Construction											
Oil Base Caulk&Seal,1/4"x1/4" Jt					152.57	4278.01	33.93	131.23	0.00	4443.18	
	0.04	KM	ARFCA	0.01	6	224	2	7	0	233	5620.62
3'x7'x6-3/4"DP Steel Door Frame					3.33	93.47	1.22	69.11	0.00	163.80	
16 Ga Frame for 1-3/4"Door	4.00	EA	ACARB	0.75	13	444	6	328	0	778	194.59
3'x 7'x 2"x 18Ga Metal Door					2.22	62.31	0.82	160.00	0.00	223.13	
(Unrated)	4.00	EA	ACARB	1.13	9	296	4	760	0	1,060	265.07
4"x 4" Steel Butt Hinges					0.50	14.02	0.18	6.35	0.00	20.55	
SD Ball Bearing, Finish Hdwe	6.00	PR	ACARB	5.00	3	100	1	45	0	147	24.42
Hvy Duty Cylinderical Lockset					0.43	12.19	0.16	82.77	0.00	95.12	
Finish Hardware	4.00	EA	ACARB	5.75	2	58	1	393	0	452	113.00
Door Bumper, Bronze Floor Type					0.25	7.01	0.09	2.44	0.00	9.54	
Finish Hardware	4.00	EA	ACARB	10.00	1	33	0	12	0	45	11.34
Rubber Door Silencers					0.25	7.01	0.09	0.09	0.00	7.19	
Type L03011	12.00	EA	ACARB	10.00	3	100	1	1	0	103	8.54
Paint Int Metal Door & HM Frame					2.00	48.94	0.60	2.55	0.00	52.09	
	4.00	EA	APTRA	0.63	8	248	3	13	0	264	65.89
3' x 7' Hollow Metal Door With	4.00	EA			45	1,503	18	1,560	0	3,082	770.41
10' x10' Automatic Service Door					15.01	454.68	5.76	2000.00	0.00	2460.44	
	8.00	EA	SIWSB	0.17	120	4,321	55	19,008	0	23,384	2923.00
10'x10' Automatic Service Doors	8.00	EA			120	4,321	55	19,008	0	23,384	2923.00
Horiz Truss Jt Reinf in 8" Wall					14.91	412.19	3.32	249.01	0.00	664.52	
Use 6" Wide Truss for 8" Wall	4.68	KM	AMABA	0.08	70	2,440	20	1,474	0	3,933	840.62
Type N Masonry Cement 1:3 Mix					0.00	0.00	0.00	87.58	0.00	87.58	
	52.03	M3	N/A	0.00	0	0	0	5,764	0	5,764	110.79
Int Scaf Wall,16'(4.9M)-30'(12M)					0.13	3.66	0.05	1.22	0.00	4.93	
Tubular Steel,Based on 1 Use/Mo	1896.72	M2	ACARB	19.17	247	8,776	115	2,931	0	11,822	6.23
8"x16"x8"(21cm)Regular CMU Ptn					1.37	37.32	0.30	8.93	0.00	46.56	
(Sand Aggregate)	1688.08	M2	AMABF	3.83	2,313	79,704	634	19,078	0	99,416	58.89
Clean & Point Block Masonry					0.13	3.72	0.03	2.80	0.00	6.55	
	3793.43	M2	AMABA	9.29	510	17,846	145	13,430	0	31,420	8.28

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
8" CMU Walls	1896.72	M2			3,141	108,765	914	42,677	0	152,356	80.33
Interior Construction	2034.58	M2			3,306	114,590	987	63,245	0	178,821	87.89
Interior Finishes											
Floor Hardener,Metallic,Hvy Duty					0.15	3.86	0.20	2.91	0.00	6.96	
0.65 #/SF	2034.58	M2	ACMAC	7.55	296	9,929	504	7,480	0	17,913	8.80
Concrete Floor Sealer	2034.58	M2			296	9,929	504	7,480	0	17,913	8.80
Fluid Appl,Rubber Base,Polyureth					0.30	8.50	0.07	8.61	0.00	17.18	
6 Mil Thick, Applied in 2 Coats	3192.16	M2	ARFCB	8.25	969	34,333	274	34,772	0	69,379	21.73
Waterproof CMU Walls	3192.16	M2			969	34,333	274	34,772	0	69,379	21.73
3/4"Thick Glass Cloth Faced Fbgs					0.15	4.31	0.06	11.09	0.00	15.45	
Fiberglass Acoustical Ceil Pnls	183.95	M2	ACARB	16.26	28	1,003	13	2,580	0	3,596	19.55
T Bar Ceil Susp System 2'x 2'					0.13	3.77	0.05	2.80	0.00	6.62	
	183.95	M2	ACARB	18.58	25	878	12	651	0	1,541	8.38
Water Resistant Acoustical	183.95	M2			53	1,881	25	3,231	0	5,137	27.93
Interior Finishes	2034.58	M2			1,318	46,144	803	45,483	0	92,429	45.43
Specialties											
Painted Steel Partition					2.86	80.11	1.05	233.00	0.00	314.16	
Floor Mtd w/Door & Side Divider	4.00	EA	ACARB	0.88	11	381	5	1,107	0	1,493	373.23
Toilet Partitions	4.00	EA			11	381	5	1,107	0	1,493	373.23
Urinal Screen, Floor Mtd					3.33	93.47	1.22	80.00	0.00	174.69	
Painted Steel	1.00	EA	ACARB	0.75	3	111	1	95	0	208	207.53
Urinal Screens	1.00	EA			3	111	1	95	0	208	207.53
3"x8" Hard Plastic Door Sign					0.50	12.08	0.07	7.50	0.00	19.65	
Adhesive w/o Frame	4.00	EA	ULABA	2.50	2	57	0	36	0	93	23.34
Signage					2	57	0	36	0	93	

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Surf.Mtd Sgl Clothes Hook					0.42	11.68	0.15	3.20	0.00	15.04	
	4.00	EA	ACARB	6.00	2	56	1	15	0	71	17.86
Surf.Mtd 2 Roll Toil. Paper Hold					0.42	11.68	0.15	15.00	0.00	26.84	
	4.00	EA	ACARB	6.00	2	56	1	71	0	128	31.88
Surf.Mtd Globe Soap Dispenser					0.67	18.69	0.24	7.69	0.00	26.63	
	4.00	EA	ACARB	3.75	3	89	1	37	0	127	31.63
Surf.Mtd 18"x24" Mirror & Shelf					0.67	18.69	0.24	35.00	0.00	53.94	
	4.00	EA	ACARB	3.75	3	89	1	166	0	256	64.08
Surf.Mtd 48" Grab Bar					0.50	14.02	0.18	40.00	0.00	54.20	
	2.00	EA	ACARB	5.00	1	33	0	95	0	129	64.39
Recessed Towel Disp & Receptacle					1.00	28.04	0.37	167.35	0.00	195.76	
	2.00	EA	ACARB	2.50	2	67	1	398	0	465	232.56
Surf.Mtd Sanit. Napkin Dispenser w/Receptor - Free					1.00	28.04	0.37	188.10	0.00	216.51	
	1.00	EA	ACARB	2.50	1	33	0	223	0	257	257.21
Surf.Mtd Sanit Napkin Receptacle					0.83	23.37	0.31	21.00	0.00	44.67	
	3.00	EA	ACARB	3.00	2	83	1	75	0	159	53.07
24"Long SST Mop Holder,3 Holders					0.42	11.68	0.15	27.00	0.00	38.84	
	1.00	EA	ACARB	6.00	0	14	0	32	0	46	46.14
110V Elect. Hand Dryer, Surf.Mtd					2.50	70.10	0.92	263.35	0.00	334.37	
	2.00	EA	ACARB	1.00	5	167	2	626	0	794	397.23
Toilet and Bath Accessories					21	686	9	1,738	0	2,433	
Specialties	2034.58	M2			37	1,235	16	2,976	0	4,227	2.08
Plumbing											
Plumbing fixtures					0.00	750.00	0.00	750.00	0.00	1500.00	
	11.00	EA		0.00	0	9,801	0	9,801	0	19,602	1782.00
Roof drainage					0.00	4.31	0.00	4.31	0.00	8.61	
	2034.58	M2		0.00	0	10,407	0	10,407	0	20,814	10.23
Pipe & Fitting(Allowance)FRP					0.00	229.66	0.00	98.42	0.00	328.08	
	457.20	M		0.00	0	124,740	0	53,460	0	178,200	389.76
Plumbing	11.00	EA			0	144,948	0	73,668	0	218,616	19874.16

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
HVAC											
Includes Separate Systems In Each Room, 100% Fresh Air, Dehumidifying And HEPA Filters As Specified											
Air conditioning					0.00	161.46	0.00	53.82	0.00	215.28	
	874.22	M2		0.00	0	178,555	0	59,518	0	238,073	272.33
Dehumidifyer/vent					0.00	21.53	0.00	21.53	0.00	43.06	
	966.20	M2		0.00	0	26,312	0	26,312	0	52,624	54.47
HEPA filter w/housing					0.00	240.00	4.12	260.00	0.00	504.12	
	24.00	EA		0.00	0	7,286	125	7,894	0	15,305	637.71
Vent Only					0.00	8.07	0.00	8.07	0.00	16.15	
	910.45	M2		0.00	0	9,298	0	9,298	0	18,596	20.42
HVAC	2034.58	M2			0	221,451	125	103,022	0	324,598	159.54
Fire Protection											
Includes Separate Wet Pipe System in Each Room											
Fire Protection					0.00	6.46	0.00	5.92	0.00	12.38	
	2034.58	M2		0.00	0	16,622	0	15,237	0	31,859	15.66
Fire Protection	2034.58	M2			0	16,622	0	15,237	0	31,859	15.66
Electrical											
Allowance for complete interior electrical systems. (includes Service & Distribution, Lighting, Power Telephone, HLAN, Security, Fire Alarm, and Public Address. See backup for cost breakdown.)					0.00	69.97	0.00	57.05	0.00	127.01	
	2034.58	M2		0.00	0	159,930	0	130,405	0	290,335	142.70
Electrical	2034.58	M2			0	159,930	0	130,405	0	290,335	142.70
Equip., Furnishings, Conveying											
Motorized (15 fpm) Conveyors (4' Wide)					34.86	928.33	88.49	3280.83	0.00	4297.66	
	478.54	M	ESELG	0.12	16,681	527,759	50,310	1,865,160	0	2,443,228	5105.61
Motorized (15 fpm) Conveyors (6' Wide)					34.86	928.33	88.49	3280.83	0.00	4297.66	
	27.43	M	ESELG	0.12	956	30,254	2,884	106,920	0	140,058	5105.61
Conveyors (In Decon Building)	505.97	M			17,638	558,012	53,194	1,972,080	0	2,583,286	5105.61

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Fleet Wash System W/Water Reclimation, Quote from Fleetwash Systems, Paul Wiegand, 800-925-3778					5500.00	166767.50	1390.00	105000.00	0.00	273157.50	
	4.00	EA	MPLUJ1	0.00	22,000	807,155	6,728	508,200	0	1,322,082	330521
Blower system					916.67	27794.58	231.67	40000.00	0.00	68026.25	
	4.00	EA	MPLUJ1	0.01	3,667	134,526	1,121	193,600	0	329,247	82311.76
Handheld Gun					20.00	606.43	5.05	3000.00	0.00	3611.48	
	2.00	EA	MPLUJ1	0.28	40	1,468	12	7,260	0	8,740	4369.89
Gas Water Heater					17.99	546.63	72.93	4800.00	0.00	5419.56	
	1.00	EA	MPLUS	0.19	18	661	88	5,808	0	6,558	6557.67
Fleet wash system					25,725	943,809	7,949	714,868	0	1,666,627	
Equip., Furnishings, Conveying	2034.58	M2			43,362	1,501,822	61,143	2,686,948	0	4,249,913	2088.84
Sitework											
Portable Fencing					0.00	0.00	0.00	98.42	0.00	98.42	
	56.39	M		0.00	0	0	0	6,593	0	6,593	116.93
Sitework					0	0	0	6,593	0	6,593	
Decontamination Facility	2034.58	M2			55,962	2,458,972	85,696	3,629,704	22,612	6,196,983	3045.83
W.Water Collection/Trmt System											
Collection & Treatment System											
Evaporation Tanks 3'Deep by 50'Dia. Quote By Environetics Inc., Steve Winters,815-838-8331					0.00	14550.00	0.00	90250.00	0.00	104800.00	
	8.00	EA		0.00	0	138,283	0	857,736	0	996,019	124502
Pump Allowance					0.00	500.00	0.00	1000.00	0.00	1500.00	
	8.00	EA		0.00	0	4,752	0	9,504	0	14,256	1782.00
Piping Allowance to Btch Plnt From Decon Facility Includes Piping at the Tanks, Excavation, Backfill, Fittings, etc,					0.00	0.00	0.00	82.02	0.00	82.02	
	975.36	M		0.00	0	0	0	95,040	0	95,040	97.44
Collection & Treatment System	1.00	EA			0	143,035	0	962,280	0	1,105,315	1105315
W.Water Collection/Trmt System	2034.58	M2			0	143,035	0	962,280	0	1,105,315	543.26

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Wastewater Treatment Plant											
Package Wastewater Trmt Plant											
Package Treatment Plant					0.00	0.00	0.00	0.00	1000000	1000000.00	
utilizing the reverse osmosis process,as directed by Westinghouse Handford Company & Montgomery Watson	1.00	LS		0.00	0	0	0	0	1,000,000	1,000,000	1000000
Package Wastewater Trmt Plant					0	0	0	0	1,000,000	1,000,000	
Wastewater Treatment Plant					0	0	0	0	1,000,000	1,000,000	
Decontamination Facility					55,962	2,602,007	85,696	4,591,984	1,022,612	8,302,298	

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Container Storage Shed											
Container Storage Shed											
Substructure											
Trench, 2-1/2 CY Hyd Excavator					0.07	1.72	0.13	0.00	0.00	1.85	
113 CY/Hr (86M3)/Hr	792.09	M3	CODEK	86.30	55	1,619	125	0	0	1,744	2.20
Trim Slopes/Sides of Excavation					0.18	4.33	0.20	0.00	0.00	4.53	
Hand Labor	515.61	M2	ULABE	6.97	93	2,654	124	0	0	2,778	5.39
Cont Wall Footing Forms, 2 Uses					0.98	25.31	0.58	7.43	0.00	33.32	
Plywd Forms, Form & Strip w/Acc	515.61	M2	ACARL	5.11	504	15,506	356	4,549	0	20,412	39.59
Gr 60 Resteel,Ftgs & Slabs,#3-#6					0.01	0.43	0.00	0.44	0.00	0.87	
	3020.93	KG	SIWRC	283.95	43	1,534	12	1,582	0	3,128	1.04
Pour Cont Ftgs,Shlw,Direct Chute					0.47	11.56	4.46	78.48	0.00	94.49	
Place 3000 PSI Conc Foundations	240.46	M3	ALABI	17.20	112	3,302	1,274	22,418	0	26,993	112.26
Concrete Floor Finishes, Screed					0.12	3.18	0.02	0.00	0.00	3.19	
	515.61	M2	ACMAA	10.45	62	1,947	10	0	0	1,957	3.80
Conc Curing, Sprayed Membrane					0.02	0.55	0.00	0.32	0.00	0.87	
Curing Compound	515.61	M2	ULABB	110.32	12	335	2	198	0	535	1.04
Backfill Trenches by Hand					1.01	24.30	0.15	0.00	0.00	24.44	
Without Compaction	509.20	M3	ULABA	1.24	512	14,698	88	0	0	14,786	29.04
Compaction, 6" Layers w/Air Tamp					0.16	3.88	0.30	0.00	0.00	4.19	
By Hand, (15cm) Layers	509.20	M3	CODEK	38.23	80	2,350	182	0	0	2,532	4.97
3'x 1.5' Wide Continuous Footing	563.88	M			1,472	43,945	2,173	28,747	0	74,865	132.77
Grade Beam Forms, 3 Uses					0.71	18.26	0.42	7.21	0.00	25.89	
Plywd Forms, Form & Strip w/Acc	1031.23	M2	ACARL	7.08	728	22,370	514	8,835	0	31,720	30.76
Gr 60 Resteel,Ftgs & Slabs,#3-#6					14.11	428.23	3.33	467.38	0.00	898.94	
	16.78	MT	SIWRC	0.28	237	8,538	66	9,319	0	17,923	1067.94
Pour Grade Beam, Reg, Conc Pump					0.32	8.00	3.09	78.48	0.00	89.56	
Place 3000 PSI Conc Foundations	240.46	M3	ALABI	24.85	77	2,286	882	22,418	0	25,585	106.40
1'-6" x3'-0" Concrete Grade Beam	563.88	M			1,042	33,194	1,462	40,571	0	75,228	133.41
Slab on Gr Edge Forms,7" to 12"H					0.30	7.80	0.18	2.23	0.00	10.21	
(18cm to 31cm)H, Based on 4 Uses	573.03	M	ACARL	16.57	173	5,313	122	1,519	0	6,954	12.14

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
6" High Keyed Joint Forms,4 Uses					0.22	5.75	0.13	1.21	0.00	7.10	
(15 cm) High	213.36	M	ACARL	22.48	47	1,459	34	308	0	1,800	8.44
Trm & Shpe f/Slab on Grd by Hand					0.18	4.31	0.03	0.00	0.00	4.34	
Finish Grade	1289.03	M2	ULABA	7.00	230	6,602	40	0	0	6,641	5.15
Soil Poisoning					0.02	0.58	0.00	0.08	0.00	0.66	
	1289.03	M2	ULABA	52.26	31	885	5	115	0	1,005	0.78
4"(10cm) Capillary Water Barrier					0.14	3.45	0.27	16.09	0.00	19.81	
Compacted Thickness	212.17	M3	CODEK	43.01	30	870	67	4,055	0	4,993	23.53
Fine Grd Gravel Bedding by Hand					0.09	2.17	0.01	0.00	0.00	2.18	
Finish Grade	1289.03	M2	ULABA	13.94	115	3,318	20	0	0	3,338	2.59
6 Mil Polyethylene Vapor Barrier					0.03	0.82	0.01	0.22	0.00	1.04	
	1417.94	M2	ACARB	85.94	41	1,374	18	363	0	1,755	1.24
Gr 60 Resteel,Ftgs & Slabs,#3-#6					14.11	428.23	3.33	467.38	0.00	898.94	
	25.17	MT	SIWRC	0.28	355	12,807	100	13,978	0	26,885	1067.94
Pour Slab on Gr,>= 6", Dir Chute					0.32	7.93	3.06	78.48	0.00	89.46	
>= (15 cm) Place 3000 PSI Conc	212.17	M3	ALABI	25.09	68	1,998	771	19,780	0	22,548	106.28
Concrete Floor Finishes, Screed					0.12	3.18	0.02	0.00	0.00	3.19	
	1289.03	M2	ACMAA	10.45	154	4,868	25	0	0	4,892	3.80
Conc Floor Finishes, Stl Trowel					0.17	4.56	0.23	0.00	0.00	4.79	
	1289.03	M2	ACMAC	6.39	222	6,981	354	0	0	7,335	5.69
Conc Curing, Sprayed Membrane					0.02	0.55	0.00	0.32	0.00	0.87	
Curing Compound	1289.03	M2	ULABB	110.32	29	837	5	495	0	1,337	1.04
6" Thick Concrete Slab on Grade	1289.03	M2			1,495	47,312	1,560	40,612	0	89,483	69.42
Substructure	1289.03	M2			4,010	124,450	5,195	109,931	0	239,576	185.86
Superstructure											
4"x4" Weight Range 10-22 LB/LF					23.52	651.19	159.06	1807.79	0.00	2618.03	
	40.82	MT	SIWSM	0.34	960	30,433	7,434	84,486	0	122,353	2997.13
Roof Construction - Steel	1289.03	M2			960	30,433	7,434	84,486	0	122,353	94.92
Superstructure	1289.03	M2			960	30,433	7,434	84,486	0	122,353	94.92

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Roofing											
24 Ga 2"Standing Seam Roof Panel					0.17	4.71	0.98	25.30	0.00	30.99	
Painted	1289.03	M2	SIWSH	34.84	222	7,216	1,503	38,736	0	47,456	36.82
Standing Seam Metal Roof	1289.03	M2			222	7,216	1,503	38,736	0	47,456	36.82
Roofing	1289.03	M2			222	7,216	1,503	38,736	0	47,456	36.82
Conveying											
Motorized (15 fpm) Conveyors					34.86	928.33	88.49	3280.83	0.00	4297.66	
(4' Wide) Quote by Bill Vick, Mathews Eq Co 404-343-9009.	281.94	M	ESELG	0.12	9,828	310,941	29,641	1,098,900	0	1,439,482	5105.61
Storage Area Conveyors	281.94	M			9,828	310,941	29,641	1,098,900	0	1,439,482	5105.61
Conveying	1289.03	M2			9,828	310,941	29,641	1,098,900	0	1,439,482	1116.71
Container Storage Shed	1289.03	M2			15,020	473,040	43,773	1,332,053	0	1,848,866	1434.30
Container Storage Shed					15,020	473,040	43,773	1,332,053	0	1,848,866	

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CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Automated Data Processing Equip.											
Automated Data Processing Equipm											
Automated data processing											
Automated data processing					0.00	0.00	0.00	0.00	2000000	2000000.00	
equipment	1.00	LS		0.00	0	0	0	0	2,247,000	2,247,000	2247000
Automated data processing					0	0	0	0	2,247,000	2,247,000	
Automated Data Processing Equipm					0	0	0	0	2,247,000	2,247,000	
Automated Data Processing Equip.					0	0	0	0	2,247,000	2,247,000	

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Fuel and Chemical Storage											
Fuel & Chemical Storage											
Fuel & Chemical Storage											
500 Gal storage tank					10.00	294.41	4.41	1205.00	0.00	1503.82	
1 at fuel storage area, 1 at bulk chemical storage area	2.00	EA	MSPFL	0.40	20	700	10	2,863	0	3,573	1786.54
15000Gal Dbl wall diesel tank					32.41	984.44	131.34	15000.00	0.00	16115.78	
Fiberglass w/leak detection	1.00	EA	MPLUS	0.11	32	1,170	156	17,820	0	19,146	19145.55
250 Gal Lube oil storage tank					5.00	147.13	2.21	400.00	0.00	549.34	
	2.00	EA	MSPFL	0.80	10	350	5	950	0	1,305	652.61
Concrete pad					1.14	33.44	0.50	43.06	0.00	77.00	
	55.74	M2	MSPFL	3.52	63	2,215	33	2,851	0	5,099	91.47
Allowance for Piping, Pumps, and					0.00	0.00	0.00	0.00	10000.00	10000.00	
Dispensers	1.00	LS		0.00	0	0	0	0	11,880	11,880	11880.00
Fuel & Chemical Storage					126	4,433	205	24,485	11,880	41,003	
Fuel & Chemical Storage					126	4,433	205	24,485	11,880	41,003	
Fuel and Chemical Storage					126	4,433	205	24,485	11,880	41,003	

CF 125.3.2 Support Facilities	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Sanitary Waste Systems											
Sanitary Waste Systems											
Septic Systems											
40,000 Gal Precast Septic Tank					150.00	3712.25	821.78	23355.00	0.00	27889.03	
w/excavation	2.00	EA	UOEHC	0.04	300	8,820	1,953	55,491	0	66,264	33132.17
12 Outlet Conc Distribution Box					3.50	106.32	14.18	75.00	0.00	195.50	
	2.00	EA	MPLUS	1.00	7	253	34	178	0	465	232.26
Hvy Duty Leaching Field Chamber					4.00	98.99	21.91	363.30	0.00	484.21	
13'x 3'-9"x 1'-6"	2.00	EA	UOEHC	1.50	8	235	52	863	0	1,150	575.24
Distribution Piping					0.00	19.68	6.56	16.40	0.00	42.65	
w/excavation	731.52	M		0.00	0	17,107	5,702	14,256	0	37,066	50.67
Stone Fill					0.00	2.62	3.92	10.46	0.00	17.00	
	91.75	M3		0.00	0	285	428	1,140	0	1,853	20.20
Septic Systems					315	26,700	8,168	71,929	0	106,798	
Sanitary Waste Systems					315	26,700	8,168	71,929	0	106,798	
Sanitary Waste Systems					315	26,700	8,168	71,929	0	106,798	
CF 125.3.2 Support Facilities					116,811	5,007,118	390,720	9,993,217	3,281,492	18,672,548	

CF 125.3.5 Miscellaneous	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
CF 125.3.5 Miscellaneous											
Secondary Containment											
Secondary Containment & Leachate Pump Station Under The Grout Plant											
Secondary Containment System											
Pump control enclosure											
Pump control enclosure					0.00	250.00	0.00	2250.00	0.00	2500.00	
	1.00	EA		0.00	0	297	0	2,673	0	2,970	2970.00
Pump control enclosure					0	297	0	2,673	0	2,970	
Pumps-leachate/leak detection											
Pump Allowance					20.00	607.54	81.05	1049.00	0.00	1737.60	
	1.00	EA	MPLUS	0.18	20	722	96	1,246	0	2,064	2064.26
Pumps-leachate/leak detection					20	722	96	1,246	0	2,064	
Liner											
60 Mil Hdpe Liner					0.00	0.00	0.00	0.00	4.84	4.84	
	2989.17	M2		0.00	0	0	0	0	14,479	14,479	4.84
Excavation For Liner					0.00	1.31	1.31	0.00	0.00	2.62	
	425.10	M3		0.00	0	556	556	0	0	1,112	2.62
Liner					0	556	556	0	14,479	15,591	
Secondary Containment System					20	1,575	652	3,919	14,479	20,625	
Secondary Containment					20	1,575	652	3,919	14,479	20,625	

CF 125.3.5 Miscellaneous	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Site Communications											
Site Communications Distribution											
Communications Distribution											
Allowance for communications distribution system, cabling for data processing is included in "Data Processing Allowance" elsewhere (includes trenching, 2-way & 4-way concrete encased duct, manholes, and fiber optic cabling)	4023.37	M	EELEC	0.90	3.60 14,483	99.28 448,784	0.00 0	65.62 296,604	0.00 0	164.90 745,388	185.26
Communications Distribution	4023.37	M			14,483	448,784	0	296,604	0	745,388	185.26
Site Communications Distribution					14,483	448,784	0	296,604	0	745,388	
Site Communications					14,483	448,784	0	296,604	0	745,388	

CF 125.3.5 Miscellaneous	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Site Electrical											
Site Electrical Distribution											
Primary Distribution											
Allowance for main primary feed, from existing overhead primary to substation area. (includes 15kv riser from transmission lines, trenching, 4-way concrete encased duct, cabling, and terminations)	60.96	M	EELEC	0.49	6.63 404	182.78 12,518	0.00 0	160.76 11,010	0.00 0	343.54 23,528	385.96
Allowance for primary distribution feeds from substation to various structures (includes trenching, 2-way concrete encased duct, cabling, and terminations)	2956.57	M	EELEC	0.82	3.98 11,754	109.66 364,243	0.00 0	85.30 283,347	0.00 0	194.96 647,590	219.03
Primary Distribution					12,158	376,761	0	294,357	0	671,118	
Miscellaneous Secondary Distr.											
Allowance for miscellaneous site electrical secondaries (includes trenching, 2-way concrete encased duct, cabling, and terminations)	1.00	LS		0.00	0.00 0	22500.00 25,279	3500.00 3,932	47500.00 53,366	0.00 0	73500.00 82,577	82577.25
Miscellaneous Secondary Distr.					0	25,279	3,932	53,366	0	82,577	
Electrical system at gate points											
Allowance for electrical connections/equipment at gate points	3.00	EA	EELEC	0.02	172.87 519	4767.95 16,070	0.00 0	4500.00 15,167	0.00 0	9267.95 31,238	10412.54
Electrical system at gate points	3.00	EA			519	16,070	0	15,167	0	31,238	10412.54
Site Electrical Distribution					12,677	418,110	3,932	362,891	0	784,933	
Site Electrical					12,677	418,110	3,932	362,891	0	784,933	

CF 125.3.5 Miscellaneous	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Substation/Equipment											
Substation/Equipment											
Substation/Electrical Equipment											
Allowance for					0.00	20000.00	0.00	150000.00	0.00	170000.00	
substation/transformers	1.00	LS		0.00	0	22,470	0	168,525	0	190,995	190995
Substation/Electrical Equipment					0	22,470	0	168,525	0	190,995	
Substation/Equipment					0	22,470	0	168,525	0	190,995	
Substation/Equipment					0	22,470	0	168,525	0	190,995	

CF 125.3.5 Miscellaneous	QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
Site Lighting											
General Site Lighting											
Site lighting											
Allowance for general site lighting					35.01	1052.91	197.57	1500.00	0.00	2750.48	
	45.00	EA	EELEJ	0.14	1,576	53,232	9,989	75,836	0	139,057	3090.16
Site lighting	45.00	EA			1,576	53,232	9,989	75,836	0	139,057	3090.16
General Site Lighting					1,576	53,232	9,989	75,836	0	139,057	
Site Lighting					1,576	53,232	9,989	75,836	0	139,057	
CF 125.3.5 Miscellaneous					28,756	944,172	14,573	907,775	14,479	1,880,999	
CF 125.3 Contract 3					165,173	6,529,842	1,498,351	17132210	21418482	46,578,884	
ENV. RESTORATION DISPOSAL FAC.					421,938	14371343	14946441	21862708	21540429	72,720,921	

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	ACARB	2 B-carpnter + Small Tools			PROD = 100%				CREW HOURS =	2246
MIL	B-CARPNTERF	Carpenters	0.50	HR	28.84	0.50	14.42			14.42
MIL	B-CARPNTERL	Carpenters	2.00	HR	27.84	2.00	55.68			55.68
MIL	XMIXX020 E	Small Tools	0.66	HR	1.39			0.66	0.92	0.92
	TOTAL					2.50	70.10	0.66	0.92	71.02
	ACARL	4 B-carpnter + Misc Power Tools			PROD = 100%				CREW HOURS =	517
MIL	B-CARPNTERL	Carpenters	2.00	HR	27.84	2.00	55.68			55.68
MIL	B-CARPNTERF	Carpenters	1.00	HR	28.84	1.00	28.84			28.84
MIL	B-CARPNTERA	Carpenters	1.00	HR	20.88	1.00	20.88			20.88
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	23.95	1.00	23.95			23.95
MIL	XMIXX010 E	Misc. Power Tools	0.32	HR	5.85			0.32	1.87	1.87
MIL	XMIXX020 E	Small Tools	0.79	HR	1.39			0.79	1.10	1.10
	TOTAL					5.00	129.35	1.11	2.97	132.32
	ACMAA	1 B-cemtfinr + Small Tools			PROD = 100%				CREW HOURS =	553
MIL	B-CEMTFINRF	Cement Finishers	0.25	HR	27.38	0.25	6.85			6.85
MIL	B-CEMTFINRL	Cement Finishers	1.00	HR	26.38	1.00	26.38			26.38
MIL	XMIXX020 E	Small Tools	0.12	HR	1.39			0.12	0.17	0.17
	TOTAL					1.25	33.23	0.12	0.17	33.39
	ACMAC	1 B-cemtfinr + Misc Power Tools			PROD = 100%				CREW HOURS =	1296
MIL	B-CEMTFINRF	Cement Finishers	0.10	HR	27.38	0.10	2.74			2.74
MIL	B-CEMTFINRL	Cement Finishers	1.00	HR	26.38	1.00	26.38			26.38
MIL	XMIXX010 E	Misc. Power Tools	0.21	HR	5.85			0.21	1.23	1.23
MIL	XMIXX020 E	Small Tools	0.18	HR	1.39			0.18	0.25	0.25
	TOTAL					1.10	29.12	0.39	1.48	30.60
	ACMAE	1 B-cemtfinr + Small Tools			PROD = 100%				CREW HOURS =	121
MIL	B-CARPNTERL	Carpenters	1.00	HR	27.84	1.00	27.84			27.84
MIL	B-CEMTFINRF	Cement Finishers	1.00	HR	27.38	1.00	27.38			27.38
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	23.95	1.00	23.95			23.95
MIL	XMIXX020 E	Small Tools	0.45	HR	1.39			0.45	0.63	0.63
	TOTAL					3.00	79.17	0.45	0.63	79.80
	AGLAB	2 B-glazier + Small Tools			PROD = 100%				CREW HOURS =	302
MIL	B-GLAZIER F	Glazier	0.50	HR	28.84	0.50	14.42			14.42
MIL	B-GLAZIER L	Glazier	2.00	HR	27.84	2.00	55.68			55.68
MIL	XMIXX020 E	Small Tools	0.24	HR	1.39			0.24	0.33	0.33
	TOTAL					2.50	70.10	0.24	0.33	70.43

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	ALABI	6 B-laborer + 2 Electric Concrete Vibrators				PROD = 100%			CREW HOURS =	88
MIL	B-CEMTFINRL	Cement Finishers	1.00	HR	26.38	1.00	26.38			26.38
MIL	B-LABORER F	Laborer (Semi-Skilled)	1.00	HR	24.95	1.00	24.95			24.95
MIL	B-LABORER L	Laborer (Semi-Skilled)	5.00	HR	23.95	5.00	119.75			119.75
MIL	B-EQOPRMEDL	Eq Oper, Medium	1.00	HR	27.74	1.00	27.74			27.74
MIL	C55SC005 E	CONC PUMP,117CY/HR,75'BOOM,TRK	1.00	HR	65.60			1.00	65.60	65.60
MIL	C65MS001 E	CONCRETE VIBRATOR, 2.5"	2.00	HR	0.78			2.00	1.56	1.56
MIL	XMIXX020 E	Small Tools	0.68	HR	1.39			0.68	0.95	0.95
MIL	A15XX009 E	AIR COMPR, 250 CFM, 100 PSI	1.00	HR	8.22			1.00	8.22	8.22
MIL	A20XX002 E	AIR HOSE, 1", 50', HARDROCK	1.00	HR	0.37			1.00	0.37	0.37
	TOTAL					8.00	198.82	5.68	76.70	275.52
	ALATA	1 B-lathers + Small Tools				PROD = 100%			CREW HOURS =	747
MIL	B-LATHERS L	Lathers	1.00	HR	27.44	1.00	27.44			27.44
MIL	B-LATHERS F	Lathers	0.25	HR	28.44	0.25	7.11			7.11
MIL	XMIXX020 E	Small Tools	0.25	HR	1.39			0.25	0.35	0.35
	TOTAL					1.25	34.55	0.25	0.35	34.90
	AMABA	1 B-brklayr + Small Tools				PROD = 100%			CREW HOURS =	464
MIL	B-BRKLAYR F	Bricklayers	0.25	HR	28.44	0.25	7.11			7.11
MIL	B-BRKLAYR L	Bricklayers	1.00	HR	27.44	1.00	27.44			27.44
MIL	XMIXX020 E	Small Tools	0.20	HR	1.39			0.20	0.28	0.28
	TOTAL					1.25	34.55	0.20	0.28	34.83
	AMABF	3 B-brklayr + Small Tools				PROD = 100%			CREW HOURS =	440
MIL	B-CARPNTERL	Carpenters	0.25	HR	27.84	0.25	6.96			6.96
MIL	B-BRKLAYR F	Bricklayers	1.00	HR	28.44	1.00	28.44			28.44
MIL	B-BRKLAYR L	Bricklayers	2.00	HR	27.44	2.00	54.88			54.88
MIL	B-BRKLAYRHL	Bricklayer (Semi-Skilled)	2.00	HR	26.38	2.00	52.76			52.76
MIL	XMIXX020 E	Small Tools	0.82	HR	1.39			0.82	1.14	1.14
	TOTAL					5.25	143.04	0.82	1.14	144.18
	APLAE	1 B-plaster + Gunite Equipment, 4-12 Cy/Hr				PROD = 100%			CREW HOURS =	335
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	23.95	1.00	23.95			23.95
MIL	B-PLASTER F	Plasters	1.00	HR	28.44	1.00	28.44			28.44
MIL	B-PLASTERHL	Plasters (Semi-Skilled)	1.00	HR	26.94	1.00	26.94			26.94
MIL	C35AL005 E	CONT MIX GUN RIG 12/CYHR TRLRMT	1.00	HR	6.35			1.00	6.35	6.35
MIL	XMIXX020 E	Small Tools	0.15	HR	1.39			0.15	0.21	0.21
	TOTAL					3.00	79.33	1.15	6.56	85.89
	APTRA	1 B-paintord + Small Tools				PROD = 100%			CREW HOURS =	486
MIL	B-PAINTORDL	Painters, Ordinary	1.00	HR	24.27	1.00	24.27			24.27
MIL	B-PAINTORDF	Painters, Ordinary	0.25	HR	25.27	0.25	6.32			6.32
MIL	XMIXX020 E	Small Tools	0.27	HR	1.39			0.27	0.38	0.38
	TOTAL					1.25	30.59	0.27	0.38	30.96

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SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	ARFCA	1 B-roofer + Small Tools			PROD = 100%				CREW HOURS =	91
MIL	B-ROOFER L	Roofers, Composition	1.00	HR	27.84	1.00	27.84			27.84
MIL	B-ROOFER F	Roofers, Composition	0.25	HR	28.84	0.25	7.21			7.21
MIL	XMIXX020 E	Small Tools	0.20	HR	1.39			0.20	0.28	0.28
	TOTAL					1.25	35.05	0.20	0.28	35.33
	ARFCB	2 B-roofer + Small Tools			PROD = 100%				CREW HOURS =	387
MIL	B-ROOFER F	Roofers, Composition	0.50	HR	28.84	0.50	14.42			14.42
MIL	B-ROOFER L	Roofers, Composition	2.00	HR	27.84	2.00	55.68			55.68
MIL	XMIXX020 E	Small Tools	0.40	HR	1.39			0.40	0.56	0.56
	TOTAL					2.50	70.10	0.40	0.56	70.66
	ATIFA	1 B-tilelyr + Small Tools			PROD = 100%				CREW HOURS =	726
MIL	B-TILELYR F	Tile Layers (floor)	0.25	HR	27.38	0.25	6.85			6.85
MIL	B-TILELYR L	Tile Layers (floor)	1.00	HR	26.38	1.00	26.38			26.38
MIL	XMIXX020 E	Small Tools	0.16	HR	1.39			0.16	0.22	0.22
	TOTAL					1.25	33.23	0.16	0.22	33.45
	CODEK	5 B-laborer + 1 Backhoe Loader, 55 Hp			PROD = 100%				CREW HOURS =	59
MIL	B-LABORER L	Laborer (Semi-Skilled)	4.00	HR	23.95	4.00	95.80			95.80
MIL	B-LABORER F	Laborer (Semi-Skilled)	1.00	HR	24.95	1.00	24.95			24.95
MIL	B-EQOPRMEDL	Eq Oper, Medium	1.00	HR	27.74	1.00	27.74			27.74
MIL	L50CS002 E	LDR,W/BH,WH,1.0CY FE BKT/24"DIP	1.00	HR	10.84			1.00	10.84	10.84
MIL	XMIXX020 E	Small Tools	0.48	HR	1.39			0.48	0.67	0.67
	TOTAL					6.00	148.49	1.48	11.50	159.99
*	CODSL1	25 B-eqoprmed + 14 Scraper, 44 Cy, 550/440 Hp			PROD = 100%				CREW HOURS =	3976
MIL *	B-LABORER L	Laborer (Semi-Skilled)	2.00	HR	23.95	2.00	47.90			47.90
MIL *	B-EQOPRCRNF	Eq Oper, Crane/Shovl	1.00	HR	28.74	1.00	28.74			28.74
MIL *	B-EQOPRCRNL	Eq Oper, Crane/Shovl	25.00	HR	27.74	25.00	693.50			693.50
MIL *	S15CA003 E	SCRAPER,SELF,32-44CY,52T,PWRSHF	14.00	HR	140.16			14.00	1962.22	1962.22
MIL *	T40XX032 S	WATER TANK, 2500 GAL (ADD TRUCK	1.00	HR	0.00	1.00	0.00			0.00
MIL *	T15CA017 U	DOZER,CWLR,CAT D-9N, (ADD BLADE	1.00	HR	21.24	1.00	21.24			21.24
MIL *	G15CA006 S	GRADER,MOTOR,CAT16-G, ARTIC	1.00	HR	68.39	1.00	68.39			68.39
MIL *	L20AB001 E	LIGHT SET,6KW W/GEN,TRLR MTD	6.00	HR	5.24			6.00	31.42	31.42
MIL *	R50ID007 S	ROLL,VIB,SELF,SD, 84"W X 60"D	1.00	HR	0.00	1.00	0.00			0.00
MIL *	T15CA015 S	DOZER,CWLR,CAT D-8L, (ADD BLADE	4.00	HR	87.72	4.00	350.89			350.89
MIL *	T15CA017 E	DOZER,CWLR,CAT D-9N, (ADD BLADE	4.00	HR	80.26			4.00	321.02	321.02
MIL *	T10CA017 S	BLADE, UNIVERSAL,HYDR,FOR D8	4.00	HR	8.34	4.00	33.36			33.36
MIL *	T50FO010 S	TRK, HWY,F800,24,700 GVW, 2 AXL	1.00	HR	22.59	1.00	22.59			22.59
MIL *	S15CA003 U	SCRAPER,SELF,32-44CY,52T,PWRSHF	1.00	HR	40.63	1.00	40.63			40.63
MIL *	T10CA022 E	BLADE, UNIVERSAL,HYDR,FOR D9	4.00	HR	8.38			4.00	33.51	33.51
MIL *	X-TRKDVRHVL	Outside Truck Dr. Heavy	1.00	HR	23.95	1.00	23.95			23.95
	TOTAL					29.00	794.09	42.00	2885.29	3679.38

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
*	CODSL3	5 B-eqoprmed + 5 Scraper, 32 Cy, 550/440 Hp			PROD = 100%				CREW HOURS =	441
MIL *	B-LABORER L	Laborer (Semi-Skilled)	2.00	HR	23.95	2.00	47.90			47.90
MIL *	B-EQOPRCRNF	Eq Oper, Crane/Shovl	1.00	HR	28.74	1.00	28.74			28.74
MIL *	B-EQOPRCRNL	Eq Oper, Crane/Shovl	10.00	HR	27.74	10.00	277.40			277.40
MIL *	S15CA003 E	SCRAPER,SELF,32-44CY,52T,PWRSHF	5.00	HR	140.16			5.00	700.79	700.79
MIL *	T40XX032 E	WATER TANK, 2500 GAL (ADD TRUCK	1.00	HR	2.73			1.00	2.73	2.73
MIL *	G15CA006 E	GRADER,MOTOR,CAT16-G, ARTIC	1.00	HR	55.81			1.00	55.81	55.81
MIL *	R50ID007 E	ROLL,VIB,SELF,SD, 84"W X 60"D	1.00	HR	29.74			1.00	29.74	29.74
MIL *	T15CA015 E	DOZER,CWLR,CAT D-8L, (ADD BLADE	3.00	HR	68.16			3.00	204.47	204.47
MIL *	T10CA017 E	BLADE, UNIVERSAL,HYDR,FOR D8	3.00	HR	6.52			3.00	19.55	19.55
MIL *	T50FO010 E	TRK, HWY,F800,24,700 GVW, 2 AXL	1.00	HR	17.37			1.00	17.37	17.37
MIL *	X-TRKDVRHVL	Outside Truck Dr. Heavy	1.00	HR	23.95	1.00	23.95			23.95
	TOTAL					14.00	377.99	15.00	1030.46	1408.45
*	CODSL4	1 B-eqoprmed + 1 Scraper, 32 Cy, 550/440 Hp			PROD = 100%				CREW HOURS =	601
MIL *	B-LABORER L	Laborer (Semi-Skilled)	3.00	HR	23.95	3.00	71.85			71.85
MIL *	B-EQOPRCRNF	Eq Oper, Crane/Shovl	1.00	HR	28.74	1.00	28.74			28.74
MIL *	B-EQOPRCRNL	Eq Oper, Crane/Shovl	4.00	HR	27.74	4.00	110.96			110.96
MIL *	S15CA002 E	SCRAPER,SELF,21-31CY,37.5T,PWRS	1.00	HR	108.65			1.00	108.65	108.65
MIL *	T40XX032 E	WATER TANK, 2500 GAL (ADD TRUCK	1.00	HR	2.73			1.00	2.73	2.73
MIL *	G15CA006 E	GRADER,MOTOR,CAT16-G, ARTIC	1.00	HR	55.81			1.00	55.81	55.81
MIL *	R50ID007 E	ROLL,VIB,SELF,SD, 84"W X 60"D	1.00	HR	29.74			1.00	29.74	29.74
MIL *	L40ID002 E	LDR,FE,WH, 1.63 CY, ARTICULATED	1.00	HR	17.36			1.00	17.36	17.36
MIL *	T55DJ001 E	TRK,OFF,R-DUMP,13-18CY,25T,D25C	2.00	HR	45.17			2.00	90.33	90.33
MIL *	T50FO010 E	TRK, HWY,F800,24,700 GVW, 2 AXL	1.00	HR	17.37			1.00	17.37	17.37
MIL *	X-TRKDVRHVL	Outside Truck Dr. Heavy	3.00	HR	23.95	3.00	71.85			71.85
	TOTAL					11.00	283.40	8.00	321.98	605.38
*	CODSL5	5 B-eqoprmed + 5 Scraper, 32 Cy, Pugmill			PROD = 100%				CREW HOURS =	467
MIL *	B-LABORER L	Laborer (Semi-Skilled)	3.00	HR	23.95	3.00	71.85			71.85
MIL *	B-EQOPRCRNF	Eq Oper, Crane/Shovl	1.00	HR	28.74	1.00	28.74			28.74
MIL *	B-EQOPRCRNL	Eq Oper, Crane/Shovl	11.00	HR	27.74	11.00	305.14			305.14
MIL *	S15CA003 E	SCRAPER,SELF,32-44CY,52T,PWRSHF	5.00	HR	140.16			5.00	700.79	700.79
MIL *	T40XX032 E	WATER TANK, 2500 GAL (ADD TRUCK	1.00	HR	2.73			1.00	2.73	2.73
MIL *	G15CA006 E	GRADER,MOTOR,CAT16-G, ARTIC	1.00	HR	55.81			1.00	55.81	55.81
MIL *	R50ID007 E	ROLL,VIB,SELF,SD, 84"W X 60"D	1.00	HR	29.74			1.00	29.74	29.74
MIL *	T15CA015 E	DOZER,CWLR,CAT D-8L, (ADD BLADE	3.00	HR	68.16			3.00	204.47	204.47
MIL *	T10CA017 E	BLADE, UNIVERSAL,HYDR,FOR D8	3.00	HR	6.52			3.00	19.55	19.55
MIL *	T50FO010 E	TRK, HWY,F800,24,700 GVW, 2 AXL	1.00	HR	17.37			1.00	17.37	17.37
MIL *	X-TRKDVRHVL	Outside Truck Dr. Heavy	1.00	HR	23.95	1.00	23.95			23.95
MIL *	B10KL002 E	PORT. PUG. 30"x 50'CONVEYOR, 8C	1.00	HR	21.46			1.00	21.46	21.46
	TOTAL					16.00	429.68	16.00	1051.92	1481.60
	CODTF	3 B-eqoprmed + 1 Dozer, Cat D-7h,1Truck,1Grader			PROD = 100%				CREW HOURS =	318
MIL	B-EQOPRMEDL	Eq Oper, Medium	3.00	HR	27.74	3.00	83.22			83.22
MIL	B-EQOPRMEDF	Eq Oper, Medium	1.00	HR	28.74	1.00	28.74			28.74
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00	HR	22.49	1.00	22.49			22.49
MIL	B-LABORER L	Laborer (Semi-Skilled)	2.00	HR	23.95	2.00	47.90			47.90

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SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
MIL	T15CA013 E	DOZER,CWLR,D-7H,PS,(ADD BLADE)	1.00	HR	51.58			1.00	51.58	51.58
MIL	T10CA013 E	BLADE, UNIVERSAL,HYDR,FOR D7	1.00	HR	5.08			1.00	5.08	5.08
MIL	A10AR002 E	TOWED SPREADER, 8' WIDE	1.00	HR	1.30			1.00	1.30	1.30
MIL	T50GM016 E	TRK, HWY, 3 AXLE, 41000 GVW, 6X	1.00	HR	18.03			1.00	18.03	18.03
MIL	R40HY004 E	ROLL,VIB,TOWED,STL,PAD,58"D,60"	1.00	HR	9.82			1.00	9.82	9.82
MIL	R50DY002 E	ROLLR,VIB,SD,SELF,66WX48D,13TON	1.00	HR	27.09			1.00	27.09	27.09
MIL	G15CA003 E	GRADER,MOTOR,CAT12-G, ARTIC	1.00	HR	25.37			1.00	25.37	25.37
	TOTAL					7.00	182.35	7.00	138.27	320.62
	COKCF	8 B-laborer + 1 Cmi Slip Form Paving Machine			PROD = 100%				CREW HOURS =	1218
MIL	B-CEMTFINRL	Cement Finishers	1.00	HR	26.38	1.00	26.38			26.38
MIL	B-RODMAN L	Rodmen (reinforcing)	1.00	HR	30.10	1.00	30.10			30.10
MIL	B-LABORER L	Laborer (Semi-Skilled)	8.00	HR	23.95	8.00	191.60			191.60
MIL	B-EQOPRMEDL	Eq Oper, Medium	1.00	HR	27.74	1.00	27.74			27.74
MIL	B-EQOPRMEDF	Eq Oper, Medium	1.00	HR	28.74	1.00	28.74			28.74
MIL	C45GO005 E	CONC PAVER,SLIPFORM,25'W,CRWLR	1.00	HR	54.95			1.00	54.95	54.95
MIL	XMIXX020 E	Small Tools	1.46	HR	1.39			1.46	2.03	2.03
	TOTAL					12.00	304.56	2.46	56.98	361.54
	COMCA	5 B-laborer + 1 Front End Ldr, 3-3/4 Cy, Cwlr			PROD = 100%				CREW HOURS =	3626
MIL	B-LABORER L	Laborer (Semi-Skilled)	4.00	HR	23.95	4.00	95.80			95.80
MIL	B-LABORER F	Laborer (Semi-Skilled)	1.00	HR	24.95	1.00	24.95			24.95
MIL	B-EQOPRMEDL	Eq Oper, Medium	1.00	HR	27.74	1.00	27.74			27.74
MIL	B20CI006 E	CHIPPER, 16" CAPACITY, TRLR-MTD	1.00	HR	5.78			1.00	5.78	5.78
MIL	L35CA007 E	LDR,FE,CRWLR, 3.75 CY, 973	1.00	HR	65.03			1.00	65.03	65.03
MIL	XMIXX020 E	Small Tools	0.74	HR	1.39			0.74	1.03	1.03
	TOTAL					6.00	148.49	2.74	71.85	220.34
	EELEC	2 B-laborer +			PROD = 100%				CREW HOURS =	8358
MIL	B-ELECTRN F	Electricians	0.25	HR	34.19	0.25	8.55			8.55
MIL	B-ELECTRN L	Electricians	1.00	HR	33.19	1.00	33.19			33.19
MIL	B-LABORER L	Laborer (Semi-Skilled)	2.00	HR	23.95	2.00	47.90			47.90
	TOTAL					3.25	89.64	0.00	0.00	89.64
	EELEJ	5 B-electrn + 1 Line Truck			PROD = 100%				CREW HOURS =	920
MIL	B-ELECTRN L	Electricians	2.00	HR	33.19	2.00	66.38			66.38
MIL	B-ELECTRN F	Electricians	1.00	HR	34.19	1.00	34.19			34.19
MIL	B-ELECTRN A	Electricians	2.00	HR	24.89	2.00	49.79			49.79
MIL	XMIXX020 E	Small Tools	0.49	HR	1.39			0.49	0.68	0.68
MIL	P40RE001 E	TRK,HWY,LINE TRK W/AERIAL PLATF	1.00	HR	27.53			1.00	27.53	27.53
	TOTAL					5.00	150.36	1.49	28.21	178.57

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	ESELG	2 B-elevcont + 1- 22 Ton Crane, Hydraulic			PROD =	100%			CREW HOURS =	6491
MIL	B-ELECTRN F	Electricians	1.00	HR	34.19	1.00	34.19			34.19
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	23.95	1.00	23.95			23.95
MIL	B-EQOPRMEDL	Eq Oper, Medium	0.25	HR	27.74	0.25	6.94			6.94
MIL	B-ELEVCONTL	Elevator Constrs	1.00	HR	27.49	1.00	27.49			27.49
MIL	B-ELEVCONTA	Elevator Constrs	1.00	HR	20.62	1.00	20.62			20.62
MIL	C75PH004 E	CRANE,HYD,SELF, 22 TON	0.25	HR	32.04			0.25	8.01	8.01
MIL	XMIXX020 E	Small Tools	2.00	HR	1.39			2.00	2.78	2.78
	TOTAL					4.25	113.18	2.25	10.79	123.97
*	MPLUJ1	2 B-plumber + Small Tools			PROD =	100%			CREW HOURS =	4674
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	23.95	1.00	23.95			23.95
MIL	B-PLUMBER A	Plumbers	1.00	HR	25.31	1.00	25.31			25.31
MIL	B-PLUMBER L	Plumbers	1.00	HR	33.75	1.00	33.75			33.75
MIL	B-PLUMBER F	Plumbers	0.50	HR	34.75	0.50	17.38			17.38
MIL *	XMIXX020 E	Small Tools	1.00	HR	1.39			1.00	1.39	1.39
MIL *	B-ELECTRN L	Electricians	2.00	HR	33.19	2.00	66.38			66.38
	TOTAL					5.50	166.77	1.00	1.39	168.16
	MPLUS	2 B-plumber + 1- 14 Ton Crane, Hydraulic			PROD =	100%			CREW HOURS =	70
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	23.95	1.00	23.95			23.95
MIL	B-EQOPRMEDL	Eq Oper, Medium	0.50	HR	27.74	0.50	13.87			13.87
MIL	B-PLUMBER F	Plumbers	1.00	HR	34.75	1.00	34.75			34.75
MIL	B-PLUMBER L	Plumbers	1.00	HR	33.75	1.00	33.75			33.75
MIL	C75GV001 E	CRANE,HYD,SELF,ROUGH TER,4WD,18	0.50	HR	26.81			0.50	13.41	13.41
MIL	XMIXX020 E	Small Tools	0.56	HR	1.39			0.56	0.78	0.78
	TOTAL					3.50	106.32	1.06	14.18	120.50
	MSHMA	1 B-shtmtlwk + Small Tools			PROD =	100%			CREW HOURS =	130
MIL	B-SHTMTLWKL	Sheet Metal Workers	1.00	HR	29.96	1.00	29.96			29.96
MIL	B-SHTMTLWKF	Sheet Metal Workers	0.25	HR	30.96	0.25	7.74			7.74
MIL	XMIXX020 E	Small Tools	0.34	HR	1.39			0.34	0.47	0.47
	TOTAL					1.25	37.70	0.34	0.47	38.17
	MSHMB	2 B-shtmtlwk + Small Tools			PROD =	100%			CREW HOURS =	157
MIL	B-SHTMTLWKA	Sheet Metal Workers	1.00	HR	22.47	1.00	22.47			22.47
MIL	B-SHTMTLWKL	Sheet Metal Workers	1.00	HR	29.96	1.00	29.96			29.96
MIL	B-SHTMTLWKF	Sheet Metal Workers	0.50	HR	30.96	0.50	15.48			15.48
MIL	XMIXX020 E	Small Tools	0.69	HR	1.39			0.69	0.96	0.96
	TOTAL					2.50	67.91	0.69	0.96	68.87
	MSHMG	3 B-shtmtlwk + Small Tools			PROD =	100%			CREW HOURS =	449
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	23.95	1.00	23.95			23.95
MIL	B-SHTMTLWKA	Sheet Metal Workers	1.00	HR	22.47	1.00	22.47			22.47
MIL	B-SHTMTLWKF	Sheet Metal Workers	1.00	HR	30.96	1.00	30.96			30.96
MIL	B-SHTMTLWKL	Sheet Metal Workers	1.00	HR	29.96	1.00	29.96			29.96

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
MIL	XMIXX010 E	Misc. Power Tools	0.13	HR	5.85			0.13	0.76	0.76
MIL	XMIXX020 E	Small Tools	0.78	HR	1.39			0.78	1.08	1.08
	TOTAL					4.00	107.34	0.91	1.84	109.18
	MSPFL	3 B-stm/Pipe + Small Tools			PROD = 100%			CREW HOURS =		23
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	23.95	1.00	23.95			23.95
MIL	B-STM/PIPEF	Steam/Pipefitters	1.00	HR	34.75	1.00	34.75			34.75
MIL	B-STM/PIPEL	Steam/Pipefitters	1.00	HR	33.75	1.00	33.75			33.75
MIL	B-STM/PIPEA	Steam/Pipefitters	1.00	HR	25.31	1.00	25.31			25.31
MIL	XMIXX020 E	Small Tools	1.27	HR	1.39			1.27	1.77	1.77
	TOTAL					4.00	117.76	1.27	1.77	119.53
	SIWRB	2 B-rodman + Small Tools			PROD = 100%			CREW HOURS =		77
MIL	B-RODMAN L	Rodmen (reinforcing)	2.00	HR	30.10	2.00	60.20			60.20
MIL	B-RODMAN F	Rodmen (reinforcing)	0.50	HR	31.10	0.50	15.55			15.55
MIL	XMIXX020 E	Small Tools	0.39	HR	1.39			0.39	0.54	0.54
	TOTAL					2.50	75.75	0.39	0.54	76.29
	SIWRC	3 B-rodman + Small Tools			PROD = 100%			CREW HOURS =		359
MIL	B-RODMAN F	Rodmen (reinforcing)	1.00	HR	31.10	1.00	31.10			31.10
MIL	B-RODMAN L	Rodmen (reinforcing)	3.00	HR	30.10	3.00	90.30			90.30
MIL	XMIXX020 E	Small Tools	0.68	HR	1.39			0.68	0.95	0.95
	TOTAL					4.00	121.40	0.68	0.95	122.35
	SIWSB	2 B-strsteel + Small Tools			PROD = 100%			CREW HOURS =		208
MIL	B-STRSTEELL	Struct Stl Workers	2.00	HR	30.10	2.00	60.20			60.20
MIL	B-STRSTEELF	Struct Stl Workers	0.50	HR	31.10	0.50	15.55			15.55
MIL	XMIXX020 E	Small Tools	0.69	HR	1.39			0.69	0.96	0.96
	TOTAL					2.50	75.75	0.69	0.96	76.71
	SIWSD	9 B-strsteel + 1 Gasoline Welding Machine			PROD = 100%			CREW HOURS =		42
MIL	B-STRSTEELA	Struct Stl Workers	3.00	HR	22.58	3.00	67.73			67.73
MIL	B-STRSTEELF	Struct Stl Workers	1.00	HR	31.10	1.00	31.10			31.10
MIL	B-STRSTEELL	Struct Stl Workers	5.00	HR	30.10	5.00	150.50			150.50
MIL	XMIXX020 E	Small Tools	1.59	HR	1.39			1.59	2.21	2.21
MIL	W35XX002 E	WELDER, 200 AMP W/1 AXLE TRLR	1.00	HR	5.57			1.00	5.57	5.57
	TOTAL					9.00	249.33	2.59	7.78	257.10
	SIWSH	5 B-strsteel + 1- 22 Ton Crane, Hydraulic			PROD = 100%			CREW HOURS =		83
MIL	B-STRSTEELA	Struct Stl Workers	2.00	HR	22.58	2.00	45.15			45.15
MIL	B-STRSTEELF	Struct Stl Workers	1.00	HR	31.10	1.00	31.10			31.10
MIL	B-STRSTEELL	Struct Stl Workers	2.00	HR	30.10	2.00	60.20			60.20
MIL	B-EQOPRMEDL	Eq Oper, Medium	1.00	HR	27.74	1.00	27.74			27.74
MIL	C75PH004 E	CRANE,HYD,SELF, 22 TON	1.00	HR	32.04			1.00	32.04	32.04
MIL	XMIXX020 E	Small Tools	1.55	HR	1.39			1.55	2.15	2.15
	TOTAL					6.00	164.19	2.55	34.19	198.38

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	SIWSM	6 B-strsteel + 1- 55 Ton Crane, Hydr. Trk Mtd			PROD =	100%			CREW HOURS =	543
MIL	B-STRSTEELL	Struct Stl Workers	3.00	HR	30.10	3.00	90.30			90.30
MIL	B-STRSTEELA	Struct Stl Workers	2.00	HR	22.58	2.00	45.15			45.15
MIL	B-STRSTEELF	Struct Stl Workers	1.00	HR	31.10	1.00	31.10			31.10
MIL	B-EQOPRCRNL	Eq Oper, Crane/Shovl	1.00	HR	27.74	1.00	27.74			27.74
MIL	B-EQOPROILL	Eq Oper, Oilers	1.00	HR	27.24	1.00	27.24			27.24
MIL	C80LI007 E	CRANE,HYD,TRKMTD, 60T W/110'BOO	1.00	HR	51.53			1.00	51.53	51.53
MIL	XMIXX020 E	Small Tools	1.86	HR	1.39			1.86	2.59	2.59
	TOTAL					8.00	221.53	2.86	54.11	275.64
	ULABA	1 B-laborer + Small Tools			PROD =	100%			CREW HOURS =	2140
MIL	B-LABORER F	Laborer (Semi-Skilled)	0.25	HR	24.95	0.25	6.24			6.24
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	23.95	1.00	23.95			23.95
MIL	XMIXX020 E	Small Tools	0.13	HR	1.39			0.13	0.18	0.18
	TOTAL					1.25	30.19	0.13	0.18	30.37
	ULABB	2 B-laborer + Small Tools			PROD =	100%			CREW HOURS =	330
MIL	B-LABORER L	Laborer (Semi-Skilled)	2.00	HR	23.95	2.00	47.90			47.90
MIL	B-LABORER F	Laborer (Semi-Skilled)	0.50	HR	24.95	0.50	12.48			12.48
MIL	XMIXX020 E	Small Tools	0.27	HR	1.39			0.27	0.38	0.38
	TOTAL					2.50	60.38	0.27	0.38	60.75
	ULABE	1 B-laborer + Misc. Power Tools			PROD =	100%			CREW HOURS =	133
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	23.95	1.00	23.95			23.95
MIL	B-LABORER F	Laborer (Semi-Skilled)	0.25	HR	24.95	0.25	6.24			6.24
MIL	XMIXX010 E	Misc. Power Tools	0.22	HR	5.85			0.22	1.29	1.29
MIL	XMIXX020 E	Small Tools	0.09	HR	1.39			0.09	0.13	0.13
	TOTAL					1.25	30.19	0.31	1.41	31.60
	ULABN	3 B-laborer + 1 Flatbed Truck W/Hyd. Crane			PROD =	100%			CREW HOURS =	2471
MIL	B-LABORER F	Laborer (Semi-Skilled)	1.00	HR	24.95	1.00	24.95			24.95
MIL	B-LABORER L	Laborer (Semi-Skilled)	2.00	HR	23.95	2.00	47.90			47.90
MIL	B-EQOPRLT L	Eq Oper, Light	1.00	HR	27.74	1.00	27.74			27.74
MIL	XMIXX020 E	Small Tools	0.47	HR	1.39			0.47	0.65	0.65
MIL	T40XX015 E	TRUCK OPT,FLATBED, 8' x 14.0'	1.00	HR	0.54			1.00	0.54	0.54
MIL	T40XX003 E	HYDR CRANE FOR FLATBED, 8.0 TON	1.00	HR	10.96			1.00	10.96	10.96
MIL	T50FO012 E	TRK, HWY, 44,300 GVW, 3 AXLE	1.00	HR	27.07			1.00	27.07	27.07
	TOTAL					4.00	100.59	3.47	39.22	139.81
	UOEHC	5 B-laborer + 1- 22 Ton Crane, Hydraulic			PROD =	100%			CREW HOURS =	197
MIL	B-LABORER F	Laborer (Semi-Skilled)	1.00	HR	24.95	1.00	24.95			24.95
MIL	B-LABORER L	Laborer (Semi-Skilled)	4.00	HR	23.95	4.00	95.80			95.80
MIL	B-EQOPRMEDL	Eq Oper, Medium	1.00	HR	27.74	1.00	27.74			27.74
MIL	C75PH004 E	CRANE,HYD,SELF, 22 TON	1.00	HR	32.04			1.00	32.04	32.04
MIL	XMIXX020 E	Small Tools	0.60	HR	1.39			0.60	0.83	0.83
	TOTAL					6.00	148.49	1.60	32.87	181.36

9513533.2229

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	UOEHD	5 B-laborer + 1- 40 Ton Crane, Truck Mounted			PROD = 100%				CREW HOURS = 18542	
MIL	B-LABORER L	Laborer (Semi-Skilled)	4.00	HR	23.95	4.00	95.80			95.80
MIL	B-LABORER F	Laborer (Semi-Skilled)	1.00	HR	24.95	1.00	24.95			24.95
MIL	B-EQOPRCRNL	Eq Oper, Crane/Shovl	0.25	HR	27.74	0.25	6.94			6.94
MIL	B-EQOPROILL	Eq Oper, Oilers	0.25	HR	27.24	0.25	6.81			6.81
MIL	C80PH004 E	CRANE,HYD,TRKMTD, 40T W/106'BOO	0.25	HR	47.03			0.25	11.76	11.76
MIL	XMIXX020 E	Small Tools	0.44	HR	1.39			0.44	0.61	0.61
	TOTAL					5.50	134.50	0.69	12.37	146.86
	XASPA	7 X-laborer + 1 Asphalt Paving Machine			PROD = 100%				CREW HOURS = 382	
MIL	A30BG003 E	ASPHALT FIN,10'SPW,PNEUM.	1.00	HR	40.52			1.00	40.52	40.52
MIL	B15MB002 E	SWEEPER, 7',ADD TRACTOR,W/SPRIN	1.00	HR	1.50			1.00	1.50	1.50
MIL	XMIXX020 E	Small Tools	2.00	HR	1.39			2.00	2.78	2.78
MIL	R30IG003 E	ROLLER,STATIC,SELF,15T, 11 TIRE	1.00	HR	12.46			1.00	12.46	12.46
MIL	R30IG008 E	ROLLER,SM-DR,SELF,12T,3WHL,3"OV	2.00	HR	12.79			2.00	25.57	25.57
MIL	T40XX012 E	TRUCK OPT,FLATBED, 8' x 9.0'	1.00	HR	0.44			1.00	0.44	0.44
MIL	T50FO006 E	TRK, HWY,F600,21,000 GVW, 2 AXL	1.00	HR	13.93			1.00	13.93	13.93
MIL	T50GM012 E	TRK, HWY, 2 AXLE, 24000 GVW, 4X	1.00	HR	10.80			1.00	10.80	10.80
MIL	X-LABORER L	Outside Laborer	7.00	HR	23.95	7.00	167.65			167.65
MIL	X-EQOPRMEDL	Outside Equip. Op. Medium	3.00	HR	27.24	3.00	81.72			81.72
MIL	X-EQOPRMEDF	Outside Equip. Op. Medium	1.00	HR	28.24	1.00	28.24			28.24
MIL	X-TRKDVRHVL	Outside Truck Dr. Heavy	1.00	HR	23.95	1.00	23.95			23.95
	TOTAL					12.00	301.56	10.00	108.00	409.56
	XSABA	3 X-eqoprmed + 1 Grader, Cat 12g, 135 Hp			PROD = 100%				CREW HOURS = 890	
MIL	G15CA003 E	GRADER,MOTOR,CAT12-G, ARTIC	1.00	HR	25.37			1.00	25.37	25.37
MIL	XMIXX020 E	Small Tools	2.00	HR	1.39			2.00	2.78	2.78
MIL	R30IG003 E	ROLLER,STATIC,SELF,15T, 11 TIRE	1.00	HR	12.46			1.00	12.46	12.46
MIL	R30IG008 E	ROLLER,SM-DR,SELF,12T,3WHL,3"OV	1.00	HR	12.79			1.00	12.79	12.79
MIL	T40XX012 E	TRUCK OPT,FLATBED, 8' x 9.0'	1.00	HR	0.44			1.00	0.44	0.44
MIL	T40XX018 E	TRUCK OPT,FLATBED, 8' x 20.0'	1.00	HR	0.69			1.00	0.69	0.69
MIL	T50GM008 E	TRK,HWY,4X2 3500 PICKUP, 8600GV	1.00	HR	8.60			1.00	8.60	8.60
MIL	T50GM012 E	TRK, HWY, 2 AXLE, 24000 GVW, 4X	1.00	HR	10.80			1.00	10.80	10.80
MIL	T50GM016 E	TRK, HWY, 3 AXLE, 41000 GVW, 6X	1.00	HR	18.03			1.00	18.03	18.03
MIL	X-LABORER L	Outside Laborer	3.00	HR	23.95	3.00	71.85			71.85
MIL	X-EQOPRMEDF	Outside Equip. Op. Medium	1.00	HR	28.24	1.00	28.24			28.24
MIL	X-EQOPRMEDL	Outside Equip. Op. Medium	2.00	HR	27.24	2.00	54.48			54.48
MIL	X-TRKDVRLTL	Outside Truck Dr. Light	2.00	HR	23.95	2.00	47.90			47.90
	TOTAL					8.00	202.47	10.00	91.95	294.42
	XSGRA	2 X-eqoprmed + 1 Sheepsfoot Roller, 210 Hp			PROD = 100%				CREW HOURS = 768	
MIL	G15CA003 E	GRADER,MOTOR,CAT12-G, ARTIC	1.00	HR	25.37			1.00	25.37	25.37
MIL	XMIXX020 E	Small Tools	2.00	HR	1.39			2.00	2.78	2.78
MIL	R30CA001 E	ROLLER,STATIC,SELF,84"W,11 TIRE	1.00	HR	14.19			1.00	14.19	14.19
MIL	T40XX033 E	WATER TANK, 3000 GAL (ADD TRUCK	1.00	HR	2.90			1.00	2.90	2.90
MIL	T50GM016 E	TRK, HWY, 3 AXLE, 41000 GVW, 6X	1.00	HR	18.03			1.00	18.03	18.03
MIL	X-LABORER L	Outside Laborer	2.00	HR	23.95	2.00	47.90			47.90
MIL	X-EQOPRMEDL	Outside Equip. Op. Medium	2.00	HR	27.24	2.00	54.48			54.48

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
MIL	X-EQOPRMEDF	Outside Equip. Op. Medium	1.00	HR	28.24	1.00	28.24			28.24
MIL	X-TRKDVRLTL	Outside Truck Dr. Light	1.00	HR	23.95	1.00	23.95			23.95
	TOTAL					6.00	154.57	6.00	63.27	217.84

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ITEM ID	DESCRIPTION			
Overhead Items - AA				
Building Subcontractor				
Acoustical Tile				
Carpet				
Electrical/Instrumentation				
Elevator				
Fence				
Fire Protection				
Glass And Glazing				
Gypsum Wallboard				
HVAC				
Liner Subcontractor				
Masonry				
Membrane Roofing				
Plumbing				
Preformed Roofing and Siding				
Painting and Sealants				
Resilient Flooring				
Railroad Subcontractor				
Special Equipment				
Site Mechanical				
Structural Steel				
Tile				
Site Preparation				
* CODSL4	1 B-eqoprmed + 1 Scraper, 32 Cy, 550/440 Hp	PROD = 100%	CREW HOURS = 286	
COMCA	5 B-laborer + 1 Front End Ldr, 3-3/4 Cy, Cwlr	PROD = 100%	CREW HOURS = 3626	
EELEJ	5 B-electrn + 1 Line Truck	PROD = 100%	CREW HOURS = 490	
ULABN	3 B-laborer + 1 Flatbed Truck W/Hyd. Crane	PROD = 100%	CREW HOURS = 2228	
UOEHC	5 B-laborer + 1- 22 Ton Crane, Hydraulic	PROD = 100%	CREW HOURS = 146	
Utilities				
Trench Rough Grading/Excavation				
* CODSL1	25 B-eqoprmed + 14 Scraper, 44 Cy, 550/440 Hp	PROD = 100%	CREW HOURS = 3976	
Demolition				
ULABB	2 B-laborer + Small Tools	PROD = 100%	CREW HOURS = 98	
ULABN	3 B-laborer + 1 Flatbed Truck W/Hyd. Crane	PROD = 100%	CREW HOURS = 243	
XASPA	7 X-laborer + 1 Asphalt Paving Machine	PROD = 100%	CREW HOURS = 53	
XSABA	3 X-eqoprmed + 1 Grader, Cat 12g, 135 Hp	PROD = 100%	CREW HOURS = 48	
XSGRA	2 X-eqoprmed + 1 Sheepsfoot Roller, 210 Hp	PROD = 100%	CREW HOURS = 43	
Lead Railroad				
UOEHD	5 B-laborer + 1- 40 Ton Crane, Truck Mounted	PROD = 100%	CREW HOURS = 18542	
Underpass				
EELEJ	5 B-electrn + 1 Line Truck	PROD = 100%	CREW HOURS = 28	
Road Crossing				
Equipment				
Grading for Trench Liner				
* CODSL4	1 B-eqoprmed + 1 Scraper, 32 Cy, 550/440 Hp	PROD = 100%	CREW HOURS = 315	

ITEM ID	DESCRIPTION				
Trench Lining					
* CODSL3	5 B-eqoprmed + 5 Scraper, 32 Cy, 550/440 Hp	PROD =	100%	CREW HOURS =	441
* CODSL5	5 B-eqoprmed + 5 Scraper, 32 Cy, Pugmill	PROD =	100%	CREW HOURS =	467
CODTF	3 B-eqoprmed + 1 Dozer, Cat D-7h,1Truck,1Grader	PROD =	100%	CREW HOURS =	318
Leachate Storage and Pumping					
MPLUS	2 B-plumber + 1- 14 Ton Crane, Hydraulic	PROD =	100%	CREW HOURS =	48
Electrical					
EELEJ	5 B-electrn + 1 Line Truck	PROD =	100%	CREW HOURS =	17
Equipment					
Landscaping and Irrigation					
Roads, Walks and Paved Areas					
ACMAE	1 B-cemtfinr + Small Tools	PROD =	100%	CREW HOURS =	121
COKCF	8 B-laborer + 1 Cmi Slip Form Paving Machine	PROD =	100%	CREW HOURS =	1218
EELEJ	5 B-electrn + 1 Line Truck	PROD =	100%	CREW HOURS =	70
XASPA	7 X-laborer + 1 Asphalt Paving Machine	PROD =	100%	CREW HOURS =	329
XSABA	3 X-eqoprmed + 1 Grader, Cat 12g, 135 Hp	PROD =	100%	CREW HOURS =	842
XSGRA	2 X-eqoprmed + 1 Sheepsfoot Roller, 210 Hp	PROD =	100%	CREW HOURS =	725
Operations Building					
ACARB	2 B-carpnter + Small Tools	PROD =	100%	CREW HOURS =	2023
ACARL	4 B-carpnter + Misc Power Tools	PROD =	100%	CREW HOURS =	74
ACMAA	1 B-cemtfinr + Small Tools	PROD =	100%	CREW HOURS =	161
ACMAC	1 B-cemtfinr + Misc Power Tools	PROD =	100%	CREW HOURS =	506
AGLAB	2 B-glazier + Small Tools	PROD =	100%	CREW HOURS =	302
ALABI	6 B-laborer + 2 Electric Concrete Vibrators	PROD =	100%	CREW HOURS =	30
ALATA	1 B-lathers + Small Tools	PROD =	100%	CREW HOURS =	747
APTRA	1 B-paintord + Small Tools	PROD =	100%	CREW HOURS =	472
ARFCA	1 B-roofer + Small Tools	PROD =	100%	CREW HOURS =	81
ATIFA	1 B-tilelyr + Small Tools	PROD =	100%	CREW HOURS =	726
CODEK	5 B-laborer + 1 Backhoe Loader, 55 Hp	PROD =	100%	CREW HOURS =	13
EELEC	2 B-laborer +	PROD =	100%	CREW HOURS =	1
ESELG	2 B-elevcont + 1- 22 Ton Crane, Hydraulic	PROD =	100%	CREW HOURS =	28
MSHMA	1 B-shtmtlwk + Small Tools	PROD =	100%	CREW HOURS =	130
MSHMB	2 B-shtmtlwk + Small Tools	PROD =	100%	CREW HOURS =	157
MSHMG	3 B-shtmtlwk + Small Tools	PROD =	100%	CREW HOURS =	194
SIWRB	2 B-rodman + Small Tools	PROD =	100%	CREW HOURS =	77
SIWRC	3 B-rodman + Small Tools	PROD =	100%	CREW HOURS =	30
SIWSB	2 B-strsteel + Small Tools	PROD =	100%	CREW HOURS =	126
SIWSD	9 B-strsteel + 1 Gasoline Welding Machine	PROD =	100%	CREW HOURS =	20
SIWSH	5 B-strsteel + 1- 22 Ton Crane, Hydraulic	PROD =	100%	CREW HOURS =	46
SIWSM	6 B-strsteel + 1- 55 Ton Crane, Hydr. Trk Mtd	PROD =	100%	CREW HOURS =	184
ULABA	1 B-laborer + Small Tools	PROD =	100%	CREW HOURS =	570
ULABB	2 B-laborer + Small Tools	PROD =	100%	CREW HOURS =	195
ULABE	1 B-laborer + Misc. Power Tools	PROD =	100%	CREW HOURS =	23
Decontamination Facility					
ACARB	2 B-carpnter + Small Tools	PROD =	100%	CREW HOURS =	207

LABOR ID: HANFRD EQUIP ID: HANFRD Currency in DOLLARS CREW ID: HANFRD UPB ID: PTC93D

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ITEM ID	DESCRIPTION				
ACARL	4 B-carpnter + Misc Power Tools	PROD =	100%	CREW HOURS =	152
ACMAA	1 B-cemtfinr + Small Tools	PROD =	100%	CREW HOURS =	219
ACMAC	1 B-cemtfinr + Misc Power Tools	PROD =	100%	CREW HOURS =	588
ALABI	6 B-laborer + 2 Electric Concrete Vibrators	PROD =	100%	CREW HOURS =	26
AMABA	1 B-brklayr + Small Tools	PROD =	100%	CREW HOURS =	464
AMABF	3 B-brklayr + Small Tools	PROD =	100%	CREW HOURS =	440
APLAE	1 B-plaster + Gunite Equipment, 4-12 Cy/Hr	PROD =	100%	CREW HOURS =	335
APTRA	1 B-paintord + Small Tools	PROD =	100%	CREW HOURS =	14
ARFCA	1 B-roofer + Small Tools	PROD =	100%	CREW HOURS =	10
ARFCB	2 B-roofer + Small Tools	PROD =	100%	CREW HOURS =	387
CODEK	5 B-laborer + 1 Backhoe Loader, 55 Hp	PROD =	100%	CREW HOURS =	18
ESELG	2 B-elevcont + 1- 22 Ton Crane, Hydraulic	PROD =	100%	CREW HOURS =	4150
* MPLUJ1	2 B-plumber + Small Tools	PROD =	100%	CREW HOURS =	4674
MPLUS	2 B-plumber + 1- 14 Ton Crane, Hydraulic	PROD =	100%	CREW HOURS =	5
MSHMG	3 B-shtmtlwk + Small Tools	PROD =	100%	CREW HOURS =	255
SIWRC	3 B-rodman + Small Tools	PROD =	100%	CREW HOURS =	171
SIWSB	2 B-strsteel + Small Tools	PROD =	100%	CREW HOURS =	82
SIWSD	9 B-strsteel + 1 Gasoline Welding Machine	PROD =	100%	CREW HOURS =	22
SIWSM	6 B-strsteel + 1- 55 Ton Crane, Hydr. Trk Mtd	PROD =	100%	CREW HOURS =	239
ULABA	1 B-laborer + Small Tools	PROD =	100%	CREW HOURS =	858
ULABB	2 B-laborer + Small Tools	PROD =	100%	CREW HOURS =	21
ULABE	1 B-laborer + Misc. Power Tools	PROD =	100%	CREW HOURS =	36
Container Storage Shed					
ACARB	2 B-carpnter + Small Tools	PROD =	100%	CREW HOURS =	17
ACARL	4 B-carpnter + Misc Power Tools	PROD =	100%	CREW HOURS =	291
ACMAA	1 B-cemtfinr + Small Tools	PROD =	100%	CREW HOURS =	173
ACMAC	1 B-cemtfinr + Misc Power Tools	PROD =	100%	CREW HOURS =	202
ALABI	6 B-laborer + 2 Electric Concrete Vibrators	PROD =	100%	CREW HOURS =	32
CODEK	5 B-laborer + 1 Backhoe Loader, 55 Hp	PROD =	100%	CREW HOURS =	27
ESELG	2 B-elevcont + 1- 22 Ton Crane, Hydraulic	PROD =	100%	CREW HOURS =	2313
SIWRC	3 B-rodman + Small Tools	PROD =	100%	CREW HOURS =	159
SIWSH	5 B-strsteel + 1- 22 Ton Crane, Hydraulic	PROD =	100%	CREW HOURS =	37
SIWSM	6 B-strsteel + 1- 55 Ton Crane, Hydr. Trk Mtd	PROD =	100%	CREW HOURS =	120
ULABA	1 B-laborer + Small Tools	PROD =	100%	CREW HOURS =	711
ULABB	2 B-laborer + Small Tools	PROD =	100%	CREW HOURS =	16
ULABE	1 B-laborer + Misc. Power Tools	PROD =	100%	CREW HOURS =	74
Automated Data Processing Equip.					
Fuel and Chemical Storage					
MPLUS	2 B-plumber + 1- 14 Ton Crane, Hydraulic	PROD =	100%	CREW HOURS =	9
MSPFL	3 B-stm/Pipe + Small Tools	PROD =	100%	CREW HOURS =	23
Sanitary Waste Systems					
MPLUS	2 B-plumber + 1- 14 Ton Crane, Hydraulic	PROD =	100%	CREW HOURS =	2
UOEHC	5 B-laborer + 1- 22 Ton Crane, Hydraulic	PROD =	100%	CREW HOURS =	51
Secondary Containment					
MPLUS	2 B-plumber + 1- 14 Ton Crane, Hydraulic	PROD =	100%	CREW HOURS =	6
Site Communications					

ITEM ID	DESCRIPTION			
EELEC	2 B-laborer +	PROD =	100%	CREW HOURS = 4456
Site Electrical				
EELEC	2 B-laborer +	PROD =	100%	CREW HOURS = 3901
Substation/Equipment				
Site Lighting				
EELEJ	5 B-electrn + 1 Line Truck	PROD =	100%	CREW HOURS = 315

9513333.2266

SRC	LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
MIL	B-BRKLAYR	Bricklayers	27.44	0.0%	0.0%	0.00	0.00	27.44	HR	02/01/94	15.93	1902
MIL	B-BRKLAYRH	Bricklayers (Semi-Skilled)	26.38	0.0%	0.0%	0.00	0.00	26.38	HR	02/07/94	9.76	881
MIL	B-CARPNTER	Carpenters	27.84	0.0%	0.0%	0.00	0.00	27.84	HR	02/07/94	19.84	7914
MIL	B-CEMTFINR	Cement Finishers	26.38	0.0%	0.0%	0.00	0.00	26.38	HR	02/07/94	13.98	3544
MIL	B-ELECTRN	Electricians	33.19	0.0%	0.0%	0.00	0.00	33.19	HR	02/07/94	24.38	30884
MIL	B-ELEVCONT	Elevator Constrs	27.49	0.0%	0.0%	0.00	0.00	27.49	HR	02/07/94	22.26	12981
MIL	B-EQOPRCRN	Eq Oper, Crane/Shovl	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	21.20	122008
MIL	B-EQOPRLT	Eq Oper, Light	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	17.02	2471
MIL	B-EQOPRMED	Eq Oper, Medium	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	17.15	9419
MIL	B-EQOPROIL	Eq Oper, Oilers	27.24	0.0%	0.0%	0.00	0.00	27.24	HR	02/07/94	11.00	5178
MIL	B-GLAZIER	Glazier	27.84	0.0%	0.0%	0.00	0.00	27.84	HR	02/07/94	17.48	756
MIL	B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	175543
MIL	B-LATHERS	Lathers	27.44	0.0%	0.0%	0.00	0.00	27.44	HR	02/07/94	13.48	933
MIL	B-PAINTORD	Painters, Ordinary	24.27	0.0%	0.0%	0.00	0.00	24.27	HR	02/07/94	13.34	607
MIL	B-PLASTER	Plasters	27.44	0.0%	0.0%	0.00	0.00	27.44	HR	02/07/94	12.83	335
MIL	B-PLASTERH	Plasters (Semi-Skilled)	26.94	0.0%	0.0%	0.00	0.00	26.94	HR	02/07/94	8.73	335
MIL	B-PLUMBER	Plumbers	33.75	0.0%	0.0%	0.00	0.00	33.75	HR	02/07/94	23.92	11826
MIL	B-RODMAN	Rodmen (reinforcing)	30.10	0.0%	0.0%	0.00	0.00	30.10	HR	02/07/94	17.95	2847
MIL	B-ROOFER	Roofers, Composition	27.84	0.0%	0.0%	0.00	0.00	27.84	HR	02/07/94	18.12	1082
MIL	B-SHTMTLWK	Sheet Metal Workers	29.96	0.0%	0.0%	0.00	0.00	29.96	HR	02/07/94	24.14	1903
MIL	B-STM/PIPE	Steam/Pipefitters	33.75	0.0%	0.0%	0.00	0.00	33.75	HR	02/07/94	22.30	70
MIL	B-STRSTEEL	Struct Stl Workers	30.10	0.0%	0.0%	0.00	0.00	30.10	HR	02/07/94	24.06	4568
MIL	B-TILELYR	Tile Layers (floor)	26.38	0.0%	0.0%	0.00	0.00	26.38	HR	02/07/94	12.63	908
MIL	B-TRKDVRHV	Truck Drivers, Heavy	22.49	0.0%	0.0%	0.00	0.00	22.49	HR	01/18/94	10.49	318
MIL	X-EQOPRMED	Outside Equip. Op. Medium	27.24	0.0%	0.0%	0.00	0.00	27.24	HR	02/07/94	17.43	6501
MIL	X-LABORER	Outside Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	11.84	6879
MIL	X-TRKDVRHV	Outside Truck Dr. Heavy	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	19.19	7068
MIL	X-TRKDVRLT	Outside Truck Dr. Light	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	17.05	2548

SRC LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
Overhead Items - AA											
Building Subcontractor											
Acoustical Tile											
Carpet											
Electrical/Instrumentation											
Elevator											
Fence											
Fire Protection											
Glass And Glazing											
Gypsum Wallboard											
HVAC											
Liner Subcontractor											
Masonry											
Membrane Roofing											
Plumbing											
Preformed Roofing and Siding											
Painting and Sealants											
Resilient Flooring											
Railroad Subcontractor											
Special Equipment											
Site Mechanical											
Structural Steel											
Tile											
Site Preparation											
MIL B-ELECTRN	Electricians	33.19	0.0%	0.0%	0.00	0.00	33.19	HR	02/07/94	24.38	2449
MIL B-EQOPRCRN	Eq Oper, Crane/Shovl	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	21.20	1429
MIL B-EQOPRLT	Eq Oper, Light	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	17.02	2228
MIL B-EQOPRMED	Eq Oper, Medium	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	17.15	3772
MIL B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	26401
MIL X-TRKDVRHV	Outside Truck Dr. Heavy	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	19.19	857
Utilities											
Trench Rough Grading/Excavation											
MIL B-EQOPRCRN	Eq Oper, Crane/Shovl	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	21.20	103364
MIL B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	7951
MIL X-TRKDVRHV	Outside Truck Dr. Heavy	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	19.19	3976
Demolition											
MIL B-EQOPRLT	Eq Oper, Light	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	17.02	243
MIL B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	975
MIL X-EQOPRMED	Outside Equip. Op. Medium	27.24	0.0%	0.0%	0.00	0.00	27.24	HR	02/07/94	17.43	485
MIL X-LABORER	Outside Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	11.84	600
MIL X-TRKDVRHV	Outside Truck Dr. Heavy	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	19.19	53
MIL X-TRKDVRLT	Outside Truck Dr. Light	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	17.05	140
Lead Railroad											
MIL B-EQOPRCRN	Eq Oper, Crane/Shovl	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	21.20	4635
MIL B-EQOPROIL	Eq Oper, Oilers	27.24	0.0%	0.0%	0.00	0.00	27.24	HR	02/07/94	11.00	4635
MIL B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	92709
Underpass											

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SRC	LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
MIL	B-ELECTRN	Electricians	33.19	0.0%	0.0%	0.00	0.00	33.19	HR	02/07/94	24.38	140
Road Crossing												
Equipment												
Grading for Trench Liner												
MIL	B-EQOPRCRN	Eq Oper, Crane/Shovl	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	21.20	1575
MIL	B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	945
MIL	X-TRKDVRHV	Outside Truck Dr. Heavy	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	19.19	945
Trench Lining												
MIL	B-EQOPRCRN	Eq Oper, Crane/Shovl	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	21.20	10462
MIL	B-EQOPRMED	Eq Oper, Medium	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	17.15	1272
MIL	B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	2920
MIL	B-TRKDVRHV	Truck Drivers, Heavy	22.49	0.0%	0.0%	0.00	0.00	22.49	HR	01/18/94	10.49	318
MIL	X-TRKDVRHV	Outside Truck Dr. Heavy	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	19.19	909
Leachate Storage and Pumping												
MIL	B-EQOPRMED	Eq Oper, Medium	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	17.15	24
MIL	B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	48
MIL	B-PLUMBER	Plumbers	33.75	0.0%	0.0%	0.00	0.00	33.75	HR	02/07/94	23.92	97
Electrical												
MIL	B-ELECTRN	Electricians	33.19	0.0%	0.0%	0.00	0.00	33.19	HR	02/07/94	24.38	84
Equipment												
Landscaping and Irrigation												
Roads, Walks and Paved Areas												
MIL	B-CARPNTER	Carpenters	27.84	0.0%	0.0%	0.00	0.00	27.84	HR	02/07/94	19.84	121
MIL	B-CEMTFINR	Cement Finishers	26.38	0.0%	0.0%	0.00	0.00	26.38	HR	02/07/94	13.98	1340
MIL	B-ELECTRN	Electricians	33.19	0.0%	0.0%	0.00	0.00	33.19	HR	02/07/94	24.38	350
MIL	B-EQOPRMED	Eq Oper, Medium	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	17.15	2437
MIL	B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	9868
MIL	B-RODMAN	Rodmen (reinforcing)	30.10	0.0%	0.0%	0.00	0.00	30.10	HR	02/07/94	17.95	1218
MIL	X-EQOPRMED	Outside Equip. Op. Medium	27.24	0.0%	0.0%	0.00	0.00	27.24	HR	02/07/94	17.43	6017
MIL	X-LABORER	Outside Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	11.84	6279
MIL	X-TRKDVRHV	Outside Truck Dr. Heavy	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	19.19	329
MIL	X-TRKDVRLT	Outside Truck Dr. Light	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	17.05	2409
Operations Building												
MIL	B-CARPNTER	Carpenters	27.84	0.0%	0.0%	0.00	0.00	27.84	HR	02/07/94	19.84	5355
MIL	B-CEMTFINR	Cement Finishers	26.38	0.0%	0.0%	0.00	0.00	26.38	HR	02/07/94	13.98	788
MIL	B-ELECTRN	Electricians	33.19	0.0%	0.0%	0.00	0.00	33.19	HR	02/07/94	24.38	29
MIL	B-ELEVCONT	Elevator Constrs	27.49	0.0%	0.0%	0.00	0.00	27.49	HR	02/07/94	22.26	56
MIL	B-EQOPRCRN	Eq Oper, Crane/Shovl	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	21.20	184
MIL	B-EQOPRMED	Eq Oper, Medium	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	17.15	96
MIL	B-EQOPROIL	Eq Oper, Oilers	27.24	0.0%	0.0%	0.00	0.00	27.24	HR	02/07/94	11.00	184
MIL	B-GLAZIER	Glazier	27.84	0.0%	0.0%	0.00	0.00	27.84	HR	02/07/94	17.48	756
MIL	B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	1771
MIL	B-LATHERS	Lathers	27.44	0.0%	0.0%	0.00	0.00	27.44	HR	02/07/94	13.48	933
MIL	B-PAINTORD	Painters, Ordinary	24.27	0.0%	0.0%	0.00	0.00	24.27	HR	02/07/94	13.34	589
MIL	B-RODMAN	Rodmen (reinforcing)	30.10	0.0%	0.0%	0.00	0.00	30.10	HR	02/07/94	17.95	312

SRC	LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
MIL	B-ROOFER	Roofers, Composition	27.84	0.0%	0.0%	0.00	0.00	27.84	HR	02/07/94	18.12	101
MIL	B-SHTMTLWK	Sheet Metal Workers	29.96	0.0%	0.0%	0.00	0.00	29.96	HR	02/07/94	24.14	1138
MIL	B-STRSTEEL	Struct Stl Workers	30.10	0.0%	0.0%	0.00	0.00	30.10	HR	02/07/94	24.06	1824
MIL	B-TILELYR	Tile Layers (floor)	26.38	0.0%	0.0%	0.00	0.00	26.38	HR	02/07/94	12.63	908
Decontamination Facility												
MIL	B-BRKLAYR	Bricklayers	27.44	0.0%	0.0%	0.00	0.00	27.44	HR	02/01/94	15.93	1902
MIL	B-BRKLAYRH	Bricklayers (Semi-Skilled)	26.38	0.0%	0.0%	0.00	0.00	26.38	HR	02/07/94	9.76	881
MIL	B-CARPNTER	Carpenters	27.84	0.0%	0.0%	0.00	0.00	27.84	HR	02/07/94	19.84	1234
MIL	B-CEMTFINR	Cement Finishers	26.38	0.0%	0.0%	0.00	0.00	26.38	HR	02/07/94	13.98	946
MIL	B-ELECTRN	Electricians	33.19	0.0%	0.0%	0.00	0.00	33.19	HR	02/07/94	24.38	13498
MIL	B-ELEVCONT	Elevator Constrs	27.49	0.0%	0.0%	0.00	0.00	27.49	HR	02/07/94	22.26	8300
MIL	B-EQOPRCRN	Eq Oper, Crane/Shovl	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	21.20	239
MIL	B-EQOPRMED	Eq Oper, Medium	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	17.15	1084
MIL	B-EQOPROIL	Eq Oper, Oilers	27.24	0.0%	0.0%	0.00	0.00	27.24	HR	02/07/94	11.00	239
MIL	B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	10987
MIL	B-PAINTORD	Painters, Ordinary	24.27	0.0%	0.0%	0.00	0.00	24.27	HR	02/07/94	13.34	18
MIL	B-PLASTER	Plasters	27.44	0.0%	0.0%	0.00	0.00	27.44	HR	02/07/94	12.83	335
MIL	B-PLASTERH	Plasters (Semi-Skilled)	26.94	0.0%	0.0%	0.00	0.00	26.94	HR	02/07/94	8.73	335
MIL	B-PLUMBER	Plumbers	33.75	0.0%	0.0%	0.00	0.00	33.75	HR	02/07/94	23.92	11695
MIL	B-RODMAN	Rodmen (reinforcing)	30.10	0.0%	0.0%	0.00	0.00	30.10	HR	02/07/94	17.95	683
MIL	B-ROOFER	Roofers, Composition	27.84	0.0%	0.0%	0.00	0.00	27.84	HR	02/07/94	18.12	981
MIL	B-SHTMTLWK	Sheet Metal Workers	29.96	0.0%	0.0%	0.00	0.00	29.96	HR	02/07/94	24.14	766
MIL	B-STRSTEEL	Struct Stl Workers	30.10	0.0%	0.0%	0.00	0.00	30.10	HR	02/07/94	24.06	1839
Container Storage Shed												
MIL	B-CARPNTER	Carpenters	27.84	0.0%	0.0%	0.00	0.00	27.84	HR	02/07/94	19.84	1203
MIL	B-CEMTFINR	Cement Finishers	26.38	0.0%	0.0%	0.00	0.00	26.38	HR	02/07/94	13.98	470
MIL	B-ELECTRN	Electricians	33.19	0.0%	0.0%	0.00	0.00	33.19	HR	02/07/94	24.38	2313
MIL	B-ELEVCONT	Elevator Constrs	27.49	0.0%	0.0%	0.00	0.00	27.49	HR	02/07/94	22.26	4625
MIL	B-EQOPRCRN	Eq Oper, Crane/Shovl	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	21.20	120
MIL	B-EQOPRMED	Eq Oper, Medium	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	17.15	675
MIL	B-EQOPROIL	Eq Oper, Oilers	27.24	0.0%	0.0%	0.00	0.00	27.24	HR	02/07/94	11.00	120
MIL	B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	3955
MIL	B-RODMAN	Rodmen (reinforcing)	30.10	0.0%	0.0%	0.00	0.00	30.10	HR	02/07/94	17.95	635
MIL	B-STRSTEEL	Struct Stl Workers	30.10	0.0%	0.0%	0.00	0.00	30.10	HR	02/07/94	24.06	905
Automated Data Processing Equip.												
Fuel and Chemical Storage												
MIL	B-EQOPRMED	Eq Oper, Medium	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	17.15	5
MIL	B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	33
MIL	B-PLUMBER	Plumbers	33.75	0.0%	0.0%	0.00	0.00	33.75	HR	02/07/94	23.92	19
MIL	B-STM/PIPE	Steam/Pipefitters	33.75	0.0%	0.0%	0.00	0.00	33.75	HR	02/07/94	22.30	70
Sanitary Waste Systems												
MIL	B-EQOPRMED	Eq Oper, Medium	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	17.15	52
MIL	B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	259
MIL	B-PLUMBER	Plumbers	33.75	0.0%	0.0%	0.00	0.00	33.75	HR	02/07/94	23.92	4
Secondary Containment												
MIL	B-EQOPRMED	Eq Oper, Medium	27.74	0.0%	0.0%	0.00	0.00	27.74	HR	02/07/94	17.15	3

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SRC LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
MIL B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	6
MIL B-PLUMBER	Plumbers	33.75	0.0%	0.0%	0.00	0.00	33.75	HR	02/07/94	23.92	11
Site Communications											
MIL B-ELECTRN	Electricians	33.19	0.0%	0.0%	0.00	0.00	33.19	HR	02/07/94	24.38	5570
MIL B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	8913
Site Electrical											
MIL B-ELECTRN	Electricians	33.19	0.0%	0.0%	0.00	0.00	33.19	HR	02/07/94	24.38	4876
MIL B-LABORER	Laborer (Semi-Skilled)	23.95	0.0%	0.0%	0.00	0.00	23.95	HR	02/07/94	12.86	7801
Substation/Equipment											
Site Lighting											
MIL B-ELECTRN	Electricians	33.19	0.0%	0.0%	0.00	0.00	33.19	HR	02/07/94	24.38	1576

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Appendix E
Outline Specification

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OUTLINE SPECIFICATION

DIVISION 2 - SITEWORK

Section 02050 Demolition, Decontamination, and Decommissioning

1.0 Relocate existing minor facilities and obstructions.

2.0 Remove existing asphalt concrete roadways and replace after railroad installation.

3.0 Remove existing fence and replace after utility installation.

4.0 Relocate existing utilities.

5.0 Relocate steam system.

6.0 Relocate existing overhead electrical lines.

7.0 Relocate communication and alarm systems.

Section 0210 Site Preparation

1.0 Site drainage complying with Section 0270, Sanitary Wastewater Collection and Stormwater Management Systems.

2.0 Vehicle parking, sidewalks, and road requirements complying with Section 0250, Paving and Surfacing.

3.0 Landscaping complying with Section 0290, Landscaping.

4.0 Site grading complying with Section 0250, Paving and Surfacing, and Section 0270, Sanitary Wastewater Collection and Stormwater Management Systems.

5.0 Site power and lighting complying with Section 0278, Power and Lighting.

6.0 Site security in accordance with requirements set forth in DOE 5632 series. See Section 0283, Physical Protection, for additional requirements.

Section 0215 Shoring and Underpinning

1.0 All Shoring and underpinning complying with the safety requirements of 29 CFR 1926, Subpart P.

Section 0220 Earthwork

1.0 Excavate for ERDF disposal trench in accordance with 10 CFR 1910 and line in accordance with 40 CFR 260-281.

2.0 Grading, excavation, and embankment work to establish sub-grade for ERDF support facilities.

3.0 Sub-grade and drainage grading for roads, parking facilities, and railroad crossings.

4.0 Excavation for buried utility pipe, electrical cables, communication cables, and conduits.

5.0 Grading, excavation, embankment, obstruction clearance, and utility relocation for railroad facilities in accordance with the *American Railway Engineering Association Manual for Railway Engineering,* Volumes I and II

6.0 General site grading, design, and erosion control conforming to the *Hanford Plant Standards General Design Criteria, DOE General Design Criteria* DOE Order 6430.1A, Sections 0260, 0262, 0266, 0270, 0273, 0278, 1540, and 1630-1699.8, and WHC-CM-7-5.

7.0 Design, construction practices, and construction materials associated with grading, embankment and excavation for roadways, parking lots, and container transfer areas shall conform to the *Washington State Department of Transportation Manual,* M 41-10 (WSDOT).

8.0 Minimum depth of water lines shall be in accordance with *Hanford Standard Design Criteria*, SDC-3.2.

9.0 Survey control and recordkeeping will be done in accordance with DOE Order 6430.1A, Section 0202 and 40 CFR 264.309.

10.0 Structural backfill compacted in accordance with WSDOT, Section 2-03.3(14)c, Method B or C.

11.0 Common backfill: each layer compacted with one pass of vibratory roller.

12.0 Trench waste fill will be in 1 ft lists compacted to 95% of maximum density.

13.0 Sandbedding for underground pipe, cables, and conduits in accordance with ASTM D 663.

14.0 Plastic sheet marker for buried pipe.

15.0 Plastic sheet marker and board covering for buried cables and conduits.

16.0 Finished grade to slope away from structures and drain to ponds and tanks.

17.0 Crushed gravel stabilization.

18.0 Compaction control test: WSDOT, Section 2-03.3(14)d.

Section 02235 Road Subgrade and Granular Base

1.0 Granular base: WSDOT, Section 9-03.9(3).

2.0 Leveling course: WSDOT, Section 9-03.9(3).

3.0 Backfill: WSDOT, Section 2-03.3(14)c, Method B.

4.0 Subgrade: WSDOT, Section 2-06.3.

5.0 Place and spread base materials in accordance with WSDOT, Section 4-04.3(4).

6.0 Compact base materials to 95 percent of maximum density determined by WSDOT Test Method No. 606.

7.0 Compaction control test: WSDPT, Section 2-03.3(14)d.

Section 0235 Building Foundations

1.0 Building foundations in accordance with the requirements of the UBC and ACI 318.

Section 0245 Railroad Design

1.0 Track layout, drainage, structures, rail, ties, joint bars, tie plates, rail anchors, spikes, guardrails, highway-railway grade crossings, ballast, turnouts, superelevation, grades, clearances, and electrical grounding for railroad facilities in accordance with the *American Railway Engineering Association Manual for Railway Engineering,* Volumes I and II.

Section 02506 Traffic Control

1.0 Signs, pavement markings, and channelization in accordance with ANSI D6.1.

Section 02512 Hot-Laid Asphaltic Concrete Paving

1.0 Paving asphalt: WSDOT, Section 9-02.1(4), viscosity grade AR-4000-W.

2.0 Prime coat: WSDOT, Section 9-02.1(2), medium curing liquid asphalt MC-250.

3.0 Aggregate: Class B, WSDOT, Section 9-03.8.

4.0 Blending sand: WSDOT, Section 9-03.8(4).

5.0 Mineral filler: WSDOT, Section 9-03.8(5).

6.0 Proportion of asphalt concrete materials: WSDOT, Section 9-03.8(6), Class B.

7.0 Construction: WSDOT, Section 5-04.3.

8.0 Permanent signing: ANSI D6.1, Section II and WSDOT, Section 8-21.

9.0 Permanent marking: WSDOT, Section 8-22.

10.0 Traffic control: WSDOT, Section 1-07.23.

Section 02650 Piped Utility Materials

1.0 Sanitary sewer pipe: ASTM D 3034 for SDR 35 PVC pipe.

2.0 Sanitary water pipe: AWWA C900.

3.0 Install pipe in accordance with ASTM D3839.

4.0 Flush pipe for 1 minute at 5 feet per second.

5.0 Hydrostatic test pipe for 30 minutes.

6.0 Disinfect sanitary water lines.

Section 02668 Fire Water Systems

1.0 Cement lined ductile iron pipe: 6 inch, 8 inch and 12 inch.

2.0 Post-indicator valve: Kennedy valve with Potter Model PIVSU-A Supervisory Switch and 6-inch diameter grout-filled Schedule 40 carbon steel barrier posts: 6, 8, and 12 inch.

3.0 Gate valves: 4, 6, 8, and 12 inch.

4.0 Cement lined fittings.

5.0 Thrust restraints in accordance with NFPA 24.

6.0 Flush and test in accordance with NFPA 24.

7.0 Fire Hydrants: Clow Medallion with 6-inch gate valve and 6-inch diameter grout-filled Schedule 40 carbon steel barrier posts.

8.0 Hydrostatic testing in accordance with NFPA 24.

Section 02730 Sanitary Sewers

1.0 Sanitary sewer: PVC plastic pipe or cement-mortar lined ductile iron pipe.

2.0 Manholes; Concrete, 48-inch inside diameter.

3.0 Install sanitary sewer in accordance with WSDOT M41-10.

4.0 Flush and test in accordance with WSDOT M41-10.

Section 02745 Septic tanks and Drain Fields

1.0 Septic Tank: 2 compartment concrete tank.

2.0 Dosing Chamber: Concrete vault.

3.0 Effluent Pumps: Submersible, 3-phase electric.

4.0 Pressure Dosed Drain Fields:

a. Excavate beds with minimum ground disturbance.
b. Install drain rock.
c. Install distribution pipe.
d. Install geotextile fabric and backfill.

5.0 Test system for operational adequacy.

Section 02750 Industrial Wastewater Treatment

1.0 Hazardous waste tank systems complying with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 270, and 40 CFR 271.

2.0 Structural requirements for spill or overfill prevention devices complying with 40 CFR 280.30 and 40 CFR 264.194.

3.0 Structural requirements for secondary containment complying with 40 CFR 264.193.

4.0 Petrochemicals and hazardous chemical tank systems complying with 40 CFR 280 and 40 CFR 281.

Section 02810 Irrigation Systems

1.0 Pipe: WSDOT, Section 9-15.1(2) PVC pipe.

2.0 Automatic controller: Solid state electronics capable of repeating a 1-week program indefinitely.

3.0 Automatic control valve: Compatible with controller.

4.0 Sprinkler heads: WSDOT M41-10, Section 9-15.4.

5.0 Drip heads: Compatible with system.

6.0 Install system in accordance with WSDOT M41-10, Section 8.03.

Section 02831 Chain Link Fences and Gates

1.0 Fabric: FS RR-F-191/1, Type I, 2-inch mesh, 9 gage, 84-inches high with three strands of barbed wire.

2.0 Posts, top rails, and braces: FS RR-F-191/3, Class I, Grade A or B.

3.0 Accessories: FS RR-F-191/4.

4.0 Gates: Braced frames constructed of specified fabric and pipe.

Section 02850 Solid Waste Systems

1.0 ERDF Trench: 40 CFR 122, 40 CFR 192, 40 CFR 240, 40 CFR 241, 40 CFR 256, 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 267, DOE 5820.2A, and RCRA, Subtitles C and D.

Section 02900 Landscaping

1.0 Sod: 100 percent blue grass or as required by local climate.

2.0 Top Soil: Fertile friable soil containing normal amount of organic matter.

3.0 Fertilizer: Nonburning, slow release, Formula 16-16-16.

4.0 Plantings: Nursery grown container stock; trees grown under local conditions for at least 2 years.

DIVISION 3 - CONCRETE

Section 03300 Cast-In-Place Concrete

1.0 Cement: ASTM C 150, Type II.

2.0 Aggregate: ASTM C 33.

3.0 Air entraining admixture: ASTM C 260.

4.0 Concrete Properties:

a. Minimum compressive strength: 4,000 psi at 28 days.
b. Slump: 4 inch maximum.

5.0 Reinforcing steel bars: ASTM A 615, deformed, Grade 60.

6.0 Mix and deliver in accordance with ASTM C 94.

7.0 Concrete forms: Wood, steel, plywood, or pressed fiberboard.

8.0 Nonshrink grout: Nonmetallic.

9.0 Expansion joint: Preformed bituminous type material.

10.0 Place, finish, cure, and test in accordance wit ACI 301.

DIVISION 4 - MASONRY

Section 04220 Concrete Unit Masonry

1.0 Hollow concrete masonry units, 8 x 8 x 16 inches, per ASTM C 90, Grade N, Type I.

2.0 Mortar: ASTM C 270, Type M.

3.0 Coarse grout: ASTM C 476.

4.0 Reinforcement: Horizontal, truss type, vertical: ASTM C 615, deformed, Grade 60.

5.0 Anchor bolts: ASTM A 307.

DIVISION 5 - METALS

Section 05120 Structural Steel

1.0 Rolled steel shapes and plates: ASTM A 36.

2.0 Steel tubing: ASTM A 500 or ASTM A 501.

3.0 Steel pipe: ASTM A 53.

4.0 Bolts; ASTM A 325, Type 1 or 2 or ASTM A 490, Type 1 or 2.

5.0 Nuts: ASTM A 563, Grade C, heavy hex.

6.0 Washers: ASTM F 436.

7.0 Expansion anchors: Hilti Kwik-Bolt II or HSL.

8.0 Electrodes for welding: E 70XX.

9.0 Fabricate and erect structural steel in accordance with AISC.

10.0 Welding in Accordance with AWS D1.1.

Section 05210 Steel Joists

1.0 Open web steel joints: Meet the requirements of SJI Standard Specifications for open web steel joints.

2.0 Joist girders: Meet the requirements of SJI Standard Specifications for joist girders.

Section 05300 Metal Decking

1.0 Standard wide rib deck, meeting the requirements of SDI. Design manual for composite decks, form decks, and roof decks; manufactured from zinc-coated steel sheets.

2.0 Design and install metal deck in accordance with SDI.

Section 05500 Metal Fabrications

1.0 Rolled steel shapes: ASTM A 36.

2.0 Steel plate: ASTM A 36 or ASTM A 283.

3.0 Steel bars and rods: ASTM A 36

4.0 Weld studs: Nelson Stud Welding Co., Type No. H4L.

5.0 Metal grating: Hot dip galvanized in accordance with FS RR-G-661, Type I, pressure locked with end bars.

6.0 Steel pipe railings: ASTM A 53 or ASTM 120 welded, galvanized.

7.0 Steel tubing: ASTM A 500, Grade B.

8.0 Bolts: ASTM A 307.

9.0 Nuts: ASTM A 563, Grade A.

10.0 Steel tanks.

11.0 Steel ladders and handhold.

12.0 Stair nosings.

13.0 Metal louvers.

14.0 Wrought iron ornamental planter grating.

15.0 Welding in accordance with AWS D1.1.

Section 05720 Ornamental Handrails and Railings

1.0 Stainless steel cap rail: 2 1/2-inch outside diameter.

2.0 Guard panel, (1/2 inch thick Plexiglas with 1/4-inch spacer, aluminum shoe molding with setting block.

3.0 Assembly height: 3 foot 6 inches above finish floor at open areas.

DIVISION 6 - WOOD AND PLASTICS

Section 06100 Rough Carpentry

1.0 Plywood.

2.0 Framing lumber.

3.0 Nailers, blocking, stripping.

4.0 Moisture barrier.

5.0 Rough hardware: Bolts, nuts, lag screws, toggle bolts, wood screws, wire nails, and staples.

Section 06200 Finish Carpentry

1.0 Oak handrail: Red oak with eased edges.

2.0 Laminated plastic sheet: 0.050-inch thick.

3.0 Window sills: Medium density particleboard covered with plastic laminate.

4.0 Contact adhesive: Solvent release type.

Section 06410 Custom Casework

1.0 Particleboard: Density Grade B, Class 2, medium density.

2.0 Laminated plastic sheet: 0.050-inch thick.

3.0 Laminated plastic backing sheet.

4.0 Hardware: Extension drawer slides, hinges, standards and shelf clips, bar-type pulls, latches, fasteners, and locks.

5.0 Sound deadener.

6.0 Type of construction: Flush overlay.

7.0 Cabinet doors: Flush type, 3/4-inch thick.

8.0 Drawers and doors: Flush overlay.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

Section 07150 Dampproofing

1.0 Primer: ASTM D 41.

2.0 Asphalt: ASTM D 449, Type II.

3.0 Asphalt saturated felt: ASTM D 226, Type I.

Section 07200 Insulation

1.0 Exterior wall: Glass fiber, foil faced, blanket type, R-19 thermal resistance.

2.0 Metal Roof: Glass fiber, foil faced, blanket type, R-32 thermal resistance.

2.0 Acoustical: 3 1/2-inch thick sound attenuation batts, unfaced.

Section 07212 Rigid Insulation

1.0 Polystyrene foam board: 2-inch thick at perimeter foundation below grade, FS HH-I-524, Type II, Class B.

2.0 Roof insulation board: Closed cell phenolic foam core, R-38 thermal resistance.

Section 07460 Cladding/Siding

1.0 Siding Panels: Flat 24 gage metal wall panels with stucco texture (Butler Texture-Cote or equal) and/or brick panels (ButlerStone BrickWal System or equal).

2.0 Subgirts: Prefinished, cold formed metal, standard product from siding manufacturer.

3.0 Accessories: Prefinished metal trim, metal flashing, neoprene closures.

Section 07530 Single-Ply Membrane Roofing

1.0 Roofing system: Factory Mutual Class I, single-ply membrane over insulation board over metal deck with crickets to drains.

2.0 Insulation stops: Treated 2 by lumber.

3.0 Single-ply traffic strips.

4.0 PVC-coated coping and flashing.

Section 07620 Sheet Metal Flashing and Trim

1.0 24-gage galvanized metal flashing, trim reglets, and scuppers.

Section 07700 Roof Specialties and Accessories

1.0 Prefabricated curbs.

2.0 Expansion joints.

3.0 Relief vents.

Section 07800 Skylights

1.0 Tubular anodized aluminum frames and crossbars.

2.0 Concealed glazing fasteners.

Section 07920 Sealants and Caulking

1.0 Polysulfide sealant with nonstaining primer.

2.0 Closed-cell polyethylene foam backer rod.

3.0 Premolded bituminous expansion joint filler.

4.0 Fire-barrier sealant: UL listed or FM approved.

DIVISION 8 - DOORS AND WINDOWS

Section 08100 Metal Doors and Frames

1.0 Exterior doors: Hollow metal, flush type with 18-gage face sheets, insulated for exterior installation, acoustical, and/or fire rated as required.

2.0 Interior doors (shop areas): Hollow metal, flush type with 18-gage face sheets, insulated as required for acoustical and/or fire rated installation.

3.0 Sliding fire doors and tracks, fire rated as required.

4.0 Frames: Hollow metal, 16 gage, fire rated as required.

5.0 Louvers, metal, fire rated as required.

Section 08210 Wood Doors

1.0 Solid core, solid stave, flush type for office areas, fire rated as required.

2.0 Louvers, metal, fire rated as required.

Section 08305 Access Doors

1.0 Flush panel access door for drywall.

Section 08330 Overhead Coiling Doors

1.0 Insulated type, face mounted, fully weather-stripped, power operated with auxiliary chain drive.

Section 08360 Sectional Overhead Doors

1.0 Insulated type, face mounted, power operated with auxiliary chain drive complying with ANSI A216.1.

Section 08410 Aluminum Entrances and Storefronts

1.0 Anodized aluminum mullion, sill and head sections. Glazing channels to accept insulated double pane glazing.

2.0 Medium stile doors, 1-3/4 inch thick.

Section 08520 Aluminum Windows

1.0 Tubular anodized aluminum frames.

Section 08710 Door Hardware

1.0 Panic hardware for exterior doors.

2.0 Door closers, stops, holders, latch sets, push/pull plates, kick plates, smoke seal weather-stripping, and air seals.

3.0 Locksets for managerial offices, conference rooms, storage rooms, mechanical rooms, file rooms, copy rooms, janitorial closets, and telecommunication rooms, exits, and entries.

4.0 Fire door hardware: UL listed or FM approved.

Section 08810 Glazing

1.0 Exterior window glazing: Insulated glass, low emissivity, tinted, 1-inch thick.

2.0 Tempered glass: Light reducing.

3.0 Single pane glazing: Wire glass for interior door lights.

4.0 Preformed elastomeric glazing gasket.

DIVISION 9 - FINISHES

Section 09250 Gypsum Board

1.0 Fire-retardant board: 5/8-inch thick, Type X.

2.0 Water-resistant board: 5/8-inch thick, Type W-R board on walls in restrooms.

3.0 Metal studs, 6 inch and 3 1/2 inch, 18 to 25 gage, galvanized.

4.0 Ceiling framing: Cold-rolled channels and metal-furring channels.

5.0 Hangers: Galvanized, annealed wire.

Section 09310 Ceramic Tile

1.0 Standard tile for shower walls, dry off, and restroom area.

2.0 Glazed wall tile wainscot with bullnose top.

3.0 Thin set installation.

Section 09500 Acoustical Treatment

1.0 Acoustical ceiling tiles: 2 by 4 foot and 2 by 2 foot, lay in mineral board, UL 1-hour fire rated where required, Class A.

2.0 Water-resistant ceiling tiles: 2 by 4, plastic surface coating, Class A.

3.0 Suspension system: Exposed 2-way metal tee grid with wall moldings as directed, fire rated and nonfire-rated as required.

4.0 Hanger wire: 12 gage, galvanized soft steel.

Section 09650 Resilient Flooring

1.0 Vinyl composition tile.

2.0 Sheet vinyl flooring.

3.0 Rubber base, 4 inch.

4.0 Edge strips.

5.0 Primer.

6.0 Adhesives.

Section 09680 Carpet

1.0 Tufted, textured loop, anti-static, Class I critical radiant flux of 0.45 watts per square centimeter with polypropylene backing.

Section 09805 Special Protective Coating

1.0 Amercoat 33 coating or equal.

Section 09900 Painting

1.0 Fillers: Wood paste, plastic wood, concrete.

2.0 Sealers: Quick drying, emulsion type.

3.0 Primers: Enamel undercoat alkyd type zinc/chromate for ferrous metals. Alkyd zinc oxide for galvanized metals.

4.0 Paints: Gloss enamel, latex flat, latex semi-gloss.

5.0 Stains and varnishes: Urethane varnish on exposed wood.

DIVISION 10 - SPECIALTIES

Section 10115 Markerboards

1.0 Markerboards: White, dry markerboards, unit size 42-inches high by 72-inches long.

Section 10160 Metal Toilet Compartments

1.0 Doors, partitions, screens: 1-inch thick steel face panels.

Section 10260 Wall and Corner Guards

1.0 Wall guards.

2.0 Corner guards.

Section 10270 Access Flooring

1.0 Floor system: 24 by 24 inch removable interchangeable panels, resilient tile finish, adjustable pedestal support, UL Class A.

Section 10350 Flagpoles

1.0 Flag: 4-feet high by 6-feet long.

2.0 Pole: Aluminum, cone, 30-feet high, 6-inch diameter at base.

3.0 Self-storing electric switch operation.

Section 10400 Identifying Devices

1.0 Site sign with ground lights.

2.0 Building directories.

3.0 Lighted company logo signs.

4.0 Building numbers: Adhesive vinyl lettering.

5.0 Room title signs.

6.0 Exit signs: Self powered, wall mounted.

Section 10505 Metal Lockers

1.0 Lockers: Single-tiered, 15 by 18 by 72 inch metal lockers.

2.0 Locker benches: Heavy-duty aluminum legs, hardwood tops.

Section 10522 Fire Extinguishers, Cabinets and Accessories

1.0 Fire extinguisher cabinets: Bubble front, semi-recessed wall mounting.

2.0 Fire extinguishers by others.

Section 10650 Operable Partitions

1.0 Accordion folding partitions: Vinyl-clad cold rolled steel panels connected to full length steel hinges, STC 44 minimum, UL Class A flame spread.

Section 10670 Storage Shelving

1.0 Metal storage shelving.

2.0 Metal span shelving.

Section 10800 Toilet and Bath Accessories

1.0 Papertowel dispensers.

2.0 Waste receptacles.

3.0 Toilet paper holders.

4.0 Mirrors.

5.0 Soap dispensers.

6.0 Sanitary napkin dispensers.

7.0 Sanitary napkin disposal.

8.0 Electric hand dryers.

9.0 Grab bars for handicap stalls.

10.0 Coat hooks.

11.0 Anchor devices.

12.0 Toilet seat cover holders.

13.0 Mop and broom holders.

14.0 Curtain rods.

DIVISION 11 - EQUIPMENT

Section 11132 Projection Screens

1.0 Conference Rooms:

a. Viewing Surface, 6 feet by 6 feet matte white.
b. Flame retardant and mildew resistant seamless fabric.
c. Extension wall brackets, 6 inch.
d. Heavy gauge steel case.
e. Concealed roller ends.

Section 11160 Loading Dock Equipment

1.0 Bumper dock.

Section 11452 Residential Appliances

1.0 Range: Drop-in, self cleaning.

2.0 Exhaust hood.

3.0 Microwave oven: Convection microwave oven, approximately 1.0 cubic foot capacity.

4.0 Refrigerator: Residential grade, approximately 21 cubic feet capacity with top freezer and ice maker.

5.0 Dishwasher: Residential grade, quiet wash, extra large capacity.

Section 11703 Deisel Engine-Generators with Enclosures

1.0 Deisel generators will provide backup power to critical systems.

DIVISION 12 - FURNISHINGS

Section 12301 Metal Casework

1.0 Casework for shops.

2.0 Base cabinets: Metal with wood work tops, 34 inches high.

3.0 Wall cabinets: Metal with adjustable shelves, 30 inches high.

4.0 Bin storage: Metal with adjustable sliding shelves and dividers.

Section 12302 Wood Casework

1.0 Casework for conference/lunchroom and administrative areas.

2.0 Base cabinets: Stained oak with plastic laminate covered counter top and splash, 36 inches high.

3.0 Wall cabinets: Stained oak with adjustable shelving, 30 inches high.

Section 12510 Blinds

1.0 Horizontal blinds: One unit required for each window in offices, conferences rooms, copy center, and lunchrooms.

2.0 Typical unit: One-inch wide virgin aluminum slats, approximately 5-foot wide by 6-foot high.

Section 12600 Furniture and Accessories

1.0 Metal desks, file cabinets, tables, bookshelves, and credenzas for operational offices.

2.0 Wood with plastic laminate: desks, file cabinets, tables, bookshelves, and credenzas for administrative offices.

3.0 Office chairs: ergonomically designed.

4.0 Lobby furniture.

5.0 Wood conference table.

6.0 Interlocking/stackable chairs: Ergonomically designed metal frame, cushion seat and back.

Section 12690 Floor Mats and Frames

1.0 Entrance mat: Composed of selected aircraft and truck tires, 1-1/2 pounds per square foot.

2.0 Recessed aluminum frame, 3/.8-inch thickness.

3.0 Adhesive.

DIVISION 13 - SPECIAL CONSTRUCTION

Section 13120 Preengineered Structures

1.0 Submit fabrication drawing with certificate signed by a registered structural engineer stating structure meets the design criteria. Include design reactions for foundations.

2.0 Design Criteria:

a. SDC 4.1, Noncategory I: All structures except shop area overhead crane supports.
b. SDC 4.1, Category I: Supports for shop area overhead crane supports.

3.0 Submit erection instruction and diagrams.

Section 13440 Instrumentation

1.0 Plant Computer System: Compatible with ER system. Specification to be prepared in detail during definitive design.

DIVISION 14 - CONVEYING SYSTEMS

Section 14200 Elevators

1.0 Passenger elevators: Hydraulic type, 3,000 and 5,000-pound capacities, 150 feet per minute travel speed.

2.0 Car light.

3.0 Emergency telephone.

4.0 Car door.

5.0 Self-supporting hoistway framing.

6.0 Concrete inserts for framing.

7.0 Machines located in machine rooms.

8.0 Control system.

9.0 Signal equipment.

10.0 Freight protection.

Section 14355 Sub-Compact Pickup Trucks

1.0 Mobile decontamination units will be provided with a high pressure, low volume water washer with hot water and detergent options. Each will be mounted in the bed of a 450 kg (1,000 lb [0.5 ton]) pickup truck. Each mobile decontamination unit will be a standard pressure washer unit as manufactured by Hotsy, Sioux, or equal. Each unit will be self contained and provided as skid mounted for semi-permanent mounting in the pickup.

Section 14360 Three-Axle Cab Truck Tractors

1.0 Each transport tractor will be equipped to pull a trailer containing one 45,000 kg (100,000 [50 ton]) waste container at a time. Standard transport vehicle equipment include lights for night time operation and vehicle cabs with HEPA filters and climate control devices. Remote controls for activating the tilt cylinder, operating the lock-down mechanism, and operating the end gate latch will be provided inside the truck cab.

2.0 The unloaded transport tractor/trailers must meet DOT requirements for movement on public roads.

3.0 Vehicle performance will require operating at speeds of up to 48 kph (30 mph) on paved roads and 24 kph (15 mph) on gravel roads. The trucks will have sufficient power to operate on 10 percent grades and meet the operation cycle times specified in the operations plan.

Section 14368 Tandem-Axle Semi Trailers

1.0 Each transport trailer will be equipped to carry one 45,000 kg (100,000 [50 ton]) waste container at a time. Lock down devices will be provided for securing the waste container to the trailer frame. Other standard transport vehicle equipment includes lights for night time operation and tilt cylinders for raising the bed to empty the container contents. Remote controls for activating the tilt cylinder, operating the lock-down mechanism, and operating the end gate latch will be provided inside the truck cab.

2.0 The unloaded transport trailers must meet DOT requirements for movement on public roads.

3.0 Vehicle performance will require operating at speeds of up to 48 kph (30 mph) on paved roads and 24 kph (15 mph) on gravel roads.

Section 14370 Front End Loaders

1.0 Front end loaders used to load stockpiled materials into transport trucks and the grout batch plant will be rubber tired 2.7 m^3 (3.5 yd^3) loaders. These will be standard construction equipment similar to Caterpillar, Dresser, or equivalent. Loaders will be equipped with lights for night time operation and the cabs will be enclosed with HEPA filters and climate control facilities. Each loader will have sufficient power and bucket capacity to meet the operation cycle specified in the operations plan.

Section 14570 Belt Conveyors

1.0 Each conveyor will be a belt-drive roller type conveyor suitable for moving 4,540 kg (10,000 lb) containers. The conveyors will be equipped with guides to keep the containers centered and to keep the containers from turning on the conveyor. The rollers will be a pair of 0.6 m (2 ft) wide rollers with one under each side of the container. The drive belt can be retracted to stop the container as needed for surveying or staging for loading onto the railcars.

Section 14620 Trolley Hoists

1.0 Arrangement.

2.0 Capacity.

3.0 Operating Conditions.

4.0 Monorail track.

5.0 Monorail switches.

6.0 Tractor drives and trolleys.

7.0 Hoists.

8.0 Mechanical.

9.0 Electrical.

10.0 Controls.

11.0 Testing.

Section 14630 Bridge Cranes

1.0 Arrangement.

2.0 Capacity.

3.0 Operating Conditions.

4.0 Bridge.

5.0 Trolley and Hoist.

6.0 Mechanical.

7.0 Electrical.

8.0 Controls.

9.0 Testing.

Section 14650 Fork Lifts

1.0 Standard forklifts will be modified to produce wheeled container handlers. The design capacity of container handlers is 4,540 kg (10,000 lb [5 tons]) and 45,400 kg (100,000 lb). All handlers will be wheel driven. Each handler will be capable of transferring containers directly from the railcar to the transport tractor/trailer within the cycle time specified in the operations plan.

Section 14670 Tractor Dozers

1.0 Standard equipment for tractor dozers includes lights for night time operation, push blades suitable for movement of soil rubble and demolition waste, tow bars capable of retrieving equivalent dozer units from construction areas as well as towing 18,000 kg (40,000 lb [20 ton]) vibratory compactors, and controls which allow for manual and remote operation. Each dozer will be track driven. Minimum push capacity, cycle time, and operating conditions are specified in the operations plan. Enclosed cabs with HEPA filters and climate control facilities will be provided for dozer operators.

Section 14680 Vibratory Compactors

1.0 Vibratory compactors will be standard equipment with a minimum rating of 18,100 kg (40,000 lb [20 ton]). Each compactor will be capable of being towed by the dozer equipment and will be equipped with lights for night time operation.

Section 14690 Grout Batch Plant

1.0 A batch plant will be provided as part of the ERDF to supply grout to fill voids left during the burial of debris. Based on the currently expected waste characteristics, the plant should be sized to produce a maximum of 107 m^3 (140 yd^3) of grout per day, and a minimum of 22.9 m^3 (30 yd^3) per day.

Section 14700 Transport trucks

1.0 Transport trucks used to haul interim cover and grout material (sand) from stock piles will be standard construction equipment with a capacity of 11.5 m^3 (15 loose yd^3) and with HEPA filtration added. Rear dump tail gates and locking attachments will be operable with remote mechanisms from inside the truck cab. The tilt cylinder will be operable from a remote actuator located inside the truck cab.

2.0 Standard equipment for these trucks must meet DOT requirements for moving on public roads. Cabs will be equipped with HEPA filters and climate control devices.

3.0 Vehicle performance will require operating at speeds of up to 48 kph (30 mph) on paved roads and 24 kph (15 mph) on gravel roads. The trucks will have sufficient power to operate on 10 percent grades and meet the operation cycle times specified in the operations plan.

Section 14710 Grout Transport Trucks

1.0 Grout transport trucks used to haul grout from the batch plant to the disposal trench will be standard over-the-road mixing units with front end discharge capability that have been modified to include HEPA filtered cabs. The unloading chute will be remotely operated from within the truck cab and will be capable of swing and tilt operations. Trucks will have a minimum of 6.9 m^3 (9 yd^3)wet batch capacity with a self contained water tank for adjusting batch water content. Wash and spray devices for cleaning the unloading chute and mixing drum will be part of the water tank system.

2.0 Transport trucks will meet DOT requirements for movement on public roads. Truck cabs will be enclosed and equipped with HEPA filters and climate control devices. Vehicle lights will also be sufficient for night time operation.

3.0 Vehicle performance will require operating at speeds of up to 48 kph (30 mph) on paved roads and 24 kph (15 mph) on gravel roads. The trucks will have sufficient power to operate on 10 percent grades and meet the operation cycle times specified in the operations plan.

Section 14720 Road Graders

1.0 Road graders will be equipped with an enclosed cab containing HEPA filter and climate control facilities as well as lights for night time operation. The grader will be capable of performing light grading of gravel roads and will have front wheel tilt and front and rear wheel steering. Wheel and blade control mechanisms will be operable from within the operator cab and will be hydraulically driven. The grader will have sufficient power to meet the operation cycle specified in the operations plan.

Section 14730 Water/Spray Trucks

1.0 The water truck will have a 11,356 L (3,000 gal) capacity and be used to maintain gravel roads and granular interim cover material. It will be equipped with loading hoses and front operating pressurized spray mechanisms. All spray mechanisms will be operable from within the truck cab. Lights will be provided to allow for night time operations and vehicle cabs will be enclosed with HEPA filters and climate control facilities.

2.0 The water truck will be required to operate on 10 percent grades and will have sufficient power to meet the operation cycle times specified in the operations plan.

Section 14740 Trailer Tippers

1.0 Trailer tippers, used to unload containers within the disposal trench, will be capable of dumping a loaded container while the container is mounted on the transport trailer. The trailer will be equipped with leveling devices which will be used to level the tipping platform. Other equipment include lights for night time operations and an enclosed cab with HEPA filters and climate control devices.

2.0 Tippers will be equipped with water spray nozzles. These devices will be located at the waste discharge point of the tipper and will be used for dust suppression. Variable speed pumps will be capable of delivering 76 to 380 L/min (20 to 100 gpm) of water to the spray nozzles. Water, for the spray nozzles, will be contained in two storage tanks. Raw water will be used. Storage tanks will be capable of being towed behind a tractor similar to the waste transport tractors. Each storage tank will have a capacity of 11,356 L (3,000 gal).

3.0 Tippers will be designed to insure clearance of all waste material from the trailer tilting mechanism and platform when waste is dumped into the trench. Tippers will also be designed to be relocated by a truck tractor equivalent to the truck tractors used for transporting waste containers. Each tipper will be capable of maintaining the production rates specified in the operations plan.

Section 14750 Portable Lighting

1.0 Portable lighting units used to light the working areas of the disposal trench and the material stock piles will have self contained engines and generator units. These portable lighting units will be on elevated towers and will be able to be able to be relocated using light weight utility trucks, such as a mobile decontamination unit.

Section 14760 Railroad Locomotive

1.0 One locomotive will be used for relocation of trains between the container off-loading area and the container on-loading area. This locomotive will be designed to relocate 17 railcars (based on the expected train length of 15 railcars plus provision for future increases in train sizes). Each railcar will contain two loaded waste containers. Each container weighs 45,000 kg (100,000 lb [50 tons]). In addition, the locomotive will be designed to meet the process cycle specified in the operations plan.

Section 14770 Container Off-Loading Crane

1.0 The container off-loading crane will have a capacity of 45,400 kg (50 ton) and will be used for unloading single use containers into the disposal trench. It will be capable of lifting containers directly from the bed of a tractor/trailer and placing it on the floor of the disposal area.

2.0 The crane will be equipped with a lifting attachment which provides a locking mechanism which attaches to the container while the container is being lifted. In addition, the crane will be fitted with lights for night time operation. The container design includes lifting attachments on the top four corners of the container to facilitate lifting by the crane.

Section 14780 Tire Maintenance Truck

1.0 A tire maintenance truck, meeting DOT requirements for movement on public roads, will be used for providing service on all types of on-site, rubber tired vehicles. The truck will be equipped with an air compressor, tire change tools, a tire lifting hoist, and a truck jack system. Lights will be provided for night time operations and truck cabs will be enclosed and will include HEPA filters and climate control devices. The truck will have the capability to carry tires for heavy equipment, trucks, or light duty vehicles.

Section 14790 Preventative Maintenance/Fuel Truck

1.0 An equipment and vehicle service truck, meeting DOT requirements for movement on public roads, will be used for transporting and dispensing fuel to heavy equipment, trucks, light duty vehicles, and portable lighting facilities. The truck will be equipped with covered and secured storage space for carrying filters, coolants, small parts, and service tools. The truck will include an enclosed cab with HEPA filters and climate control devices. Lights will be provided for night time operations.

Section 14800 Electronics/Instrument Maintenance Truck

1.0 An electronics and instrument service truck, meeting DOT requirements for movement on public roads, will be used for accessing and field maintenance of field located electronics and instruments. The truck will be equipped with covered and secured storage space for carrying small parts and service tools. The truck will include an enclosed cab with HEPA filters and climate control devices. Lights will be provided for night time operations.

Section 14810 Vacuum Trucks

1.0 Two vacuum trucks, meeting DOT requirements for movement on public roads, will be used for removing spilled materials. One vehicle will be dedicated for contaminated materials and second will be for clean materials. Each truck will include an enclosed cab with HEPA filters and climate control devices. Lights will be provided for night time operations.

Section 14820 Street Sweeper

1.0 The street sweeper will be standard equipment with modifications made to the cab. Modifications will include sealing the cab and installing HEPA filters for incoming air.

Section 14830 Containers

1.0 Containers used for the transport of waste materials from and within the ERDF facility will be provided as part of the ER project. Lifting attachments will be located on the top four corners of the container to facilitate lifting by the container handler. The lifting attachments provide a means of locking the lifting mechanism to the container while the container is being lifted. Each container will also be equipped with an end gate that opens over the entire end of the container.

DIVISION 15 - MECHANICAL

Section 15300 Fire Protection

1.0 Ordinary hazard pipe schedule 6 inch wet sprinkler systems (2) designed and installed in accordance with NFPA 13.

2.0 Alarm check valves: 6 inch Reliable.

3.0 Backflow prevention assembly: 8 inch, Ames double-check assembly with OS&Y isolation valves and Potter OSYSU-A supervisory switches.

4.0 OS&Y control valves: Kennedy 6 inch with potter OSYSU-A supervisory switch.

5.0 Fire department connections; 4 inch by 2-1/2 inch by 2-1/2 inch.

6.0 Acceptance testing in accordance with NFPA 13.

7.0 Portable fire extinguisher cabinets installed in accordance with NFPA 10.

Section 15400 Plumbing

A. Plumbing Fixtures

1.0 Water Closet

a. Bowl: Wall hung siphon jet vitreous china closet bowl with elongated rim.
b. Flush valve: Exposed chrome plated, diaphragm type with oscillating handle, escutcheon, bumper, integral screwdriver stop and vacuum breaker.
c. Seat: Five-ply, solid white plastic, open front extended back, less cover, complete with self-sustaining hinge.

2.0 Urinal: Vitreous china wall hung, wash-out urinal with shields, integral trap, integral flushing rim, removable stainless steel strainer.

3.0 Lavatory

a. Lavatory: Self-rimming counter top 19 x 16 inches minimum porcelain on stainless steel lavatory with drillings on 34 inch centers, overflow, seal of putty, caulking, or concealed vinyl gasket.
b. Trim: Chrome-plated combination supply fitting with indirect lift waste, aerator, lever handles, handicap accessible.

4.0 Cabinet shower: 36 by 36 by 75 inch high cabinet with stone texture receptor, soap dish, curtain rod with snap hoods, heavy plastic curtain, and removable chrome plated strainer.

5.0 Kitchen sink

a. Sink: Double-bowl self rimming. Stainless steel with tilting ledge.
b. Trim: Chrome plated.

6.0 Fountain: Surface-mounted electric water cooler with stainless steel top, elevated antisquirt bubbler with stream guard automatic stream regulator, mounting brackets.

7.0 Service or mop sinks:

a. Bowl: 36 by 24 by 10 inch deep, white molded stone, floor mounted sink with 1-inch wide shoulders, stainless steel strainer.
b. Trim: Exposed wall-type supply with cross handles, spout wall brace, vacuum breaker, hose and spout, strainers, eccentric adjustable inlets, integral screwdriver stops with covering caps and adjustable threaded wall flanges, 5 feet of 1/2 inch plain end reinforced rubber hose clamp, and mop hanger.

8.0 Floor drains (FD) size 2 inch with 5 inch polished bronze, J. R.. Smith Manufacturing Co., Figure 210A, inside caulk.

9.0 Potable water piping: Piping for potable cold water, domestic hot water (DHW) and DHW recirculation systems. Service temperature 40°F to 200°F, service pressure 115 psig maximum.

a. Inside building: Type K hard copper with copper alloy solder fittings. Solder, lead free, ASTM B 32, alloy Grade 95TA.
b. Underground, buried: Type K soft copper dielectric fittings when connecting to dissimilar metals.
c. Valves, strainers, and unions: Brass, screwed connections with unions.
d. All flanged connections of equipment, glass filled Teflon gasket, 1/16 inch thick and flange with face to match equipment flange.
e. DHW and DHW recirculation piping insulation: 2-inch thick glass, fiber piping insulation, Manville Micro-Lok with AP jacket.
f. Electric Water Heater (EHW) ADM-EWH-1,3,5: State, Model SB6-40-6-IFE, 40 gallons, 6 kW, 3 elements, 208 volt, 3 phase, 25 gph recovery at 100°F rise.
g. Electric Water Heater (EHW) ADM-EWH-2,4,6: State, Model SB6-82-9-IFE, 82 gallons, 9 kW, 3 elements, 208 volt, 3 phase, 37 gph recovery at 100°F rise.

B. Sanitary Sewer and Sewer Vent

1.0 Above ground 2 inch and smaller

a. Pipe: Schedule 40, galvanized steel, ASTM A 53, Type E or S, Grade B.
b. Joints: Threaded, sealed with sealant tape.
c. Fittings:

1) Waste piping: Black cast iron, ANSI B~~16~~ 12.
2) Vent piping: Class 125, cast iron threaded in accordance with ANSI B16.4.

2.0 Above ground 2-1/2 inch and larger

a. Piping: Hubless cast iron sanitary system in accordance with CISPI 301.
b. Joints: Sealing sleeve with shield and clamp in accordance with CISPI 301.

3.0 Underground all sizes

a. Piping: Service weight cast iron soil pipe in accordance with ASTM A 74.
b. Joints: Hubless cast iron in accordance with UPC, Section 802.
c. Fittings: Service weight cast iron soil fittings in accordance with ASTM A 74.

Section 15493 Chemical Process Piping Systems

1.0 HEPA filter cooling water collection tanks.

2.0 Liquid waste surge tanks.

3.0 Liquid waste monitoring tanks.

4.0 Liquid waste holding tanks.

5.0 Standard sump pumps: Gould Model 3171, sized as required.

6.0 High pressure water pump.

7.0 Breathing air supply: Portable bottle rack units equipped with bottles, 100 foot long hoses to masks, and masks. Portable bottle rack units equipment.

8.0 Shop and instrument air compressors: Tank mounted.

9.0 Liquid chemical storage.

Section 15500 Heating, Ventilating, and Air Conditioning

A. Operations Building Clean Supply System

1.0 Air handling unit: Horizontal draw through custom built unit consisting of mixing box, 30 percent ASHRAE prefilter section, 85 percent ASHRAE final filter section, electric preheating coil, chilled water coil section, adiabatic humidifier section and fan section with variable inlet vanes, 460 volts, 3 phase, 60 Hz.

Return - exhaust fan, Airfoil, belt drive, variable inlet vanes, 460 volts, 3 phase, 60 Hz.

2.0 Exhaust fan: Roof exhaust fan with motorized shut-off damper and prefabricated curb, 208 volts, 1 phase, 60 Hz.

3.0 Electric Unit Heaters: Standard UL listed or FM approved with unit mounted thermostat, 208 volts, 3 phase, 60 Hz.

4.0 Terminal units: Pressure independent fan powered parallel flow electrically controlled variable air volume boxes with electric heating coil, TITUS DMFC-3000 series.

B. Dedicated Shop Supply System

1.0 Air handling unit: Horizontal draw-through custom built unit consisting on mixing box, 30 percent ASHRAE prefilter section, 85 percent ASHRAE final filter section, electric preheating coil and chilled water coil section, adiabatic humidifier section and fan section with variable inlet vanes, 3 phase, 60 Hz.

Return - exhaust fan: Airfoil, belt drive, variable inlet vanes, capacity nominal 22,400 cfm at 1 inch wg static pressure, fan motor 7.5 hp, 460 volts, 3 phase, 60 Hz.

2.0 Exhaust fan: Roof exhaust fan, with motorized shut-off damper and prefabricated curb, 208 volts, 1 phase, 60 Hz.

3.0 Terminal units: Pressure independent fan powered parallel flow electrically controlled variable air volume boxes with electric heating coil.

C. Decontamination Facility Supply System

1.0 Air handling unit: Horizontal draw-through custom built unit consisting on mixing box, 30 percent ASHRAE prefilter section, 85 percent ASHRAE final filter section, electric preheating coil and chilled water coil section, adiabatic humidifier section and fan section with variable inlet vanes, 3 phase, 60 Hz.

Return - exhaust fan: Airfoil, belt drive, variable inlet vanes, capacity nominal 22,400 cfm at 1 inch wg static pressure, fan motor 7.5 hp, 460 volts, 3 phase, 60 Hz.

2.0 Exhaust fan: Roof exhaust fan, with motorized shut-off damper and prefabricated curb, 208 volts, 1 phase, 60 Hz.

3.0 Terminal units: Pressure independent fan powered parallel flow electrically controlled variable air volume boxes with electric heating coil.

D. Miscellaneous: The following components and requirements apply to all HVAC systems located in the building.

1.0 Return Grilles: Steel, one set of blades parallel to the long dimensions with AG-15 opposed blade damper.

2.0 Supply diffusers: Heavy gauge steel back pan, steel perforated face with standard white finish.

3.0 Supply and return air ductwork: ASTM A 527 galvanized steel, fabricated in accordance with SMACNA HVAC Duct Construction Standard Metal and Flexible.

4.0 Flexible duct: Class I air duct in accordance with UL 181, wiremold, Type wg.

5.0 Duct thermal insulation: For outside air duct, supply air, return air, semirigid insulation for indoor duct Owens Corning Fiberglass Industrial Insulation, 700 series, Type 703 FRK. Two inch minimum thickness, 3 lbs/ft^2 density with foil reinforced craft facing vapor barrier.

6.0 Duct acoustic insulation: Supply air ductwork down stream of the fan will be lined with rigid glass acoustic duct insulation, Aeroflex fiberglass duct liner Type 150, 1 inch thick with vinyl face on the air stream, for a distance of 25 feet.

7.0 Fire damper: 1-1/2 hour fire resistance rating, UL listed, factory sleeve, Air Balance Inc. 119 ALX.

8.0 Penetration seals: For all ductwork and piping penetrations through walls, fire barriers, floors, and roof; seal with Bisco SF-20 or equal and maintain the same fire rating as the barrier penetration.

E. Chilled Water Cooling Systems and Condenser Water System

1.0 Chilled water and condenser water piping.

a. Pipe 1/2 inch and larger: Carbon steel, Schedule 40, ASTM A 53, Type E or S, Grade B or ASTM A 106, Grade B, seamless.

b. Fittings for pipe 1-1/2 inches and smaller: Class 150, malleable iron, threaded, ANSI B16.3.

c. Fittings for pipe 2 inches and larger: Wrought steel, ASTM A 234, Grade WPB, wall thickness to match pipe butt welding, ANSI B16.9.

d. Flanges 2 inches and larger: Class 150, ASTM A 105; raised face, welding neck or slip on ANSI B16.5; bore to match pipe interior diameter.

e. Bolting: Carbon steel, heavy hex series bolts, ASTM A 307, Grade B; heavy hex nuts, ASTM A 563, Grade A.

f. Gaskets: Glass-filled Teflon, 1/16 inch thick.

g. Valves 1-1/2 inches and smaller: Class 150, bronze body threaded ends.

h. Valves 2 inches and larger: Class 150, bronze or cast iron body, flanged ends.

i. Insulation for indoor piping: 2 inches thick, Manville Micro-Lok fiberglass pipe insulation with AP jacket.

j. Insulation for outdoor piping: 2 inch thick, Manville Micro-Lok fiberglass pipe insulation with metal jacket.

k. Air separator: B & G Rofairtrol Model RL-4.

l. Backflow preventers: Comply with WAC-248-54-285.

F. Chilled Water Systems

1.0 Chillers: ADM-CHL-1 and ADM-CHL-2, Dunham-Bush Inc., Model HWSC-110-A packaged chiller (to 50 percent capacity each), each to cool 240 gpm of water from 55°F to 45°F, condenser water leaving 90°F capacity 100 tons; with automatic controls, safety controls and control panel.

2.0 Chilled water pumps: ADM-CHW-P1 and ADM-CHW-P2, Gould's Model 3410, S-4X6-11 horizontal, centrifugal, end suction, direct drive. Capacity each pump 480 gpm at 100 feet water head, motor 20 hp, 1,150 rpm, 460 volts, 3 phase, 60 Hz.

3.0 Compression tank: ADM-TK-1, capacity - 60 gallons.

G. Condenser Water System Equipment

1.0 Packaged cooling tower: ADM-TWR-1, Baltimore Air Coil Closed Circuit, Series V, Model No. F-1482-N. The tower is sized to handle full water gpm requirements for both the chillers and cool 600 gpm of water from 90°F entering water temperature down to 80°F leaving water temperature. The tower will be a complete package with circulating water spray pump assembly, forced draft fans, galvanized steel water pan, coil section corrosion protected, and capable of being freely drained by gravity flow.

2.0 Condenser Water Treatment System: ADM-PFS-1, chemical feed system consisting of a Polymer Feed System (PFS) train capable of providing 5 gph of a chemical polymer feed solution to the cooling tower, a 50 gallon mixing tank, a metering pump at 5 gph capacity, necessary automatic controls package and mounted on a skid package installed outdoors by the cooling tower. System will have one mixer located at the cooling tower. The system will be entirely corrosion proof and EPA approved.

3.0 Condenser Water System Compression Tank: ADM-TK-2, complete with piping and instrument connections and air separator device. Capacity to 60 gallons.

4.0 Condenser Water Pumps: ADM-CS-P1 and ADM-CS-P2, Gould's Co., Model 3410-S-4X6-11 horizontal, centrifugal, end suction , direct drive. Capacity 600 gpm at 80 feet water head, motor 20 hp, 1,150 rpm, 460 volts, 3 phase, 60 Hz.

DIVISION 16 - ELECTRICAL

Section 16300 High Voltage Distribution (Above 600 Volts)

1.0 13.8 kV aerial line conductors: 3-#4 ACSR.

2.0 Lightning arresters: Distribution, valve type, rated 15 kV, 95% BIL.

3.0 Distribution cutouts: Open, fused, heavy duty.

4.0 Poles: Class 2, butt-treated western red cedar.

5.0 Underground duct: Concrete-encased rigid steel conduit, 24 inch minimum burying depth under street.

6.0 Underground cable: #2 AWG, 15 kV-rated, shielded, EPR-insulated copper conductors.

7.0 Transformers: Outdoor, pad-mounted, dry-type, 13.8 kV, 480Y/277V ac, fusible load break switch on primary, surge arresters on primary, provisions for adding fan cooling package.

Section 16300 Medium Voltage Distribution

1.0 Cable: 15 kilovolt underground residential distribution (URD) single conductor, annealed copper, No. 4/0 AWG, Class B compressed strand, 220 mil ethylene-propylene-rubber, 1/3 sized copper concentric neutral embedded in a thermosetting jacket.

2.0 Separable insulated connectors: 15 kilovolt elbow connector; load break 200 ampere for No. 4/0 AWG.

3.0 Conduit for encasement into duct banks: PVC Schedule 80.

4.0 Pad-mounted sectionalizing cabinet: Metal enclosure with separable insulated connector cable junction.

5.0 Pad-mounted transformer: Less-flammable liquid insulated self-cooled, compartmental-type, for use with separable high voltage connectors, bayonet-type fault and overload sensing primary fuses for use on loop feed systems and with provision for secondary busway connection.

6.0 Pad-mounted transformer and sectionalizing cabinet lightning arrester: Premolded rubber elbow, metal oxide varistor type, 10.2 kilovolt rated.

Section 16400 Service and Distribution

1.0 Conduit for encasement into duct banks: PVC Schedule 80.

2.0 Conduit for encasement into duct banks under roadway: Rigid steel.

3.0 Exposed conduit: Rigid steel.

4.0 Buried conduit: PVC-coated galvanized rigid steel.

5.0 Concealed conduit: Electrical metallic tubing.

6.0 Power conductors: 600 volt, Type XHHW, or THWN/THHN copper.

7.0 Transformer: Dry type, single phase, meeting the requirements of NEMA ST 20.

8.0 Panelboards: Surface mounting, circuit breaker type full rated, conforming to FS -P-115W and NEMA PB 1, 25,000 AIC minimum for 40 volt panelboards. A 22,000 AIC minimum for all 240 and 208 volt panelboards will be used as a design basis.

9.0 Interior Lighting Fixtures:

a. Fluorescent, recessed, 2 by 4 foot, parabolic, 18 cells, with two or three 34 watt lamps.
b. Fluorescent, recessed, 2 by 4 foot, refractive grid, with two, three, or four 34 watt lamps.
c. Incandescent, recessed, 150 watt PAR flood lamp.
d. Incandescent, wall mounted, 200 watt lamp with diffuser.
e. Fluorescent fixture low wattage ballasts.
f. Fixture fittings and parts for installation.
g. Fluorescent, industrial type, ceiling hung.

10.0 Exterior Lighting Fixtures:

a. Incandescent, recessed soffit mounted, 150 watt lamp, photocell control.
b. Low-pressure sodium light, wall and pole mounted, photocell control.
c. Incandescent, ground lighting for complex sign, 150 watt lamps, photocell control.

11.0 Grounding:

a. Grounded service and derived systems neutrals.
b. Building ground grid system.

12.0 Receptacles:

a. Convenience, 120 Vac NEMA configuration 5-20R.
b. Special purpose, 250 Vac NEMA configuration 13-15R.
c. Special purpose, 125/250 Vac NEMA configuration 14-15R.

13.0 Toggle switch: 20 A, 277 Vac.

14.0 Manholes

a. Power: Prefabricated 9 ft by 5 ft by 6 ft deep.
b. Communications: Prefabricated 9 ft by 5 ft by 6 ft deep.

15.0 Distribution switchboards: Free standing metal enclosed, for front access only, conforming to UL 891, and will be US labeled "Suitable for use as Service Equipment." The main breaker will be an insulated frame breaker with solid state trip device with long time, short time, instantaneous, and ground fault trips. There will be current and potential transformers ahead of the main breaker for remote energy metering. The distribution section will consist of panel mounted molded case circuit breakers. The bus rating and number and size of breakers are shown on the one-line diagrams. The switchboards will have minimum bus bracing and interrupting rating of all circuit breakers of 30,000 A.

16.0 Motor control centers: Totally enclosed, dead front, free-standing, front access only, conforming to NEMA ICS-2 and UL 845. The bus and device ratings are shown on the one-line diagrams. The minimum bus bracing and interrupting rating of the circuit breakers will be 30,000 A.

17.0 Distribution panelboard: Surface mounting, circuit breaker type, conforming to FS W-P-115 and NEMA PB 1, 14,000 AIC minimum.

18.0 Starters: Full voltage, non-reversing, 600 Vac, enclosed combination type with magnetic breaker. Breaker size, and starter size are shown on one-line diagram.

Section 16740 Voice and Data Systems

NOTE: Brand names and part numbers in items 2 through 5 are to match existing equipment brand names and part numbers. All other items are typical products.

1.0 General

a. Exposed conduit: Rigid galvanized steel, ANSI C 80.1.
b. Conduits below grade: PVC coated rigid steel, NEMA RN1, or concrete encased PVC conduit schedule 80, FS W-C-1094, TYPE II.
c. Conduit concealed in ceilings or walls: Electrical metallic typing (EMT), UL 797. FoDuct No. PE-5004 by Innerduct.

2.0 Signal Distribution

a. Backboard: 4 foot by 8 foot by 1/2 inch fire retardant plywood.
b. Cross connect with protectors: Krone blocks 8 positions, set of 50.
c. Panel: Fiber optic distribution panel, Telect No. 15-2330-0100 and Telect No. 15-0949-M619.
d. Equipment rack: Electrorack No. 115-069 Rev. C.

3.0 HLAN System

a. Fiber optic transceiver ODS 234 and ODS 232.
b. Buffer repeater: Hanford Computer Store No. 426.
c. Multiport: Hanford Computer Store No. 273.
d. Fiber optic jumper cables: Telect No. 504-0909-003.
e. Fiber optic splices: Norland Elastomeric Model 2125.

4.0 Cables

a. Fiber optic exterior: 24 multimode gel filled; kelvar strength members for aerial and underground 62.5/125 micron, Anixer No. 370-047-62125WP-02.
b. Fiber optic interior: 2 multimode; tight buffered Plenum cable, 62.2/125 micron, Anixer No. 370-047-62125WP-02.
c. Telephone external: 25 pair, 24 AWG, PIC, gel filled with corrugated copper shield, solid conductor, Anixer No. E-002524DPI.
d. Telephone Interior: 4 pair, 24 AWG, CMP, Plenum rated PIC, solid conductor, Anixer No. CMP-00424HAC.
e. Ethernet cable: Teflon 50 ohm, Belden No. 89880.
f. Transceiver Cable: 20 AWG, 4 pair Teflon, Belden 89892.
g. Connectors, 15 pin D-SUB:

1) Male plug: Anixter No. 081425.
2) Female Socket: Anixter No. 081424.
3) Male body: AMP No. 205205-1.
4) Female body: AMP No. 205205-1.
5) Pins: AMP No. 66506-3.
6) Socket: AMP No. 66504-3.

5.0 Terminations AMP Universal Wiring System

a. Shield installation kit Anixer No. P2-AC0-40.
b. RJ-11 jack AMP No. 555611-1.

Section 16720 Alarm and Detection System

1.0 Local Energy Alarm Control Panel: Alarm control panel will have programmable modules, auxiliary relays, and 60 hours of standby power, Pyrotonics System 3.

2.0 Radio Fire Alarm Reporter: Furnished by government. Project to supply replacement.

3.0 Manual Pull Stations: Double action.

4.0 Alarm Devices: Must be compatible with fire alarm control panel.

5.0 Fire Alarm Strobe/Chimes: Single stroke.

6.0 Water Flow Alarm Switch: Tamper resistant with retard.

7.0 Post Indicator Valve Switch: Tamper resistant with 2 sets of SPDT contacts.

8.0 HEPA filter water spray system control panel: System with modules as required, 120 hours standby battery power supply, approximately 40 ampere hours.

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Appendix F
Conceptual Project Schedule

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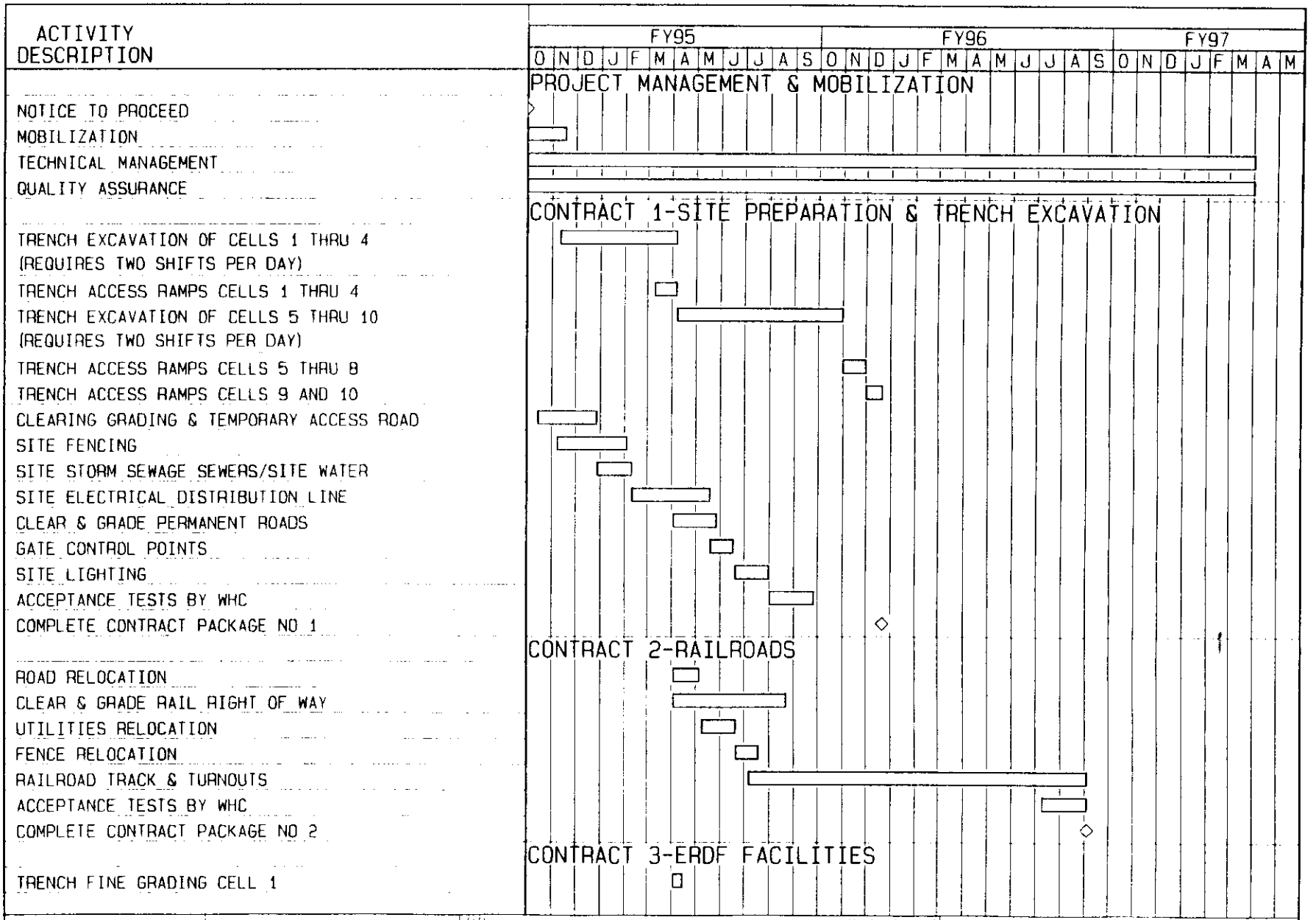

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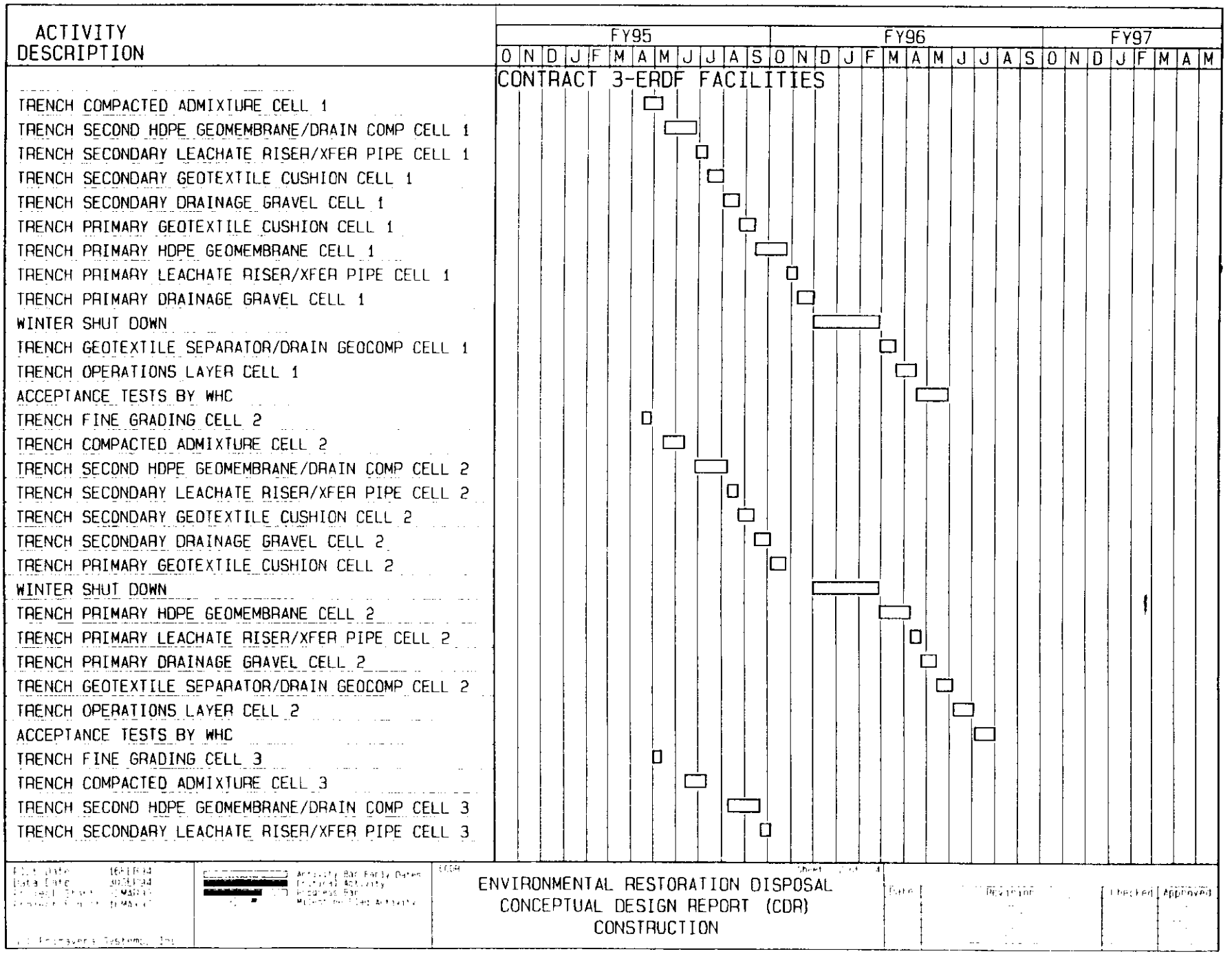
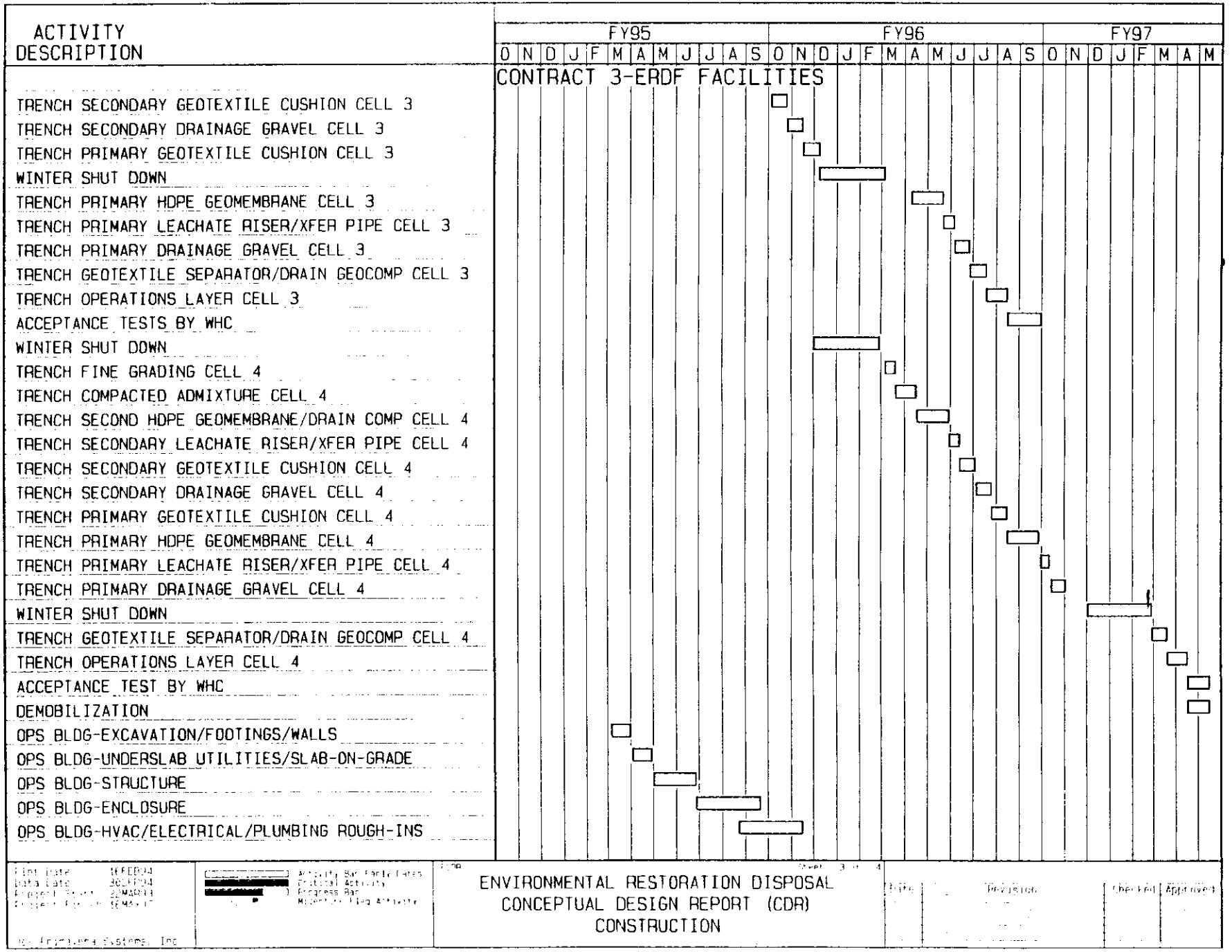
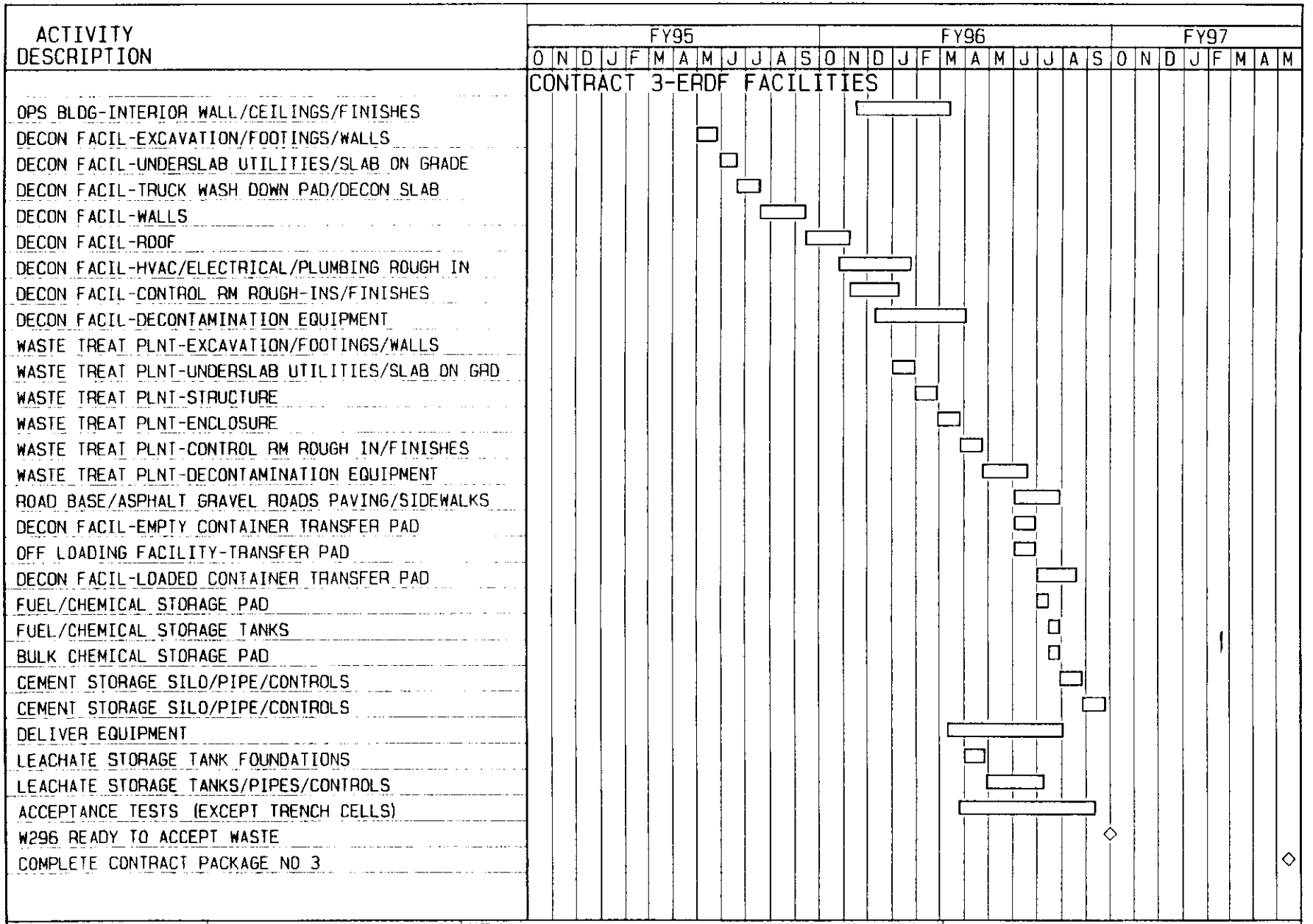

ACTIVITY DESCRIPTION
FY95
FY96
FY97
O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M
CONTRACT 3-ERDF FACILITIES
TRENCH COMPACTED ADMIXTURE CELL 1
TRENCH SECOND HDPE GEOMEMBRANE/DRAIN COMP CELL 1
TRENCH SECONDARY LEACHATE RISER/XFER PIPE CELL 1
TRENCH SECONDARY GEOTEXTILE CUSHION CELL 1
TRENCH SECONDARY DRAINAGE GRAVEL CELL 1
TRENCH PRIMARY GEOTEXTILE CUSHION CELL 1
TRENCH PRIMARY HDPE GEOMEMBRANE CELL 1
TRENCH PRIMARY LEACHATE RISER/XFER PIPE CELL 1
TRENCH PRIMARY DRAINAGE GRAVEL CELL 1
WINTER SHUT DOWN
TRENCH GEOTEXTILE SEPARATOR/DRAIN GEOCOMP CELL 1
TRENCH OPERATIONS LAYER CELL 1
ACCEPTANCE TESTS BY WHC
TRENCH FINE GRADING CELL 2
TRENCH COMPACTED ADMIXTURE CELL 2
TRENCH SECOND HDPE GEOMEMBRANE/DRAIN COMP CELL 2
TRENCH SECONDARY LEACHATE RISER/XFER PIPE CELL 2
TRENCH SECONDARY GEOTEXTILE CUSHION CELL 2
TRENCH SECONDARY DRAINAGE GRAVEL CELL 2
TRENCH PRIMARY GEOTEXTILE CUSHION CELL 2
WINTER SHUT DOWN
TRENCH PRIMARY HDPE GEOMEMBRANE CELL 2
TRENCH PRIMARY LEACHATE RISER/XFER PIPE CELL 2
TRENCH PRIMARY DRAINAGE GRAVEL CELL 2
TRENCH GEOTEXTILE SEPARATOR/DRAIN GEOCOMP CELL 2
TRENCH OPERATIONS LAYER CELL 2
ACCEPTANCE TESTS BY WHC
TRENCH FINE GRADING CELL 3
TRENCH COMPACTED ADMIXTURE CELL 3
TRENCH SECOND HDPE GEOMEMBRANE/DRAIN COMP CELL 3
TRENCH SECONDARY LEACHATE RISER/XFER PIPE CELL 3
ENVIRONMENTAL RESTORATION DISPOSAL
CONCEPTUAL DESIGN REPORT (CDR)
CONSTRUCTION
Date
Revision
Checked
Approved

9513333.2289




ACTIVITY DESCRIPTION
FY95
FY96
FY97
O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M
CONTRACT 3-ERDF FACILITIES
OPS BLDG-INTERIOR WALL/CEILINGS/FINISHES
DECON FACIL-EXCAVATION/FOOTINGS/WALLS
DECON FACIL-UNDERSLAB UTILITIES/SLAB ON GRADE
DECON FACIL-TRUCK WASH DOWN PAD/DECON SLAB
DECON FACIL-WALLS
DECON FACIL-ROOF
DECON FACIL-HVAC/ELECTRICAL/PLUMBING ROUGH IN
DECON FACIL-CONTROL RM ROUGH-INS/FINISHES
DECON FACIL-DECONTAMINATION EQUIPMENT
WASTE TREAT PLNT-EXCAVATION/FOOTINGS/WALLS
WASTE TREAT PLNT-UNDERSLAB UTILITIES/SLAB ON GRD
WASTE TREAT PLNT-STRUCTURE
WASTE TREAT PLNT-ENCLOSURE
WASTE TREAT PLNT-CONTROL RM ROUGH IN/FINISHES
WASTE TREAT PLNT-DECONTAMINATION EQUIPMENT
ROAD BASE/ASPHALT GRAVEL ROADS PAVING/SIDEWALKS
DECON FACIL-EMPTY CONTAINER TRANSFER PAD
OFF LOADING FACILITY-TRANSFER PAD
DECON FACIL-LOADED CONTAINER TRANSFER PAD
FUEL/CHEMICAL STORAGE PAD
FUEL/CHEMICAL STORAGE TANKS
BULK CHEMICAL STORAGE PAD
CEMENT STORAGE SILO/PIPE/CONTROLS
CEMENT STORAGE SILO/PIPE/CONTROLS
DELIVER EQUIPMENT
LEACHATE STORAGE TANK FOUNDATIONS
LEACHATE STORAGE TANKS/PIPES/CONTROLS
ACCEPTANCE TESTS (EXCEPT TRENCH CELLS)
W296 READY TO ACCEPT WASTE
COMPLETE CONTRACT PACKAGE NO 3
Plot Date 16FEB94
Data Date 30SEP94
Project Start 22MAR93
Project Finish 16MAY97
Activity Bar Early Date
Critical Activity
Progress Bar
Milestone Flag Activity
CDR
Sheet 4 of 4
ENVIRONMENTAL RESTORATION DISPOSAL
CONCEPTUAL DESIGN REPORT (CDR)
CONSTRUCTION
Date
Revision
Checked
Approved
(c) Primavera Systems, Inc

Appendix G
Engineering Sketches

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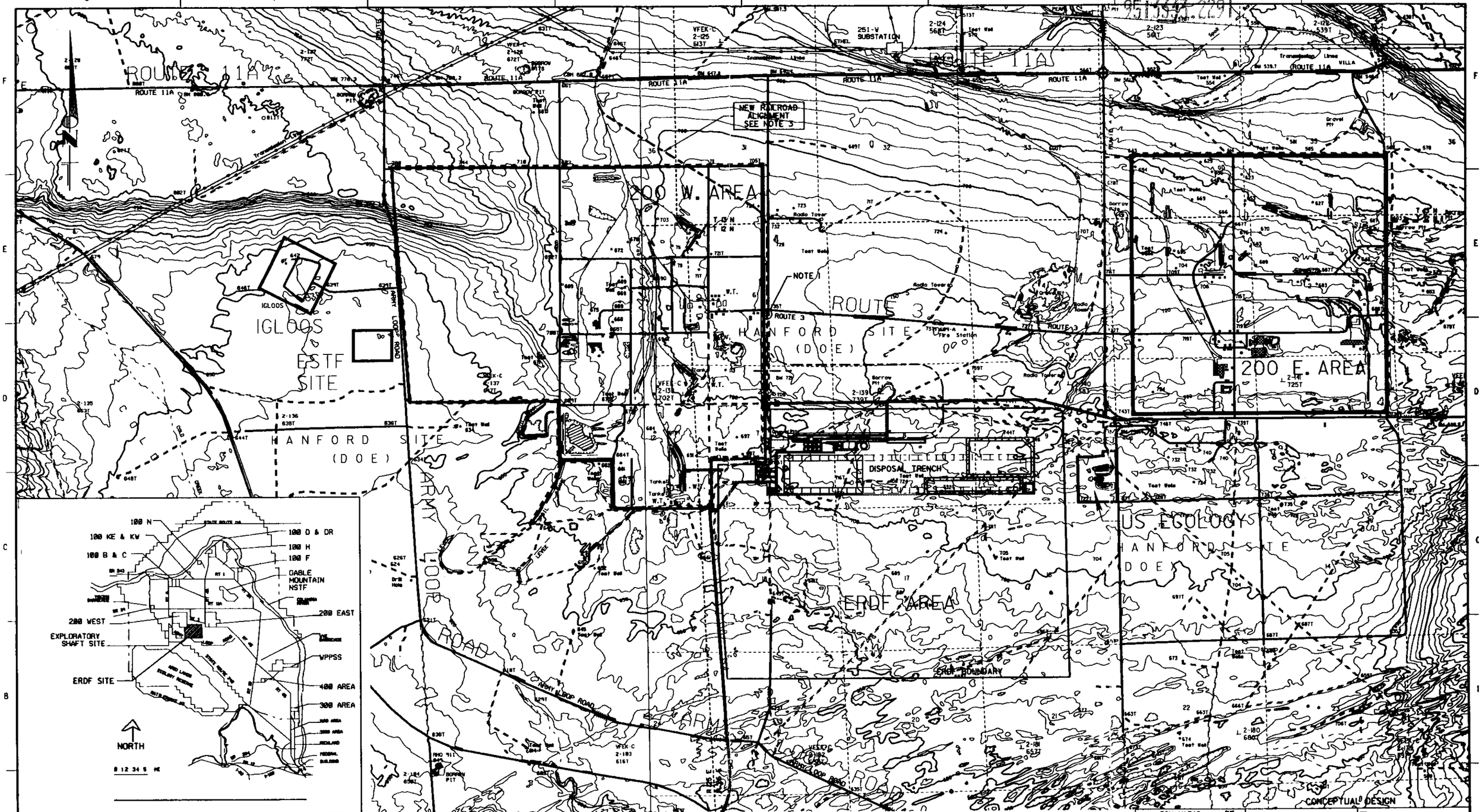

NOTES:

1. RELOCATE ABOVE GRADE STEAM LINE FOR RAILROAD INSTALLATION.
2. TOPOGRAPHY IS SHOWN IN FEET ABOVE SEA LEVEL
3. INSTALL NEW ROAD AND FENCE ON SOUTH SIDE OF RAILROAD. DEMOLISH EXISTING FENCE NORTH OF RAILROAD.

METERS 0 500 1000 2000

FEET 0 1000 2000 4000 6000

DESIGNED TOM NARAD
DRAWN DON SPENCER
CHECKED LARRY BENNETT

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Prepared for: U.S. ARMY CORPS OF ENGINEERS, Walla Walla District
By: MONTGOMERY WATSON

OVERALL SITE PLAN

D ES-296-01

SCALE AS SHOWN

PLOT SCALE:

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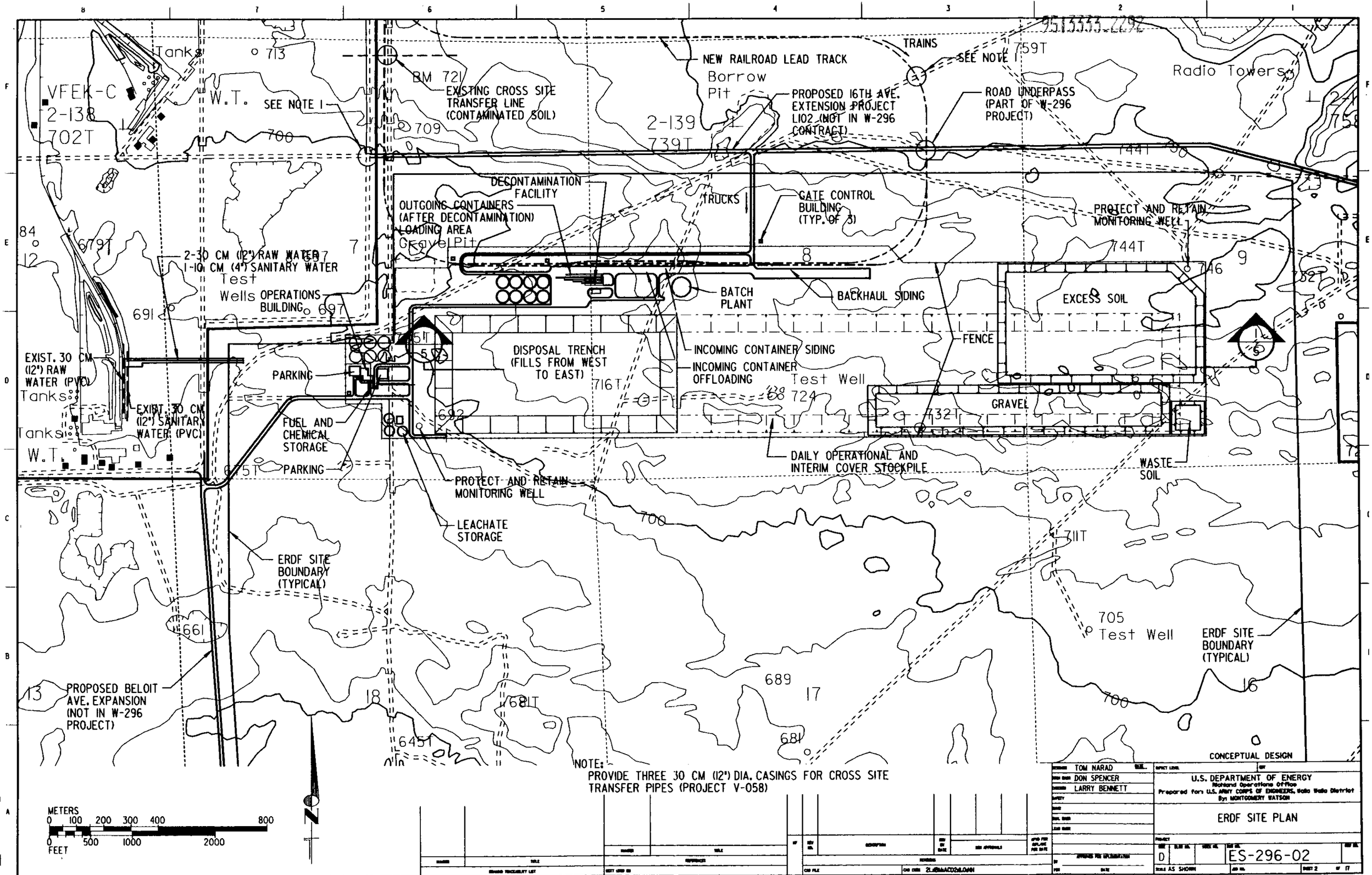

NOTE:
PROVIDE THREE 30 CM (12") DIA. CASINGS FOR CROSS SITE TRANSFER PIPES (PROJECT V-058)

TOM NARAD
DON SPENCER
LARRY BENNETT

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Prepared for: U.S. ARMY CORPS OF ENGINEERS, Walla Walla District
By: MONTGOMERY WATSON

ERDF SITE PLAN

D
ES-296-02
SCALE AS SHOWN
SHEET 2 OF 17

PLOT SCALE: 2

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Test Wells

697

691

POTENTIALLY CONTAMINATED RUNOFF STORAGE TANKS

Gravel Pit

DECON FACILITY

DRAIN FIELD

GROUT BATCH PLANT W/TRUCK WASHDOWN PAD AND LEAK COLLECTION LINER SYSTEM

OPERATIONS BUILDING

PK

716T

692

DRAIN FIELD

FUEL AND CHEMICAL STORAGE

CLEAN RUNOFF STORAGE AREAS

OUTLET STRUCTURES

615T

LEACHATE STORAGE

METERS 0 50 100 150 200 400

FEET 0 250 500 1000

LEGEND

- CLEAN RUNOFF AREA- METERED RELEASE
- POTENTIALLY CONTAMINATED RUNOFF AREA
- PK PARKING LOT
- LEACHATE LINE
- RUNOFF NOT DETAINED

CONCEPTUAL DESIGN

TOM NARAD
PAM ANKRUM
LARRY BENNETT

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Richland Operations Office
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By: MONTGOMERY WATSON

ERDF SITE
STORM DRAINAGE PLAN

D ES-296-03

SCALE AS SHOWN

SHEET 3 OF 17

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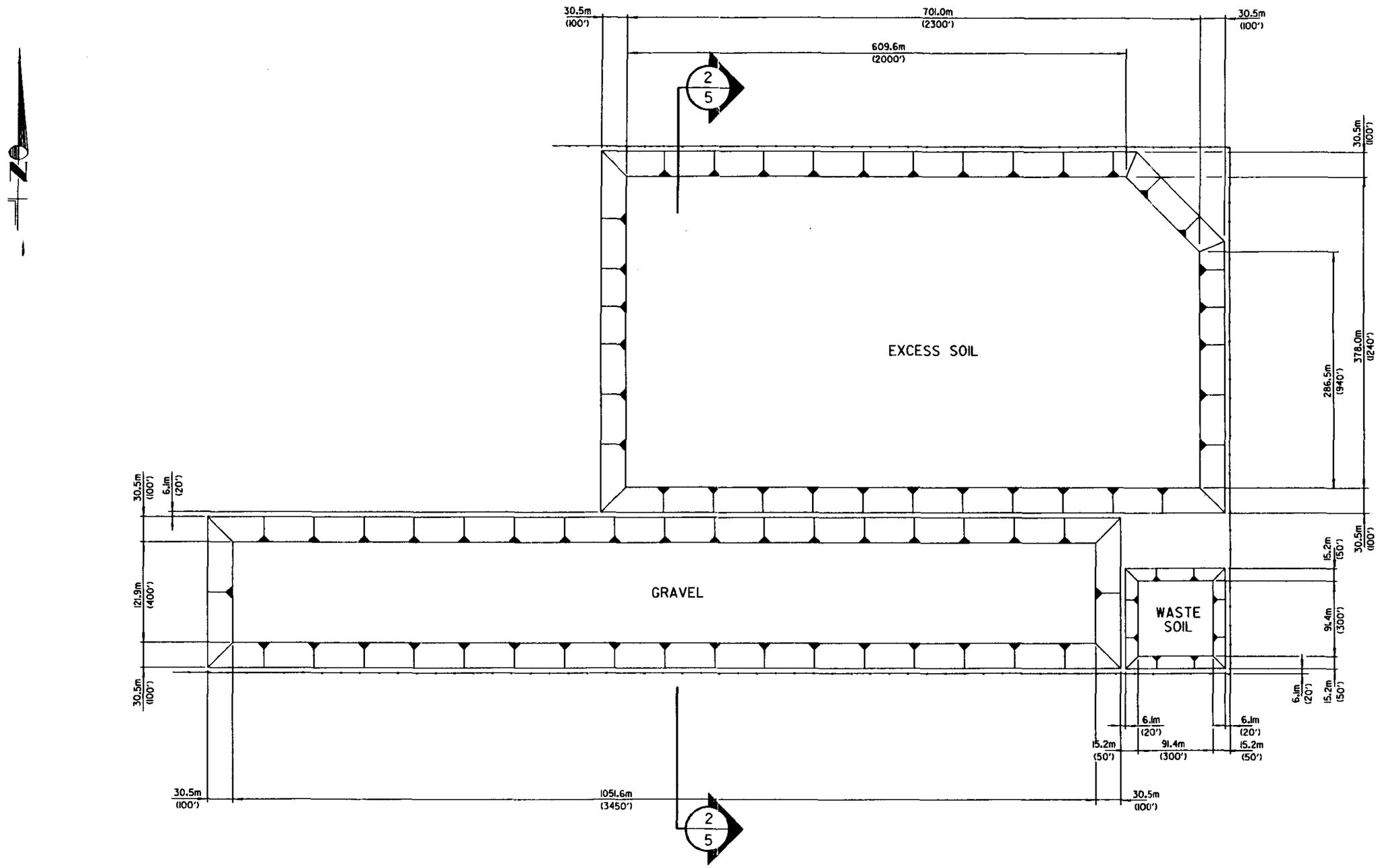

WASTE SPOILS PILES PLAN

METERS 0 60 120
0 100' 200' 400'
FEET

CONCEPTUAL DESIGN

TOM NARAD
LARRY BENNETT
LARRY BENNETT

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Richland Operations Office
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By: MONTGOMERY WATSON

ERDF SITE
WASTE SPOILS PILES PLANS

D | ES-296-04

SCALE AS SHOWN | SHEET 4 OF 17

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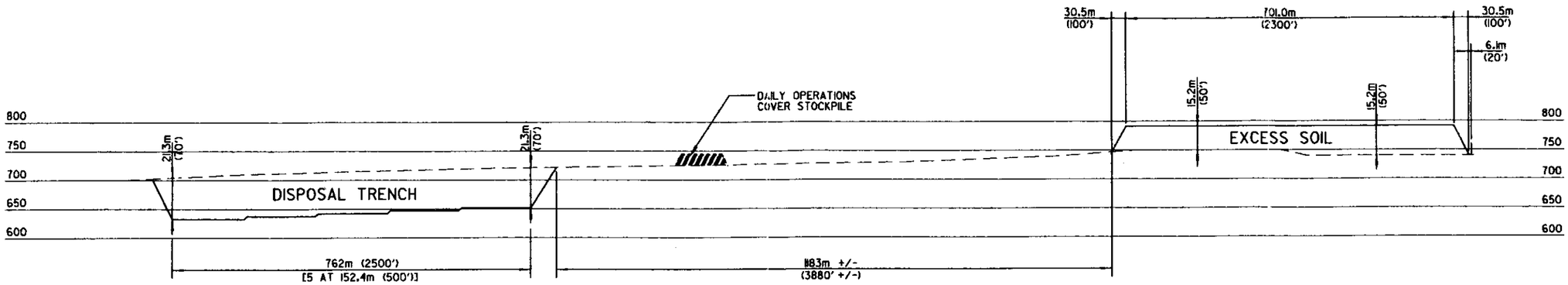
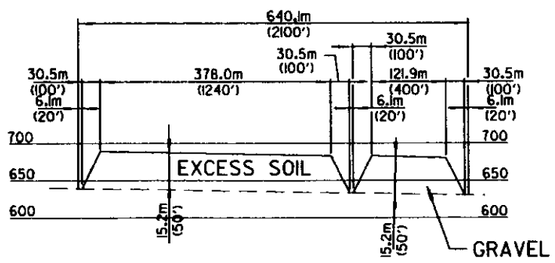


NOTE:
ELEVATIONS ARE IN FEET.

SECTION 1/2

HORIZ: METERS 0 120 240 — FEET 0 200' 400' 800'

VERT: METERS 0 30 60 — FEET 0 50' 100' 200'



NOTE:
ELEVATIONS ARE IN FEET.

SECTION 2/4

HORIZ: METERS 0 120 240 — FEET 0 200' 400' 800'

VERT: METERS 0 30 60 — FEET 0 50' 100' 200'

CONCEPTUAL DESIGN

DESIGNED TOM NARAD
DRAWN LARRY BENNETT
CHECKED LARRY BENNETT

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Prepared for: U.S. ARMY CORPS OF ENGINEERS, Walla Walla District
By: MONTGOMERY WATSON

ERDF SITE
WASTE SPOILS PILES SECTIONS

SIZE D — DWG NO. ES-296-05

SCALE AS SHOWN — SHEET 5 OF 17

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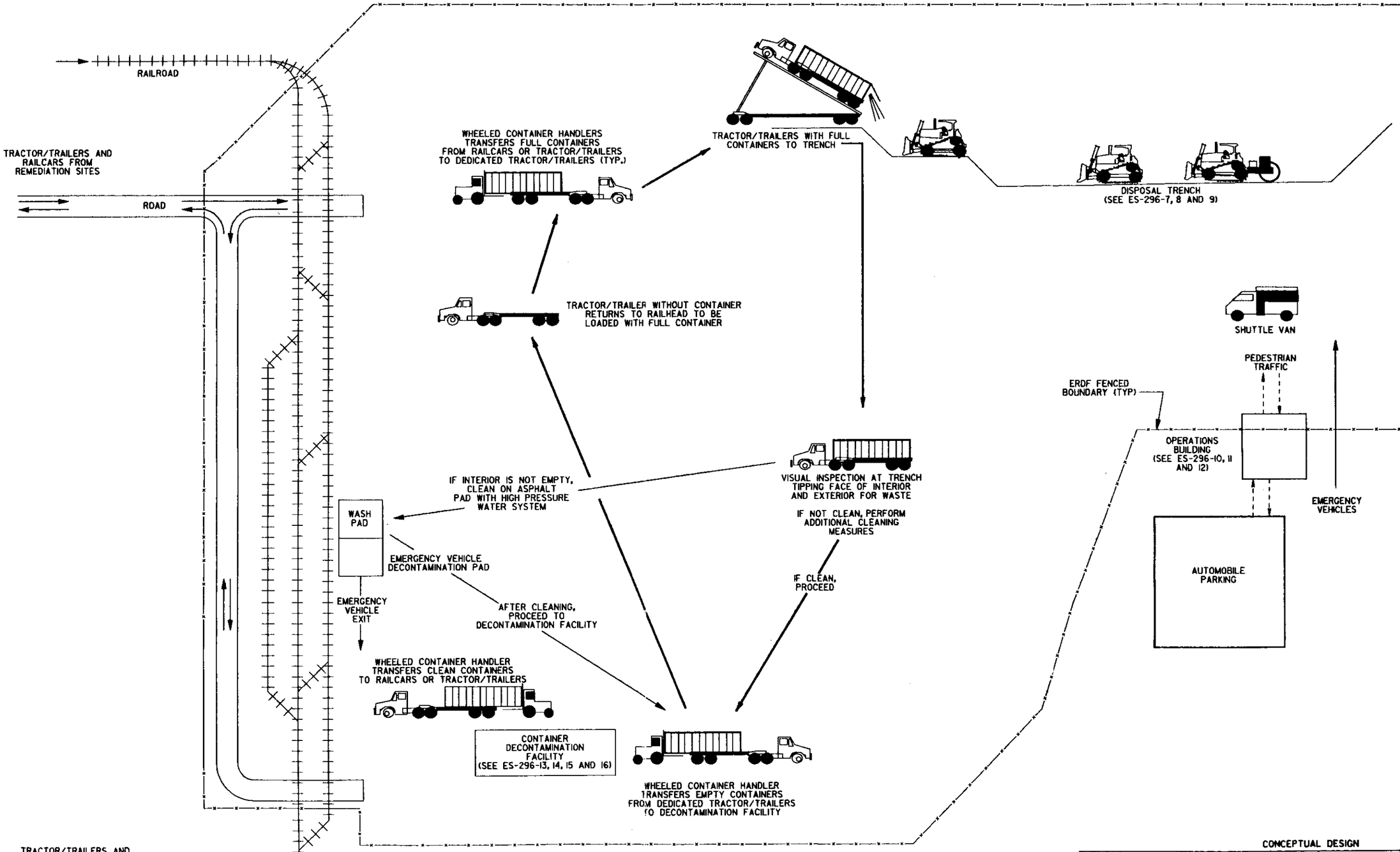

CONCEPTUAL DESIGN

TOM NARAD
LARRY BENNETT
AL ANDERSON

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By: MONTGOMERY WATSON

OVERALL ERDF PROCESS FLOW DIAGRAM

D ES-296-06

SCALE NONE

SHEET 6 OF 17

PLOT SCALE:

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891 m (2922 ft)

INITIAL EXCAVATION (CELLS 1, 2, 3, AND 4) — PHASE 2 EXCAVATION

30 m (100 ft)

INITIAL LINING (CELLS 1, 2, AND 3) — PHASE 2 LINING (CELLS 4, 5, AND 6) — PHASE 3 LINING (CELLS 7 AND 8) — PHASE 4 LINING (CELLS 9 AND 10)

ACCESS RAMP (TYP.)

433 m (1420 ft)

152 m (500 ft) (TYP.)

CELL 1 — CELL 2 — CELL 3 — CELL 4 — CELL 5 — CELL 6 — CELL 7 — CELL 8 — CELL 9 — CELL 10

3H:1V — 1.5H:1V — 1 % — 2 %

TEMPORARY LINER TERMINATION (TYP.) SEE 3/7

FUTURE TRENCH EXPANSION (AS REQUIRED)

TO LEACHATE STORAGE FACILITY SEE 4/-

LEACHATE COLLECTION CELL (TYP.)

152 m (500 ft) (TYP.)

30 m (100 ft) (TYP.)

SIDESLOPE RISER PIPES, 2 EACH CELL (TYP.)

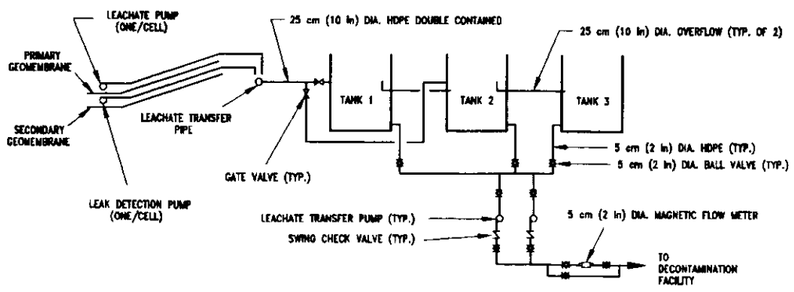
25 cm (10 in) HDPE LEACHATE GRAVITY PIPE (TYP.)

PUMP CONTROL ENCLOSURE (TYP.)

N

0 90 180 METERS

0 300 600 FEET



4/- LEACHATE COLLECTION\TRANSPORT\STORAGE DIAGRAM

NOT TO SCALE

NOTES

1. ACTUAL CELL FLOOR SLOPES MAY VARY SLIGHTLY FROM THOSE SHOWN TO ACCOMMODATE RISE IN TRENCH ELEVATION FROM WEST TO EAST.

CONCEPTUAL DESIGN

DESIGN ENGR Frank S. Shuri

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Prepared for: U.S. ARMY CORPS OF ENGINEERS, Walla Walla District
By: MONTGOMERY WATSON

AREA FILL TRENCH LAYOUT

PROJECT ENVIRONMENTAL RESTORATION DISPOSAL FACILITY

SIZE D — DWG NO. ES-296-07 — REV NO. 0

SCALE AS SHOWN — SHEET 7 OF

PLOT SCALE: 2

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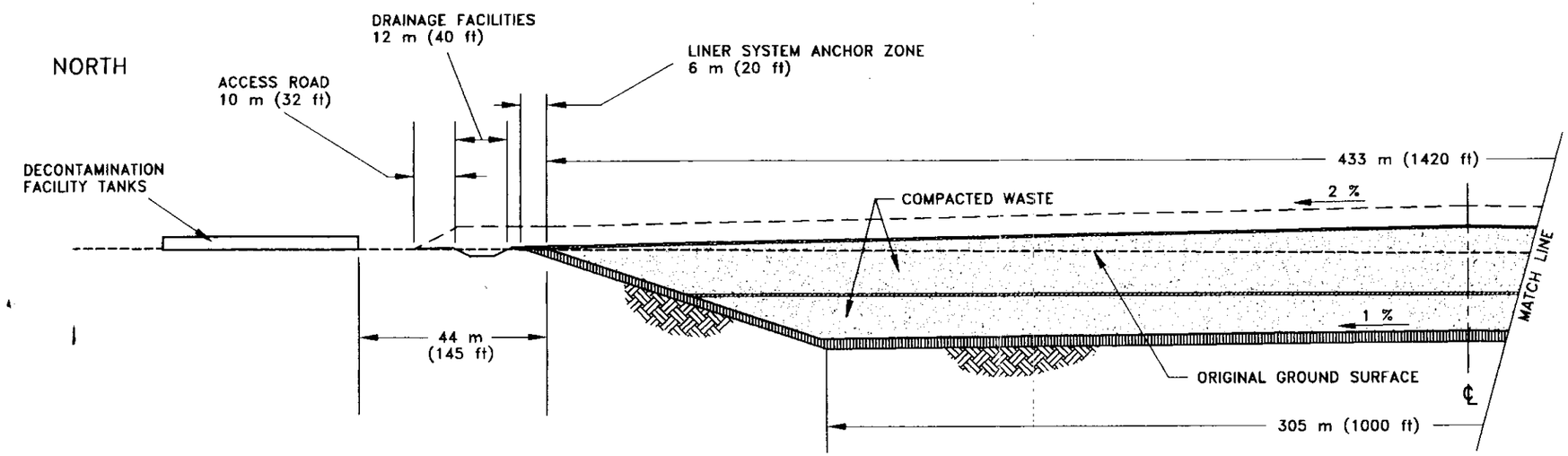
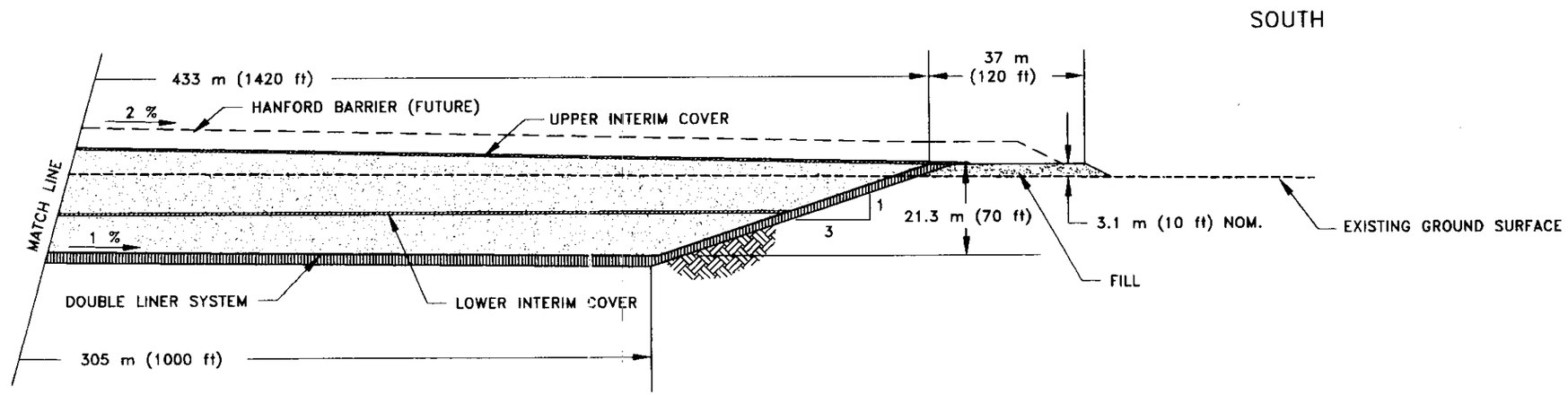


NOTES

1. HANFORD BARRIER NOT PART OF PROJECT W-296.



A
5

TRENCH SECTION

0 30 60 METERS
0 100 200 FEET

CONCEPTUAL DESIGN

Frank S. Shuri

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
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By: MONTGOMERY WATSON

AREA FILL TRENCH CROSS SECTION

ENVIRONMENTAL RESTORATION DISPOSAL FACILITY

D ES-296-08 0

SCALE AS SHOWN SHEET 8

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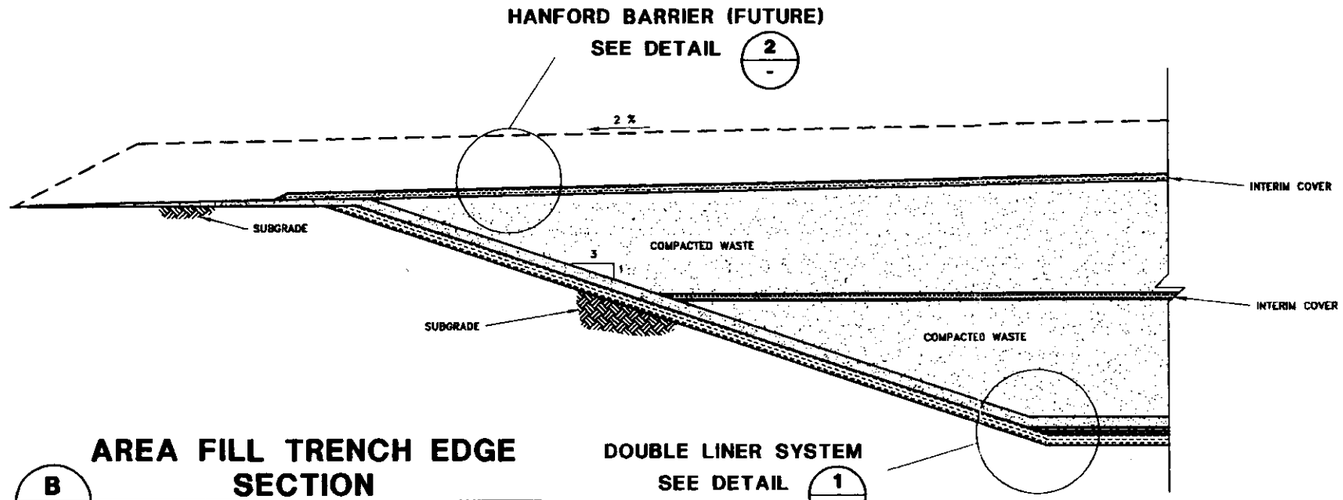
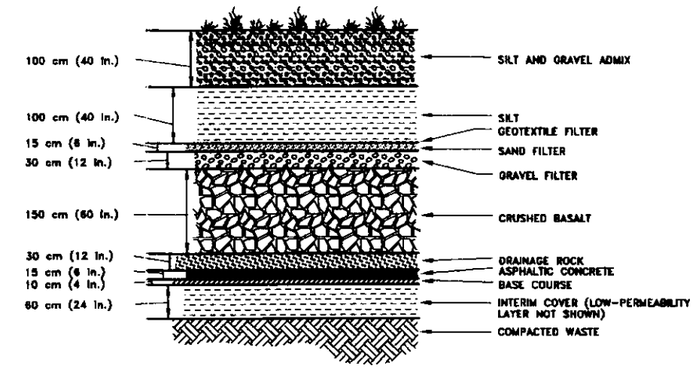


AREA FILL TRENCH EDGE SECTION

B/5

0 12 24 METERS
0 40 80 FEET

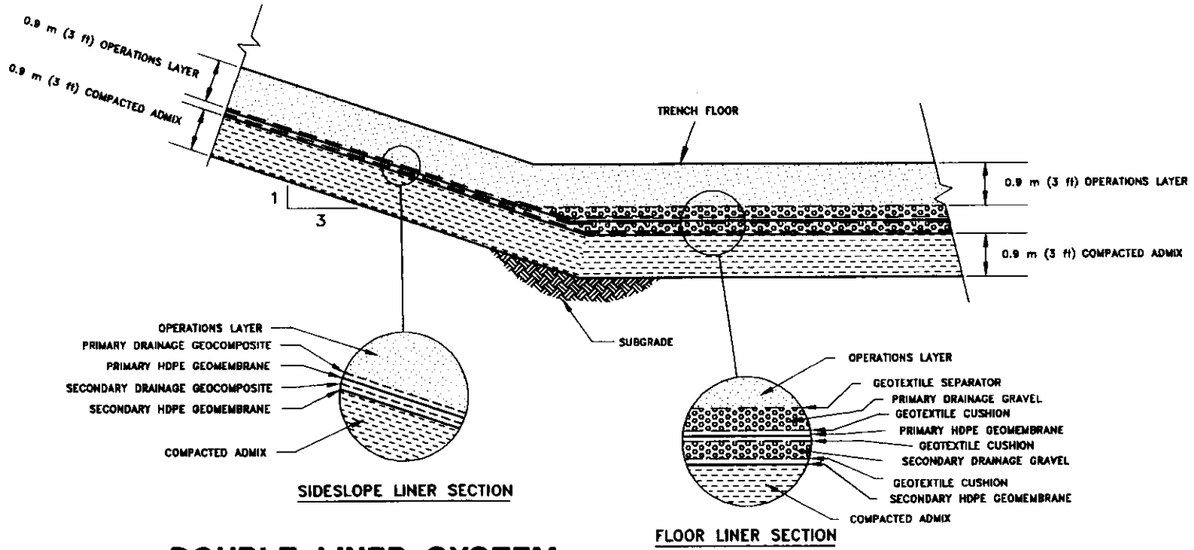


HANFORD BARRIER DETAIL

2/-

NOT TO SCALE

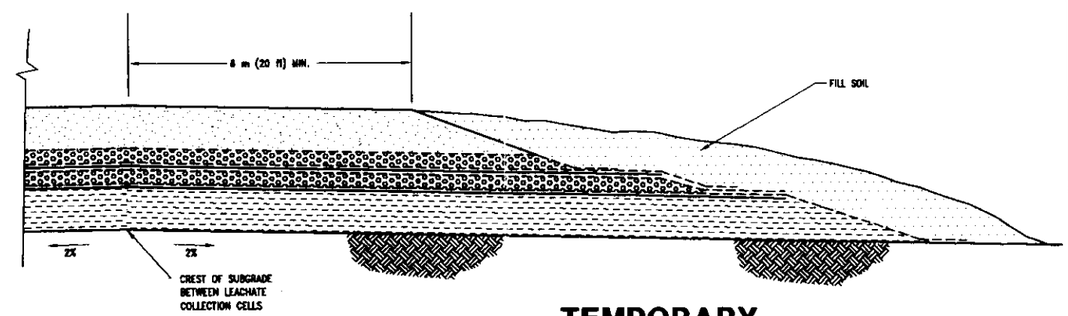
(NOTE 2)



DOUBLE LINER SYSTEM DETAIL

1/-

0 3 6 METERS
0 10 20 FEET



TEMPORARY LINER TERMINATION DETAIL

3/-

0 3 6 METERS
0 10 20 FEET

NOTES

1. SUMP DETAILS NOT SHOWN
2. HANFORD BARRIER NOT PART OF PROJECT W-296

CONCEPTUAL DESIGN

DRAWN BY Frank S. Shuri

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Prepared for: U.S. ARMY CORPS OF ENGINEERS, Walla Walla District
By: MONTGOMERY WATSON

AREA FILL TRENCH DETAILS

PROJECT ENVIRONMENTAL RESTORATION DISPOSAL FACILITY

SIZE D | DWG NO. ES-296-09 | REV NO. 0

SCALE AS SHOWN | SHEET 9

CAD CODE 2L:IBM:ACD2:11.0:NN

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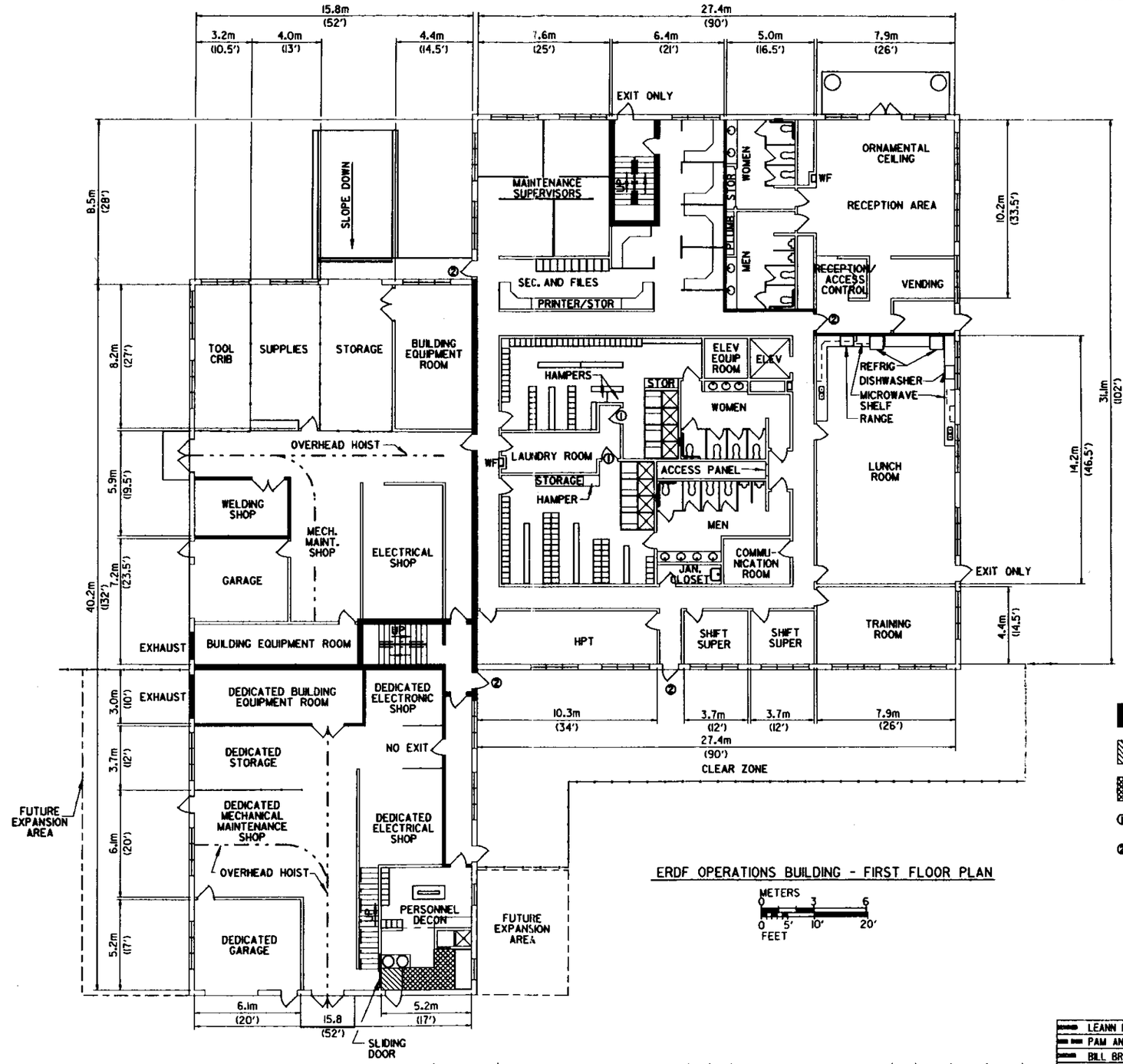

FIREWALLS

CONTAMINATED AREAS

STEP OFF AREA

① DOORS FOR MAINTENANCE USE ONLY. NOT TO BE USED FOR NORMAL ACCESS.

② CYPHER-LOCKED DOORS

ERDF OPERATIONS BUILDING - FIRST FLOOR PLAN

METERS 0 3 6

FEET 0 5' 10' 20'

CONCEPTUAL DESIGN

DESIGNED LEANN HAYS	DATE
DRAWN PAM ANKRUM	
CHECKED BILL BRUMM	

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Prepared for U.S. ARMY CORPS OF ENGINEERS, Walla Walla District
By: MONTGOMERY WATSON

ERDF OPERATIONS BUILDING
FIRST FLOOR PLAN

SIZE D | DRAWING NO. ES-296-10

SCALE AS SHOWN | SHEET 10 OF 17

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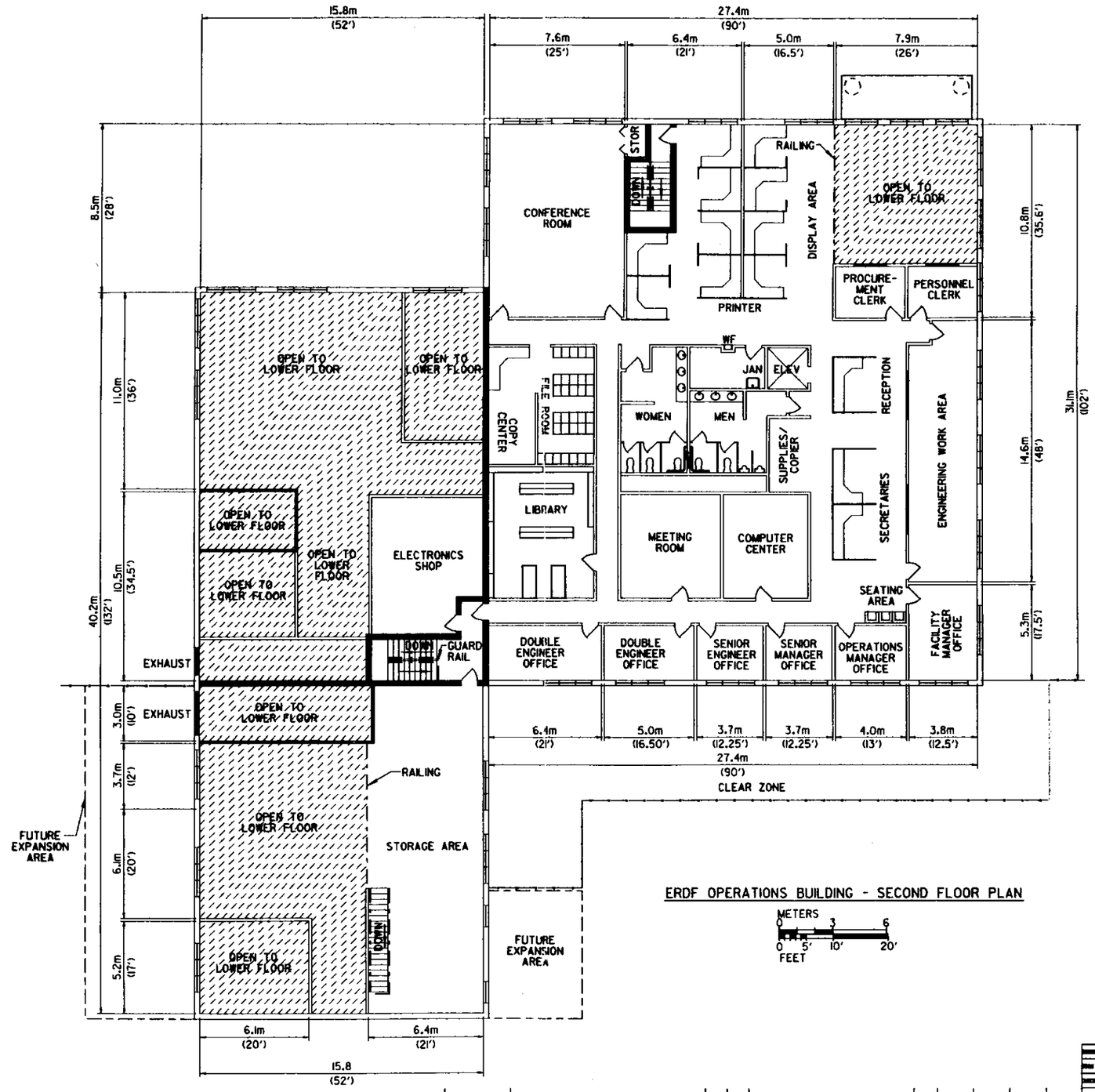

FIREWALLS

AREAS WITH HIGH CEILING AND NO SECOND FLOOR

ERDF OPERATIONS BUILDING - SECOND FLOOR PLAN

METERS 0 3 6

0 5' 10' 20'

FEET

CONCEPTUAL DESIGN

DESIGNED LEANN HAYS	U.S. DEPARTMENT OF ENERGY Richland Operations Office Prepared for: U.S. ARMY CORPS OF ENGINEERS, Walla Walla District By: MONTGOMERY WATSON
DRAWN PAM ANKRUM	ERDF OPERATIONS BUILDING SECOND FLOOR PLAN
CHECKED BILL BRUMM	
SIZE D	DWG NO. ES-296-11
SCALE AS SHOWN	SHEET 11 OF 17

PLOT SCALE: 2

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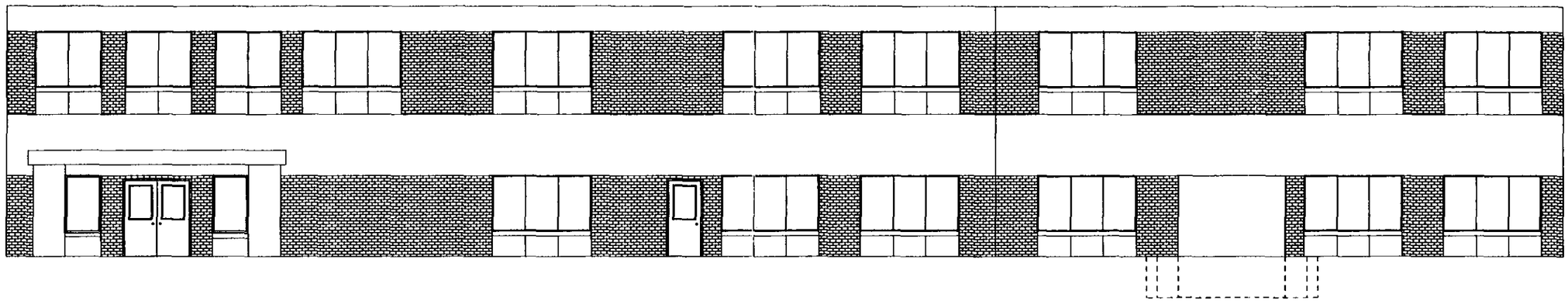

WEST ELEVATION

METERS 0 1 2 3

0 5' 10'

FEET

CONCEPTUAL DESIGN

DESIGNED LEANN HAYS	SPACE LEVEL
DRAWN BY PAM ANKRUM	U.S. DEPARTMENT OF ENERGY Richland Operations Office Prepared for: U.S. ARMY CORPS OF ENGINEERS, Walla Walla District By: MONTGOMERY WATSON
CHECKED BILL BRUMM	ERDF OPERATIONS BUILDING ELEVATION
SAFETY	
DRAWN	
MAIL ENGR	
LEAD ENGR	
APPROVED FOR IMPLEMENTATION	
BY	
PER	DATE

SIZE D	CLASS NO.	SHEET NO.	DWG NO. ES-296-12
SCALE AS SHOWN	JOB NO.	SHEET 12 OF 17	

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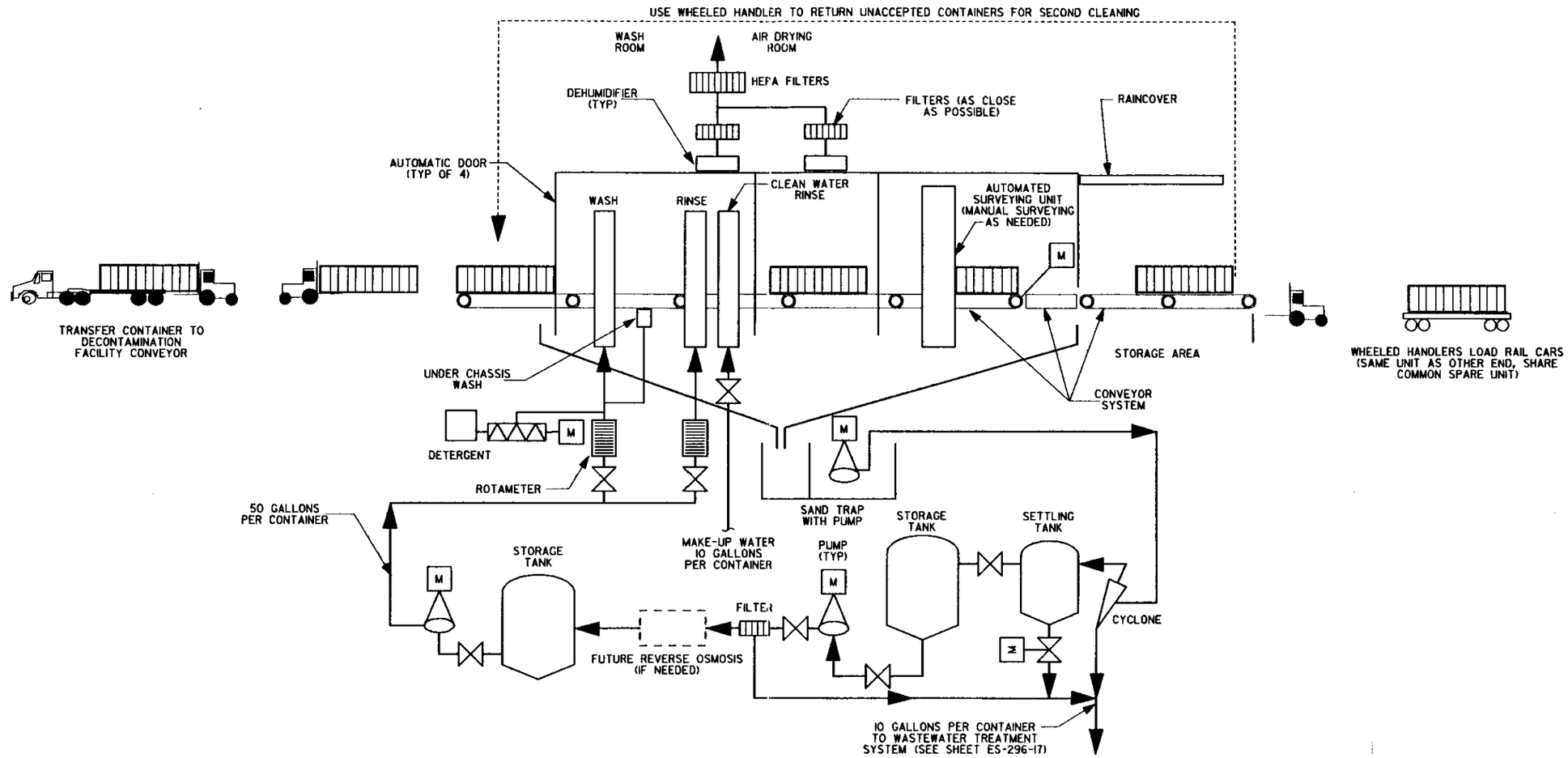

TYPICAL OF FOUR SYSTEMS

NOTE:

M = MOTOR

CONCEPTUAL DESIGN

TOM NARAD
LARRY BENNETT
CHRIS CAIN

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Prepared for: U.S. ARMY CORPS OF ENGINEERS, Walla Walla District
By: MONTGOMERY WATSON

EQUIPMENT DECONTAMINATION PROCESS FLOW DIAGRAM

D ES-296-13

SCALE NONE

PLOT SCALE:

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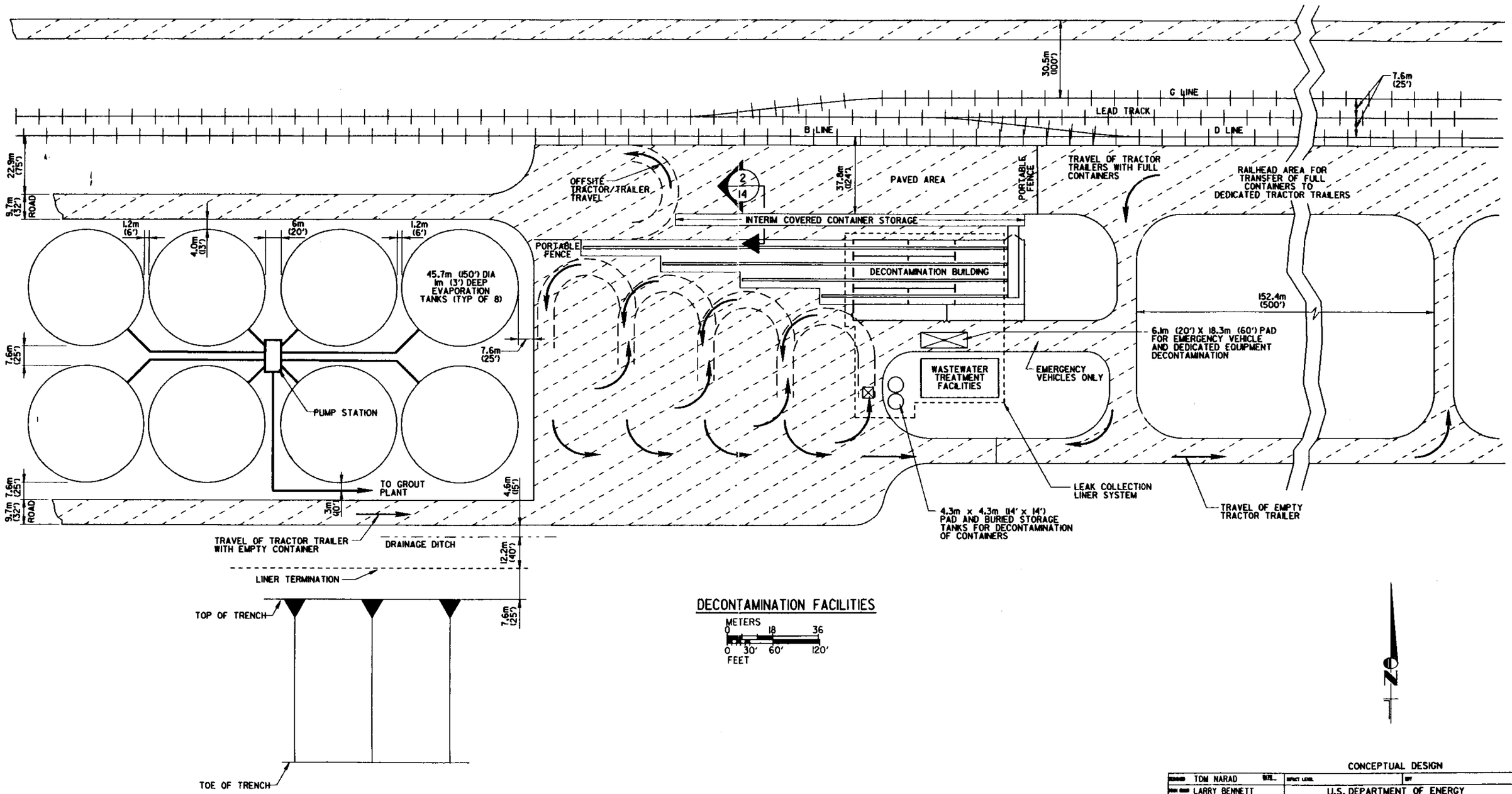

CONCEPTUAL DESIGN

DESIGNED TOM NARAD	U.S. DEPARTMENT OF ENERGY Richland Operations Office Prepared for: U.S. ARMY CORPS OF ENGINEERS, Walla Walla District By: MONTGOMERY WATSON
DRAWN LARRY BENNETT	
CHECKED DON SPENCER	DECONTAMINATION FACILITY PLAN
SIZE D	DWG NO. ES-296-14
SCALE AS SHOWN	SHEET 14 OF 17

PLOT SCALE:

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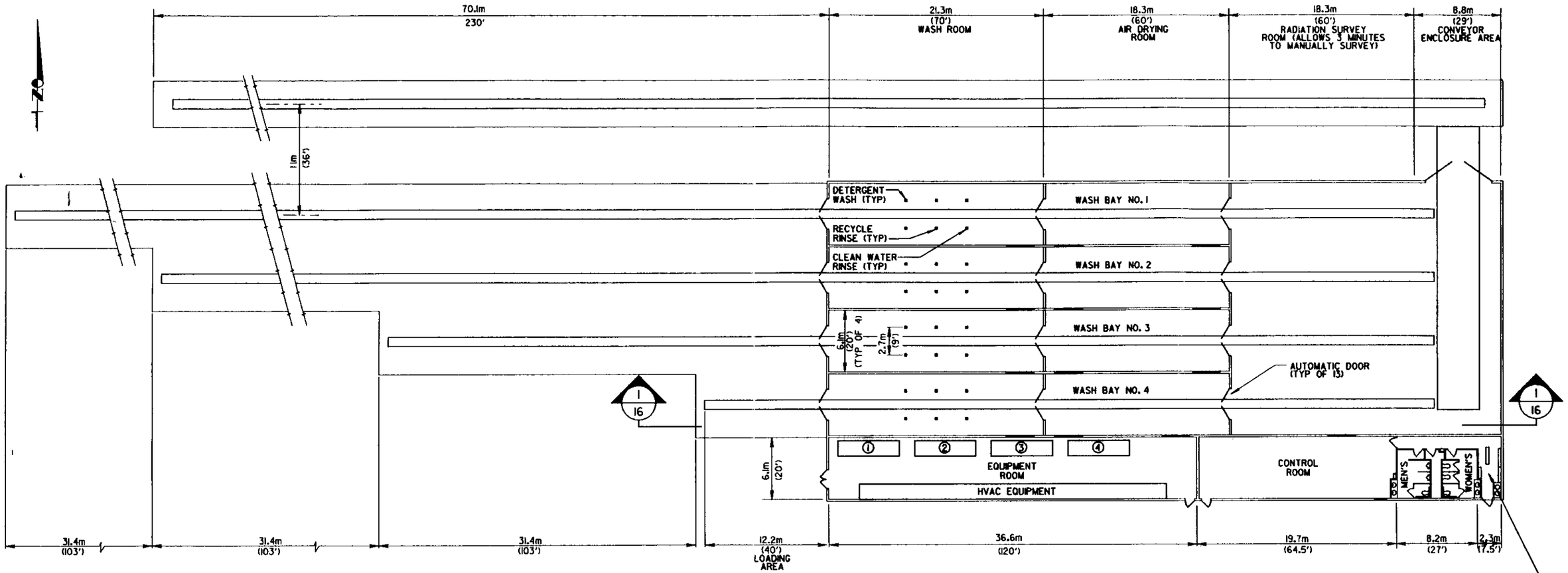

LEGEND

1. WASH BAY NO. 1 EQUIPMENT
2. WASH BAY NO. 2 EQUIPMENT
3. WASH BAY NO. 3 EQUIPMENT
4. WASH BAY NO. 4 EQUIPMENT

DECONTAMINATION BUILDING

METERS 0 5 10

0 10' 20' 30' FEET

CONCEPTUAL DESIGN

DESIGNED TOM NARAD	U.S. DEPARTMENT OF ENERGY
DRAWN LARRY BENNETT	Richland Operations Office
CHECKED CHRIS CAIN	Prepared for: U.S. ARMY CORPS OF ENGINEERS, Walla Walla District
	By: MONTGOMERY WATSON
	DECONTAMINATION BUILDING PLAN
	SIZE D — DRAWING NO. ES-296-15
	SCALE AS SHOWN — SHEET 15 OF 17

PLOT SCALE: 2

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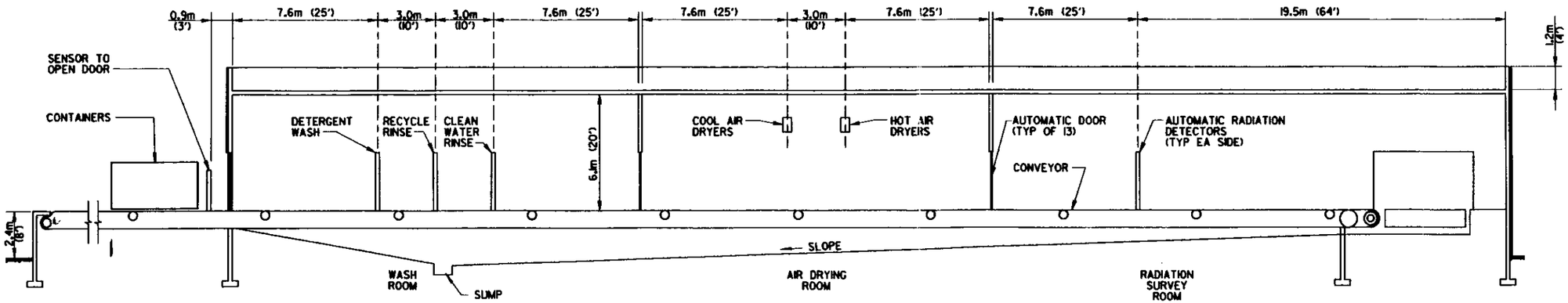
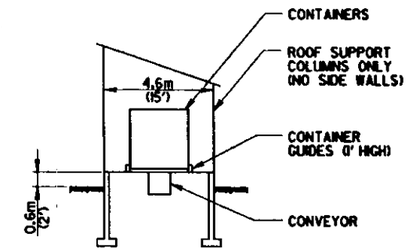


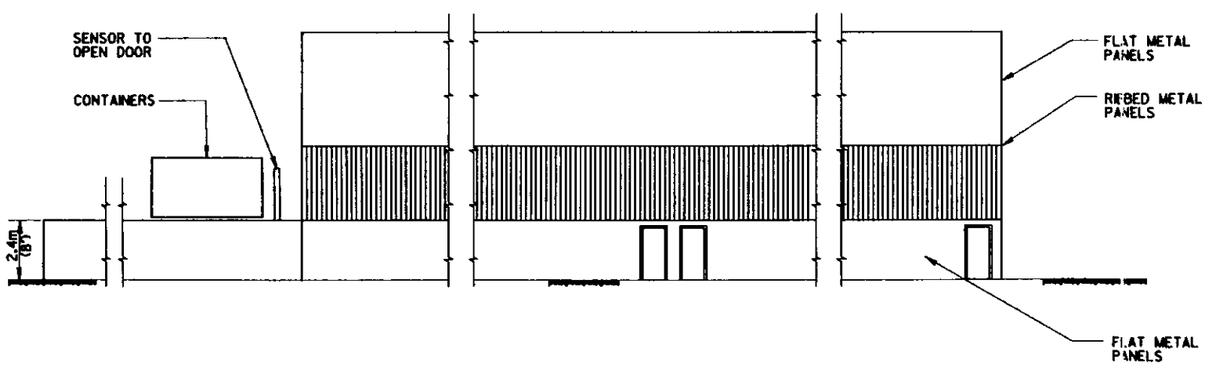
SECTION 1/13

METERS 0 3 6
0 5' 10' 20'
FEET



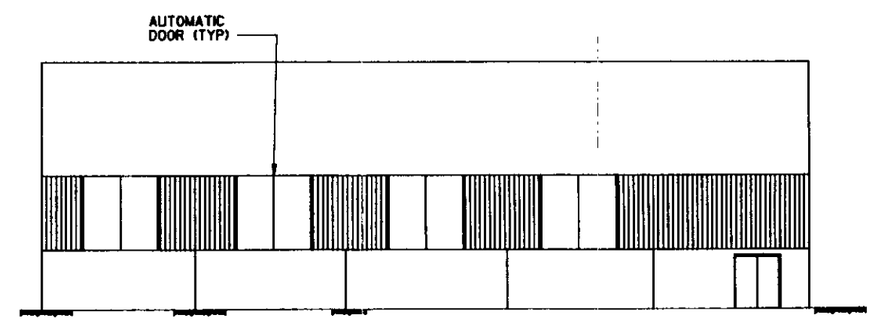
SECTION 2/12

METERS 0 3 6
0 5' 10' 20'
FEET



SOUTH ELEVATION

METERS 0 3 6
0 5' 10' 20'
FEET



WEST ELEVATION

METERS 0 3 6
0 5' 10' 20'
FEET

CONCEPTUAL DESIGN

TOM NARAD
LARRY BENNETT
CHRIS CAIN

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Prepared for: U.S. ARMY CORPS OF ENGINEERS, Walla Walla District
By: MONTGOMERY WATSON

DECONTAMINATION BUILDING
ELEVATIONS AND SECTIONS

D | ES-296-16

SCALE AS SHOWN

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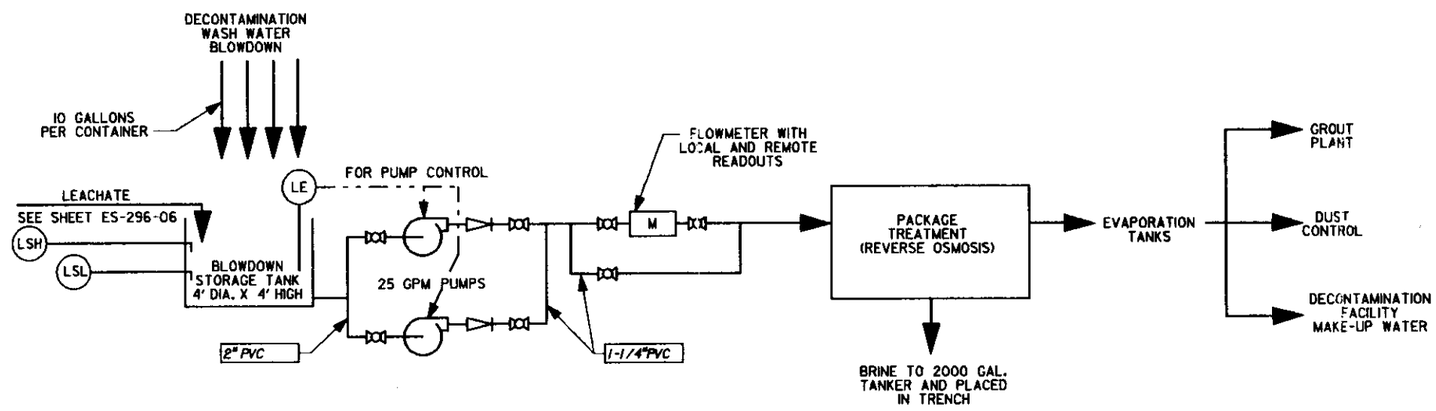

WASTEWATER TREATMENT SYSTEM

NOTE:

M = MOTOR

CONCEPTUAL DESIGN

DESIGNED TOM NARAD	U.S. DEPARTMENT OF ENERGY Richland Operations Office Prepared for: U.S. ARMY CORPS OF ENGINEERS, Walla Walla District By: MONTGOMERY WATSON
DRAWN LARRY BENNETT	
CHECKED CHRIS CAIN	WASTEWATER TREATMENT SYSTEM PROCESS FLOW DIAGRAM
	PROJECT D — ES-296-17
	SCALE NONE — SHEET 17 OF 17

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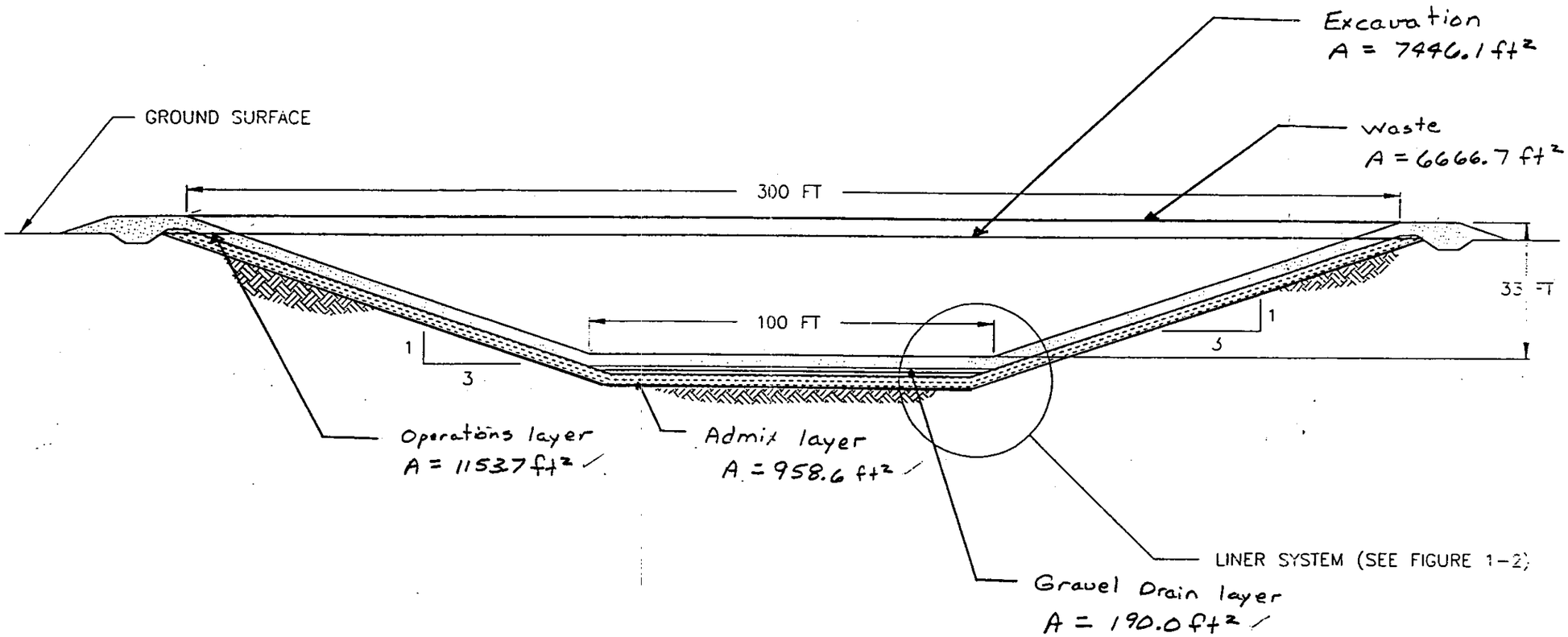
ACAD AREAS



923-A017 42581

Figure 1-3. Trench Cross Section

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SUBJECT Cost Estimate For Excess Fill Disposal		
Job No. 923-A017	Made by RDL	Date 7-14-93
Ref.	Checked	Sheet 1 of 3
	Reviewed	

Two scenarios For Excess material Disposal From ERSDF Trenches.

1. Place material onsite with scrapers (southern half of site)
2. Stock Pile and load into trains to backhaul to the waste excavation site.

Assumptions For Each Site

- Scenario 1 Assumptions
  - A) Scraper haul ½ mile each way to place onsite, no compaction other than scraper wheels
  - B) Add cost at remediation site for excavating soil and transport to remediation area for backfill; assume ¼ mile each way by scraper
- Scenario 2 Assumptions
  - A) Load onto trains, assuming 750' round trip haul by scraper, load w/ rubber tired front end loader
  - B) Dump at remediation site, assume 750' haul from tracks to place on-site.

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SUBJECT Cost Estimate For Excess Fill Disposal		
Job No. 923-A017	Made by RDL	Date 7-14-93
Ref.	Checked	Sheet 2 of 3
	Reviewed	

Cost Estimate

- Scenario (1) Approx. 5000' haul @ site w/ scraper + Approx. 3000' haul at remediation site.

Assume 11 CY Elevating Scraper

5000' haul = 2.82 CY
3000' haul = 2.33 CY

Ref. means 1993 Page 39
Section 022 246 0150
022 246 0200

Total cost = 2.82 + 2.33 CY
= $5.15 CY

- Scenario (2) Approx. 1500' haul at ERSDF site, 1500' haul at remediation site + cost to load onto trains.

Assume 11 CY Elevating Scraper

1500' haul = 2.06 CY
1500' haul = 2.06 CY
$4.12 CY

Assume Loading onto Trains w/ 3 CY, rubber tired front end loader

cost = 0.87 CY*

*Ref. means Page 37, Section 022 238 1601

Total Cost = 4.12 + 0.87
= 4.99 CY

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Golder Associates	SUBJECT Cost Estimate For Excess Fill Disposal		
	Job No. 923-A017	Made by RDL	Date 7-14-93
	Ref.	Checked	Sheet 3 of 3
		Reviewed	

Summary

Scenario 1, Place material on-site plus add in the cost for material to backfill excavation at remediation site, using previously stated assumptions, $ 5.15 CY

Scenario 2, Backhaul material to Remediation site, using previously stated assumptions

$ 4.99 CY

Conclusion: Based on above assumptions, cost's for each alternative appear to be equal.

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022 200 | Excav, Backfill, Compact

			CREW	DAILY OUTPUT	MAN-HOURS	UNIT	1993 BARE COSTS MAT.	LABOR	EQUIP.	TOTAL	TOTAL INCL O&P
242	2020	Common earth	B-10L	400	.030	C.Y.		.67	.73	1.40	1.83
	2040	Clay		250	.048			1.07	1.17	2.24	2.92
	2200	150' haul, sand & gravel		230	.052			1.16	1.27	2.43	3.18
	2220	Common earth		200	.060			1.34	1.46	2.80	3.66
	2240	Clay		125	.096			2.14	2.33	4.47	5.85
	2400	300' haul, sand & gravel		120	.100			2.23	2.43	4.66	6.10
	2420	Common earth		100	.120			2.67	2.92	5.59	7.30
	2440	Clay		65	.185			4.11	4.49	8.60	11.25
	3000	105 H.P., 50' haul, sand & gravel	B-10W	700	.017			.38	.59	.97	1.24
	3020	Common earth		610	.020			.44	.68	1.12	1.42
	3040	Clay		385	.031			.69	1.08	1.77	2.26
	3200	150' haul, sand & gravel		310	.039			.86	1.34	2.20	2.79
	3220	Common earth		270	.044			.99	1.54	2.53	3.21
	3240	Clay		170	.071			1.57	2.44	4.01	5.10
	3300	300' haul, sand & gravel		140	.086			1.91	2.96	4.87	6.20
	3320	Common earth		120	.100			2.23	3.46	5.69	7.20
	3340	Clay		100	.120			2.67	4.15	6.82	8.65
	4000	200 H.P., 50' haul, sand & gravel	B-10B	1,400	.009			.19	.59	.78	.94
	4020	Common earth		1,230	.010			.22	.68	.90	1.07
	4040	Clay		770	.016			.35	1.08	1.43	1.72
	4200	150' haul, sand & gravel		595	.020			.45	1.40	1.85	2.23
	4220	Common earth		516	.023			.52	1.61	2.13	2.57
	4240	Clay		325	.037			.82	2.56	3.38	4.08
	4400	300' haul, sand & gravel		310	.039			.86	2.68	3.54	4.27
	4420	Common earth		270	.044			.99	3.08	4.07	4.91
	4440	Clay		170	.071			1.57	4.89	6.46	7.80
	5000	300 H.P., 50' haul, sand & gravel	B-10M	1,900	.006			.14	.49	.63	.76
	5020	Common earth		1,650	.007			.16	.56	.72	.87
	5040	Clay		1,025	.012			.26	.90	1.16	1.39
	5200	150' haul, sand & gravel		920	.013			.29	1.01	1.30	1.56
	5220	Common earth		800	.015			.33	1.16	1.49	1.78
	5240	Clay		500	.024			.53	1.85	2.38	2.86
	5400	300' haul, sand & gravel		470	.026			.57	1.97	2.54	3.04
	5420	Common earth		410	.029			.65	2.26	2.91	3.49
	5440	Clay		250	.048			1.07	3.71	4.78	5.70
	5500	460 H.P., 50' haul, sand & gravel	B-10X	1,930	.006			.14	.62	.76	.90
	5510	Common earth		1,680	.007			.16	.72	.88	1.03
	5520	Clay		1,050	.011			.25	1.15	1.40	1.65
	5530	150' haul, sand & gravel		1,290	.009			.21	.93	1.14	1.35
	5540	Common earth		1,120	.011			.24	1.07	1.31	1.55
	5550	Clay		700	.017			.38	1.72	2.10	2.48
	5560	300' haul, sand & gravel		660	.018			.40	1.82	2.22	2.63
	5570	Common earth		575	.021			.46	2.09	2.55	3.01
	5580	Clay		350	.034			.76	3.44	4.20	4.95
	6000	700 H.P., 50' haul, sand & gravel	B-10V	3,500	.003			.08	.77	.85	.97
	6010	Common earth		3,035	.004			.09	.89	.98	1.11
	6020	Clay		1,925	.006			.14	1.40	1.54	1.75
	6030	150' haul, sand & gravel		2,025	.006			.13	1.33	1.46	1.66
	6040	Common earth		1,750	.007			.15	1.54	1.69	1.92
	6050	Clay		1,100	.011			.24	2.44	2.68	3.06
	6060	300' haul, sand & gravel		1,030	.012			.26	2.61	2.87	3.27
	6070	Common earth		900	.013			.30	2.99	3.29	3.75
	6080	Clay		550	.022			.49	4.89	5.38	6.15
	6090	For dozer with ripper, see div. 022-278									
246	0010	EXCAVATION, BULK, SCRAPERS (R022-240)									
	0100	Elevating scraper 11 C.Y., sand & gravel 1500' haul	B-33F	690	.020	C.Y.		.46	1.24	1.70	2.06

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0222 | Excav, Bac

0350	3000' haul		530	.026			.59	1.61	2.20	2.68	
0400	5000' haul		440	.032			.72	1.94	2.66	3.24	
0500	Clay, 1500' haul		375	.037			.84	2.28	3.12	3.80	
0550	3000' haul		330	.042			.95	2.59	3.54	4.32	
0600	5000' haul		275	.051			1.15	3.11	4.26	5.20	
1000	Self propelled scraper, 14 C.Y. 1/4 push dozer, sand										
1050	and gravel, 1500' haul	B-33D	920	.015	C.Y.		.34	1.84	2.18	2.55	
1100	3000' haul		805	.017			.39	2.10	2.49	2.91	
1200	5000' haul		645	.022			.49	2.62	3.11	3.64	
1300	Common earth, 1500' haul		800	.017			.39	2.11	2.50	2.93	
1350	3000' haul		700	.020			.45	2.42	2.87	3.35	
1400	5000' haul		560	.025			.56	3.02	3.58	4.18	
1500	Clay, 1500' haul		500	.028			.63	3.38	4.01	4.69	
1550	3000' haul		440	.032			.72	3.84	4.56	5.35	
1600	5000' haul		350	.040			.90	4.83	5.73	6.70	
2000	21 C.Y., 1/4 push dozer, sand & gravel, 1500' haul	B-33E	1,180	.012			.27	1.68	1.95	2.25	
2100	3000' haul		910	.015			.35	2.17	2.52	2.92	
2200	5000' haul		750	.019			.42	2.64	3.06	3.55	
2300	Common earth, 1500' haul		1,030	.014			.31	1.92	2.23	2.58	
2350	3000' haul		790	.018			.40	2.50	2.90	3.37	
2400	5000' haul		650	.022			.48	3.04	3.52	4.09	
2500	Clay, 1500' haul		645	.022			.49	3.07	3.56	4.12	
2550	3000' haul		495	.028			.64	4	4.64	5.40	
2600	5000' haul		405	.035			.78	4.89	5.67	6.55	
2700	Towed, 10 C.Y., 1/4 push dozer, sand & gravel, 1500' haul	B-33B	560	.025			.56	2.39	2.95	3.49	
2720	3000' haul		450	.031			.70	2.97	3.67	4.35	
2730	5000' haul		365	.038			.86	3.67	4.53	5.35	
2750	Common earth, 1500' haul		420	.033			.75	3.19	3.94	4.66	
2770	3000' haul		400	.035			.79	3.35	4.14	4.89	
2780	5000' haul		310	.045			1.02	4.32	5.34	6.30	
2800	Clay, 1500' haul		315	.044			1	4.25	5.25	6.20	
2820	3000' haul		300	.047			1.05	4.46	5.51	6.50	
2840	5000' haul		225	.062			1.40	5.95	7.35	8.70	
2900	15 C.Y., 1/4 push dozer, sand & gravel, 1500' haul	B-33C	800	.017			.39	1.67	2.06	2.44	
2920	3000' haul		640	.022			.49	2.09	2.58	3.06	
2940	5000' haul		520	.027			.61	2.57	3.18	3.76	
2960	Common earth, 1500' haul		600	.023			.53	2.23	2.76	3.26	
2980	3000' haul		560	.025			.56	2.39	2.95	3.49	
3000	5000' haul		440	.032			.72	3.04	3.76	4.45	
3020	Clay, 1500' haul		450	.031			.70	2.97	3.67	4.35	
3040	3000' haul		420	.033			.75	3.19	3.94	4.66	
3060	5000' haul		320	.044			.98	4.18	5.16	6.10	
250 0010	EXCAVATING, STRUCTURAL Hand, pits to 6' deep, sandy soil R022-240	1 Clab	8	1	C.Y.		18.55		18.55	29	250
0100	Heavy soil or clay		4	2			37		37	58	
0300	Pits 6' to 12' deep, sandy soil		5	1.600			29.50		29.50	46.50	
0500	Heavy soil or clay		3	2.667			49.50		49.50	77.50	
0700	Pits 12' to 18' deep, sandy soil		4	2			37		37	58	
0900	Heavy soil or clay		2	4			74		74	116	
1100	Hand loading trucks from stock pile, sandy soil		12	.667			12.35		12.35	19.40	
1300	Heavy soil or clay		8	1			18.55		18.55	29	
1500	For wet or muck hand excavation, add to above				%				50%	50%	
1550	Excavation rock by hand/air tool	B-9	3.40	11.765	C.Y.		223	42.50	265.50	395	

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022 200 | Excav, Backfill, Compact

			CREW	DAILY OUTPUT	MAN-HOURS	UNIT	1993 BARE COSTS MAT.	LABOR	EQUIP.	TOTAL	TOTAL INCL O&P	
234	4500	City block within zone of influence, minimum	A-8	25,200	.001	S.F.		.03		.03	.04	234
	4600	Maximum	"	15,100	.002	"		.04		.04	.07	
	5000	Excavate and load boulders, less than 0.5 C.Y.	B-10T	80	.150	C.Y.		3.34	6.25	9.59	12.05	
	5020	0.5 C.Y. to 1 C.Y.	B-10U	100	.120			2.67	9.45	12.12	14.50	
	5200	Excavate and load blasted rock, 3 C.Y. power shovel	B-12T	1,530	.010			.24	.71	.95	1.14	
	5400	Haul boulders, 25 Ton off-highway dump, 1 mile round trip	B-34E	330	.024			.47	1.76	2.23	2.66	
	5420	2 mile round trip		275	.029			.57	2.11	2.68	3.19	
	5440	3 mile round trip		225	.036			.69	2.58	3.27	3.90	
	5460	4 mile round trip		200	.040			.78	2.90	3.68	4.38	
	5600	Bury boulders on site, less than 0.5 C.Y., 300 H.P. dozer										
	5620	150' haul	B-10M	310	.039	C.Y.		.86	2.99	3.85	4.61	
	5640	300' haul		210	.057			1.27	4.41	5.68	6.80	
	5800	0.5 to 1 C.Y., 300 H.P. dozer, 150' haul		300	.040			.89	3.09	3.98	4.77	
	5820	300' haul		200	.060			1.34	4.63	5.97	7.15	
238	0010	EXCAVATING, BULK BANK MEASURE Common earth piled (R022-240)										238
	0020	For loading onto trucks, add								15%	15%	
	0050	For mobilization and demobilization, see division 022-274 (R022-250)										
	0100	For hauling, see division 022-266										
	0200	Backhoe, hydraulic, crawler mtd., 1 C.Y. cap. = 75 C.Y./hr.	B-12A	600	.027	C.Y.		.60	.96	1.56	1.97	
	0250	1-1/2 C.Y. cap. = 100 C.Y./hr.	B-12B	800	.020			.45	.91	1.36	1.69	
	0260	2 C.Y. cap. = 130 C.Y./hr.	B-12C	1,040	.015			.35	.93	1.28	1.55	
	0300	3 C.Y. cap. = 160 C.Y./hr.	B-12D	1,620	.010			.22	1.33	1.55	1.80	
	0310	Wheel mounted, 1/2 C.Y. cap. = 30 C.Y./hr.	B-12E	240	.067			1.51	1.34	2.85	3.77	
	0360	3/4 C.Y. cap. = 45 C.Y./hr.	B-12F	360	.044			1	1.26	2.26	2.92	
	0500	Clamshell, 1/2 C.Y. cap. = 20 C.Y./hr.	B-12G	160	.100			2.26	2.78	5.04	6.50	
	0550	1 C.Y. cap. = 35 C.Y./hr.	B-12H	280	.057			1.29	1.86	3.15	4.02	
	0950	Dragline, 1/2 C.Y. cap. = 30 C.Y./hr.	B-12I	240	.067			1.51	1.90	3.41	4.39	
	1000	Dragline, 3/4 C.Y. cap. = 35 C.Y./hr.		280	.057			1.29	1.63	2.92	3.76	
	1001	3/4 C.Y. cap. = 35 C.Y./hr.		280	.057			1.29	1.63	2.92	3.76	
	1050	1-1/2 C.Y. cap. = 65 C.Y./hr.	B-12P	520	.031			.70	1.42	2.12	2.62	
	1100	3 C.Y. cap. = 112 C.Y./hr.	B-12V	900	.018			.40	.99	1.39	1.70	
	1200	Front end loader, track mtd., 1-1/2 C.Y. cap. = 70 C.Y./hr.	B-10N	560	.021			.48	.64	1.12	1.43	
	1250	2-1/2 C.Y. cap. = 95 C.Y./hr.	B-10O	760	.016			.35	.60	.95	1.21	
	1300	3 C.Y. cap. = 130 C.Y./hr.	B-10P	1,040	.012			.26	.73	.99	1.20	
	1350	5 C.Y. cap. = 160 C.Y./hr.	B-10Q	1,620	.007			.16	.66	.82	.97	
	1500	Wheel mounted, 3/4 C.Y. cap. = 45 C.Y./hr.	B-10R	360	.033			.74	.65	1.39	1.86	
	1550	1-1/2 C.Y. cap. = 80 C.Y./hr.	B-10S	640	.019			.42	.51	.93	1.21	
	1600	2-1/4 C.Y. cap. = 100 C.Y./hr.	B-10T	800	.015			.33	.63	.96	1.20	
	1601	3 C.Y. cap. = 100 C.Y./hr.	"	1,100	.011			.24	.46	.70	.87	
	1650	5 C.Y. cap. = 185 C.Y./hr.	B-10U	1,480	.008			.18	.64	.82	.98	
	1800	Hydraulic excavator, truck mtd, 1/2 C.Y. = 30 C.Y./hr.	B-12J	240	.067			1.51	2.45	3.96	4.99	
	1850	48 inch bucket, 1 C.Y. = 45 C.Y./hr.	B-12K	360	.044			1	2.25	3.25	4.01	
	3700	Shovel, 1/2 C.Y. capacity = 55 C.Y./hr.	B-12L	440	.036			.82	1.01	1.83	2.37	
	3750	3/4 C.Y. capacity = 85 C.Y./hr.	B-12M	680	.024			.53	.76	1.29	1.64	
	3800	1 C.Y. capacity = 120 C.Y./hr.	B-12N	960	.017			.38	.61	.99	1.24	
	3850	1-1/2 C.Y. capacity = 160 C.Y./hr.	B-12O	1,280	.013			.28	.65	.93	1.15	
	3900	3 C.Y. cap. = 250 C.Y./hr.	B-12T	2,000	.008			.18	.54	.72	.88	
	4000	For soft soil or sand, deduct								15%	15%	
	4100	For heavy soil or stiff clay, add								60%	60%	
	4200	For wet excavation with clamshell or dragline, add								100%	100%	
	4250	All other equipment, add								50%	50%	
	4400	Clamshell in sheeting or cofferdam, minimum	B-12H	160	.100			2.26	3.26	5.52	7.05	
	4450	Maximum	"	60	.267			6.05	8.70	14.75	18.75	
	8000	For hauling excavated material, see div. 022-266										
242	0010	EXCAVATING, BULK, DOZER Open site										242
	2000	75 H.P., 50' haul, sand & gravel	B-10L	460	.026	C.Y.		.58	.63	1.21	1.59	

SITE WORK 2

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SUBJECT Mass Balance ERSDF Site		
Job No. 923-A017	Made by RDL	Date 7-16-93
Ref.	Checked AA	Sheet 1 of 6
	Reviewed	

Given:
Total Trench Length = 121,458 Ft
- Gravel Length 45,666 Ft
- Sand Length 75,792 Ft

- Mass Balance Per LF of Excavation for Trench in Gravel Sequence + Sand Sequence

A) Quanitity From Excavation (see Tables 5 and 6, attached)

Mat.	(CY/LF) Gravel Sq.		Sand Sq.		Total
2"+	33.6		0	1,52[illegible]	1,538,617
1"-2"	48.7		6	1,[illegible]	1,863,734
1"- #10	97		0		4,441,824
< #10	30.6		0		1,401,235
Sand	87.6	4,011,379	274.2	20,747,617	24,758,996
Silt	0		0		0
Silt Admix	0		0		0

Total = 34,004,400

34.0 M.cy

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SUBJECT ERSDF Design Studies		
Job No. 932-A017	Made by RDL	Date 7-19-93
Ref.	Checked	Sheet 2 of 6
	Reviewed	

Mat.	Total Quantity needed For Construction CY/LF		CY	Mill. CY
2"	74.1		9,000,038	9.0
1"	0		0	0
1"-#10	88.7	(gravel seg)	4,061,750	
	36.7	(sand seg)	2,776,942	6.8
			6,838,692	
< #10	30.6	(gravel seg)	1,401,235	1.4
Sand	12.4	gravel seg	567,821	
	94.9	Sand seg	7,180,703	7.8
			7,748,524	
Silt	48.9		5,939,296	5.9
Silt/Pea Admix	48.9		5,939,296	5.9
		Total	=	36.8

Excess material (				
Mat.	CY/LF		CY	million CY
2"	0		0	0
1"-2"	40.7	(gravel seg)	1,863,734	1.9
1"-#10	8.3	(gravel seg)		
	-36.7	(sand seg)	0	0
< #10	0		0	0
Sand	75.2		3,443,558	
	179.3		13,566,914	17.0
			17,010,472	
Silt	0		0	0
Silt admix	0		0	0
			Total =	18.9

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Golder Associates

SUBJECT ERSDF Design Studies Mass Mat. Balance		
Job No. 923-A017	Made by RDL	Date 7-19-93
Ref.	Checked	Sheet 3 of 6
	Reviewed	

Deficit For Construction

Mat.	CY/LF	CY	million CY
2"+	40.4 (gravel)	1,849,997	
	74.1 (sand)	5,606,851	7.5
1"-2"	0	0	0
1" - #10	-8.3 (excess)	-380,074	
	36.7 (deficit)	2,776,942	2.4
		2,396,869	
< #10	0	0	0
Sand	0	0	0
Silt	48.9	5,939,296	5.9
Silt Admix	48.9	5,939,296	5.9
		Total =	21.7

For Summary, Please See Attached Table

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Table 5. **Gravel Sequence Trench Material Balance per Linear Foot of Excavation**

Material	Quantity From Excavation (cy)	Quantity Required (cy)	Excess (cy)	Deficit (cy)
2" +	34	74	-	40
1" to 2"	41	0	41	-
1" to U.S. #10 sieve	97	89	8	-
< U.S. #10 sieve	31	31	0	0
Unprocessed Sand	88	12	75	-
Silt	0	49	-	49
Silt/Pea Gravel Admix	0	49	-	49
Combined Total	291	304	124	138

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Table 6. **Sand Sequence Trench Material Balance per Linear Foot of Excavation**

Material	Quantity From Excavation (cy)	Quantity Required (cy)	Excess (cy)	Deficit (cy)
2" +	0	74	-	74
1" to 2 "	0	0	-	-
1" to U.S. #10 sieve	0	37	-	37
< #10 sieve	0	0	-	-
Unprocessed Sand	274	95	179	-
Silt	0	49	-	49
Silt/Pea Gravel Admix	0	49	-	49
Combined Total	274	304	179	209

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Table 7. Site-Wide Material Balance

Material	Quantity From Excavation (Million Cubic Yards)	Quantity Required for Construction (Million Cubic Yards)	Excess (Million Cubic Yards)	Deficit (Million Cubic Yards)
2" +	1.5	9.0	0	7.5
1" to 2"	1.9	0	1.9	0
1" to U.S. #10 Sieve	4.4	6.8	0	2.4
< U.S. #10 Sieve	1.4	1.4	0	0
Unprocessed Sand	24.8	7.8	17.0	0
Silt	0	5.9	0	5.9
Silt/Pea Gravel Admix	0	5.9	0	5.9
Combined Total	34.0	36.8	18.9	21.7

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APPENDIX F

SITE CAPABILITY ASSESSMENT TECHNICAL MEMORANDUM

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Westinghouse Hanford Company | **Internal Memo**

From: Remediated Waste Projects 24700-93-272
Phone: 6-0248 A5-56
Date: June 18, 1993
Subject: RESOURCES TO SUPPORT THE ENVIRONMENTAL RESTORATION STORAGE AND DISPOSAL FACILITY

To:

B. A. Austin	B2-35	M. C. Hughes	R2-81
J. R. Bell	R3-09	W. F. Irvine	G2-02
M. L. Bell	T6-16	G. W. Jackson	H6-21
D. L. Borders	B3-62	J. M. Knoll	B3-59
W. R. Brooksher	L4-01	R. E. Lerch	B3-63
A. J. Fisher	R2-56	G. H. Moulthrop	B3-25
A. D. Gadeken	B4-52	R. W. Powell	H4-14
E. W. Gerber	L5-62	D. K. Quigley	G1-56
E. F. Gray	R3-50	D. C. Richardson	R2-31
J. W. Hagan	B3-55	W. G. Ruff	R3-50
W. H. Hamilton	N3-10	A. R. Schade	H4-60
J. H. Hammond	B3-03	W. J. Schlauder	R2-34
J. M. Hawkins	B5-21	L. K. Severud	H5-60
R. E. Heineman	R3-12	R. M. Suyama	B3-08
R. W. Holleran	H3-21	T. C. Varljen	H5-27
B. A. Holmberg	G4-02	J. C. Wiborg	H4-60
J. O. Honeyman	B2-30	R. D. Wojtasek	H6-27

cc:	I. W. Brewer	A5-56
	M. A. Casbon	A5-56
	C. E. Hodge	A5-56
	M. J. Lauterbach	H6-01
	W-296 Project Files	G6-51
	VRD File/LB	

As you may know, Westinghouse Hanford Company (WHC) is embarking on a major construction project; W-296, "Environmental Restoration Storage and Disposal Facility," (ERSDF). The ERSDF will provide disposal facilities for an estimated 26 million cubic yards of radioactive and hazardous waste (mostly soil) generated during remediation of past practice sites at Hanford.

The project will provide disposal trenches, expanded rail capabilities for cross site transfer of waste, enhanced motorized container handling capabilities, extended site utilities and services, dedicated maintenance and personnel support facilities. The project is scheduled for turnover and operation in the last quarter of fiscal year 1996 and will be located in the 200 Area.

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Project W-296 is in the early stages of definition (pre-conceptual design report) but the size of the operation and the volume of waste to be transported may have a significant impact on existing resources at Hanford. As the project develops, I will require a point of contact from your organization to work out support requirements (such as transportation, rail car maintenance, health physics technicians, operations, etc.). Your help in establishing these requirements will ensure that the proper resources are available when required.

I will notify you of our next management review meeting so that you or your designated point of contact may attend.

If you have any questions, please call me on 376-0248.

V. R. Dronen, Manager
Remediated Waste Projects
Projects Department

dah

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[10] From: Debbie A Severin at ~WHC62 7/6/93 4:02PM (1011 bytes: 19 ln)
To: Vernon R Dronen at ~WHC85
cc: John R Bell at ~WHC289, N F (Nick) Barilo Jr, Steven R Staley,
chael A Tredway, Robert D (Bob) Lichfield at ~WHC198, Debbie A Severin,
on J Hart
Subject: RESOURCES FOR PROJECT W-296
---------- Message Contents ----------

Reference: Internal Memo, V. R. Dronen to Distribution, dated June 18, 1993, "Resources To Support The Environmental Restoration Storage and Disposal Facility."

As requested, the following will be the points of contact for Industrial Health, Safety, and Fire Protection (JR Bell):

Nick Barilo - Fire Protection (372-3191)
Steve Staley - Industrial Safety & Hygiene (372-2598)

If you have any further questions, please give me a call at 372-3353.

RECEIVED
JUL 07 1993
V. R. DRONEN

Debbie Severin
Staff Assistant
Industrial Health, Safety,
and Fire Protection

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Westinghouse Hanford Company | **Internal Memo**

From: Safeguards and Security
Phone: 376-9927 L4-01
Date: July 7, 1993
Subject: RESOURCES TO SUPPORT THE ENVIRONMENTAL RESTORATION STORAGE AND DISPOSAL FACILITY

RECEIVED
JUL 0 8 1993
V. R. DRONEN

To: V. R. Dronen A5-56

cc: J. W. Gideon T4-17
F. O. Strankman L4-05
WRB File

Reference: Internal Memo, V. R. Dronen to B. A. Austin, et al., "Resources to Support the Environmental Restoration Storage Disposal Facility," dated June 18, 1993.

I have appointed the Northern Area Security Operations Manager, Mr. James W. Gideon to act as point of contact for construction project: W-296, "Environmental Restoration Storage and Disposal Facility," (ERSDF).

Please contact Mr. Gideon (373-5031), to work out any support requirements you may have.

W. R. Brooksher
Manager

KGD/kgd

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