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DOCUMENT # DOE/RL 91-17, Rev. 0, Vol. 2 of 2

EDMC # 17658

SECTION 2 **OF** 2

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APPENDIX 4A-5

CONSTRUCTION SPECIFICATION W-032-C1, AS-BUILT REV. 1, FOR RADIOACTIVE MIXED WASTE STORAGE BUILDING

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OFFICIAL RELEASE BY WHC (23)
DATE JAN 28 1991
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W-032-C1
AS-BUILT REV. 1

CONSTRUCTION SPECIFICATION FOR

RADIOACTIVE MIXED WASTE

FOR
STORAGE BUILDING

Original Issue: 06-03-88

Prepared By:

Kaiser Engineers Hanford Company
Richland, Washington

For the US Department of Energy

Contract DE-AC06-87RL10900

Eric H. Eggenbeck Client Concurrence	1-9-91 Date
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ECNs affecting specification page attached.

W032C1.AB

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SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 INTRODUCTION

1.1.1 The RMW Storage Building is to be located in the 200 West Limited Area of the Hanford Site, approximately 32 miles northwest of Richland, Washington.

1.1.2 This Specification is for the construction of the complete facility.

1.2 STATEMENT OF WORK

1.2.1 Work Included: The itemization included herein is intended to be broad in scope to identify major elements. The work shall include, but not be limited to, the following:

1.2.1.1 Site work: Truck unloading and drive areas shall be stabilized with gravel. Fire protection water shall be extended from a nearby sanitary waterline.

1.2.1.2 Construction: The facility shall be a pre-engineered metal building and concrete floor slab-on-grade. The storage area shall provide for spill containment. The entire floor area and containment shall be coated with a protective coating to provide an impervious containment area. The fire protection system shall be a dry-pipe system. The sprinkler system riser shall be housed in an insulated compartment within the facility.

1.2.1.3 Mechanical: The sprinkler system riser housing shall be heated for freeze protection. The storage area shall be mechanically ventilated to provide the required air changes. No heating or cooling will be required for the storage area.

1.2.1.4 Electrical: Fluorescent lighting and convenience receptacles will be provided. *High voltage power shall be extended from an existing 13.8 kV aerial line to a power pole and pad-mounted service equipment.* ECN

1.2.1.5 Fire alarm system.

1.2.2 Work Not Included: The following work will be performed by others:

1.2.2.1 Clearing and grubbing of the area for the foundation and slab.

1.2.2.2 Excavation and backfill required for the foundation and slab on grade.

1.2.2.3 Construction of the spread footings, column pedestals, and foundation wall.

1.2.2.4 Installation of the 5/8-inch stranded galvanized steel cable including exothermic weld.

1.3 DRAWINGS

1.3.1 The Drawings which describe the work covered by these Contract Documents are listed on the Schedule of Drawings.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

9 2 1 2 3 6 5 1 7 2 6

SECTION 01019

ITEMS FURNISHED FOR CONSTRUCTION

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 Code of Federal Regulations (CFR)

Title 30 Mineral Resources Sub Chapter N	Metal and Nonmetal Mine Safety and Health
30 CFR 56	Safety and Health Standards - Surface Metal and Nonmetal Mines

1.2 SUBMITTALS: Not Used.

1.3 GENERAL

1.3.1 Material and equipment furnished or made available to be incorporated into the Work are set forth in this Section. Other services and utilities provided are covered in other sections of this Specification.

1.3.2 Comply with provisions of Section 9 of the Contract General Conditions for all items furnished for construction.

1.3.3 Provide KEH access to the premises where items furnished for construction are stored before incorporation into the Work.

1.4 GRAVEL AND SAND

1.4.1 Gravel and sand from unmined natural deposites is available at no cost from sites designated by KEH within 4 miles of the project site. KEH makes no representation that unmined materials will meet physical properties required in this Specification.

1.4.2 If the Contractor elects to utilize the available gravel sites he shall furnish all equipment and labor required to excavate, process, load, transport, and place the gravel and sand.

1.4.3 Material from the gravel sites shall be used only for the work covered by this Specification and no gravel or sand, processed or nonprocessed, or concrete manufactured therefrom shall be transported off the Hanford Site.

1.4.4 Access to gravel sites and travel between gravel sites and construction sites shall be on roads designated by KEH and the use shall be in compliance with the requirements of Section 01500 of this Specification.

1.4.5 Operations at the gravel sites shall be in compliance with the following requirements.

1.4.5.1 Confine removal of overburden and top soil to areas designated by KEH. Stabilize blow sand areas after surface has been disturbed with ballast or other approved method to prevent wind erosion.

1.4.5.2 Make no excavation or bank cut within 100 feet of power lines, paved roads, railroads, security fences, or other permanent structures.

1.4.5.3 Excavation and processing shall be in accordance with 30 CFR 56, Safety and Health Standards. Correct operations identified by KEH to be hazardous to life or property.

1.4.5.4 Explosives are prohibited articles as described in Section 56 of the Contract General Conditions and shall not be brought to the Hanford Site or proposed for use without written KEH approval.

1.4.5.5 Temporary structures are permitted at the gravel site for offices, storage, or repair facilities necessary for the gravel removal and processing operations. No facility for habitation shall be permitted.

1.4.5.6 Use of gravel sites shall be nonexclusive. Others may also enter the gravel sites to excavate material required for other work.

1.4.5.7 Upon completion of operations the gravel site shall be cleared of debris, temporary structures, and equipment. The excavated area shall be graded, banks properly sloped, and stabilized to prevent wind erosion. Conditions identified by KEH as not meeting these requirements shall be corrected before final acceptance of the Work.

1.4.5.8 The right to use the gravel sites may be terminated by KEH for failure to comply with requirements set forth herein or for abandonment of operations under this contract. The right to use the gravel site shall terminate without notice upon acceptance of Work under this Contract.

1.5 MATERIALS AND EQUIPMENT

1.5.1 Materials and equipment listed below will be furnished by KEH, without cost to the Contractor, for incorporation into the Work.

1.5.1.1 One 4,000 SF preengineered/prefabricated metal building including two hollow metal personnel doors with view glasses. View glasses shall be in kit form and must be installed.

1.5.1.2 One radio alarm master box and antenna (not including conduit or wiring).

1.5.1.3 Two 3,000 CFM wall exhausters complete with bird screen, wall grille, and gravity damper.

1.5.1.4 Two wall mounted louvers.

1.5.1.5 Two Continuous air Monitors (CAMs) including temporary stands.

1.5.1.6 One 4-inch UL listed or FM approved post indicating valve.

1.5.1.7 One 6-inch UL listed or FM approved fire hydrant and one hydrant connection valve.

1.5.1.8 One pole-mounted distribution transformer. ECN-

1.5.1.9 One main distribution panel.

1.5.1.10 One socket-type watthour demand meter.

1.5.1.11 One combination meter and CT cabinet.

1.5.1.12 Two current transformers.

1.5.1.13 One test switch. ECN-

1.5.1.14 15 kV cable. ECN-

1.5.2 ~~Materials and equipment noted in Paragraph 1.5 are on hand and are presently stored at the KEH Warehouse, 1252 building, in the 3000 Area, approximately 28 road miles from the jobsite.~~ *Materials and equipment noted in subparagraphs 1.5.1.1 through 1.5.1.13, with the exception of the item noted in subparagraph 1.5.1.10, are on hand and presently stored at the KEH Warehouse, 1252 Building, in the 3000 Area, approximately 28 road miles from* the jobsite. The socket-type watthour demand meter, noted in subparagraph *1.5.1.10, will not be available prior to the project completion date and consequently, will be installed by others.* ECN- ECN- ECN-

1.5.3 Furnish equipment and labor for uncrating or unpacking materials and equipment noted in Paragraph(s) 1.5.1.1 and 1.5.1.2 and for handling, transportation, and performing all installation as required.

1.5.4 Other materials and equipment shown or specified in the Specifications and the Drawings required to complete the Work shall be furnished by the Contractor.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

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SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 REFERENCES: Not Used.

1.2 SUBMITTALS: Not Used.

1.3 ESTIMATED QUANTITIES: The quantities of unit price items listed below and in the Schedule of Unit Price Items are estimates only. The Contractor will be required to complete the work specified in accordance with the contract unit prices whether it involves quantities greater or less than the following estimates: (See Article 1.5, Variations in Estimated Quantities).

Item No.	Description	Unit	Estimated Quantity
1.	Clearing and grubbing	SY	1,000
2.	Cut and fill	CY	500
3.	8" underground pipe (D.I.)	LF	500
4.	4" underground pipe (D.I.) & PIV	LF	~~50~~ *215* ECN
5.	Direct buried electric cable	LF	300
6.	Buried ~~1"~~ *1/2"* conduit w/wire	LF	~~600~~ *215* ECN
7.	4" thick gravel stabilization	SY	800
8.	4' wire fence removal	LF	100
9.	UL/FM fire hydrant	EA	1

The following work item is established on a job basis (the entire work as one job). The Contractor will be required to perform the work specified in accordance with the contract price.

Item No.	Description	Unit	Estimated Quantity
10.	Complete balance of work	Job	1

1.4 MEASUREMENT AND PAYMENT

1.4.1 It is mutually agreed that the contract price for the following items as described in Article 1.3 above and in the Schedule of Unit Price Items, shall be full compensation for furnishing all labor, materials (except for materials furnished by KEH, as specified), equipment, and for

other expenses incidental to this contract. No further compensation of any kind or description will be made.

1.4.1.1 Clearing and grubbing: Measurement will be made on a square yard (SY) basis for the actual area cleared and grubbed as measured in the field and approved by KEH. Payment will be made at the applicable contract unit price per SY (Item No. 1). Said contract price and payment shall constitute full compensation for all costs of labor, material, and equipment, including the cost to haul waste materials to the disposal site, in accordance with the contract specifications and drawings and as directed by KEH.

1.4.1.2 Cut and fill: Measurement will be made on a cubic yard (CY) basis for amount of in place material worked to attain the compacted surface elevations specified. Payment will be made at the applicable contract unit price per CY (Item No. 2). Said contract price and payment shall constitute full compensation for all costs of labor, material, and equipment to complete the requirements of the contract specification and construction drawings (site plan to be provided prior to award) and as directed by KEH.

1.4.1.3 8" underground pipe (D.I.): Measurement will be made on a lineal foot (LF) basis, including fittings, for complete installation of the 8" fire pipeline. Payment will be made at the applicable contract unit price per LF (Item No. 3). Said contract price and payment shall constitute full compensation for all labor, material, tools, and equipment to excavate, install the 8" pipe including an 8" x 8" x 4" tee. Test and backfill the pipeline in accordance with the contract specification and construction drawings (site plan to be provided prior to award) and as directed by KEH.

1.4.1.4 4" underground pipe (D.I.) and PIV: Measurement will be made on a LF basis, including fittings for installation of the 4" fire pipeline to a point 5 feet from the storage building exterior. Payment will be made at the applicable contract unit price per lineal foot (LF) (Item No. 4). Said contract price and payment shall constitute full compensation for all labor, material, tools, and equipment to excavate, install the 4" pipe including a 4" ell and 4" post indicator valve with painted guard posts. Test and backfill the pipeline in accordance with the contract specification and construction drawings (site plan to be provided prior to award) and as directed by KEH.

1.4.1.5 Direct buried electric cable: Measurement will be made on a LF basis for electric power cable installed to a point 5 feet from the storage building exterior. Payment will be made at the applicable contract unit price per LF (Item No. 5). Said contract price and payment shall constitute full compensation for all labor, material, tools, and equipment to excavate, place, and backfill the direct buried electric cable in accordance with the contract specifications and construction drawings (site plan to be provided prior to award) and as directed by KEH.

1.4.1.6 Buried 1" conduit with control wire: Measurement will be made on a LF basis for 1" conduit and the fire alarm wire installed to a point 5 feet from the storage building exterior. Payment will be made at the applicable contract unit price per LF (Item No. 6). Said contract price

and payment shall constitute full compensation for all labor, material, tools, and equipment to excavate, place, and backfill the 1" conduit and included fire alarm wire in accordance with the contract specifications and construction drawings (site plan to be provided prior to award) and as directed by KEH.

1.4.1.7 4-inch thick gravel stabilization: Measurement will be made on a square yard (SY) basis for the actual area stabilized in the field as measured by KEH. Payment will be made at the applicable contract unit price per SY (Item No. 7). Said contract unit price and payment shall constitute full compensation for all costs of labor, material, and equipment to place stabilization, including the cost to haul material to the point of installation.

1.4.1.8 Removal of 4-foot wire fence: Measurement will be made on a LF basis for removal of a 4-foot high welded wire fabric fence. Payment will be made at the applicable contract unit price per LF (Item No. 8). Said contract price and payment shall constitute full compensation for all labor, material, tools, and equipment to remove and dispose of the existing section of fence.

1.4.1.9 UL/FM fire hydrant: Measurement will be based on the installation of one UL listed or FM approved fire hydrant. Payment will be made at the applicable contract unit price for item No. 9. Said contract unit price for the fire hydrant shall constitute full compensation for all labor, material, tools, and equipment to excavate, install, and backfill the fire hydrant, *fire hydrant connection valve, and an 8" x 8" x 6" tee.* ECN

1.4.1.10 Complete balance of work: Payment will be made at the contract price for all other work as specified in the contract documents on a job basis. Contract price to include all costs for labor, material, tools, and equipment and all incidental costs to provide a completed facility.

1.5 VARIATIONS IN ESTIMATED QUANTITIES

1.5.1 Where the quantity of a pay item in this contract is an estimated quantity and where the actual quantity of such pay item varies more than 25 percent above or below the estimated quantity stated in this contract, an equitable adjustment in the contract price shall be made upon demand of either KEH or the Contractor. The equitable adjustment shall be based upon any increase or decrease in costs due solely to the variation above 125 percent or below 75 percent of the estimated quantity.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

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SECTION 01027

APPLICATION FOR PAYMENT

PART 1 - GENERAL

1.1 REFERENCES: Not Used.

1.2 SUBMITTALS: Not Used.

1.3 APPLICATION PROCEDURE

1.3.1 Payment to Contractor as set forth in Section 15 of Contract General Conditions are initiated by the Contractor making an application for payment as follows:

1.3.1.1 Complete Form KEH-1026.00 and KEH-0960, Progress Estimate Backup sheet, and Monthly Estimate of Work Completed for unit price pay items (samples appended), furnished by KEH and include the following either in the letter requesting payment or at the end of the Progress Estimate Backup:

Subtotal Value of All Pay Items Completed to Date (Include all Modifications)		$X,XXX.XX
Allowance for Material Stored on Site:		
Previous net Allowance	$X,XXX.XX	
Minus Materials Placed	X,XXX.XX	
Plus Materials Stored	X,XXX.XX	
Net Allowance		X,XXX.XX
Subtotal Value Completed to Date		$X,XXX.XX
Less Previous Payments	$X,XXX.XX	
Less Other Charges From KEH	X,XXX.XX	
Subtotal Deductions		(X,XXX.XX)
Total Payment Requested		$X,XXX.XX
Less Retainage at ___%		(X,XXX.XX)
Total Payment Allowed		$X,XXX.XX

1.3.1.2 Review the information with KEH approximately 5 days before end of the pay period, adjust the data, if required, initial, and return to KEH.

1.4 PAYMENT PROCEDURE

1.4.1 Upon receipt of an approved application, KEH will prepare the payment documents and send the original and two copies to the person authorized by the Contractor to sign such documents.

1.4.2 After signing the payment documents the original and one copy shall be returned to KEH for processing. No processing of checks will be done by KEH until the signed payment document is returned.

1.4.3 KEH will mail the check to the Contractor's designated office.

1.5 ADDITIONAL DATA REQUIRED

1.5.1 When processing applications for payment and preparing payment documents, KEH may require data to substantiate and justify amounts requested. Processing of payment documents may be delayed if data is not forwarded expeditiously to KEH.

1.5.2 Requests for payment for equipment of material which the Contractor has received, but has not installed, shall be accompanied by invoice or other data to provide evidence that the title to such equipment or material is held by the Contractor.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

KAISER ENGINEERS
HANFORD

PROGRESS ESTIMATE BACKUP

Sheet ____ of ____

Contractor: | Contract No.:

Subject:

Backup For Progress Estimate No.: | Dated:

Item	Description	Estimated Cost	Weighted Percent	Percent Complete to Date	W'T'D % Complete to Date	Total $ to Date

W-032-C1
As-Built Rev. 1

KAISER ENGINEERS
HANFORD

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MONTHLY ESTIMATE OF WORK COMPLETED

(BACKUP SHEET FOR UNIT PRICE CONTRACTS)

Contract No	Contractor	Date	Sheet _____ of _____

Item No.	Description	Bid Schedule				Prior Period To (Date) _____		Current Period To (Date) _____		Total to Date	
		Unit	Est. Qty.	Unit Price	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount

KEH-0960 00 (9/87

END OF SECTION

SECTION 01040

COORDINATION

PART 1 - GENERAL

1.1 REFERENCES: Not Used.

1.2 SUBMITTALS: Not Used.

1.3 CONSTRUCTION ACTIVITIES

1.3.1 Coordinate construction activities to assure efficient and orderly sequence of work, with provisions for accommodating items to be installed later.

1.3.2 Certain work related to this Project will be performed by others. Contractor shall cooperate and coordinate his work to eliminate interferences and delays.

1.4 CONNECTIONS TO EXISTING SYSTEMS

1.4.1 Advance notice of work that will affect existing systems shall be given to KEH. Careful planning and scheduling of work activities is required to coordinate operations of existing systems to keep disruptions at minimum.

1.4.2 As required in the General Conditions, Subsection 50.7, connection to existing systems must be scheduled well in advance. KEH will coordinate schedule with Contractor and utility operators.

1.5 ACCESS TO WARRANTY WORK

1.5.1 Access to warranty work or work after possession as designated in the Contract General Conditions, Section 20 shall be coordinated with KEH and user of system.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

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SECTION 01043

JOBSITE ADMINISTRATION

PART 1 - GENERAL

1.1 REFERENCES: Not Used.

1.2 SUBMITTALS: Not Used.

1.3 WORKING HOURS

1.3.1 Work shall be performed during regular day shift which is 7:30 a.m. to 4:00 p.m., Monday through Friday, excluding holidays.

1.3.2 Work other than regular day shift requires KEH approval in advance as set forth in Section 51 of Contract General Conditions.

1.4 BADGE, DOSIMETER, AND ORIENTATION

1.4.1 The Work is located within the Controlled Access Area and inside a Limited Area, and the badge, basic dosimeter requirements, and orientation will be in accordance with Section 56 of Contract General Conditions.

1.5 EVACUATION DRILLS

1.5.1 Personnel working inside Limited Areas are required to participate in emergency evacuation drills which are held approximately once every three months and last approximately one hour.

1.5.2 Maintain daily log or other suitable record of names of all personnel including subcontractors working inside the Limited Area.

1.6 SECURITY

1.6.1 Policy and Procedures: Contractor employees are required to comply with security policy and procedures set forth in Sections 56 and 87 of Contract General Conditions. Copies of Safeguards and Security Manual KEH-MA-6 will be provided to Contractor upon request after award of Contract.

1.6.2 Security Escorts

1.6.2.1 Contractor personnel not having "5" or "3" security clearance, working within the 200 West Limited Area require security escorts. Escorts are provided by KEH at no cost except as set forth in subparagraph 1.6.2.5.

1.6.2.2 Security escorts are required for uncleared personnel to work within 200 West Limited Area. Personnel not having "5" or "3" security clearance for Limited Area or "3" security clearance for Protected Area required escorts. Escorts are provided by KEH at no cost except as set forth in subparagraph 1.6.2.5.

1.6.2.3 Provide list of employees and vehicles to be used inside the Limited Area, the anticipated start, and duration of utilization. Provide list one week before start of work in Limited Area for escort requirement determination. Provide weekly work schedules of employees, not later than Thursday of preceding week (minimum 24 hour notice required for changes), for KEH to provide sufficient escorts.

1.6.2.4 Escorts will be assigned from KEH trailer located outside 200 East Limited Area near Access Gate #814. Personnel shall meet and transport assigned escorts from that location. Provide space within contractor vehicles to accommodate number of escorts required. A minimum of one escort is required in each vehicle.

1.6.2.5 Contractor may be charged for escorts when escorts have been requested and the Contractor personnel does not show up at time and place specified. Charges will be made at the rate of $15.00 per hour for each escort for time lost waiting for Contractor personnel.

1.7 WORK NEAR ELECTRICAL LINES

1.7.1 When cranes or hoists are operated under or adjacent to existing overhead electrical lines, a standby lineman furnished by the Contractor must be in attendance.

1.8 SAFETY REQUIREMENTS

1.8.1 Fire Safety

1.8.1.1 The Contractor is required to address fire safety as part of construction safety plan required by Section 55 of Contract General Conditions. The following fire safety requirements are to be incorporated into the construction safety plan.

a. Portable shields shall be utilized wherever the Contractor is welding, cutting, or grinding.

b. Maintain fire watch a minimum of one-half hour after cessation of welding, cutting, or grinding.

c. Fully charged fire extinguishers shall be available whenever welding, cutting, or grinding.

d. Method to control ignition of brush fires.

e. Method to comply with requirements for off road driving and grass fire prevention given in Section 01500.

1.8.2 Safety Apparel

1.8.2.1 Personnel shall wear appropriate foot wear in a recognized construction area. Tennis shoes, canvas type shoes, or open toe shoes do not meet this requirement.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

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SECTION 01050

SURVEY AND FIELD ENGINEERING

PART 1 - GENERAL

1.1 REFERENCES: Not Used.

1.2 SUBMITTALS: Not Used.

1.3 QUALITY CONTROL

1.3.1 Establishing alignment and grade shall be the responsibility of a Land Surveyor registered in the state of Washington and acceptable to KEH.

1.3.2 Use skilled personnel trained and experienced in construction staking and familiar with requirements and methods needed for proper performance of work.

1.3.3 Field notes, records, and documentation shall be available to KEH to review and verify procedures used and accuracy of work.

1.4 SURVEY DATA

1.4.1 Bench mark with coordinates identified shall be provided in the field by the KEH representative. Detail surveys shall be by Contractor. Contractor shall be responsible for preservation of bench marks and reference points, including stakes or other markers established until removal is authorized by KEH.

1.4.2 From information and dimensions shown on the Drawings, perform survey/layout required by Work.

1.5 PROCEDURES

1.5.1 Before initial layout, field verify horizontal and vertical data furnished. Report discrepancies greater than allowed to KEH before proceeding.

1.5.2 Establish adequate number of permanent reference points, to be used during construction, referenced to original control points. Record locations with horizontal and vertical data on project record documents.

1.5.3 Protect and preserve control and reference points until Work is complete. Report loss or destruction of control points to KEH. Report relocation or change in data affecting reference points.

1.5.4 Periodically verify data for control and reference points, and construction stakes to maintain construction accuracy.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 01065

PERMITS

PART 1 - GENERAL

1.1 REFERENCES: Not Used

1.2 SUBMITTALS: Not Used

1.3 FEDERAL, STATE, AND MUNICIPAL LAWS, CODES, AND REGULATIONS

1.3.1 Permits or licenses to do business required by Federal, State, and Municipal laws, codes, and regulations are the responsibility of the Contractor as stated in of the General Conditions, Section 6.

1.4 HANFORD SITE PERMITS

1.4.1 General: Before certain types of work are performed at Hanford, Contractor is required to have a permit. Permits are provided by KEH at no cost, however, Contractor shall furnish information required and notify KEH in advance of work which requires permit.

1.4.2 Excavation: Do not excavate without permit set forth in the Contract General Conditions, Subsection 50.9.

1.4.3 Backfill: Place no backfill without permit.

1.4.4 Tie-in Permit: Obtain separate permits for each tie-in before making connection to existing utilities.

1.4.5 Welding and Cutting: Perform no welding or cutting without approved permit.

1.4.6 Oversize Load Permits: In addition to a Washington State permit, a site oversize load permit is required when a vehicle or load exceeds the following dimensions:

Width:	8′ - 6"
Height:	14′ - 0"
Length:	40′ - 0" (single unit)
	48′ - 0" (single trailing unit)

The site permit will be furnished by KEH with 48-hour notice.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.1 REFERENCES: Not Used.

1.2 SUBMITTALS: Not Used.

1.3 MEETING PROCEDURES

1.3.1 Representatives from KEH and Contractor, including major subcontractors, shall participate in project meetings. Representatives from Operating Contractor may attend as required by items to be discussed.

1.3.2 Meeting times and locations shall be mutually agreed to by Contractor and KEH, and will be held at the Hanford Site in Richland, Washington. KEH will issue notices of meetings and prepare minutes. Meeting minutes will be distributed to project participants.

1.4 SITE LABOR CONFERENCE

1.4.1 Before starting construction onsite, attend informational conference on Hanford Site labor requirements applicable to Project. KEH will schedule, give advance notice, and chair meeting to be attended by representatives from labor organizations whose members may be utilized in construction. Labor provisions in the General Conditions will be reviewed.

1.5 PRECONSTRUCTION MEETING

1.5.1 Meeting will be scheduled by KEH before start of onsite work has been issued. Authorized representatives of Contractor and major subcontractors shall attend. KEH will advise others having interest in Project. Meeting will be chaired by KEH.

1.5.2 Following items, as minimum, will be incorporated into agenda for meeting.

1.5.2.1 Point of contact, key personnel (Operating Contractor, Safety, QA/QC, Acceptance Inspectors, etc) and contracts personnel.

1.5.2.2 Schedule requirements and restraints, submittals and work limitations.

1.5.2.3 Safety, construction progress meetings and frequency, and certified payrolls.

1.5.2.4 Report requirements and frequency.

1.5.2.5 Major material and equipment lists.

1.5.2.6 Other pertinent items.

1.6 CONSTRUCTION PROGRESS MEETINGS

1.6.1 Meetings, held weekly at time and location determined at preconstruction conference, will be approximately 1 hour long.

1.6.2 KEH will chair meeting and request attendance of key personnel required. Authorized representative of Contractor and pertinent subcontractors shall attend.

1.6.3 Purpose of meetings is to monitor status and provide forum for exchange of pertinent Project information. Major topics may include, but not be limited to, following.

1.6.3.1 Schedule, cost, and construction status.

1.6.3.2 Design and scope changes.

1.6.3.3 Submittal status, key material and equipment delivery status.

1.6.3.4 Potential problem areas.

1.6.3.5 Action item status, goals for next meeting.

1.6.3.6 Other appropriate items.

1.6.4 Minutes will be issued by KEH as promptly as possible following meeting. Action items will be identified with assigned follow-up. Issues resolved will be reported in minutes, as well as closed action items.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01300

SUBMITTALS

1.1 DESCRIPTION

1.1.1 This Section summarizes requirements for submittal of documents defined in Part 1 of each Section of the Specification and describes procedures for supplemental submittals.

1.2 SUBMITTALS

1.2.1 Submittals listed in Part 1 of each Section require either review and approval or review for record.

1.2.1.1 Review and approval: Submittals shall have been approved and returned to Contractor before proceeding with procurement, fabrication, or construction.

a. Approved submittals are identified by submittal stamp with "Approved" or "Approved with Exception" box checked. "Approved" signifies general concurrence to achieve conformance with design concept of the Project and compliance with requirements of Contract Documents. "Approved with Exception" signifies general concurrence with noteworthy comments or clarifications. Approval of submittals does not relieve Contractor of responsibility for errors contained therein.

b. Submittal not approved is identified on submittal stamp as "Not Approved, Revise and Resubmit." Submittal is considered, by Architect-Engineer (A-E), to be technically deficient or incomplete and unacceptable. Resubmittal is required, hence fabrication, procurement, or performance of procedures shall not proceed.

1.2.1.2 Review for record: Contractor may proceed with procurement, fabrication, or construction, however, acceptance is contingent upon compliance with the Drawings and Specifications. Incomplete or inaccurate submittal data will be returned to Contractor with appropriate comments and items procured or work performed shall be corrected.

1.2.2 Supplemental Submittals: Submittals initiated by Contractor for consideration of "equal substitute" products or corrective procedures shall contain sufficient data for review and approval.

1.2.2.1 Equal substitute product submittals must contain outline dimensions, operating clearances, and sufficient engineering data to indicate substantial compliance with the Drawings and Specifications.

a. Identify each submittal by specification number, Section and Paragraph number; or referenced Drawing number and detail.

b. Improperly identified submittals will be returned without consideration.

1.3 SUBMITTAL PROCEDURES

1.3.1 Submittals are itemized in Article 1.4 and are identified by submittal number and title. Identify each submittal by Specification number and submittal number noted in schedule. Number of copies required for retention by A-E are shown in schedule. Additional copies required for Contractor uses must be added.

1.3.2 Contractor shall review submittals before forwarding data to A-E. Contractor shall sign data transmittal form showing submittal has been reviewed for compliance with Contract Documents. Contractor's signature represents he has verified materials and field measurements, and checked and coordinated information contained within submittals with requirements of Contract Documents. Only signed submittals shall be forwarded to A-E. Submittals not signed will be returned by A-E without review.

1.4 SCHEDULE OF SUBMITTALS

Submittal Number	Submittal Title	Quantity	Review and Approval	Review For Record
CONTRACT GENERAL CONDITIONS				
55/1	Safety Program; Industrial Injury/ Illness Experience; Equipment Certification	10	Prior to badging	
PROGRESS SCHEDULES				
01310/1.2.1	Progress Schedule	10	10 days after notice to proceed	
01310/1.2.2	Weekly Work Schedule	10	Weekly	
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS				
01500/1.2.1	Anchoring and Enclosure Methods	10	Prior to mobilization	
FIRE WATER SYSTEMS				
02668/1.2.1	Approval Data	10	Before delivery	
02668/1.2.2	Certified Vendor Information (CVI)	12		Before installation
02668/1.2.3	NFPA Test Certificate	10		Within 10 days after completion

Submittal Number	Submittal Title	Quantity	Review and Approval	Review For Record
SEALANTS AND CAULKING				
07920/1.2.1	Approval Data	10	Before delivery	
FIRE PROTECTION				
15300/1.2.1	Approval Data	10	Before delivery	
15300/1.2.2	Certified Vendor Information (CVI)	12		Before installation
15300/1.2.3	Design/Fabricator Drawings	10	Before fabrication	
15300/1.2.4	As-Built Drawings	10		Within 10 days after completion
15300/1.2.5	NFPA Test Certificate	10		Within 10 days after completion
HEATING, VENTILATING, AND AIR CONDITIONING				
15500/1.2.1	Approval data	10	Before delivery	
15500/1.2.2	Certified Vendor Information (CVI)	12		Before installation
SERVICE AND DISTRIBUTION (600-VOLT AND BELOW)				
16400/1.2.1	Approval Data	10	Before delivery	
ALARM AND DETECTION SYSTEMS				
16720/1.2.1	Approval Data	10	Before delivery	

END OF SECTION

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SECTION 01310

PROGRESS SCHEDULES

PART 1 - GENERAL

1.1 REFERENCES: Not Used.

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Progress Schedule: Submit schedule required in Article 1.3.

1.2.2 Weekly Work Schedule: Submit schedule required in Article 1.4.

1.3 PROGRESS SCHEDULES

1.3.1 Schedule identified in the General Conditions, Section 5, shall be in accordance with following.

1.3.1.1 Show order Contractor proposes to carry on the Work, dates it will start the several salient features of the Work (including procurement of materials and equipment), and contemplated dates for completion. Each schedule shall be in the form of a horizontal bar chart of suitable scale to show percentage of Work scheduled for completion at any time with separate bar for each activity. At end of each week or at end of other periods of time specified in Contract, Contractor shall prepare and submit 1 copy of chart showing actual progress at end of period.

1.3.1.2 Organize schedule to show activities relative to each major subcontractor and supplier. Provide subschedule to define critical portions of entire schedule.

1.3.1.3 Schedule shall include design activities and milestones, delivery date of design documents, construction activities, progress milestones, and include but not be limited to following activities.

a. Insurance, bonds/mobilization.

b. Sprinkler system design.

c. Clear and grub for firewater and electrical lines.

d. Fire water line (including excavation).

e. Rebar for slab.

f. Pour slab.

g. Cure concrete slab.

h. Special protective coating (including angle iron containment).

i. Erect building structural.

j. Attach roof and siding.

k. Install doors.

l. Install direct burial cable.

m. Run conduit and cable inside building.

n. Install CAMs.

o. Install lighting.

p. Sprinkler system installation.

q. Painting.

r. Fire alarm tie-in.

s. Fire riser enclosure (including stud walls, sheet rock and insulation).

t. Acceptance test procedure.

u. Stabilization.

v. Cleanup/Demobilization.

1.3.1.4 Schedule shall show, as minimum, accumulated percentage of completion of each activity and total percentage of work completed as of last work day of each week.

a. Develop an "S" curve from percentage of total work figures and superimpose on progress schedule.

b. Show dollar value or percent of total next to each activity shown on schedule. Figures will be basis for determining progress payments described in Section 01027.

1.4 WEEKLY WORK SCHEDULE

1.4.1 Prepare and submit detailed schedule of next week's work no later than noon of each Friday. First weekly work schedule shall be submitted within 10 working days after receipt of written notice of Contract award for review and approval. Schedule shall include following as minimum.

1.4.1.1 Work description.

1.4.1.2 Location of work.

1.4.1.3 Work involving outages, overtime, weekends, etc.

1.5 REVISIONS TO SCHEDULES

1.5.1 Whenever KEH determines there are significant variances between actual and scheduled progress, endangering completion within Contract completion time, it may require Contractor to prepare and submit revised progress schedule.

1.5.2 Show progress of each activity to date of submittal and projected completion date of each activity. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

1.5.3 Provide narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken, or proposed, and its effect, including effect of changes on schedules of separate contractors.

1.5.4 Issue copies of revised schedules to job site file, subcontractors, suppliers, and other concerned entities. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in revised schedules.

1.5.5 If Contractor fails to submit progress schedule specified in Paragraph 1.3.1 within time prescribed, or updated progress schedule specified in Paragraph 1.5.1, within requested time, KEH may withhold approval of progress payments until time Contractor submits required progress schedules.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

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SECTION 01400

QUALITY ASSURANCE

PART 1 - GENERAL

1.1 REFERENCES: Not Used.

1.2 SUBMITTALS: Not Used.

1.3 INSPECTION AND TESTING

1.3.1 Performance by Contractor

1.3.1.1 Inspection and testing to be performed by the Contractor shall be as stated in Section 19 of Contract General Conditions and including, but not limited to, the following specific inspections and testing activities:

a. Concrete preplacement, placement, curing (pour slip).

b. Hydrostatic test set forth in Sections 15300 and 02668. Testing and balancing sequence set forth in Section 15500. Continuity test set forth in Sections 16720 and 16400. Visual Weld Inspections set forth in Sections 05500 and 15300.

1.3.2 Performed by KEH

1.3.2.1 In accordance with Section 19 of Contract General Conditions KEH or its designated representative will perform inspections and tests as follows:

a. Specific inspection points.

b. Final Acceptance Inspection.

c. Testing to determine moisture-density relations and field in-place density of soils.

d. Preparation, collecting, and testing of concrete and grout test specimens.

e. Testing of special protective coating.

f. Witness Acceptance Test Procedures/Functional Tests.

1.3.3 Specific Inspection Points

1.3.3.1 The Contractor shall adhere to inspection points specified. Contractor shall assure their personnel have completed inspections of and approved portions of work in accordance with Contract requirements before notifying KEH.

a. Specific inspection points are defined as follows:

1) Construction inspection (H): Required for witnessing of specific construction features, before further construction is allowed to proceed.

2) Witness (W): Selected for inspection at option of KEH. Work may proceed upon verbal release by KEH or upon the expiration of 1 hour beyond the scheduled time of the witness.

3) Receiving (R): Special items of fabrication, equipment, and/or material scheduled to be delivered to the jobsite and/or other designated location which require inspection upon their arrival. Contractor shall notify KEH within four hours after arrival of any such item.

b. Specific Inspection Points: Apply to onsite work. Except where a longer notification period is specified, the Contractor shall notify the KEH not less than 4 working hours prior to each inspection for onsite work.

1.3.3.2 The Inspection Points; Construction Inspection (H), and Witness (W), and Receiving (R) for the contract work will be for the following items and stages of work:

a. Sitework

1) Earthwork

H - Any compaction procedure demonstration (requires 3 working days notice)
H - Any backfilling operations

2) Fire water system

R - Arrival of PIV and Post Indicator and hydrant at jobsite
W - Initial installation of piping
H - Any flushing of piping
H - Any pressure testing of piping
H - Any sanitizing of piping
H - Tie-in to existing system

b. Concrete

1) Cast-in-place concrete

H - Any placement of concrete
H - Any placement of grout

c. Metals
   1) Metal fabrication

      W - Initial welding

d. Thermal and moisture protection

   1) Insulation

      W - Initial installation of wall, ceiling, and perimeter insulation

   2) Sealant and caulking

      H - Initial installation

e. Doors and Windows

   1) Overhead coiling door

      W - Initial installation of door

f. Finishes

   1) Special protective coating

      H - Any application of each coating

g. Mechanical

   1) Fire protection

      W - Initial welding
      H - Any flushing of piping
      H - Any pressure testing of piping
      W - Initial packing of pipe penetrations

   2) HVAC

      H - Any testing and balancing HVAC system

h. Electrical

   1) Service and distribution

      W - Any continuity testing

   2) Alarm and detection systems

      W - Any continuity testing
      H - Any performance of ATP

   3) High voltage distribution ECN
      W - Any continuity testing ECN

1.4 NONCONFORMANCE REPORTING AND RESOLUTION

1.4.1 Three degrees of nonconformances are used to indicate noncompliance with contract requirements.

1.4.1.1 Obvious nonconformance: A corrective action is as obvious as the nonconformance not identified by tag, and normally corrected by Contractor without notification.

1.4.1.2 Open items nonconformance: May be identified by blue nonconformance report (NCR) tag, is readily correctable to meet Drawings and Specifications and does not require deviation from contract requirements or design. Can be corrected by Contractor without any additional direction, deviation, or change to Contract requirements.

1.4.1.3 Report nonconformance: May be identified by blue NCR tag or red construction hold (CH) tag, requires change to or deviation from Contract requirements and additional direction to Contractor. Changes or deviations must be approved by KEH. Do not proceed with portion of the Work bearing red tag until installation is determined by KEH to be in compliance with Contract requirements, or specific permission to proceed is received from KEH. Tags are not to be removed by anyone other than inspector who applied tag or by direction of inspector's supervisor.

1.4.2 Differing degrees of nonconformance require different methods of reporting, resolving, and documenting.

1.4.2.1 Obvious nonconformance: Requires documenting only if it remains at time of completion of final punchlist. Documented on final punchlist.

1.4.2.2 Open item nonconformance: Documented for verification of correction on open items list available from KEH upon request.

1.4.2.3 Report nonconformance: Documented on Construction Nonconformance Report (CNCR) or audit finding report (AFR) and requires formal approved resolution.

1.4.3 Contractor shall ensure its organization is represented by a knowledgeable individual with sufficient authority to commit Contractor to corrective action requests identified by KEH.

1.4.4 Nonconformances noted during performance of Contract, require resolution before completion and final payment.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 National Fire Protection Association (NFPA)

NFPA 701-1977	Standard Methods of Fire Tests for Flame-Resistant Textiles and Films

1.1.1.2 Washington State Department of Transportation (WSDOT)

M41-10-84	Standard Specifications for Road, Bridge, and Municipal Construction

1.1.1.3 Washington Department of Ecology

WAC 173-303	Dangerous Waste Regulations

1.1.1.4 United States Environmental Protection Agency

40 CFR 761	Toxic Substance Control Act

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Anchoring and Enclosure Methods: Submit methods proposed for anchoring portable structures and enclosing underfloor area to meet the requirements of this Section.

1.3 CONSTRUCTION FACILITIES

1.3.1 First Aid: Facilities are available at Building 2719WA in the 200 West Area to provide first line medical attention.

1.3.2 Operation and Storage Areas: Confine onsite storage of materials to laydown area at Project site designated by KEH. Do not use or block parking lot east of 272WA Building.

1.3.3 Disposal Site for Waste: Dispose of excess excavation, broken asphalt, and broken concrete at site approximately 12 road miles from the Project. Site is open only during regular working hours.

1.4 TEMPORARY UTILITIES

1.4.1 Water

1.4.1.1 Construction: Water for construction purposes will be made available from an existing hydrant due north of the 272-WA Building. A 4-1/2 inch, National Standard Thread, 1/4 turn ball valve with a female swivel to a 4-inch sexless "Snap-Tite/Storz" quick connect coupling shall be connected to the 4-1/2 inch port for Fire Department use only. A reduced pressure backflow preventer, BEECO-AERGAP Model 6CM or approved, and a slow-opening 2-1/2 inch gate valve shall be installed on each hydrant port intended for construction use. A slow-opening valve will prevent water hammer. The hydrant wrench, backflow preventers and all valves shall be furnished by the Contractor. The wrench shall remain on the hydrant at all times. When used, the hydrant shall be turned "Full-on" or "Full-off." Partial opening causes damage to the hydrant. The hydrant shall be turned off at the end of each work day. The Contractor shall provide freeze protection for the hydrant and temporary piping or hoses. All temporary pipe or hose extensions shall be furnished by the Contractor. Fittings provided by the Contractor for connection to water source shall be approved by KEH prior to installation. Before final acceptance of the contract work, the Contractor shall remove all temporary piping, hoses and valves installed by him.

NOTE: Contractor is required to notify KEH prior to each opening of hydrant.

1.4.1.2 Drinking: Available within 200 West Area. Furnish adequate drinking water to employees.

1.4.2 Electrical: Contractor shall provide temporary power.

1.4.3 Telephone

1.4.3.1 Telephone system is operated by General Telephone Company of the Northwest, Inc (GTE). Upon request, KEH will arrange for telephone service at field offices of Contractor and subcontractors, if facilities are available. KEH will charge Contractor for installation and services in accordance with charge assessed by GTE. Charges will be determined on basis of published tariffs. Information on tariffs may be obtained from DOE's Site Services Contractor, office of the Manager of the Plant Telephone and Radio, Telephone 376-6322.

1.4.3.2 Charges will be deducted from payments due Contractor. Contractor and subcontractors may use provided telephones for long distance calls necessary to the Work. Calls shall be made by valid credit card and cost not charged to Site Services Contractor or KEH.

1.4.4 Sanitary Facilities: Furnish and service chemical or other approved sanitary toilets for use of employees. Facilities shall meet the requirements of KEH which are available upon request.

1.5 ACCESS ROADS PARKING AREAS

1.5.1 Access to 200 West Area: Through main gate.

1.5.2 Parking: Available in vicinity of the Project inside the Limited Area. "No Parking" signs are posted to show fire and emergency lanes. No on-street parking will be permitted.

1.5.3 Grass Fire Prevention: Keep off-road driving to minimum. Vehicles driving off-road or to remote locations, shall carry a minimum 10 pound ABC dry chemical portable fire extinguisher, communications equipment consisting of two-way radio or mobile phone (CB type radios not acceptable) and shovel. Report fires immediately to nearest Hanford Patrol and Hanford Fire Department.

1.6 TEMPORARY CONTROLS

1.6.1 Dust Control: Maintain work areas to prevent hazard or nuisance to others. Accomplish dust control by sprinkling or other methods approved by KEH. Repeat sprinkling at necessary intervals to keep disturbed area damp at all times. Keep sufficient equipment at the Project to accomplish dust control as work proceeds and whenever dust nuisance or hazard occurs. No separate or direct payment will be made for dust control and cost shall be considered incidental to and included in contract price.

1.6.2 Temporary Enclosures: Plastic sheeting materials used to form enclosures shall have fire retardant capabilities meeting the requirements of NFPA 701. Acceptable manufacturers Winman Corporation, St. Cloud, Minnesota; Lancs Industries, Kirkland, Washington; and Protective Plastics, Inc, Greer, South Carolina. Other manufacturers may be submitted to KEH for approval.

1.6.3 Traffic Control: Temporary traffic control and barricades in accordance with WSDOT M41-10, Section 1-07.23(3).

1.7 FIELD OFFICE

1.7.1 Contractor may establish a field office equipped and staffed to conduct the Work. Keep copies of Drawings, Specifications and other information pertinent to the Work at office or Project site. KEH shall have access to documents at all times. Telephone service may be made available at field office as set forth in Paragraph 1.4.3 providing such service is available. Contractor may utilize existing telephones at buildings designated by KEH for local calls.

1.7.2 Anchor or tie down portable or relocatable structures, including trailers for field offices and storage, to prevent overturning or lateral movement in winds up to 70 mph, and enclose or skirt underfloor area with material that will not burn or support combustion to prevent accumulation of wind-blown debris and use of underfloor space for material storage. Complete anchoring and enclosure within 14 days of arrival on-site in accordance with submitted methods.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

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SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 REFERENCES: Not Used

1.2 SUBMITTALS: Not Used

1.3 RECORD REQUIREMENTS

1.3.1 The nature of the work at the Hanford Site requires that certain documents, as defined herein, be held to record the construction process and the administration of the Contract. KEH is responsible for assembling all pertinent data for final disposition. The Contractor is responsible for preparing, preserving, and delivering those Project Record Documents to KEH required by this Contract. These documents are in addition to those submittals required in Section 01300.

1.3.2 Project Record Documents shall be marked by the Contractor to identify those copies for record and to prevent their use for construction. Record copies of construction documents shall be kept in the Contractor's Field Office and shall be available to KEH during the progress of the work.

1.3.3 Some data required for Project Records are delivered to KEH during the course of construction and contract administration, while other required records are assembled after completion of construction for delivery to KEH. In all situations the Contractor is required to document the delivery by retaining a copy of reports delivered during course of work until construction completion, retaining a copy of letter of transmittal itemizing delivered items, or other means acceptable to KEH.

1.4 PROJECT RECORD DOCUMENTS

1.4.1 General: The documents required for Project Record are itemized herein. Each document shall be identified by Title or Number and shall be complete. All notes or markings added by hand shall be legible utilizing a permanent non-smearing marking media, such as ink or felt tip markers, in contrasting color.

1.4.2 Contract Documents: One set of Drawings and the Contract Documents, including Addenda and Modifications to the Contract, shall be stored in the Field Office apart from documents used in construction and shall be maintained in a clean, dry, and legible condition. Legibly mark each item to record actual construction, including changes to dimensions and details, manufacturer's name, catalog number, and substitute products.

1.4.3 Certified Payrolls: Each week certified payrolls, as required by Section 108 of the Contract General Conditions, shall be filed with KEH and copies kept in Field Office until Contract completion. No progress payments will be processed unless all certified payrolls for the work period have been received by KEH.

1.4.4 Weekly Manpower Report: A weekly manpower report completed daily and submitted weekly (before 10:00 a.m. on Monday for the previous week) is required during the performance period of subject contract. Forms for Contractor's use in documenting the foregoing will be furnished by KEH.

1.4.5 Backfill Permit: Retain all backfill permits approved for the work as required in Section 02200.

1.4.6 Soil Compaction Procedure: Retain all Form KEH-382 completed for the work as required in Section 02200 and Section 02235.

1.4.7 Pour Slips: After obtaining KEH approval of concrete pour slip required in Section 03300, give copy to KEH and retain Contractor copy until Contract closeout to forward to KEH.

1.4.8 Trip Tickets: Deliver to KEH with each truck load of concrete as required in Section 03300 and retain Contractor copy until Contract closeout and to forward to KEH.

1.4.9 Concrete Tests: If the Contractor elects to test concrete or to have independent tests performed, copies of such tests shall be given to KEH.

1.4.10 Megger Test Reports: Provide reports of all tests as required in Section 16400.

1.4.11 Flushing/Cleaning Documentation: Provide documentation required by NFPA 13.

1.4.12 Leak/Pressure Testing: Provide documentation that testing required in Sections 15300 and 02668 was accomplished.

1.4.13 Product Samples and Manufacturer's Instructions: In addition to submittal required in Section 01300 and requirements of this Section, any information received by the Contractor from suppliers that can document products used and how they were installed shall be forwarded to KEH for Project Records.

1.4.14 Matrial Safety Data Sheets (MSDS) reference Contract General Conditions, Section III.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

D 653-85	Standard Terms and Symbols Relating to Soil and Rock

1.1.1.2 Washington State Department of Transportation (WSDOT)

M41-10-84	Standard Specifications for Road, Bridge, and Municipal Construction

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 General: Obtain select soils from excavation or other designated locations. Obtain onsite approval for soils.

2.1.2 Fill or Backfill

2.1.2.1 Structural: Well-graded soil mixtures which may contain cobbles up to 3 inches in greatest dimension if uniformly distributed and not constituting more than 20 percent of volume of fill.

2.1.2.2 Common: Well-graded soil mixtures containing cobbles up to 8 inches in greatest dimension if uniformly distributed and not constituting more than 40 percent of volume of fill.

2.1.3 Bedding for Underground Pipe, Conduit, and Cable: Sand, defined in ASTM D 653, or excavated sandy material having less than 20 percent gravel particles and maximum dimension of 1/2 inch.

2.1.4 Stabilization: Gravel, defined in ASTM D 653. Maximum size of particles 3/4 inch minus for driveway and parking area.

2.1.5 Plastic Sheet Marker: 6-inch-wide green nondetectable tape similar to "Terra Tape" manufactured by Griffolyn Co, Inc. Tape shall be imprinted with warning such as "Caution Buried Installation Below" at intervals of not more than 4 feet.

PART 3 - EXECUTION

3.1 EXCAVATION

3.1.1 Before performing excavation, obtain excavation permit for area to be excavated. Excavation permits will be furnished by the Government upon advance notice of scheduled activity.

3.1.2 Locate and expose underground utilities by hand tools. Use of heavy equipment and machinery is subject to approval of the Government's Representative.

3.1.3 Shore excavations more than 4-feet deep and with sides sloped steeper than 1-1/2 horizontal to 1 vertical. Install shoring as excavation progresses and remove as backfilling is accomplished.

3.1.4 Do not store excavated or other material closer than 2 feet from edge of excavation unless barrier is erected to retain excavated materials. Store and maintain materials in manner that they are prevented from falling or sliding into excavation.

3.1.5 Wherever slopes of excavations will intersect existing underground lines or structures such as building foundations, underground piping, electrical ducts or direct-buried electrical lines, install shoring or other means of support to prevent overstressing existing structure or underground lines or to prevent interrupting service to existing buildings.

3.1.6 Footings and Foundations

3.1.6.1 Make excavations for footings to depth shown on the Drawings or to further depth as necessary to provide undisturbed surface to receive footing. Make excavations to proper width with allowances made for forms and bracing. Make bottom of excavations compact, level, true, and free of loose material.

3.1.6.2 If over-excavation occurs where footings are designed to be placed on undisturbed earth, correct at time of placing concrete by extending concrete down to undisturbed earth, or by placement of backfill, compacted in accordance with Subparagraph 3.2.2.2a.

3.1.7 Where stabilization is required, finish subgrade 3 inches below elevations shown on the Drawings.

3.2 FILLING AND BACKFILLING

3.2.1 General

3.2.1.1 Backfill Permit: Obtain signatures required on backfill permit for area to be backfilled. Forms will be furnished by the Government's Representative. Work not started within 5 calendar days from time permit is approved shall not be started until new permit has been approved. A continuing job that has not had backfill installed within past 5 calendar days will require new backfill permit.

3.2.1.2 Remove debris and organic matter from area to be filled or backfilled.

3.2.1.3 Use only select materials for fill or backfill. Keep materials free of frozen particles, lumps, organic matter, and trash.

3.2.1.4 Do not place fill or backfill on frozen ground.

3.2.1.5 Filling or backfilling by sluicing or flooding with water will not be permitted.

3.2.1.6 Bring fill or backfill up evenly on sides of walls, structures, and utility lines to avoid unbalanced loading.

3.2.1.7 Do not place fill or backfill against concrete structure or foundation wall less than 14 days after completion of structure or wall unless written permission from the Government's Representative is obtained. Provide wall support, where noted on the Drawings, before filling or backfilling.

3.2.2 Structural Fill or Backfill

3.2.2.1 Before placement of fill or backfill, demonstrate, to the Government's Representative, by physical test at jobsite, that procedure proposed for installation and compaction of soils will provide degree of compaction specified. Prepare "Soil Compaction Procedure" Form KEH-382 (sample appended) in accordance with printed instructions. Forms will be furnished by the Government's Representative.

3.2.2.2 Place backfill in accordance with WSDOT M41-10, Section 2-03.3(14)C and approved procedures as follows:

a. Use Method C under foundations, slabs, and pipelines.

b. Use Method B under driveway area, and within 5 feet of the building.

3.2.2.3 Compaction control tests will be in accordance with WSDOT M41-10, Section 2-03.3(14)D.

3.2.3 Common Fill or Backfill

3.2.3.1 Place fill or backfill in layers not more than 12-inches thick, loose measurement.

3.2.3.2 Compact each layer, full width, by at least 1 pass of vibratory or rammer-type compactor, pneumatic-tired roller, loaded scraper wheel, grader wheel, or power roller.

3.2.3.3 Mound over top layer of backfill to depth of 1 inch for each 12 inches of trench depth to maximum mound height of 6 inches.

3.3 INSTALLATION OF PLASTIC SHEET MARKER: Place continuous over buried utility lines. Place marker tape directly over line and 1 foot below finish grade. Place marker over each outside pipe of multiple lines. Place intermediate markers at maximum of 4 feet apart.

3.4 FINISH GRADING AND STABILIZATION

3.4.1 Rake area disturbed by work, remove surface stones larger than 6 inches, and dispose of excess material and debris at area designated by the Government's Representative.

3.4.2 Stabilize area indicated on Drawings with 2-inch course of gravel (compacted) meeting the requirements of Paragraph 2.1.4. Finish stabilization course to elevations shown on the Drawings.

3.5 FIELD QUALITY CONTROL

3.5.1 Soil Compaction Tests: Sampling and testing of compacted fill and backfill will be performed by the Government's Representative.

END OF SECTION

SECTION 02668

FIRE WATER SYSTEMS

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

ANSI Z53.1-1979	American National Standard Safety Color Code for Marking Physical Hazards

1.1.1.2 American Water Works Association (AWWA)

C104-85	American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
C110-82	American National Standard for Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in., for Water and Other Liquids
C111-85	American National Standard for Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
C151-86	American National Standard for Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
C 500-86	AWWA Standard for Gate Valves for Water and Sewerage Systems
C 502-85	AWWA Standard for Dry-Barrel Fire Hydrants
C600-82	AWWA Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances
C651-86	AWWA Standard for Disinfecting Water Mains

1.1.1.3 Factory Mutual System (FM)

1988 Edition	Approval Guide

1.1.1.4 Federal Specifications (FS)

TT-E-489G	Enamel, Alkyd, Gloss (For Exterior And Interior Surfaces)
TT-P-645A	Primer, Paint, Zinc Chromate, Alkyd Type

1.1.1.5 National Fire Protection Association (NFPA)

NFPA 13	Standard for the Installation of Sprinkler Systems, 1987 Edition
NFPA 24-1987	Standard for the Installation of Private Fire Service Mains and Their Appurtenances
NFPA 1963	Standard for Screw Threads and Gaskets for Fire Hose Connections, 1985 Edition

1.1.1.6 Underwriters Laboratories, Inc (UL)

January 1987, Including July 1987 Supplement	Fire Protection Equipment Directory

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Approval Data: Submit information listed in Column 5 of Vendor Data List in this Section.

1.2.2 Certified Vendor Information (CVI): Submit information listed in Column 6 of Vendor Data List in this Section.

1.2.3 NFPA Test Certificate: Submit completed Contractor's Material and Test Certificate in accordance with NFPA 13, Section 1-12.

1.3 GOVERNMENT FURNISHED EQUIPMENT: Post indicator valve, fire hydrant, and hydrant connection valve.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 General

2.1.1.1 Components of new underground fire protection system, if not designated in this Section and the Drawings by manufacturer's name and model

or figure number, shall be current products of manufacturer and be listed or approved for intended use by UL or FM.

2.1.1.2 System is designed for maximum operating pressure of 125 psig.

2.1.2 Piping

2.1.2.1 Pipe, pipe joints and fittings shall meet the requirements of NFPA 24, the Drawings and this Section.

2.1.2.2 Pipe: Cement lined meeting the requirements of AWWA C104 and ductile iron, Class 50 (minimum) meeting the requirements of AWWA C151. Pipe shall have rubber gasketed mechanical joints or push-on joints meeting the requirements of AWWA C111.

2.1.2.3 Fittings: Cement lined meeting the requirements of AWWA C104, with joints and pressure class ratings compatible with pipe used and shall meet the requirements of AWWA C110.

2.1.3 Post Indicator Valve (PIV)

2.1.3.1 Gate valve: Nonrising stem valve with indicator post flange. Valve shall open in counterclockwise direction.

2.1.3.2 Indicator post: Adjustable, telescoping barrel type with locking handle and clearly visible, position indicator sign plates, protected by nonbreakable plastic windows. Post shall be matched for assembly to gate valve.

2.1.3.3 Valve position supervisory limit switch for installation on post indicator valve: Tamperproof and designed for use intended. Switch shall be operated during first 2 revolutions of handle in closing direction.

2.1.4 Fire Hydrants: Meeting the requirements of AWWA C502, dry barrel type with compression type main valve which opens against pressure. Inlets shall be 6 inches with minimum 5 inch valve opening. Hydrants shall have one 4-1/2 inch pumper nozzle and two 2-1/2 inch hose nozzles, including caps and chains. Nozzle threads shall be National Standard Fire Hose Coupling Threads in accordance with NFPA 1963. Hydrant operating nut and cap nuts shall be National Standard Pentagon in accordance with AWWA C502 and open in counter-clockwise direction. Stem seals shall be O ring type.

2.1.5 Hydrant Connection Valve: 6 inch gate valve meeting the requirements of AWWA C500 and provided with adjustable cast iron valve box.

2.1.6 Reflective Sheeting: 6 inch wide reflective sheeting for placement around fire hydrant body and 3 inch wide sheeting for placement around barricade posts for fire hydrants, shall be Scotchlite No. 3270 silver "Wide-Angle Flat Top", adhesive coated.

2.1.7 Drainage Material for Fire Hydrant Base: 3/8 inch to 1 inch clean crushed rock or gravel.

2.1.8 Bitumastic: Koppers No. 550 or Superservice Black.

2.1.9 Painting Materials

2.1.9.1 Primer: FS TT-P-645, (alkyd type zinc chromate) National Lead No. 200-41.

2.1.9.2 Paint: FS TT-E-489, Class A, Composition G.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Install piping and piping accessories in accordance with NFPA 24, AWWA C600, the Drawings, and this Section.

3.1.2 Protect pipe and fittings from impact shocks and dropping. Before laying, inspect pipe and discard damaged components. Remove damaged components from job site.

3.1.3 Keep piping systems clean during work. Once fabrication has started on length of pipe, plug or cap open ends of piping when installation is not in progress to prevent entry of dirt and other foreign material. Inner surfaces of pipe, valves, and fittings shall be smooth, clean, and free of sand, debris and dirt when installed.

3.1.4 Where piping is laid in trench, trench shall be free of frost or frozen earth and standing water.

3.1.5 Install new fire mains minimum depth of 3'-6" from grade to top of pipe.

3.1.6 Install restraints on pipe and piping components in accordance with NFPA 24, Article 8-6 and A-8-6.2. Restraining mechanical joints as listed in UL Fire Protection Equipment Directory may be substituted for conventional anchoring. Where thrust blocks are used, make bearing area equal to area shown in Table 8-6.2.9 multiplied by a factor of 1.33

3.1.7 Coat carbon steel accessories, which will be buried, such as tie-rods and clamps, with bitumastic. Allow time for bitumastic to dry before backfilling.

3.1.8 Install fire hydrants and hydrant connection valves in accordance with the Drawings and this Section.

3.1.9 Install post barricades around fire hydrants and post indicator valves in accordance with the Drawings and this Section.

3.1.10 Excavation, backfill and grading work shall meet the requirements of Section 02200 as it applies.

3.1.11 Place drainage material at base of fire hydrant in accordance with AWWA C600, Section 3.7. Interface between drainage material and compacted earth fill shall be separated by layer of 30 pound roofing paper.

3.1.12 Fire hydrant base pad shall bear on undisturbed or compacted earth and be minimum 24 inch diameter or square by 4 inch thick precast concrete.

3.1.13 Centerline of fire hydrant pumper nozzle shall be between 18 and 22 inches above adjacent finished grade. Orient pumper nozzle toward roadway or street.

3.1.14 Painting and Marking

3.1.14.1 Surface preparation, materials and coating application of primer and paint shall be in accordance with Section 09900.

3.1.14.2 Paint entire fire hydrant with 1 coat of primer and 2 coats of yellow enamel.

3.1.14.3 Paint upper barrel of indicator post with 1 coat of primer and 2 coats of red enamel.

3.1.14.4 Paint entire length of each barricade post with primer and above ground portion with 2 coats of red enamel.

3.1.14.5 Colors: Defined in ANSI Z53.1.

3.1.14.6 Primer shall meet the requirements of FS TT-P-645, and enamel shall meet the requirements of FS TT-E-489.

3.1.14.7 After painting is completed, place 6 inch wide reflective band around body of fire hydrant immediately below pumper nozzle. Place 3 inch wide reflective bands around fire hydrant barricade posts as shown on the Drawing.

3.2 FIELD QUALITY CONTROL

3.2.1 General

3.2.1.1 Furnish equipment and instruments required to perform flushing and testing.

3.2.1.2 Perform flushing and testing while witnessed by KEH (Acceptance Inspector).

3.2.1.3 Remove and replace or repair apparatus, material, or work which fails in flushing or testing operations and repeat operation.

3.2.1.4 Repair damage resulting from flushing or testing.

3.2.2 Flushing

3.2.2.1 Prepare written procedure for disposal of flushing water. Deliver to KEH (Field Engineer) for approval before flushing.

3.2.2.2 Flush new piping in accordance with NFPA 24, Article 8-8.

3.2.2.3 Provide documented evidence that flushing has been accomplished in accordance with this Section. Deliver to KEH (Acceptance Inspector) before testing.

3.2.3 Hydrostatic Testing

3.2.3.1 Perform testing in accordance with NFPA 24, Article 8-9.

3.2.3.2 Perform testing after piping has been flushed and before backfill is placed over pipe joints.

3.2.3.3 Verify that air has been expelled from piping before applying hydrostatic pressure.

3.2.3.4 Examine piping joints, fittings, and other potential leak sources during test. Leaks in piping system are not acceptable. Repair leaks and retest.

3.2.3.5 If piping system is subject to freezing, remove water from lines upon completion of tests.

3.3 DISINFECTING

3.3.1 Arrange for bacteriological testing of water samples with KEH (Acceptance Inspector) before performing disinfection procedures. Bacterial analysis is 4 days in length from time samples are received in laboratory. Analysis provides "presumptive" results in 2 days with "confirmation" at end of test.

3.3.2 Disinfect sanitary water lines in accordance with AWWA C651.

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Project No. CR0385/242260

Title PCB/RMW Storage Facility

KAISER ENGINEERS HANFORD

VENDOR DATA LIST

("X" Indicates Required Data)

1 EPN Identification	2 Description	3 Reference Drawing	4 Specification Paragraph	6 Approval/Data: Dimensional Drawings	Equipment Weights	Specifications	Material Description	Performance Data	Circuit or Control Diagrams	Data Sheets	Illustrative Cuts	Installation Instructions	6 Certified Vendor Information (CVI): Dimensional Drawings	Equipment Weights	Specifications	Certified Test Data	Circuit or Control Diagram	Instructions: Installation	Operation	Maintenance	Spare Parts List	7 Remarks
1	Piping		2.1.2				X				X											
2	Fittings		2.1.2.3				X				X											
3	Post Indicator Valve (PIV)		2.1.3								X											
4	Supervisory Switch		2.1.3.3								X											
5	Fire Hydrant		2.1.4								X											
6	Gate Valve (Hydrant Maint)		2.1.5								X											

* Submit for CVI same items submitted for approval as marked.

END OF SECTION

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SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Concrete Institute (ACI)

ACI 301-84	Specifications for Structural Concrete for Buildings
ACI 305R-77 (Revised 1982)	Hot Weather Concreting
ACI 306R-78 (Revised 1983)	Cold Weather Concreting

1.1.1.2 American Society for Testing and Materials (ASTM)

A 185-85	Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
A 615-86	Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
C 94-86a	Standard Specification for Ready-Mixed Concrete

1.1.1.3 National Ready Mixed Concrete Association (NRMCA)

January 1, 1976 (Third Revision)	Certification of Ready Mixed Concrete Production Facilities

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Concrete

2.1.1.1 Pre-approved concrete mix reference numbers are for ACME Concrete Company.

2.1.1.2 Furnish 3,000 psi concrete, pre-approved mix No. 6441. Furnish 5,500 psi concrete for column pedestals, foundation walls, and footings, mix No. 6070AX.

2.1.1.3 Mixing: In accordance with ASTM C 94.

2.1.1.4 Delivery: In accordance with ASTM C 94.

2.1.2 Reinforcing Steel

2.1.2.1 Steel bars: ASTM A 615, deformed, Grade 60.

2.1.2.2 Tie wire: Black annealed steel, 16 gauge minimum.

2.1.3 Expansion Joint Materials

2.1.3.1 Expansion joint filler: See Section 07920.

2.1.3.2 Sealant: See Type II, Section 07920.

2.1.4 Nonshrink Grout

2.1.4.1 Nonmetallic type: "Five Star Grout" by US Grout Corp; "Por-Rok" Anchoring Cement by Hallemite; or "Masterflow 713" by Master Builders.

2.1.5 Forms: Wood, steel, plywood, or Masonite Corporation "Concrete Form Presdwood," as required for various specified finishes.

2.1.6 Construction joint and control joint materials.

2.1.6.1 Sealant: See Section 9805.

PART 3 - <u>EXECUTION</u>

3.1 PREPARATION

3.1.1 Form Construction

3.1.1.1 Install formwork in accordance with ACI 301, Section 4.2. Interior shape and rigidity shall be such that finished concrete will meet the requirements of the Drawings within tolerances specified in ACI 301, Table 4.3.1.

3.1.1.2 Prepare form surfaces in accordance with ACI 301, Section 4.4.

3.1.1.3 Forms for surfaces which will be permanently concealed from view may be saturated with water before placing concrete instead of other treatment, except in freezing weather forms shall be treated with oil or stearate.

3.1.1.4 Clean forms of foreign material before placing concrete.

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3.2 INSTALLATION

3.2.1 Reinforcing Steel

3.2.1.1 Fabricate reinforcing bars accurately to dimensions shown on Drawings, within tolerances shown in ACI 301, Section 5.4.

3.2.1.2 Tag steel in accordance with Bar List.

3.2.1.3 Place reinforcing steel as shown on approved submittals within tolerances specified in ACI 301, Sections 5.4 and 5.5 allowing for a bar lap of 30 diameters minimum.

3.2.1.4 Tie bars to prevent displacement during placement of concrete.

3.2.1.5 Do not force reinforcing bars into concrete after initial set has started.

3.2.1.6 Place reinforcing with dimension of concrete protection equal to minimum given in ACI 301, Section 5.5, except where shown otherwise on the Drawings.

3.2.2 Concrete

3.2.2.1 Before ordering concrete, obtain approval of required submittals.

3.2.2.2 Before concrete is batched, obtain approval of formwork and reinforcement by the Government's Representative.

3.2.2.3 Before placing concrete:

a. Obtain approval of "Pour Slip" by the Government's Representative. "Pour Slip" shall include appropriate reference to specific portion of structure to be placed, maximum size of coarse aggregate, design strength, admixture, and slump. "Pour Slip" forms can be obtained from the Government's Representative.

b. For each truck load of concrete, deliver "Trip Ticket" to the Government's Representative. "Trip Ticket" shall contain information listed in ASTM C 94, Subparagraphs 16.1.1 through 16.1.10, and include water/cement ratio.

3.2.2.4 Place concrete in accordance with ACI 301, Sections 8.1, 8.2, and 8.3. Do not drop (free fall) more than 5 feet. Insert vibrator (vertically if possible) into concrete and reach small distance into concrete in next lower layer. Do not insert vibrators into lower courses that have reached initial set. Take care to avoid allowing head of vibrator to come in contact with forms or embedded items.

3.2.2.5 Temper concrete only as permitted in ACI 301, Section 7.5.

3.2.2.6 Place nonshrink grout where shown on the Drawings and in accordance with manufacturer's written instructions.

3.2.2.7 Construction joints: Make construction joints in accordance with ACI 301, Section 6.1, and as detailed on the Drawings.

3.2.2.8 Embedded items: Install embedded items in accordance with ACI 301, Sections 6.4 and 6.5.

3.2.2.9 Expansion joints: Locate expansion joints as shown on the Drawings and construct with premolded expansion joint filler and sealant.

3.2.2.10 Placing concrete against earth: Place on or against firm, damp surfaces free of frost, ice, and free water. Do not place until required compaction has been obtained. Dampen earth surfaces to receive fresh concrete.

3.2.2.11 Consolidation: Consolidate concrete slabs in accordance with ACI 301, Section 11.6.

3.2.3 Concrete Repair and Form Removal

3.2.3.1 Form removal: Remove in accordance with ACI 301, Section 4.5.

3.2.3.2 Cut back form ties and examine concrete surfaces for defects. Repair only after permission for patching is given by the Government's Representative.

3.2.3.3 Place concrete repair mortar within one hour after mixing. Do not retemper mortar.

3.2.3.4 Surface defect repair: Repair in accordance with ACI 301, Sections 9.1, 9.2, and 9.3. Cure concrete repairs same as new concrete.

3.2.4 Concrete Finishes and Tolerances

3.2.4.1 Formed surfaces: Start finishing following concrete repair and complete within 96 hours after forms have been removed. Finish in accordance with sections of ACI 301 noted below:

a.	Surfaces exposed to earth backfill	Section 10.2.1
b.	Interior surfaces	Section 10.2.2
c.	Exterior surfaces exposed to weather	Section 10.2.2
d.	Related unformed surfaces	Section 10.5
e.	Surfaces to receive special protective coating	Section 10.3.2

3.2.4.2 Unformed surfaces: Finish in accordance with sections of ACI 301 noted below:

a.	Interior floors	Section 11.7.3
b.	Exterior slabs subject to foot traffic	Section 11.7.4

3.3 FIELD QUALITY CONTROL

3.3.1 Concrete Testing: Sampling and testing of concrete will be the responsibility of the Government's Representative. Concrete will be tested in accordance with ACI 301, Sections 16.3.4, 16.3.5, 16.3.6, and 16.3.8.

3.4 CURING AND PROTECTION

3.4.1 Curing

3.4.1.1 Cure concrete in accordance with ACI 301, Section 12.2. Clear curing compounds shall be tinted or applied surfaces marked to delineate extent of spraying.

3.4.1.2 Test 5,500 psi concrete cylinders after 3 days for equivalent 3,000 psi concrete strength.

3.4.1.3 Do not use curing compound on concrete surfaces to receive flooring or special protective coating.

3.4.2 Protection

3.4.2.1 Cold weather: Maintain concrete at a temperature of at least 50 F for 72 hours after it is placed. Protect concrete from freezing and rapid temperature drop for not less than four days, in accordance with ACI 306R.

3.4.2.2 Hot weather: Protect exposed concrete surfaces from drying during placement in accordance with ACI 305R. Finish and maintain exposed surfaces wet continuously until the specified curing is commenced.

3.4.2.3 Protection from mechanical injury: During the curing period, the concrete shall be protected from damaging mechanical disturbances, particularly load stresses, shock, and excessive vibration. All finished concrete surfaces shall be protected from damage caused by construction equipment, materials, methods, and by rain or running water. Structures shall not be loaded in such a way as to overstress the concrete.

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SECTION 05500

METAL FABRICATIONS

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society of Mechanical Engineers (ASME)

1986 Edition, w/Addenda through Dec 1986	ASME Boiler and Pressure Vessel Code
Section IX	Welding and Brazing Qualifications

1.1.1.2 American Society for Testing and Materials (ASTM)

A 36-84a	Standard Specification for Structural Steel
A 53-86	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
A 120-84	Standard Specification for Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses
A 307-86a	Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
A 563-84	Standard Specification for Carbon and Alloy Steel Nuts

1.1.1.3 American Welding Society (AWS)

AWS D1.1-86	Structural Welding Code - Steel

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.3 QUALITY ASSURANCE

1.3.1 Qualification of Welding Personnel and Procedures

1.3.1.1 Personnel and procedures for welding structural steel shall have been qualified in accordance with AWS D1.1 before welding. Qualification in accordance with ASME Section IX may be substituted for this requirement.

1.3.1.2 Maintain file of welding procedure specifications, procedure qualification records, and welder performance qualification test results at jobsite for review by the Government's Representative.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Deliver metal fabrications to jobsite at time convenient for installation. If exposed to inclement weather, protect fabrications with paper, plastic, or other weatherproof covering and store off ground.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Rolled Steel Shapes, Plates, and Bars: ASTM A 36.

2.1.2 Steel Pipe: ASTM A 53 or ASTM A 120, (black), standard weight, Schedule 40.

2.1.3 Fasteners

2.1.3.1 Bolts: ASTM A 307, Grade A or B, except that requirement for bolt head marking is waived.

2.1.3.2 Nuts: ASTM A 563, Grade A, heavy hex.

2.1.3.3 Expansion anchors: "Kwik-Bolt" manufactured by Hilti Fastening Systems.

2.1.4 Nonshrink Grout: See Section 03300.

2.1.5 Paint: See Section 09900.

2.2 FABRICATION

2.2.1 General

2.2.1.1 Verify measurements and take field measurements necessary before fabrication. Provide miscellaneous bolts and anchors, supports, braces, and connections necessary for completion of metal fabrications. Cut, reinforce, drill, and tap metal fabrications shown to receive finish hardware and similar items. Weld or bolt connections as shown on the Drawings.

2.2.1.2 Workmanship: Form metal fabrications to shape and size, with sharp lines, angles, and true curves. Drilling and punching shall produce clean, true lines and surfaces. Execute and finish work in accordance with Fabrication Drawings.

2.2.1.3 Jointing and intersections: Accurately made, tightly fitted, and in true planes with adequate fastenings.

2.2.1.4 Perform welding of steel connections in accordance with AWS D1.1, using E70XX electrodes. Perform visual weld examination in accordance with AWS D1.1, paragraph 6.5.5 (8.15).

2.2.2 Pipe Handrails and Posts: Fabricate using steel pipe in accordance with the Drawings.

2.2.3 Miscellaneous Steel Items: Supply required clips, frames, equipment supports, and other fabrications as shown on the Drawings. Fabricate parts from standard structural sections or shapes, to sizes required. Wherever miscellaneous parts are exposed, grind edges, corners, and rough cuts smooth and free of snags. Shop paint parts except those to be embedded in concrete or masonry, or those which require other specific finishes.

2.2.4 Finishes: Prime ferrous metal in accordance with Section 09900 unless specified otherwise in Section 09805. Do not coat members to be embedded in concrete or masonry, surfaces and edges to be field welded, or items to be galvanized.

PART 3 - EXECUTION

3.1 INSPECTION: Examine areas where metal fabrications are to be installed and notify the Government's Representative in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner compatible with requirements for installation. Furnish setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, anchor bolts, and miscellaneous items having integral anchors, to be embedded in concrete or masonry construction. Coordinate with the Government's Representative for delivery of items to jobsite.

3.2 INSTALLATION

3.2.1 Install metal fabrications plumb, level, or as shown on the Drawings.

3.2.2 Make field connections as neatly as possible with joints flush and smooth. Grind smooth exposed field welds and polish before field painting.

3.2.3 After installation has been approved, clean and paint connections with primer. Touch-up shop prime coat wherever damaged.

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SECTION 07200

INSULATION

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

C 578-85	Standard Specification for Preformed, Cellular Polystyrene Thermal Insulation
C 665-86	Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing

1.1.1.2 Underwriters Laboratories, Inc (UL)

January 1987	Building Materials Directory

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Deliver materials to jobsite in original sealed containers or packages bearing manufacturer's name and brand designation. Where materials are covered by referenced specification, containers or packages shall bear specification number, type, and class as applicable.

1.3.2 Store and handle materials in manner to protect from damage during entire construction period.

1.3.3 Store insulation off ground and under cover to protect against weather, moisture, and physical damage.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Blanket and Batt Insulation: Mineral-fiber insulation meeting the requirements of ASTM C 665. Insulation containing asbestos will not be acceptable. Insulation shall be UL listed and have "flame spread" and "fuel contributed" of 25 or less, and "smoke developed" of 50 or less.

2.1.1.1 Wall insulation: Type III mineral-fiber batts with minimum thermal resistance of R-11 and faced with aluminum foil vapor barrier covering on one side. Insulation shall be capable of fitting into available space without compressing more than 10% in thickness.

2.1.1.2 Ceiling insulation: Type III mineral-fiber batts with minimum thermal resistance of R-11 and faced with aluminum foil vapor barrier covering on one side.

2.1.2 Perimeter Insulation: Polystyrene foam board, 2-inches thick, meeting the requirements of ASTM C 578, Type IV. Styrofoam SM as manufactured by Dow Chemical Co.

2.1.3 Adhesive: Styrofoam #7 or Styrofoam #1.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Blanket and Batt Insulation

3.1.1.1 Completely insulate space between framing members. Fit snugly into framing spaces leaving no voids. At walls and in ceiling (roof) spaces install with vapor barrier toward interior side of construction. Fasten flanges to metal studs with mechanical fasteners or adhesive as recommended by insulation manufacturer. Support insulation installed horizontally with #9 wire spaced at 2 feet maximum.

3.1.1.2 Install continuous behind electrical outlets. Fit around electrical conduits, pipes, and other protruding objects. When water pipes occur in exterior wall or ceiling construction, apply insulation between pipe and cold side of wall or ceiling.

3.1.1.3 Cut to fit angles, corners, or irregular spaces, forming flange of vapor barrier for fastening to framing. Seal joints or breaks in vapor barrier.

3.1.2 Perimeter Insulation

3.1.2.1 Install against exterior faces of foundation walls, continuous around entire perimeter of building.

3.1.2.2 If application is with adhesive, verify that fins and projections left after removal of forms have been removed from concrete surfaces. Clean dirt, wax, or oily film from concrete.

3.1.2.3 Install by applying to completed foundation wall with adhesive as recommended by insulation manufacturer.

END OF SECTION

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SECTION 07920

SEALANTS AND CAULKING

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

C 834-76 (1986)	Standard Specification for One Component Laytex Sealing Compounds for Use in Building Construction
D 994-71 (1982)	Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)

1.1.1.2 Federal Specifications (FS)

TT-S-00230C, Including AMD 2	Sealing Compound: Elastomeric Type, Single Component (For Caulking, Sealing, And Glazing In Buildings And Other Structures)

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Manufacturer's Installation Instructions: Include manufacturer's instructions for cleaning, priming, and application of sealants and caulking for each material condition of application along with products supplied.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Deliver materials to jobsite in manufacturer's original containers, unopened and labels intact.

1.3.2 Store and handle materials to prevent inclusion of foreign materials or exposure to temperatures exceeding 90 F.

1.3.3 Discard sealants, caulking compounds, or components outdated as indicated by shelf life date.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 General: Container labels shall show name of material, date of manufacture, mixing instructions, shelf life, and curing time. Color to closely match adjacent surfaces.

2.1.2 Sealants

2.1.2.1 Exterior building sealant: One component polyurethane: Nonsag-type meeting the requirements of FS TT-S-00230, Type II, Dymonic, Manufacturer: Tremco.

2.1.2.2 Interior building caulking: One component acrylic laytex caulk with silicone: Nonsag-type meeting requirements of ASTM C 834-76, Paintable, Manufacturer: DAP.

2.1.3 Primer: Nonstaining type, as recommended by manufacturer of sealant or caulking compound for intended service.

2.1.4 Expansion Joint Filler: Watson Bowman & Acme Corporation "W" Series, or bituminous type meeting the requirements of ASTM D 994, *or* ECN-8
Fibercane impregnated material as manufactured by A. C. Horn. ECN-8

2.1.5 Construction, expansion, and control joint filler: TU400 polyurethane sealant *or United Coatings Uniflex Sealant 200.* ECN-21

2.1.6 Backer Rod: Closed-cell polyethylene foam rod.

2.1.7 Bond Breaker Tape: Polyethylene tape with pressure sensitive adhesive.

PART 3 - EXECUTION

3.1 PREPARATION

3.1.1 Clean joints, to be sealed or caulked, of dirt, dust, oil, grease, mortar, or other foreign materials.

3.1.2 Follow written instructions of manufacturer of sealing or caulking materials for each condition of application. Unless the written instructions of the manufacturer state otherwise, make depth of sealant joints 1/2 of the joint width.

3.1.3 After special protective coating has cured, roughen surfaces of concrete joints on which polyurethane sealant is applied.

3.1.4 Remove loose particles with a wire brush. Blow out joints with oil-free and moisture-free compressed air. Remove wax or oil with methyl ethyl ketone or Xylol.

3.2 INSTALLATION

3.2.1 Primer

3.2.1.1 Prime expansion, isolation, construction, and control joints when and as recommended by sealant or caulking manufacturer for each condition of application.

3.2.1.2 Do not apply primer to concrete until concrete has cured at least 28 days.

3.2.2 Backup

3.2.2.1 Install backer rod in joints ~~where polyurethane sealant is to be applied.~~ *as shown on Drawings*. Install with proper tool, in accordance with manufacturer's written instructions. ECN- ECN-

3.2.2.2 Install bond breaker tape over backer rod in joints ~~where polyurethane sealant is to be applied.~~ *as shown on Drawings*. ECN- ECN-

3.2.3 Joint Dimension: ~~Except as recommended otherwise by manufacturer,~~ *Unless shown otherwise on Drawings*, make depth of sealant 1/2 of joint width. ECN- ECN-

3.2.4 Sealant and Caulking

3.2.4.1 Installation of caulk/sealant: Perform all caulk/sealant work using experienced workers, specified materials, and proper tools in accordance with manufacturer's written instructions for the conditions of each application. Tool after installation as required to properly fill the joint and produce a smooth surface. Take all necessary precautions to prevent excess contact of sealants with adjacent surfaces.

END OF SECTION

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SECTION 08100

METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

A 366-85	Standard Specification for Steel, Sheet, Carbon, Cold-Rolled Commercial Quality
A 569-85	Standard Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip, Commercial Quality

1.1.1.2 Steel Door Institute (SDI)

SDI-100-83	Standard Steel Doors and Frames

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Deliver to jobsite in undamaged condition.

1.3.2 Storage of doors and frames shall be in accordance with SDI-100.

1.3.3 Clean abraded or rusty areas and touch up with same primer used for shop finish.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Hollow Metal Door: Grade II, Model 1, 1-3/4-inches thick, with no seams or joints on face.

2.1.1.1 See Drawing for type and size. No fire rating labels shall be required.

2.1.1.2 Fabricate from 18-gauge (minimum) annealed and leveled ASTM A 366 or ASTM A 569 steel.

2.1.1.3 Fabricate with stiles and rails, 16-gauge minimum.

2.1.1.4 Door shall be reinforced with polystyrene foam board bonded to face sheets with adhesive per SDI-100, Paragraph 2.2.3.3.

2.1.1.5 Fabricate with 1/8-inch maximum clearance from frames.

2.1.1.6 Doors prepared for lockset, and mortised for template hinges.

2.1.1.7 Reinforce for hinges with 10-gauge minimum steel, for closers with 12-gauge minimum steel, and for locks with 14-gauge minimum steel. Reinforcement drilled and tapped as required for attachment of hardware.

2.1.1.8 Surface welds ground smooth.

2.1.2 Pressed Metal Frames

2.1.2.1 See Drawings for profiles and dimensions.

2.1.2.2 Fabricate from 16-gauge annealed and leveled ASTM A 366 or ASTM A 569 steel.

2.1.2.3 Corners mitered, welded, and ground smooth.

2.1.2.4 Three 18-gauge wall anchors and one floor anchor for each jamb.

2.1.2.5 Temporary spreader attached to bottom of each frame.

2.1.2.6 Reinforce for hinges with 10-gauge minimum steel, and for strikes and closers with 12-gauge minimum steel. Reinforcement drilled and tapped as required for attachment of hardware.

2.1.2.7 Plaster guards installed at hardware cut-outs.

2.1.3 Shop Finish: Door and frames bonderized and painted with one coat of manufacturer's standard, rust-inhibitive primer. Primer containing lead will not be acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Frames shall be installed in accordance with SDI-100 and this Specification.

3.1.2 Leave temporary spreaders in place until frames are securely attached to wall framing.

3.1.3 Install frames with jambs plumb and head level.

3.1.4 Attach frames to wall framing. Align anchors with hinges and door strike.

3.1.5 Install doors in conjunction with application of hardware, and with uniform clearance at head and jambs. Leave in smooth operating condition.

END OF SECTION

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SECTION 08332

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Referenced Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

A 526-85	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Deliver to jobsite in undamaged condition.

1.3.2 Store above ground and under cover.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Overhead Coiling Doors: As manufactured by Overhead Door Corporation.

2.1.1.1 Doors manually operated by chain.

2.1.1.2 Size doors, including components, to resist wind load of 20 psf. Minimum size of components shall be as given in manufacturer's published specifications.

2.1.1.3 Form curtain of interlocking steel slats, Style No. C-187. Form slats from copper bearing steel sheets, galvanize in accordance with ASTM A 526, 1.25 ounce zinc per square foot, and phosphatize.

2.1.1.4 Bottom of curtain shall consist of two rolled steel angles fastened, back to back, to slats. Equip bottom with continuous rubber seal.

2.1.1.5 Door curtain shall coil onto 4-inch minimum steel pipe designed for not more than 0.03 inch deflection per foot of door width. Support pipe on ball bearings and equip with adjustable, counterbalancing, helical springs.

2.1.1.6 Equip guides with double weatherstripping.

2.1.1.7 Cover coiled door with hood formed from 24-gauge minimum steel sheet, galvanized in accordance with ASTM A 526.

2.1.1.8 Give metal surfaces one coat of manufacturer's standard, rust-inhibitive primer.

2.1.1.9 Equip doors with locking devices, suitable for padlocking.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Install in accordance with the Drawings and approved submittals.

3.1.2 Attach door securely to structure.

3.1.3 At completion, adjust as required for door to operate freely.

END OF SECTION

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SECTION 08710

FINISH HARDWARE

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

ANSI A156.1-1981	American National Standard for Butts and Hinges
ANSI A156.16-1981	American National Standard for Auxiliary Hardware

1.1.1.2 Federal Specifications (FS)

FF-H-106C/GEN	Hardware, Builders'; Locks And Door Trim: General Specification For
FF-H-121D	Hardware, Builders'; Door Closers

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Packing and Marking: Pack each item of hardware separately, with necessary fasteners and instructions. Mark each item with hardware number shown in hardware list.

1.3.2 Protect hardware from damage before, during, and after installation.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Specific Requirements: See Hardware Schedule at end of this Section.

2.1.2 Manufacturer's Catalog Numbers: Catalog numbers in Hardware Schedule refer to following manufacturers:

2.1.2.1 Door hinges: ANSI A156.1, Type 2107, sizes shown in Hardware Schedule, nonremovable pins on exterior doors; Stanley.

2.1.2.2 Locksets and latchsets: FS FF-H-106 of type shown in Hardware Schedule; Corbin.

2.1.2.3 Door closers: FS FF-H-121, size shown in Hardware Schedule; Corbin.

2.1.2.4 Door stops: ANSI A156.16, type shown in Hardware Schedule.

2.1.3 Fasteners: Furnish necessary screws, bolts, or other fasteners of suitable size and type to anchor hardware in position. Match hardware finish. Furnish with expansion shields, toggle bolts, or other appropriate anchors.

PART 3 - EXECUTION

3.1 INSTALLATION: Verify installation and be responsible for fit of hardware in location specified.

3.2 ADJUSTING AND CLEANING: Remove protective coverings and clean hardware before completion of Project. Leave hardware in smooth operating condition. Deliver keys to the Government's Representative.

3.3 HARDWARE SCHEDULE

Hardware Group No.	Hardware	Quantity	Hardware Type	Finish/MFR
Group 1	Lockset	1	#8863-457-59C2-6 Without cylinder	US26D/CORBIN
(Door No. 1 and No. 3)	Closer	1	120	AL/CORBIN
	Door Stop	1	F-907B	AL/BBW
Group 2 (Door No. 5)	Hinges	1-1/2 PR	Butts 4-1/2 x 4-1/2 FBB179	US26D/STANLEY
	Latchset	1	#863-410	US26D/CORBIN
	Door Holder	1	55-331	US26D/RIXON

END OF SECTION

SECTION 09250

GYPSUM BOARD

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

C 36-85a	Standard Specification for Gypsum Wallboard
C 475-81	Standard Specification for Joint Treatment Materials for Gypsum Wallboard Construction
C 645-83	Standard Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board
C 954-86	Standard Specification for Steel Drill Screws for the Application of Gypsum Board to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
C 1002-83	Standard Specification for Steel Drill Screws for the Application of Gypsum Board

1.1.1.2 Federal Specifications (FS)

QQ-W-461H	Wire, Steel, Carbon (Round, Bare, And Coated)

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Store gypsum board at least 24 hours before installation in well ventilated, covered area heated to at least 55 F.

1.3.2 Maintain above environment throughout application of gypsum board and at least 24 hours after.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Gypsum Board

2.1.1.1 Standard board: ASTM C 36, tapered edge, thickness as noted. Supply in 48-inch width, lengths as required for minimum joints.

2.1.3 Metal Trim

2.1.3.1 Corner beads: United States Gypsum Co, No. 103.

2.1.3.2 Casing beads: United States Gypsum Co, No. 200A or 200B.

2.1.4 Reinforcing Tape (Joint Tape): ASTM C 475, 1-7/8-inch to 2-1/4-inch wide in accordance with manufacturer's standards.

2.1.5 Screws: Steel, self-tapping, phillips head, ASTM C 954 for steel studs 22 gauge and heavier, and ASTM C 1002, Type G (for gypsum), Type S (for light gauge steel), or Type W (for wood), length as recommended by the gypsum board manufacturer, 1 inch minimum.

2.1.6 Joint Compound: ASTM C 475.

2.1.7 Steel Studs and Runners: Screw studs, nonloadbearing channel type, roll-formed from 25-gauge painted or galvanized steel as noted on the Drawings, nominal 1-inch flange width, meeting the requirements of ASTM C 645.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Steel Framing at Walls and Ceiling

3.1.1.1 Frame with steel studs 16 inches on center.

3.1.1.2 Align runners accurately. Fasten to floors with concrete anchors or other approved method at 24 inches on center maximum. Fasten ceiling joists to walls with sheet metal or gypsum board screws.

3.1.1.3 Plumb wall studs and attach to top and bottom runners with at least one gypsum board screw on each side of stud end. Install studs in continuous lengths.

3.2 APPLICATION

3.2.1 Gypsum Board, General

3.2.1.1 Inspect framing scheduled to receive gypsum board.

3.2.1.2 Apply gypsum board first to ceiling, then to walls. Use boards of maximum practical lengths in order to minimize joints. Bring boards into contact, but do not force into place. Fit boards neatly where ends or edges abut.

3.2.1.3 Install fasteners at least 3/8 inch from edges.

3.2.1.4 Apply metal trim to external angles, in accordance with manufacturer's written instructions.

3.2.2 Ceiling Installation

3.2.2.1 Single ply: Apply gypsum board with long dimension at right angles to furring members.

3.2.3 Wall Installation

3.2.3.1 Single-ply: Apply parallel or perpendicular to framing or furring members. Attach ends and edges over framing or furring members except where treated joints occur at right angles to members. Stagger joints on opposite sides of partition. When installing board perpendicular, attach upper board first. Perpendicular application will not be permitted on fire rated wall construction.

3.2.4 Attachment to Steel Framing or Furring

3.2.4.1 Fasten gypsum board to framing and furring with screws. Drive screws with clutch-controlled power screwdrivers. Drive head slightly below surface.

3.2.4.2 Space screws 12 inches on center into each bearing for ceilings and 16 inches on center into each bearing for walls.

3.2.5 Taping and Finishing

3.2.5.1 Apply compound over joints in thin uniform layer, spread at least 3-inches wide, center reinforcing tape on joint and embed in compound. When dry, apply second coat of taping compound in thin uniform coat, minimum of 6-inches wide. Sand to eliminate ridges and high points.

3.2.5.2 Apply third coat of taping compound after second coat is dry and has been sanded. Feather out to minimum width of 12 inches. After compound has dried, sand as necessary to obtain uniformly smooth surface.

3.2.5.3 Finish over fasteners to be similar to finish over joint tape.

3.2.5.4 Corner treatment

a. Treat internal corners in manner specified for joints except fold reinforcing tape lengthwise through middle and fit neatly into corner.

b. Fit corner bead neatly over external corner and fasten with screws approximately 6 inches on center and drive into framing members. Treat with joint compound and reinforcing in manner specified for joints. Feather out joint compound from 8 to 10 inches on each side of corner.

END OF SECTION

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SECTION 09805

SPECIAL PROTECTIVE COATING

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 Steel Structures Painting Council (SSPC)

Surface Preparation Specifications

~~SSPC-SP-2-82~~	~~No. 2 Hand Tool Cleaning~~	ECN
~~SSPC-SP-3-82~~	~~No. 3 Power Tool Cleaning~~	
SSPC-SP6-85	*No. 6 Commercial Blast Cleaning*	ECN

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Deliver materials to jobsite in manufacturer's unopened containers with labels intact. Do not open containers or remove labels until after inspection and acceptance by the Government's Representative.

1.3.2 Store materials in accordance with manufacturer's written instructions and in well ventilated area not exposed to excessive heat, sparks, flame, or direct rays of sun.

1.4 PROJECT CONDITIONS

1.4.1 Environment for Coating: Coat exterior surfaces only when ambient and surface temperatures are between 35 F and 120 F, and temperature is 5 F above dewpoint.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 ~~Coating material shall be Industrial Formula 348 from Industrial Chemical Coating, Mt. Vernon, NY (Contact: Andy Sinclair, 1-800-431-1075), or approved equal.~~ *Primer: Amerlock 400.* ECN-

2.1.2 ~~Construction joint and control joint sealer shall be TU400 polyeurethane from GONAT, Olean, N.Y. (716-372-9650).~~ Finish Coating: Amershield.

2.1.3 ~~Surface Conditioner: Galvaprep SG by Amchem Products of Ambler, PA.~~ Filler: Nu-Klad 114. ECN-

PART 3 - EXECUTION

3.1 INSPECTION

3.1.1 Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence, or quality of work and which cannot be put into acceptable condition through preparatory work included in Article 3.2.

3.1.2 Report in writing to the Government's Representative conditions that may potentially affect proper application of finish. Do not commence surface preparation or coating application until defects have been corrected and conditions are made suitable.

3.2 PREPARATION

3.2.1 General

3.2.1.1 Before application, sweep and dust space or area to receive coating.

3.2.2 Pre-Priming

3.2.2.1 Prepare ferrous metals in accordance with SSPC-SP ~~2-Hand-Tool Cleaning-and/or-SSPC-SP-3-Power-Tool-Cleaning-using-#6-grinding-wheel,~~ *No. 6 Commercial Blast Cleaning.* Remove abrasive residue and dust, and prime within four hours after preparation. ECN-5 ECN-5

3.2.2.2 Clean concrete surfaces and joints of laitance, oil, stains, dust, and other foreign material.

a. Where laitance has not been removed, treat concrete with uniform application of one of following solutions:

1) One part 10% solution muriatic acid and three parts water.

2) 5% solution of trisodium phosphate.

b. When solution ceases to foam, rinse thoroughly with clean water and scrub with stiff bristle brush. Contact environmental engineer for proper removal of muriatic acid after etching. Allow treated area to thoroughly dry. Scratches, cracks, holes, and abrasions shall be cut back to proper key and filled with ~~Formula-348-Concrete-Patch.~~ *Nu-Klad 114.* ECN-5

c. Allow concrete to cure 30 days before coating is applied, except coating may be applied after concrete has cured 21 days if moisture content of concrete is less than 12%.

3.2.3 Post Priming

3.2.3.1 Feather abrasions, chips, skips, and holidays occurring in prime coat by sanding and recoat with material and color to minimum dry film thickness specified.

3.2.3.2 Previously coated surfaces shall be recoated only after existing film is completely dry.

3.2.3.3 Protect coating from rain until dry to touch.

3.2.4 Protection

3.2.4.1 Provide and install drop cloths, shields, and other protective devices required to protect surfaces adjacent to areas being coated. Keep spatter, smears, droppings, and overrun of coating materials to minimum and remove as coating work progresses.

3.3 APPLICATION

3.3.1 Apply coating materials in accordance with manufacturer's written instructions. ~~Formula-348-shall-be-applied-and-cured-in-temperatures-of 50-F-or-warmer.~~ ECN ECN

3.3.2 Apply with equipment as recommended by manufacturer.

3.3.3 Fill all construction, expansion, and control joints within curbed area with TU400 urethane in accordance with manufacturer's written instructions.

3.3.4 ~~With-a-primary-coat-of-Formula-348-sealer,-apply-a-3-mil-film-onto clean,-dry-surface-of-concrete-and-onto-surfaces-of-the-steel-angle-curbing.~~ *Apply a mixture of non-shrink grout and Amershield under the carbon steel curbing to form an impregnable seal along the inner and outer base of the angles. Mixture shall be 60 percent Amershield and 40 percent non-shrink grout.* ECN

3.3.5 ~~After-initial-coats-on-concrete-and-steel-have-set,-pour-a-2-inch-wide-bead-of-Formula-348-on-clean-concrete-surface-along-center-line-of angles.--Place-steel-angles-directly-on-bead-so-that-the-bead-spreads-and seals-surface-of-concrete-to-steel-angle.--Bolt-angle-down-while-bead-is still-wet.~~

3.3.6 ~~After-seal-of-curbing-has-cured,-coat-entire-surface-of-slab-within curbing,-the-concrete-curb,-and-the-steel-angles-with-a-3-mil-monolithic coat-of-Formula-348.~~

3.4 FIELD QUALITY CONTROL

3.4.1 Government Inspection: The Government's Representative will perform tests to ascertain that coating materials have been applied in accordance with this Section. ~~A-minimum-of-3-test-coupons,-approximately 16-square-inches-each,-will-be-sampled.--The-contractor-shall-repair-test-areas-in-accordance-with-the-manufacturer's-written-instructions.~~ ECN

3.5 CLEANING

3.5.1 Furnish and maintain at jobsite, closed metal containers for disposal of waste materials. Place materials spotted or soaked with paint, oil, or solvents in containers.

3.5.2 Brushes, rollers, spatulas, and spray equipment shall be thoroughly cleaned after each use and shall contain no oils, thinners, or other residue after such cleaning.

3.5.3 Remove empty cans from jobsite at end of each shift.

3.5.4 At completion of coating work, remove materials, containers, rags, cloths, brushes, and other equipment from jobsite. Clean up spills.

3.6 COATING SCHEDULE

3.6.1 ~~Concrete and masonry shall be coated per manufacturer's written instructions.~~ ECN-5

		Wet Film Thickness and Percent of Film Forming Solids per Volume	
Prime:	*Amercoat 400*	*8.5 mils*	*83% ± 3%*
Second:	*Amershield*	*8.5 mils*	*73% ± 3%*
Third:	*Amershield*	*8.5 mils*	*73% ± 3%*

3.6.2 ~~Carbon steel shall be coated per manufacturer's written instructions.~~

		Wet Mil Thickness and Percent of Film Forming Solids per Volume	
Prime:	*Amercoat 400*	*8.5 mils*	*83% ± 3%*
Second:	*Amershield*	*8.5 mils*	*73% ± 3%*
Third:	*Amershield*	*8.5 mils*	*73% ± 3%*

ECN-5

END OF SECTION

SECTION 09900

PAINTING

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

D 16-84	Standard Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products

1.1.1.2 Federal Specifications (FS)

SS-S-1996	Sealer, Water And Weather Resistant, For Asphalt, Concrete, And Masonry Surfaces
TT-E-509B, Including AMD 2	Enamel, Odorless, Alkyd, Interior, Semigloss, White And Tints
TT-E-545B, Including AMD 1	Enamel, Odorless, Alkyd, Interior-Undercoat, Flat, Tints And White
TT-P-102E, Including INT AMD 1	Paint, Oil (Alkyd Modified, Exterior, White And Tints)
TT-P-641G, Including AMD 1	Primer Coating; Zinc Dust-Zinc Oxide (For Galvanized Surfaces)
TT-P-645A	Primer, Paint, Zinc Chromate, Alkyd Type
TT-P-650C, Including AMD 1	Primer Coating, Latex Base, Interior, White (For Gypsum Wallboard)
TT-P-1511B	Paint, Latex (Gloss And Semi-gloss, Tints And White)(For Interior Use)
TT-S-179B, Including AMD 1	Sealer, Surface: Pigmented Oil, For Plaster And Wallboard

1.1.1.3 Military Specification (MS)

DOD-P-15328D, Including AMD 1	Primer (Wash), Pretreatment (Formula No. 117 For Metals)

1.1.1.4 Steel Structures Painting Council (SSPC)

Surface Preparation Specifications

SSPC-SP 2-82	No. 2 Hand Tool Cleaning
SSPC-SP 3-82	No. 3 Power Tool Cleaning

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Deliver materials to jobsite in sealed, original, labeled containers, each bearing manufacturer's name, type of paint, brand name, color designation, and instructions for mixing and/or reducing.

1.3.2 Store materials at minimum ambient temperature of 45 F in well ventilated and heated area or areas.

1.3.3 Take precautions to prevent fire hazards and spontaneous combustion.

1.4 PROJECT CONDITIONS

1.4.1 Environmental Requirements

1.4.1.1 Temperature

a. Unless otherwise recommended by paint manufacturer, apply coatings when ambient and surface temperatures are between 45 F and 95 F except water-thinned paints and other special coatings. Apply water-thinned paints when ambient and surface temperature is between 50 F and 90 F.

b. Should temporary heat be required, provide until specified surface and air temperatures exist for required time period. Maintain temporary heat for 24 hours after paint and finish application.

1.4.1.2 Weather

a. Do no exterior work on unprotected surfaces if it is raining or moisture from other source is present, or expected before applied paints can dry or attain proper cure without damage.

b. Allow wet surfaces to dry and attain required temperatures and conditions specified before proceeding with work, or continuation of previously started work.

c. Do not apply finish in areas where dust is being generated.

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1.4.1.3 Ventilation: Provide adequate continuous ventilation required for drying various materials as recommended by paint manufacturer.

1.4.1.4 Illumination: Do not proceed with work unless minimum lighting level of 15 foot-candles is provided on surfaces to be painted or finished. Provide temporary lighting to attain lighting level specified.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Terms used are defined in ASTM D 16.

2.1.2 Sealers

2.1.2.1 Concrete floor, interior: Refer to Section 09805.

2.1.2.2 Exterior concrete ramps, clear: FS SS-S-1996.

2.1.3 Primers

2.1.3.1 Enamel undercoat: FS TT-E-545 (alkyd).

2.1.3.2 Zinc chromate: FS TT-P-645, (alkyd type). Tint with lamp black to produce color other than yellow.

2.1.3.3 Zinc dust-zinc oxide: FS TT-P-641, Type II.

2.1.3.4 Wallboard: FS TT-P-650, Type 1, (latex base).

2.1.4 Paints

2.1.4.1 Oil, exterior: FS TT-P-102, PPG 1 line.

2.1.4.2 Semigloss enamel, interior: FS TT-E-509.

2.1.4.3 Latex, interior, semigloss: FS TT-P-1511, Type I, or PPG acrylic latex enamel, 6 Line.

2.1.4.4 Concrete floor, interior: Refer to Section 09805.

2.1.5 Other Materials: Materials not specifically described but required to achieve specified finishes shall be of high quality and of manufacture approved by the Government's Representative.

2.1.6 Special Protective Coatings: See Section 09805.

2.1.7 Hazardous Material Restrictions

2.1.7.1 Lead: Do not use paint that contains more than 0.06% lead by weight in total nonvolatile content of paint.

2.1.7.2 Mercury: Do not use mercurial fungicides in exterior oil paints.

2.1.8 Colors and Tints: Paint manufacturer's standard colors and tints.

PART 3 - EXECUTION

3.1 INSPECTION

3.1.1 Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence or quality of work and which cannot be put into acceptable condition through preparatory work included in Article 3.2.

3.1.2 Report in writing to the Government's Representative conditions that may potentially affect proper application of finish. Do not commence surface preparation or coating application until defects have been corrected and conditions are made suitable.

3.2 PREPARATION

3.2.1 New Surface

3.2.1.1 Surfaces to be coated shall be in proper condition to accept, and assure proper adhesion of coating system.

3.2.1.2 Ferrous metals

a. For shop primed surfaces, apply phosphoric acid etch solution at field welded or abraded spots and let set for time recommended by acid etch manufacturer, rinse with potable water, and when dry, apply prime coat. Wash primed surfaces free of dirt, oil, and grease.

b. Prepare ferrous metals in accordance with SSPC-SP 2 Hand Tool Cleaning and/or SSPC-SP 3 Power Tool Cleaning. Mill scale may be present on cleaned surface providing it is fully anchored, gives metallic appearance and does not cover more than 30 percent of surface. Prime ferrous metals within four hours after preparation.

3.2.1.3 Galvanized metals: Remove surface contamination, wash metal with phosphoric acid or approved solution, (or) apply one coat of etching type primer.

3.2.1.4 Nonferrous metals: Remove surface contamination by steam, high pressure water, or solvent washing. Apply etching type primer, (or) acid etch, let dry, then prime paint.

3.2.1.5 Gypsum wallboard: Remove contamination, dust, and dirt. If surface defects appear after prime coating, have defects repaired. After defects are corrected, apply primer over repaired areas.

3.2.2 Mixing and Thinning

3.2.2.1 General: Packaged paint may be thinned before application where necessary to suit conditions of surface, temperature, weather, and method of application. Follow manufacturer's written instructions for thinning packaged paint. Use of thinner shall not relieve Contractor from obtaining complete hiding. Do not mix paints of different manufacturers.

3.2.2.2 Pretreatment wash: Mix by adding one volume of acid component to four volumes of resin component. Add acid component slowly to resin component with constant stirring. Use within eight hours. Material may be reduced with normal butyl alcohol or 99% isopropyl alcohol, if thinning is required to maintain wet spray.

3.2.3 Protection

3.2.3.1 Cover or otherwise protect finished work of other trades, surfaces not to be painted, or surfaces not concurrently being painted.

3.2.3.2 Provide sufficient drop cloths, shields, and protective equipment to prevent spray or drippings from fouling surfaces not being painted, including surfaces in paint storage and preparation areas.

3.2.3.3 Place cotton waste, cloths, and materials which may constitute fire hazard in closed metal containers and remove daily from jobsite.

3.2.3.4 Where toxic materials, and both toxic and explosive solvents are used, take appropriate precautions in accordance with manufacturer's written instructions and applicable safety regulatory agencies. In applying acid etch coating or solutions to metals, concrete, plaster, and toxic materials to copper, provide ventilation and take protective measures to meet requirements of safety regulatory agencies.

3.3 APPLICATION

3.3.1 Surfaces to be Painted and Finished: Paint surfaces scheduled or shown. Finish factory-primed materials in accordance with this Section.

3.3.2 General: Paint may be applied by brush, roller, or spray unless otherwise specified. At time of application, paint shall show no signs of deterioration. Maintain uniform suspension of pigments during application.

3.3.2.1 Apply paint so finished surfaces are free of runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. Hiding shall be complete. Apply each coat as film of uniform thickness. Use rollers of type designed for coating to be applied and surface to be coated. Ensure that surfaces including edges, corners, crevices, welds, and rivets receive film thickness equivalent to adjacent painted surfaces.

3.3.2.2 Touch up suction spots or make overall application of primer or sealer on first coat on gypsum wallboard and other surfaces to produce uniform color and gloss.

3.3.2.3 Touch up exterior concrete sealer coats to eliminate dull spots. Wipe off excess sealer after each application.

3.3.3 Coating Progress: Allow time between successive coats to permit proper drying. Modify drying times to suit abnormal environmental conditions. Oil base or oleoresinous solvent-type paints are ready for recoating when paint feels firm, does not deform or feel sticky under moderate pressure of thumb, and application of another coat of paint does not cause lifting or loss of adhesion of undercoat.

3.3.4 Sprinkler System: Sprinkler system outside the building shall be painted in accordance with Section 02668.

3.3.5 Time Between Surface Preparation and Painting: Apply first coat on surfaces that have been cleaned, pretreated, and otherwise prepared for painting as soon as practicable after such pretreatment has been completed, but before deterioration of prepared surface.

3.3.6 Pretreatment Wash Coat: Apply vinyl-type wash coat by brush or spray. Maintain wet spray at all times.

3.4 CLEANING

3.4.1 At completion of each day, remove painting materials, empty containers, rags, cloths, brushes, or other equipment. Store or dispose of as appropriate.

3.4.2 As work proceeds and upon completion, promptly remove paint where spilled, splashed, or spattered.

3.4.3 At conclusion of work, leave premises neat and clean to satisfaction of the Government's Representative.

3.5 PAINTING AND FINISH SCHEDULE

		Minimum Dry Film	Sq Feet Per Gallon
3.5.1	Exterior		
3.5.1.1	Ferrous Metal, Oil		
	Pretreatment: MS DOD-P-15328	0.5 mil	
	Prime Coat: FS TT-P-645	1.5 mil	
	2nd Coat: FS TT-P-102		400
	Finish: FS TT-P-102		400
3.5.1.2	Galvanized Metal, Oil		
	Pretreatment: MS DOD-P-15328	0.5 mil	
	Prime Coat: FS TT-P-641, Type II	1.5 mil	
	2nd Coat: FS TT-P-102		400
	Finish: FS TT-P-102		400

	Minimum Dry Film	Sq Feet Per Gallon

3.5.2 Interior

3.5.2.1 Ferrous Metal, Enamel, Semigloss

Pretreatment: MS DOD-P-15328	0.5 mil	
Prime Coat: FS TT-P-645	1.5 mil	
2nd Coat: FS TT-E-509	1.5 mil	
Finish: FS TT-E-509	1.5 mil	

3.5.2.2 Metal Doors and Frames, Enamel, Semigloss

Prime Coat: By Door Manufacturer	1.5 mil	
2nd Coat: FS TT-E-509	1.5 mil	
Finish: FS TT-E-509	1.5 mil	
(Interior and Exterior)		

3.5.2.3 Gypsum Board, Latex, Semigloss

Sealer: FS TT-S-179 or PPG 6-2		400
Prime Coat: FS TT-P-650		400
2nd Coat: FS TT-P-1511, Type I, or PPG 6 Line		400
Finish: FS TT-P-1511, Type I, or PPG 6 Line		500

3.5.3 Use products of same manufacturer within coating system.

3.6 COLOR SCHEDULE

Colors shall be as follows:

3.6.1 Barricade Posts: Safety yellow, PPG No. 23-780 or red No. 21105 as called out in Federal Standard No. 595. See drawings for locations.

3.6.2 Miscellaneous Steel Framing: Match prime coat to existing primed components of metal building.

3.6.3 Hollow Metal Doors and Frames: Sudan Brown, PPG No. 7603.

3.6.4 Overhead Coiling Doors: Sudan Brown, PPG No. 7603.

3.6.5 Exterior steel base plate and angle.

3.6.6 Gypsum Board: Antique Ivory, PPG No. 2490.

3.6.7 Sprinkler System: Red, No. 21105, as called out in Federal Standard No. 595.

3.6.8 Where paint is scheduled, but color is not specifically called out in the above Schedule, the surface shall match to surrounding areas.

END OF SECTION

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SECTION 15300

FIRE PROTECTION

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

ANSI B31.1-1986 Edition	American National Standard Code for Pressure Piping-Power Piping

1.1.1.2 American Welding Society (AWS)

AWS D1.1-86	Structural Welding Code-Steel

1.1.1.3 Factory Mutual System (FM)

1988 Edition	Approval Guide

1.1.1.4 National Fire Protection Association (NFPA)

NFPA 13	Standard for the Installation of Sprinkler Systems, 1987 Edition

1.1.1.5 Underwriters Laboratories, Inc (UL)

January 1987, Including July 1987 Supplement	Fire Protection Equipment Directory

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Approval Data: Submit information listed in Column 5 of Vendor Data List in this Section.

1.2.2 Certified Vendor Information (CVI): Submit information listed in Column 6 of Vendor Data List in this Section.

1.2.3 Design/Fabricator Drawings: Submit Design, Fabrication, and Installation Drawings of automatic dry-pipe sprinkler system. Design in accordance with NFPA 13 for ordinary hazard occupancy classification. Size system in accordance with Pipe Schedule in NFPA 13, Section 3-6. Include applicable requirements of NFPA 13, Article 1-9 and this Section. The design shall provide complete sprinkler protection throughout the building.

1.2.3.1 Identify preliminary layouts.

1.2.3.2 Identify proposed deviations from specified materials or design requirements in writing.

1.2.3.3 Design shall be prepared under the supervision of, and submittal stamped by a licensed professional fire protection engineer.

1.2.4 As-Built Drawings: Submit As-Built Drawings of dry-pipe sprinkler system.

1.2.5 NFPA Test Certificate: Complete Contractor's Material and Test Certificate, in accordance with NFPA 13, Section 1-12.

1.3 SYSTEM DESCRIPTION

1.3.1 Sprinkler system shall include a Fire Department connection, check valves, and a 4-inch dry-pipe system alarm valve supplied with standard trim including flow alarm pressure switch, system main drain valve, water motor alarm gong, automatic air maintenance compressor, and a low air presure supervisory switch. The system shall include all other appurtenances required by this Specification and NFPA 13.

1.3.2 Components of sprinkler system, if not designated in this Section and the Drawings by manufacturer's name and model/figure number, shall be current products of manufacturer and UL listed or FM approved for use intended.

1.4 QUALITY ASSURANCE

1.4.1 Welding Documentation: Fabricator shall ensure that welders in his employ are qualified in accordance with AWS or ANSI requirements before performing shop or field welding on structural steel components which are part of this Section. Welder qualification test results shall be made available to the Government's Representative upon request. Proposed AWS or ANSI welding procedures shall be subject to review by the Government's Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Piping

2.1.1.1 Pipe and fittings: Meet the requirements of NFPA 13. Piping shall be Schedule 40 steel with threaded or grooved type (rubber-gasketed) fittings. Rubber-gasketed fittings for use with plain end pipe shall not be used.

2.1.1.2 Flexible couplings: Bolted-sleeve type for use with grooved-end pipe, with rubber rings for sealing. Couplings and gaskets shall be approved for use on dry-pipe sprinkler systems.

2.1.2 Reducers: One-piece concentric threaded reducers or reducing tees for straight run reduction in pipe sizes. Grooved type, rubber-gasketed reducing couplings, and hexagonal or face bushings shall not be used without approval of the Government's Representative.

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2.1.3 Sealant: See Type II, Section 07920.

2.1.4 Identification Labels: Approximately 2-1/4" by 14" bearing words "FIRE PROTECTION WATER" and direction arrow approximately 2-1/4" by 7". Labels shall have adhesive backing. ECN-
ECN-

2.2 EQUIPMENT

2.2.1 Water Motor Alarm Gong: Weatherproof mechanical gong with hood, complete with drain and interconnecting piping.

2.2.2 Switches

2.2.1 The flow alarm pressure switches for installation on the sprinkler systems shall have pressure-actuated, normally-open contacts.

2.2.2 An ajustable low air pressure supervisory switch shall be installed on the dry-pipe sprinkler system to annunciate a failure to maintain a proper air supply in the system.

2.2.3 Automatic Sprinklers: Nominal 1/2-inch diameter orifices, rated for intermediate temperature classification, unless other temperature ratings are required by NFPA 13.

2.2.4 Sprinkler Cabinet: Provide with required number of sprinkler heads of ratings and types installed, a sprinkler wrench, and locate adjacent to riser.

2.2.5 Fire Department Connection: Cast brass and furnished with self-closing double clappers, plugs and chains, automatic balldrip valve, and escutcheon plate. Connection shall be 4-inch IP x 2-1/2-inch HT x 2-1/2-inch HT. Hose threads shall be National Standard Fire Hose threads, 7-1/2 TPI.

2.2.6 Air Compressor: Provide an air compressor for the dry-pipe sprinkler system. A 110-volt, single-phase local power supply shall be provided to the valve enclosure as shown on the Drawing. Electrical installation and wiring shall be performed in accordance with the applicable requirements of Section 16720.

PART 3 - <u>EXECUTION</u>

3.1 INSTALLATION

3.1.1 Install automatic dry-pipe sprinkler system in accordance with NFPA 13 for ordinary hazard occupancy classification.

3.1.2 Coordinate requirements for interruption of existing services and Fire Department stand-by with the Government's Representative.

3.1.3 Protect new piping from damage by earthquake, by proper clearance around penetration holes, flexible couplings, and sway bracing, in accordance with NFPA 13, Sections 3-10.3 and A-3-10.3.

3.1.4 Pack all sprinkler pipe penetrations through walls with fiberglass or mineral-wool packing and seal on both sides with polysulfide sealant. Install escutcheons on sides exposed to view.

3.1.5 Repair damaged surfaces. Refinish repaired or defaced surfaces to match adjacent undisturbed areas.

3.1.6 Terminate exterior discharge, inspectors test, and auxiliary drain lines with 45-degree elbows, turned down.

3.1.7 Provide suitable splash-pads, at exterior discharge locations, on other than paved surfaces.

3.1.8 Welding

3.1.8.1 Limit welding to fabrication of supports or braces, if necessary. No other onsite welding will be permitted.

3.1.8.2 Perform welding of piping and attachments to pressure retaining components in accordance with ANSI B31.1 and NFPA 13.

3.1.8.3 Perform welding of steel structural elements in accordance with AWS D1.1.

3.1.8.4 Do not perform welding or flame cutting on or within building without written approval of the Government's Representative.

3.1.8.5 Perform visual weld examination in accordance with AWS D1.1, Paragraph 6.5.5 (8.15); or ANSI B31.1, Paragraph 136.4.2, as applicable.

3.1.9 Hangers and Supports

3.1.9.1 Hang, support, and brace sprinkler system piping from building structural steel members, or to metal supports attached to building structure in accordance with NFPA 13.

3.1.9.2 Obtain written authority to weld, punch, drill, or cut structural steel members to provide attachment of hangers, supports, or braces.

3.1.9.3 When required, deliver to the Government's Representative a detailed mathematical analysis, by a registered professional engineer, of structural integrity where questionable alteration of building structural components are proposed. Analysis may also be required where obvious deformation of structural members are caused by hanging sprinkler piping.

3.1.10 Signs: Permanent-type identification signs shall be installed at control, drain, test, and alarm valves. Legend shall include warning of Fire Department response to operation of valve.

3.1.11 Identification Labels ECN-2

3.1.11.1 Install labels after painting is completed.

3.1.11.2 Locate labels on pipe where they can be easily read. Place labels on bottom quadrant of overhead pipe and top quadrant of pipe lower than eye level. ECN-22

3.1.11.3 Identify only feed mains, cross mains, and risers 3" nominal diameter and larger. ECN-22

3.1.11.4 Locate line identification at interials of approximately 40' on unobstructed runs and on each side of partitions and floors. ECN

3.2 FIELD QUALITY CONTROL

3.2.1 Flushing and Testing

3.2.1.1 General

a. Furnish equipment and instruments required to perform flushing and testing operations described below.

b. Conduct flushing and testing operations while witnessed by the Government's Representative.

c. Remove and replace pieces of apparatus, material, or work which fails in flushing or testing operations and retest.

d. Repair damage resulting from flushing or testing to satisfaction of the Government's Representative.

3.2.1.2 Flushing: Flush new sprinkler system piping as described below:

a. Flush sprinkler piping by feeding water into system through alarm valve to provide velocity of at least 7 feet per second in piping being flushed.

b. Discharge flushing water from end of cross mains.

c. Discharge flushing water to point designated by the Government's Representative. Flushing shall continue until effluent runs clear and free of foreign matter.

d. Provide documented evidence that flushing has been accomplished in accordance with this Section. Deliver to the Government's Representative before testing.

3.2.1.3 Hydrostatic test

a. Hydrostatically test new sprinkler system in accordance with NFPA 13, Section 1-11.2.

b. Use hydrostatic test pressure of 200 psi.

c. Leaks in piping will not be acceptable.

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Project No. CR0385/242260

Title PCB/RMW Storage Facility

KAISER ENGINEERS HANFORD

VENDOR DATA LIST

("X" Indicates Required Data)

1 EPN Identification	2 Description	3 Reference Drawing	4 Specification Paragraph	5 Approval/Data: Dimensional Drawings	Equipment Weights	Specifications	Material Description	Performance Data	Circuit or Control Diagrams	Data Sheets	Illustrative Cuts	Installation Instructions	6 Certified Vendor Information (CVI): Dimensional Drawings	Equipment Weights	Specifications	Certified Test Data	Circuit or Control Diagram	Instructions: Installation	Operation	Maintenance	Spare Parts List	7 Remarks
1	Dry Pipe Valve		1.3.1								X		X							X	X	
2	Water Motor Alarm Gong		2.2.1								X											
3	Fire Department Connection (FDC)		2.2.5								X											
4	Check Valves		1.3.1								X											
5	Flow Alarm Pressure Switch		2.2.1								X											
6	Low Air Pressure Supervisory Switch		2.2.2								X											
7	Sprinkler Heads		2.2.3								X											
8	Flexible Couplings and Gaskets		2.1.1.2							X												
9	Air Compressor		2.2.6					X			X		X							X	X	

*Submit all approved items under Column 5 to Vendor Data File at completion of work.

END OF SECTION 15300 - 6

DOE Richlar

KEH-115 (3-82

W-032-C1 As-Built Rev. 1

SECTION 15500

HEATING, VENTILATING, AND AIR CONDITIONING

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 Air Movement and Control Association, Inc (AMCA)

AMCA Standard 210-74	Laboratory Methods of Testing Fans for Rating Purposes

1.1.1.2 American Society for Testing and Materials (ASTM)

A 307-86a	Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
A 563-84	Standard Specification for Carbon and Alloy Steel Nuts

1.1.1.3 Sheet Metal and Air Conditioning Contractors National Association, Inc (SMACNA)

1983, 1st Edition	HVAC Systems--Testing, Adjusting and Balancing

1.1.1.4 Underwriters Laboratories, Inc (UL)

January 1987	Building Materials Directory

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Approval Data: Submit information listed in column 5 of Vendor Data List in this Section.

1.2.2 Certified Vendor Information (CVI): Submit information listed in Column 6 of Vendor Data List in this Section.

1.3 GOVERNMENT FURNISHED EQUIPMENT: Wall exhausters and louvers.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Fasteners: ASTM A 307, Grade A or B bolts, with heavy hex nuts meeting the requirements of ASTM A 563, UNC threads, bolt head marking not required. Finish to be cadmium plating or electro-galvanizing.

2.2 EQUIPMENT

2.2.1 Wall Exhausters

2.2.1.1 Unit shall be Greenheck Fan Corporation, Model GWB-21, 1/3 horsepower, 3000 CFM at 0.25 inches WG static pressure. Unit shall be equipped with bird screen, wall grille, and gravity damper. Unit shall be belt-driven type with drives sized for 165% of driven horsepower. The motor pulley shall be adjustable for final system balancing. A disconnect switch shall be factory installed and wired from the fan motor to the disconnect junction box. Motor shall be equipped with over-current protection. Unit shall bear the AMCA certified performance seal for air performance. Unit wiring shall be 230 volt, single phase.

2.2.2 Louver

2.2.2.1 American Warming and Ventilating, Inc, Model LE-33. Louvers shall be flanged for flush surface application. Jambs shall be constructed with integral downspouts for carrying water from the blades to the louver sill. Screens shall be provided on the interior surface of the louvers and shall be 1/2-inch mesh. Louvers shall be constructed of extruded aluminum with an anodized finish with one coat of lacquer. Louvers shall be 36 inches by 36 inches, passing 3000 CFM with less than .15 WG pressure drop. Louvers shall be equipped with 2-inch, 30% filters.

2.2.3 Baseboard Heater: Chromalox, Model BBF-31, baseboard heater. Voltage shall be 120 volts, single phase, 60 cycles. Heater output shall be 750 watts. Baseboard length shall be 36 inches. Provide integral thermostat, Model BBFK-7. Unit shall be UL listed.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Equipment

3.1.1.1 Install where shown on the Drawings in accordance with manufacturer's written instructions.

3.2 FIELD QUALITY CONTROL

3.2.1 Testing and Balancing HVAC Systems

3.2.1.1 After system is installed, place exhaust fans in operation in accordance with manufacturer's written instructions. After fans have been in

operation for at least four hours, balance the HVAC system in accordance with SMACNA HVAC Systems--Testing, Adjusting and Balancing Publication, and under surveillance of the Government's Representative.

3.2.1.2 Furnish instruments, materials, and labor required to perform testing and balancing of systems. Instruments shall have been calibrated by approved testing laboratory with date of calibration marked on them.

3.2.1.3 Do not use instruments which are part of system for testing and balancing. Check instruments of system against test instruments.

3.2.1.4 Data to be recorded

a. After test has been performed, submit Test and Balance Data Report in accordance with Paragraph 1.2.4. Test data shall be tabulated and submitted with flow sheet indicating points of measurement.

3.2.1.5 Testing and balancing sequence: Perform in accordance with sequence given by SMACNA.

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Project No. CR0385/242260

Title PCB/RMW Storage Facility

KAISER ENGINEERS HANFORD

VENDOR DATA LIST

("X" Indicates Required Data)

1	2	3	4	5 Approval/Data									6 Certified Vendor Information (CVI)									7
																		Instructions				
EPN Identification	Description	Reference Drawing	Specification Paragraph	Dimensional Drawings	Equipment Weights	Specifications	Material Description	Performance Data	Circuit or Control Diagrams	Data Sheets	Illustrative Cuts	Installation Instructions	Dimensional Drawings	Equipment Weights	Specifications	Certified Test Data	Circuit or Control Diagram	Installation	Operation	Maintenance	Spare Parts List	Remarks
1	Wall Exhausters		2.2.1	X		X		X					X		X					X	X	

END OF SECTION 15500 - 4

W-032-C1 As-Built Rev. 1

DOE Richlan

KEH-115 (3-82)

SECTION 16300

HIGH VOLTAGE DISTRIBUTION
(Above 600-Volt)

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

ANSI C2-1987	American National Standard National Electrical Safety Code, 1987 Edition
ANSI C80.1-1983	American National Standard for Rigid Steel Conduit--Zinc Coated

1.1.1.2 Federal Specifications (FS)

W-C-1094A	Conduit And Conduit Fittings Plastic, Rigid

1.1.1.3 National Fire Protection Association (NFPA)

NFPA 70	National Electrical Code, 1987 Edition

1.1.1.4 Underwriters Laboratories, Inc (UL)

May 1987, Including Nov 1987 Supplement	Electrical Appliance and Utilization Equipment Directory
May 1987, Including Nov 1987 Supplement	Electrical Construction Materials Directory

1.1.1.5 National Electrical Manufacturers Association (NEMA)

Standards Publication/No. FB 1-1983 w/Rev through Sep 1984	Fittings and Supports for Conduit and Cable Assemblies
Standards Publication/No. RN 1-1980	Polyvinyl-Chloride Externally Coated Galvanized Rigid Steel Conduit and Electrical Metallic Tubing

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures. ECN-1

1.3 QUALITY ASSURANCE ECN-13

1.3.1 Standards: Products shall be identified for intended purpose by UL in the Electrical Appliance and Utilization Equipment Directory or Electrical Construction Materials Directory, and bear mark of laboratory. In absence of mark, submit documentation of applicable listing. Listing and marking by UL is not required for products specified to meet the requirements of a national standard, or designated by manufacturer's part number on the Drawings or in this Section.

1.4 CABLE DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery: Upon delivery to jobsite inspect cable and reels for shipping damage such as damage from mishandling or marks caused by improper lifting equipment or techniques.

1.4.2 Storage

1.4.2.1 Store reels with flanges resting vertical on hard surface or pallet to prevent sinking into ground.

1.4.2.2 Reel flanges shall not touch cable on other reels.

1.4.3 Handling

1.4.3.1 Do not drop reels.

1.4.3.2 Slings and forklifts shall not contact cable.

1.4.3.3 Use spreader bar when lifting reel with bar and sling.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Solderless Connectors and Terminal Lugs: Compression-type, rated for aluminum-to-aluminum, aluminum-to-copper, and copper-to-aluminum connections.

2.1.2 Raceways

2.1.2.1 Conduit shall meet the requirements of appropriate standard as follows:

a.	Rigid steel	ANSI C80.1
b.	PVC (Schedule 40)	FS W-C-1094, Type II

2.1.2.2 PVC coating on rigid steel conduit: Factory-applied, and meeting the requirements of NEMA RN 1, Type A-40.

2.1.2.3 Fittings for rigid steel conduit shall meet the requirements of NEMA FB 1. ECN-13

2.1.3 Duct Sealing Compound: "Sealex" manufactured by Porcelain Products Co or the equivalent by 3M Company. ECN-1

2.1.4 Wire Pulling Compound: "Y-er Eas" manufactured by Electrocompound Co or "Polywater" manufactured by American Polywater Corp.

2.2 EQUIPMENT

2.2.1 Fuse Cutouts: 100-amp, 7.8/15 kV, 110 kV BIL rating, open-type, non-loadbreak, with bracket for crossarm mounting; Westinghouse Type NCX, Style No. 279C601A03. Provide each cutout with 65T fuse.

2.2.2 Lightning Arresters: 3 kV, direct-connected, with crossarm bracket; Westinghouse Style No. 634A756A03.

PART 3 - EXECUTION

3.1 PREPARATION

3.1.1 Field Measurements: Scale dimensions on the Drawings show desired and approximate location of equipment, actual locations, distances, and levels shall be governed by field conditions.

3.2 INSTALLATION

3.2.1 General

3.2.1.1 Perform work in accordance with NFPA 70 (NEC) and ANSI C2.

3.2.1.2 Install products as shown on the Drawings and in the Specification.
3.2.1.3 Use appropriate special tools when installing devices for which special installation tools are recommended by manufacturer.

3.2.2 Conduits

3.2.2.1 Use rigid steel conduit on poles and for all bends belowgrade.

3.2.2.2 Use PVC-coated rigid steel conduit in contact with earth. Install in accordance with manufacturer's written instructions. Repair coating, damaged during handling or installation using PVC paint recommended by conduit manufacturer.

3.2.2.3 Install belowgrade conduits as directly as possible and with bend radii as long as possible.

3.2.2.4 Cut square, ream and remove burrs. Conduit shall be clean, dry, and free of debris. Immediately after installation, plug or cap exposed ends with standard accessories until wires are installed.

3.2.2.5 Set up joints in conduit installed in concrete, underground, or exposed to weather, with high temperature, antiseize, conductive thread lubricant and sealant. ECN-1

3.2.2.6 Use PVC conduit for straight runs in concrete encased duct banks. ECN-13

3.2.2.7 Form concrete encasements, unless written waiver is obtained from KEH.

3.2.2.8 Seal conduit at both ends with duct sealing compounds.

3.2.3 Conductors

3.2.3.1 Use paint or pressure-sensitive colored tape to identify conductors. Maintain phase color coding at each termination point. Identify equipment grounding conductors clearly throughout system.

3.2.3.2 Use lubricant recommended by cable manufacturer, or wire pulling compound specified, to decrease friction when pulling wire and cable through conduit.

3.2.3.3 Do not install or handle wires with thermoplastic insulation or jacket when ambient temperature is 15 F or below.

3.2.4 Splices, Taps, and Cable Terminations

3.2.4.1 Make splices and taps with solderless connectors described in Paragraph 2.1.1. Use connectors in accordance with manufacturer's written instructions.

3.2.4.2 Maximum pulling tension on conductors: As recommended by manufacturer.

3.2.4.3 Follow manufacturer's written instructions and directions for splices, stress cones, and cable terminations.

3.2.4.4 Wrap terminations for stranded insulated conductors on aerial equipment with two half-lapped layers of plastic insulating tape from 2 inches back on cable insulation to cover barrel of terminal. Taping shall affect moisture barrier so moisture cannot penetrate between conductor and insulation or interstices of stranded conductor. Overlay one half-lapped layer of silicone rubber termination tape over plastic insulating taping.

3.2.5 Aerial Equipment Grounding: Ground equipment and lightning arresters in accordance with the Drawings. Bond together pole line hardware separated by less than 2 inches.

3.3 FIELD QUALITY CONTROL

3.3.1 Testing, General

3.3.1.1 Test equipment and wiring for continuity and unintentional grounds, and verify proper phase sequence and voltage at equipment served before attempt is made to operate equipment. Notify KEH before start of tests. Correct items found, during testing or examination by KEH, to be at variance with the Drawings and Specifications. ECN-13

3.3.1.2 Furnish instruments, labor, and equipment required to conduct the testing. ECN-1

3.3.1.3 Use test instruments which bear valid calibration stamp showing date of calibration and expiration date of stamp. Calibration and accuracy of test instruments shall be certified by independent testing laboratory having standards traceable to the National Bureau of Standards.

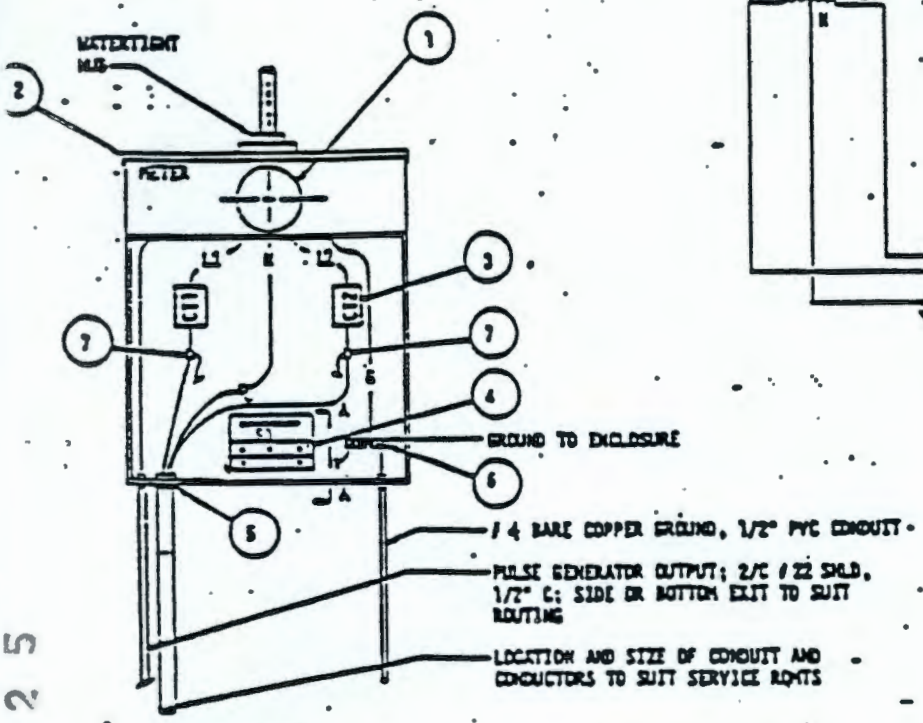
3.3.1.4 Acceptance criteria: Resistance shall not exceed five ohms on continuity checks. Resistance between phase conductors and ground shall be at least one megohm.

3.3.2 Acceptance Inspection

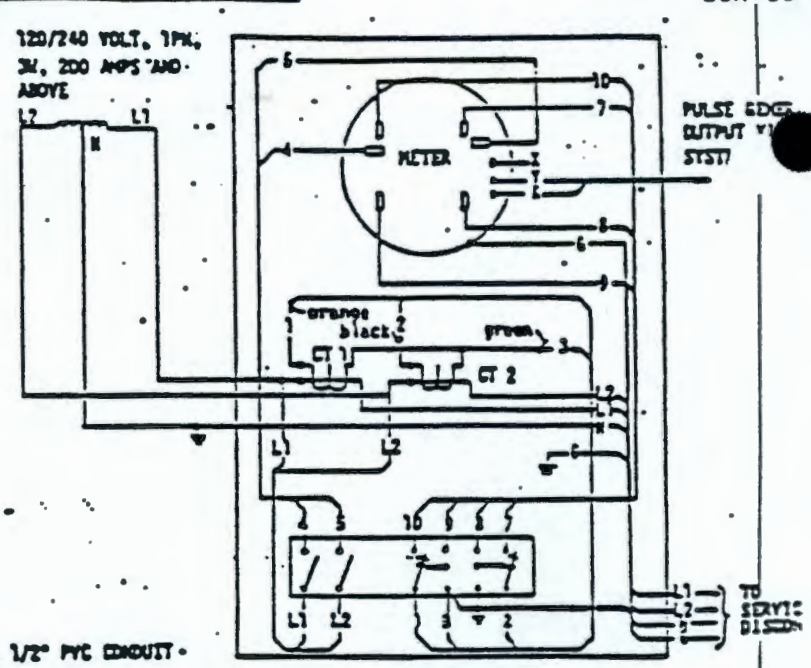
3.3.2.1 In addition to testing specified to be performed by Contractor, installation will be subject to examination by KEH for conformance with design and applicable codes. Assist KEH as requested.

END OF SECTION ECN-1

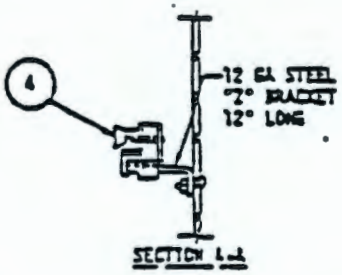
WIRING DIAGRAM - KILOWATTHOUR METER



ELEVATION



WIRING DIAGRAM



SECTION A-A

MATERIAL LIST		
PART NO.	QTY	DESCRIPTION
1	1	SOCKET-TYPE WATTHOUR DEMAND METER, GENERAL ELECTRIC (SEE NOTE 3), TYPE IMW-70-S, CLASS 20, 240 VAC, 6 TERMINAL, FOR USE WITH 2 CTs (1-PHASE, 3-WIRE, 120/240-VOLT SERVICE) 75 KVA MAXIMUM CONNECTED LOAD, COMPLETE WITH A PULSE GENERATOR, TYPE D-73, KWH/PULSE = 0.25, PULSE RATIO R/P = 125/24, AND A SWEEP HAND-TYPE REGISTER WITH A 30-MINUTE DEMAND INTERVAL.
2	1	COMBINATION METER AND CT CABINET, 1-PHASE, 3-WIRE, 400-AMP MAX, WITH MANUAL OR AUTOMATIC CIRCUIT CLOSING DEVICES, CIRCLE AW CATALOG NO. 121816.
3	2	CURRENT TRANSFORMER, 400/5 RATIO, GENERAL ELECTRIC (SEE NOTE 1), TYPE JCW-0 (200-400A) (SEE NOTE 2).
4	1	TEST SWITCH, 6-POLE, SUPERIOR CATALOG NO. 1065.
5	1	BUSHING, INSULATED GROUNDING TYPE, OZ/GEDNEY CO., TYPE BLG.
6	1	GROUNDING LUG, CIRCLE AW CATALOG NO. 4-25145.
7	3	SPLIT BOLT CONNECTOR AND TAPE FOR 600 VOLT.

NOTES:

1. MAY BE THE EQUIVALENT PRODUCT OF SANGAMO OR WESTINGHOUSE.
2. CURRENT TRANSFORMER SECONDARY WIRING SHALL BE NO. 12 AWG STRANDED COPPER, TYPE THHW WITH 600V INSULATION AND SHALL BE CONTINUOUS FROM TERMINAL TO TERMINAL; I.E., THEY SHALL NOT BE SPLICED.

END OF APPENDIX A

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SECTION 16400

SERVICE AND DISTRIBUTION
(600-Volt and Below)

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

ANSI C80.1-1983	American National Standard for Rigid Steel Conduit--Zinc Coated
ANSI C82.1-1977	American National Standard Specifications for Fluorescent Lamp Ballasts

1.1.1.2 Federal Specifications (FS)

W-C-375B/GEN	Circuit Breakers, Molded Case; Branch Circuit And Service
W-F-406C	Fittings For Cable, Power, Electrical And Conduit, Metal, Flexible
W-P-115B	Panel, Power Distribution
TT-S-00230C, Including AMD 2	Sealing Compound: Elastomeric Type, Single Component (For Caulking, Sealing, And Glazing In Buildings And Other Structures)
WW-C-566C	Conduit, Metal, Flexible

1.1.1.3 National Electrical Manufacturers Association (NEMA)

Standards Publication/ No. FB 1-1983 w/Rev through Sep 1984	Fittings and Supports for Conduit and Cable Assemblies
Standards Publication/ No. ICS 6-1983 w/Rev through Oct 1985	Enclosures for Industrial Controls and Systems

Standards Publication/ No. PB 1-1984	Panelboards
Standards Publication/ No. RN 1-1980	Polyvinyl-Chloride Externally Coated Galvanized Rigid Steel Conduit and Electrical Metallic Tubing
Standards Publication/ No. WD 1-1983	General Requirements for Wiring Devices

1.1.1.4 National Fire Protection Association (NFPA)

NFPA 70	National Electrical Code, 1987 Edition

1.1.1.5 Underwriters Laboratories, Inc (UL)

May 1987	Electrical Appliance and Utilization Equipment Directory
May 1987	Electrical Construction Materials Directory
UL 797-1977	Standard for Electrical Metallic Tubing

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Approval Data: Submit information listed in Column 5 of Vendor Data List in this Section.

1.3 QUALITY ASSURANCE

1.3.1 Standards: Products shall be identified for intended purpose by UL in the Electrical Appliance and Utilization Equipment Directory or Electrical Construction Materials Directory, and bear listing mark of laboratory. In absence of mark, submit documentation of applicable listing. Listing and marking by UL is not required for products specified to meet the requirements of a national standard, or designated by manufacturer's part number on the Drawings or in this Section.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Solderless Connectors and Terminal Lugs: Pressure type, rated for use with copper or aluminum conductors with insulating caps or covers rated for system utilization voltage. Connectors shall be types specified below:

2.1.1.1 For conductors #8 AWG and smaller:

a. Ideal Industries, Inc "Wire-Nuts."

b. Thomas and Betts Company "Sta-Kon."

c. 3M Company "Scotchlok."

2.1.1.2 For conductors #6 AWG and larger:

a. Burndy Engineering Company "Screw Pressure Connectors" or "Hydent."

b. Thomas and Betts Company "Lock-tite."

2.1.2 Raceways, Fittings, and Boxes

2.1.2.1 Conduit shall meet the requirements of appropriate standard as follows:

a.	Rigid steel	ANSI C80.1
b.	Electrical metallic tubing (EMT)	UL 797
c.	Flexible metal	FS WW-C-566

2.1.2.2 PVC coating on rigid steel conduit: Factory applied, and meeting the requirements of NEMA RN 1, Type A-40.

2.1.2.3 Conduit fittings for rigid steel and EMT shall meet the requirements of NEMA FB 1. Only compression-type threadless fittings shall be used with EMT.

2.1.2.4 Fittings used with flexible metal conduit shall meet the requirements of FS W-F-406 and be squeeze-type only. Flexible metal conduit shall have integral ground conductor.

2.1.2.5 Use "Myers" type watertight fittings or sealing locknuts manufactured by Midwest Electric Manufacturing Corp, for conduit entries into sides or tops of NEMA Type 3 or NEMA Type 3R enclosures.

2.1.2.6 Interior lighting fixture outlet boxes: 4-inch octagonal pressed steel.

2.1.2.7 Exterior lighting fixture outlet boxes: Cast with threaded hubs.

2.1.2.8 Interior receptacle outlet boxes: 4-inch square by 2-1/8-inches deep, pressed steel with 4-inch square cover.

2.1.3 Conductors: Stranded copper of the AWG size specified on the Drawings.

2.1.3.1 Conductor insulation: Type THWN/THHN or XHHW.

2.1.3.2 Direct burial cable: ~~Type USE,~~ 3-conductor ~~aluminum~~ *copper* cable, 600-volt, ~~with neoprene jacket.~~ *suitable for direct burial.* ECN-6 ECN-6

2.1.4 Concrete and Masonry Anchors: "Kwik-Bolt" manufactured by Hilti Fastening Systems.

2.1.5 Wire Pulling Compound: "Y-er Eas" manufactured by Electro Compound Company; or "Polywater" manufactured by American Polywater Corp.

2.1.6 Plastic Insulating Tape: Scotch No. 33+ manufactured by 3M Company.

2.1.7 Duct Sealing Compound: "Sealex" manufactured by Porcelain Products Co; or "Kerite" manufactured by Kerite Co.

2.1.8 Hangers for Individual Conduits: Factory-made springable wrought steel clamps or malleable iron, split and hinged rings. For suspended conduit, clamps or rings shall be bolted to, or interlocked with threaded suspension rod.

2.1.9 Grounding Materials

2.1.9.1 Ground rod: 5/8-inch diameter by 8-feet long copperweld.

2.1.9.2 Ground cable: Bare solid annealed copper wire.

2.1.9.3 Exothermic weld: Erico Products Inc "Cadweld."

2.1.10 Sealant: Polysulfide meeting the requirements of FS TT-S-00230, Type II, Class B.

2.2 EQUIPMENT

2.2.1 Equipment enclosures shall meet the requirements of NEMA ICS 6-110 and be Type 1 for indoor locations and 3R for outdoor locations.

2.2.2 Panelboard: Rating shown on panelboard schedule, UL labeled, and meeting the requirements of NFPA 70 (NEC), NEMA PB 1, and FS W-P-115, Class 1, Type 1.

2.2.2.1 Provide with main circuit breaker.

2.2.2.2 Provide doors with flush-type combination catch and locks, keyed alike and furnished with two keys for each panelboard. Provide each panelboard with directory card holder and card for branch circuit load identification.

2.2.2.3 Branch circuit breakers: Molded case bolt-on type with thermal magnetic trips, meeting the requirements of FS W-C-375. Number, rating, and

arrangement are shown on panelboard schedule. Permanently number branch circuits. Number tabs shall not be attached to, or be part of, circuit breaker.

2.2.2.4 Branch circuit breaker positions marked "space": Bussed for future circuit breakers. Provide removable single-pole filler plates for spaces shown on panelboard schedule.

2.2.3 Lighting Fixtures: Furnish with parts and fittings necessary to install in accordance with manufacturer's written instructions.

2.2.3.1 Fixtures of each type described shall be of one manufacturer and identical finish and appearance.

2.2.3.2 Fluorescent fixture ballasts: High power factor type, rated for voltage shown on the Drawings or in this Section, suited for fixture temperature environment, and provided with automatic resetting thermal protector. Ballasts shall meet the requirements of ANSI C82.1.

2.2.3.3 Lighting fixtures shall be as follows:

a. Type A: Eight-foot, 2-lamp, *800 ma* rapid start, heavy-duty industrial fluorescent fixture ~~with porcelain reflector and two F96T12 cool white lamps,~~ 120 volt. Ballast shall be rated for operation at 0 F. *Furnish fixture with two F96T12HO cool white lamps.* ECN- ECN-

b. Type B: Surface-mounted, 150-watt incandescent fixture with glass globe; Appleton, Type V-51.

c. Type H: 18-watt, low-pressure, sodium fixture for exterior wall mounting. The fixture shall have clear prismatic lens, black enclosure and photocell control. Fixture shall be Benjamin Division, Thomas Industries, Catalog No. OLB-218-120-PC.

d. Emergency lights: Fully automatic, solid-state, with one or two sealed beam lamps, high-low rate charger, and 6-volt sealed lead batteries, 120-volt ac. Cabinet shall be standard bronze hammertone. Provide a metal mounting bracket for wall mounting. Dual-Lite Company, No. AS-160BC.

e. Type R: Remote alarm light. Rotating flashing beacon, 120 volt, Federal Signal Corp. Model 27S.

2.2.4 Toggle Switch Assembly: Two, single-pole, specification grade, 277-volt, 20-amp switches mounted in cast FS box. Cover shall be cast alloy with external operating mechanisms; Crouse-Hinds, Catalog No. DS1812.

2.2.5 Receptacles: Duplex, brown, specification grade, rated 15-amp, 120-volt, 3-wire, grounding type, meeting the requirements of NEMA WD 1 Designation 5-15R with screw terminals arranged for side wiring. Self-grounding receptacles may be used instead of ground requirements specified.

2.2.6 Exit Signs: Self-luminous panels powered by tritium-filled pyrex tubes requiring no external power supply. Tubes shall be rated for 12-years (minimum) useful life and be replaceable. Signs shall consist of 6-inch white letters on green background. Provide double-faced end mounting with

direction arrows or surface-mounted units as shown on the Drawing. Units shall be Moduglo Series 700A as manufactured by Self-Powered Lighting Inc, Elmsford, NY.

PART 3 - EXECUTION

3.1 PREPARATION

3.1.1 Field Measurements: Scale dimensions on Drawings show desired and approximate location of equipment; actual locations, distances, and levels shall be governed by field conditions.

3.2 INSTALLATION

3.2.1 General

3.2.1.1 Perform work in accordance with NFPA 70 (NEC).

3.2.1.2 Fasten equipment to structural members of building or metal supports attached to structure, or to concrete surfaces.

a. Use clamping devices for attaching to structural steel, or, when clamping is impracticable, obtain written authority from the Government's Representative to weld to, drill or cut structural members to provide attachment.

b. Fasten equipment to concrete or masonry with expansion anchors.

c. Attach to drywall by screws into studs, and to metal wall panels by weld studs, bolts, or self-tapping metal screws.

d. Locate equipment, boxes, and conduit approximately where shown in relation to equipment served.

e. Do not install conduit and boxes in positions that interfere with work of other trades.

f. See Section 02200 for underground cable and conduit installation.

3.2.2 Grounding Systems

3.2.2.1 Underground conductors, electrodes, and connections: Install in accordance with the Drawings. Make joints connecting copper and galvanized steel conductors abovegrade and in dry location.

3.2.2.2 System and equipment grounding: Solidly ground neutral conductor of 3-wire, single-phase, and 4-wire, 3-phase, wye-connected distribution systems. Ground equipment in accordance with NFPA 70 (NEC).

3.2.2.3 Static grounding: Ground building steel as shown on the Drawings.

3.2.3 Conduit

3.2.3.1 Use rigid steel where subject to mechanical damage, installed exposed to weather, or installed 4 feet or less above floor. Electrical tallic tubing may be used elsewhere, when connecting electrical equipment 2 feet or less apart, and when entering top of electrical equipment 4 feet minimum above floor.

3.2.3.2 Install exposed conduit parallel with or at right angles to building lines. Where conditions permit, maintain continuous exposed horizontal runs along walls at minimum height of 9 feet above floor level or grade.

3.2.3.3 Make elbows, offsets, and bends uniform and symmetrical. Bend conduit with approved bending devices.

3.2.3.4 Cut square, ream and remove burrs. Conduit shall be clean, dry, and free of debris. Immediately after installation, plug or cap exposed ends with standard accessories until wires are installed.

3.2.3.5 Use galvanized steel locknuts and insulated bushings for attachment to enclosures except threaded hubs or sealing type locknuts shall be used outdoors or where moisture is present. Threadless fittings will not be permitted for rigid conduit. Use Erickson-type couplings where required. Do not use running threads.

3.2.3.6 Use one-hole clamps equipped with clampbacks or Unistrut with clamps to secure conduits.

3.2.3.7 Install without moisture traps wherever possible. Where practicable, provide drain holes in pullboxes or fittings at low points in raceway systems and remove burrs from drilled holes.

3.2.3.8 Flexible conduit

a. Use to make connections to motors and other equipment subject to vibration. Use liquidtight flexible metal conduit where conduit and fittings are installed outdoors or exposed to moisture or chemical fumes indoors.

b. Use in lengths not exceeding 4 feet for other equipment, with approval of the Government's Representative.

3.2.3.9 Seal opening around conduit at exterior wall penetrations using specified sealant. Make seal waterproof and finish sealant flush with surrounding wall surface.

3.2.3.10 Use hangers with 3/8-inch rods for 2-inch conduit and smaller and hangers with 1/2-inch rods for 2-1/2-inch conduit and larger. If conduit is suspended on rods more than 2-feet long, rigidly brace to prevent horizontal motion or swaying.

3.2.3.11 Apply duct sealing compound after installation of conductors, at boxes, in conduits that penetrate walls.

3.2.3.12 For conduit extended belowgrade use PVC coated rigid steel installed in accordance with manufacturer's written instructions. Repair coating, damaged during handling or installation, using PVC paint recommended by conduit manufacturer.

3.2.4 Boxes, Enclosures, and Wiring Devices

3.2.4.1 Install boxes firmly in position and plumb.

3.2.4.2 Install extension ring with blank cover on flush-mounted junction boxes where box serves permanently installed equipment.

3.2.4.3 Flush mount junction boxes served by concealed conduit.

3.2.4.4 Install dust covers on junction, pull, and outlet boxes, and other types of wiring outlets at initial installation. Do not remove dust covers until wires are installed and permanent cover or device is placed on box or outlet.

3.2.5 Conductors

3.2.5.1 Maximum pulling tension on conductors: As recommended by manufacturer.

3.2.5.2 Color coding: Single conductors shall be color coded as follows:

Hot No. 1	=	Red
Hot No. 2	=	Blue or Black
Neutral	=	White or Gray
Equipment Ground	=	Green

3.2.5.3 Maintain phase color coding for all branch and feeder circuits up to and including equipment connections.

3.2.5.4 Use lubricant recommended by cable manufacturer, or wire pulling compound specified, to decrease friction when pulling wire and cable through conduit.

3.2.5.5 Do not install or handle wires with thermoplastic insulation or jacket when ambient temperature is 15 F or below.

3.2.5.6 Install direct burial cable and mark location in accordance with the Drawing.

3.2.6 Splices, Taps, and Cable Terminations

3.2.6.1 Make splices and taps in building wire with solderless connectors described in Paragraph 2.1.1. Use connectors in accordance with manufacturer's written instructions.

3.2.6.2 Use plastic insulating tape for uninsulated splices and taps. Apply tape to thickness at least equal to conductor insulation. Where bolted

splice or connection presents irregular surface, apply insulating putty to joints before taping.

3.2.6.3 Use crimp-on type ring or spade lugs with turned up legs for wire terminations of stranded conductors to binder screw or stud-type terminals. Lugs shall have insulated sleeves.

3.2.7 Lighting Fixtures: Mount suspended lighting fixtures where shown on the Drawings using rods or chain.

3.2.8 Motor - Operated Equipment: Connect in accordance with the Drawings, this Section, and manufacturer's written instructions. Install wiring to devices which do not appear on the Drawings but are included in installation shown on the manufacturer's Drawings.

3.3 FIELD QUALITY CONTROL

3.3.1 Testing, General

3.3.1.1 Test equipment and wiring for continuity and unintentional grounds, and verify proper phase sequence and voltage at equipment served before attempt is made to operate equipment. Notify the Government's Representative before start of tests. Correct items found, during testing or examination by the Government's Representative, to be at variance with the Drawings and Specifications.

3.3.1.2 Furnish instruments, labor, and equipment required to conduct testing.

3.3.1.3 Use test instruments which bear valid calibration stamp showing date of calibration and expiration date of stamp. Calibration and accuracy of test instruments shall be certified by independent testing laboratory having standards traceable to the National Bureau of Standards.

3.3.1.4 In addition to testing specified to be performed by Contractor, installation will be subject to examination by the Government's Representative for conformance with design and applicable codes. Assist the Government's Representative as requested.

3.3.2 Motors

3.3.2.1 Check for correct rotation.

3.3.2.2 Measure and record voltage and current, and verify value agrees with data on nameplate.

3.3.3 Wiring Systems

3.3.3.1 Test wiring operating less than 150 volts to ground for continuity and unintentional grounds. Resistance shall not exceed one ohm on continuity checks.

3.3.3.2 Contractor may elect to group and connect together conductors within raceway while performing megger test. Record readings which indicate less than minimum acceptable value. Repeat megger test after replacement of defective wiring.

3.3.3.3 Reconnect devices disconnected during testing.

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Project No. CR0385/242260

Title PCB/RMW Storage Facility

KAISER ENGINEERS HANFORD

VENDOR DATA LIST

("X" Indicates Required Data)

1	2	3	4	5 Approval/Data									6 Certified Vendor Information (CVI)									7
																		Instructions				
EPN Identification	Description	Reference Drawing	Specification Paragraph	Dimensional Drawings	Equipment Weights	Specifications	Material Description	Performance Data	Circuit or Control Diagrams	Data Sheets	Illustrative Cuts	Installation Instructions	Dimensional Drawings	Equipment Weights	Specifications	Certified Test Data	Circuit or Control Diagram	Installation	Operation	Maintenance	Spare Parts List	Remarks
1	Panelboard		2.2.2	X		X					X											
2	Direct Burial Cable		2.1.3.2			X	X															
3	Lighting Fixtures		2.2.3			X	X				X											

END OF SECTION

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SECTION 16720

ALARM AND DETECTION SYSTEMS

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

ANSI C80.1-1983	American National Standard for Rigid Steel Conduit--Zinc Coated

1.1.1.2 Factory Mutual System (FM)

1986 Edition	Approval Guide

1.1.1.3 Federal Specifications (FS)

W-F-406C	Fittings For Cable, Power, Electrical And Conduit, Metal, Flexible
TT-S-00230C, Including AMD 2	Sealing Compound: Elastomeric Type, Single Component (For Caulking, Sealing, And Glazing In Buildings And Other Structures)
WW-C-566C	Conduit, Metal, Flexible

1.1.1.4 Federal Standards (FED STD)

FED-STD-595A, Including CHGS NOT 1, 2, 3, 4, 5, 6, 7, 8 And 9	Colors

1.1.1.5 National Electrical Manufacturer's Association (NEMA)

Standards Publication/ No. FB 1-1983 w/Rev through Sep 1984	Fittings and Supports for Conduit and Cable Assemblies
Standards Publication/ No. ICS 6-1983 w/Rev through Oct 1985	Enclosures for Industrial Controls and Systems

Standards Publication/ No. RN 1-1980	Polyvinyl-Chloride Externally Coated Galvanized Rigid Steel Conduit and Electrical Metallic Tubing

1.1.1.6 National Fire Protection Association (NFPA)

NFPA 70	National Electrical Code, 1987 Edition
NFPA 72B	Standard for the Installation, Maintenance and Use of Auxiliary Protective Signaling Systems for Fire Alarm Service, 1986 Edition
NFPA 1221-1984	Standard for the Installation, Maintenance and Use of Public Fire Service Communication Systems

1.1.1.7 Underwriters Laboratories, Inc (UL)

May 1987, Including Nov 1987 Supplement	Electrical Appliance and Utilization Equipment Directory
May 1987, Including Nov 1987 Supplement	Electrical Construction Materials Directory
January 1987, Including July 1987 Supplement	Fire Protection Equipment Directory
UL 38-1981 w/Rev through Sep 1981	Standard for Manually Actuated Signaling Boxes for Use With Fire-Protective Signaling Systems
UL 797-1977	Standard for Electrical Metallic Tubing
UL 1242-1985	Standard for Intermediate Metal Conduit

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Approval Data: Submit information listed in Column 5 of Vendor Data List in this Section.

1.3 QUALITY ASSURANCE

1.3.1 Standards: Products shall be identified for intended purpose by UL in the Electrical Appliance and Utilization Equipment Directory or Electrical Construction Materials Directory, and bear listing mark of laboratory.

1.3.1.1 Use fire alarm equipment listed in UL Fire Protection Equipment Directory or FM Approval Guide bearing mark of listing organization.

1.3.1.2 Fire alarm system design, components, and installation shall meet the requirements of NFPA 70 (NEC), 72B, and 1221.

1.4 GOVERNMENT FURNISHED EQUIPMENT: Radio fire alarm box and antenna.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Solderless Connectors and Terminal Lugs: Pressure type, rated for use with copper or aluminum conductors, and used in installations not exceeding 600 volts between conductors. Connectors with insulating caps or covers shall be rated for system utilization voltage. Connectors shall be types specified below:

2.1.1.1 Ideal Industries, Inc "Crimp Connectors."

2.1.1.2 Thomas and Betts Company "Sta-Kon."

2.1.2 Raceways, Fittings, and Boxes

2.1.2.1 Conduit shall meet the requirements of appropriate standard as follows:

a.	Rigid steel	ANSI C80.1
b.	Intermediate metal	UL 1242
c.	Electrical metallic tubing (EMT)	UL 797
d.	Flexible metal	FS WW-C-566

2.1.2.2 PVC coating on rigid steel conduit shall be factory applied and meet the requirements of NEMA RN 1, Type A-40.

2.1.2.3 Conduit fittings for rigid steel and EMT shall meet the requirements of NEMA FB 1. Only compression-type threadless fittings shall be used with EMT.

2.1.2.4 Fittings used with flexible metal conduit shall meet the requirements of FS W-F-406 and be squeeze-type only. Flexible metal conduit shall have integral ground conductor.

2.1.2.5 Conduit entries into sides or tops of NEMA Type 3 or NEMA Type 3R enclosures shall be made with "Myers" type watertight fittings, or sealing locknuts as manufactured by Midwest Electric Manufacturing Corp.

2.1.2.6 Exterior junction boxes shall be gasketed and watertight.

2.1.3 Conductors: Stranded copper of type and AWG size shown on the Drawings.

2.1.3.1 Conductor sizes #2 AWG and smaller shall be Type THWN/THHN except Type TW may be used for lighting circuits and ground wires.

2.1.4 Wiremarkers: Imprinted tubular plastic manufactured by ECP Corporation, Cleveland, OH; or Floytag of Seattle, WA.

2.1.5 Wire Pulling Compound: "Y-er Eas" manufactured by Electro Compound Company.

2.1.6 Tape

2.1.6.1 Plastic insulating tape: Scotch No. 33+ manufactured by 3M Company.

2.1.6.2 Conduit protection tape: Scotchrap No. 50 manufactured by 3M Company.

2.1.7 Duct Sealing Compound: "Duct Seal" manufactured by Porcelain Products Co; or "Kerite" manufactured by Kerite Co.

2.1.8 Hangers for Individual Conduits: Factory-made springable wrought steel clamps or malleable iron, split and hinged rings. For suspended conduit, clamps or rings shall be bolted to, or interlocked with threaded suspension rod.

2.1.9 Sealant

2.1.9.1 Polysulfide: Meeting the requirements of FS TT-S-00230, Type II, Class B.

2.1.10 Insulating Putty: "Scotchfil" manufactured by 3M Company; GE No. 8389 manufactured by General Electric Co; or "Airseal" manufactured by Kearney Co.

2.2 EQUIPMENT

2.2.1 Fire alarm equipment enclosures shall meet the requirements of NEMA ICS 6-110 and be Type 1.

2.2.2 Manual Fire Alarm Stations: Double-action, noncoded, nonself-restoring type with ~~double~~ *single*-pole, ~~double~~ *single*-throw positive action contacts. Stations shall meet the requirements of UL 38, be for indoor surface mounting, with hinged type cover and finished "Signal Red." ECN-11

2.2.3 Room Low Temperature Supervisory Switch: Normally closed SPST, opens below 40 F, and not adjustable, Potter Electric Signal Co, Model RTS.

2.2.4 Fire Alarm Locator Lighting Fixture: Locator light No. 332-8N5 outdoor lighting fixture, incandescent, Type N, Crouse-Hinds Vaportight Catalog No. VG175 with VN75 red glass globe, V911 guard, VXF10 outlet box, and 25 watt incandescent lamp extended service type.

PART 3 - EXECUTION

3.1 PREPARATION

3.1.1 Field Measurements: The Drawings show general layout of complete system including arrangement of equipment. Verify scale dimensions since actual locations, distances, and levels shall be governed by field conditions.

3.2 INSTALLATION

3.2.1 General

3.2.1.1 Perform work in accordance with NFPA 70 (NEC), 72B, and 1221.

3.2.1.2 Fasten equipment to structural members of building or metal supports attached to structure.

a. Use clamping devices for attaching to structural steel, or, when clamping is impracticable, obtain written authority from the Government's Representative to weld to, drill or cut structural members to provide attachment.

b. Attach to drywall by screws into studs, and to metal wall panels by bolts or self-tapping metal screws.

c. Locate equipment, boxes, and conduit approximately where shown in relation to equipment served.

d. Do not install conduit and boxes in positions that interfere with work of other trades.

e. Identify components by number and function shown on the Drawings.

f. Attach nameplates on or near component.

3.2.1.3 Use appropriate special tools when installing devices for which special installation tools are recommended by manufacturer.

3.2.1.4 The primary power for the radio fire alarm master box shall be obtained from the power panelboard as shown on the Drawings. The circuit breaker shall be red, fitted with a suitable guard (requiring the removal of a screw to open) and use only for fire alarm equipment. Label circuits used in the power panelboard.

3.2.2 Conduit

3.2.2.1 Use rigid steel or intermediate metal where subject to mechanical damage, installed in concrete floors, installed exposed to weather, or installed 10 feet or less above floor. Electrical metallic tubing may be used elsewhere, when connecting electrical equipment 2 feet or less apart, and when entering top of electrical equipment 5 feet minimum above floor.

3.2.2.2 Install concealed conduits as directly as possible and with bend radii as long as possible. Install exposed conduit parallel with or at right angles to building lines. Where conditions permit, maintain continuous exposed horizontal runs along walls at minimum height of 9 feet above floor level or grade.

3.2.2.3 Permanently label or mark at both ends with conduit number, wire number, run number, and color code of each wire shown on the Drawings.

3.2.2.4 Make elbows, offsets, and bends uniform and symmetrical. Bend conduit with approved bending devices.

3.2.2.5 Cut square, ream and remove burrs. Conduit shall be clean, dry, and free of debris. Immediately after installation, plug or cap exposed ends with standard accessories until wires are pulled.

3.2.2.6 Use galvanized steel locknuts and bushings for attachment to enclosures except threaded hubs may be used where permitted by NFPA 70 (NEC). Threadless fittings will not be permitted for rigid conduit. Use Erickson-type couplings where required. Do not use running threads.

3.2.2.7 Use one-hole clamps equipped with clampbacks to secure conduits.

3.2.2.8 Install without moisture traps wherever possible. Where practicable, provide drain holes in pullboxes or fittings at low points in systems and remove burrs from drilled holes.

3.2.2.9 Use flexible conduit to make connections to equipment subject to vibration. Use liquidtight flexible metal conduit where conduit and fittings are installed outdoors or exposed to moisture or chemical fumes indoors. Flexible conduit may be used in lengths not exceeding 4 feet for other equipment, with approval of the Government's Representative.

3.2.2.10 Set up joints in conduit installed in concrete, underground, or exposed to weather, with high temperature, antiseize, conductive thread lubricant and sealant.

3.2.2.11 Seal opening around conduit at exterior wall penetrations and penetrations of walls which form boundaries between adjoining ventilation zones, using specified sealant. Make seal waterproof and finish sealant flush with surrounding wall surface.

3.2.2.12 Use hangers with 3/8-inch rods for 2-inch conduit and smaller. If conduit is suspended on rods more than 2-feet long, rigidly brace to prevent horizontal motion or swaying.

3.2.2.13 Apply duct sealing compound in conduit at box or enclosure nearest exterior wall penetrations on both sides of wall.

3.2.2.14 Where routing is parallel with hot water or steam pipes, keep conduit at least 6 inches from pipe covering. Where not parallel with pipe it is acceptable to run closer than 6 inches, providing conduit does not touch pipe covering.

3.2.2.15 Install PVC-coated conduit in all underground locations in accordance with manufacturer's written instructions. Repair coating, damaged during handling or installation using PVC paint recommended by conduit manufacturer.

3.2.3 Boxes, Enclosures, and Wiring Devices

3.2.3.1 Install boxes firmly in position and plumb.

3.2.3.2 Install extension ring with blank cover on flush-mounted junction boxes where box serves permanently installed equipment.

3.2.3.3 Flush mount junction boxes served by concealed conduit.

3.2.3.4 Install dust covers on junction, pull, and outlet boxes, and other types of wiring outlets at initial installation. Do not remove dust covers until wires are installed and permanent cover or device is placed on box or outlet.

3.2.3.5 Paint junction box covers and conduit ell fittings with red enamel, Color 11105 in accordance with FED STD 595. Place 1-inch high letters "FA," in white, on center of covers.

3.2.3.6 Use watertight fittings for conduit entry into radio fire alarm box.

3.2.4 Conductors

3.2.4.1 All fire alarm conductor insulation shall be orange colored.

3.2.4.2 Identify each conductor as shown on the Drawings with wire markers at splice or terminal point. Attach wire marker within 2 inches of wire termination. Marker legends shall be visible without moving wire or marker.

3.2.4.3 Use lubricant recommended by cable manufacturer, or wire pulling compound specified, to decrease friction when pulling wire and cable through conduit.

3.2.4.4 Do not install or handle wires with thermoplastic insulation or jacket when ambient temperature is 15 F or below.

3.2.5 Devices

3.2.5.1 Surface mount pull stations 4'-6" above floor at locations shown on the Drawings.

3.2.5.2 Mount low temperature switch at 4 feet above floor level.

3.2.6 Cable Terminations: Use crimp-on type spade lugs for wire terminations of stranded conductors to binder screw or stud-type terminals. Spade lugs shall have upset legs and insulation sleeves sized for conductors.

3.3 FIELD QUALITY CONTROL

3.3.1 Testing, General

3.3.1.1 Test equipment and wiring installed before attempt is made to operate equipment.

3.3.1.2 Furnish instruments, labor, and equipment required to conduct testing.

3.3.1.3 In addition to testing to be performed by Contractor, installation will be subject to examination by the Government's Representative for conformance with design and applicable codes. Assist the Government's Representative as requested.

3.3.2 Wiring Systems: Test fire alarm circuits for continuity.

3.3.3 Acceptance Testing: A written acceptance test procedure (ATP) for testing fire alarm system components and installation will be prepared by the Architect-Engineer in accordance with NFPA 72B Paragraph 1-4.5. Contractor shall be responsible for performance of the ATP, and functionality of system and equipment in verifying operability of components and circuits. Perform the ATP in presence of the Government's Representative.

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Project No. CR0385/242260

Title PCB/RMW Storage Facility

KAISER ENGINEERS
HANFORD

VENDOR DATA LIST

("X" Indicates Required Data)

1	2	3	4	5 Approval/Data									6 Certified Vendor Information (CVI)									7
																		Instructions				
EPN Identification	Description	Reference Drawing	Specification Paragraph	Dimensional Drawings	Equipment Weights	Specifications	Material Description	Performance Data	Circuit or Control Diagrams	Data Sheets	Illustrative Cuts	Installation Instructions	Dimensional Drawings	Equipment Weights	Specifications	Certified Test Data	Circuit or Control Diagram	Installation	Operation	Maintenance	Spare Parts List	Remarks
1	Manual Fire Alarm Stations		2.2.2							X	X											
2	Room Low Temperature Supervisory Switch		2.2.3							X	X											

END OF SECTION

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As-Built Rev. 1

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PERMITS AND ACCEPTANCE TEST PROCEDURES

A. PERMITS

(Reserved)

B. ACCEPTANCE TEST PROCEDURE

(Reserved)

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APPENDIX 4A-6

HAZARDOUS MATERIAL STORAGE VENDOR BROCHURE, JUSTRITE MANUFACTURING COMPANY, DES PLAINES, ILLINOIS

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JUSTRITE
MANUFACTURING
COMPANY

2454 DEMPSTER STREET / DES PLAINES, ILLINOIS 60016 / (312) 298-9250 / Cable: JUSTRITE, DES PLAINES

HAZSTOR®

HAZARDOUS MATERIAL STORAGE

SPECIFICATIONS - ENGINEERING

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HAZ-STOR

DESCRIPTION: STORAGE UNIT

PURPOSE: STORAGE OF CLASS I FLAMMABLE LIQUIDS

QUALITY ASSURANCE AND REFERENCED STANDARDS

1. AISC "SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS," LATEST EDITION, INCLUDING THE "COMMENTARY" AND SUPPLEMENTS THERETO AS ISSUED.
2. AISC "MANUAL OF STEEL CONSTRUCTION," LATEST EDITION.
3. AMERICAN IRON AND STEEL INSTITUTE COLD-FORMED STEEL DESIGN MANUAL, LATEST EDITION.
4. AMERICAN WELDING SOCIETY'S "STRUCTURAL WELDING CODE AWS D1.1-77."
5. AMERICAN PLYWOOD ASSOCIATION'S "PLYWOOD DESIGN SPECIFICATION," LATEST EDITION.
6. NATIONAL DESIGN SPECIFICATION OF THE AMERICAN SOCIETY FOR TESTING AND MATERIALS.
7. NATIONAL DESIGN SPECIFICATION AND COMMENTARY FOR WOOD CONSTRUCTION.
8. THE UNIFORM BUILDING CODE.

DESIGN AND LOADING - BASED ON UNIT SIZE AS FOLLOWS:

WIDTH: 7'-10" MAX.
HEIGHT: 8'-1" MAX.
LENGTH: 7'-10" MIN. 19'-10" MAX.

SNOW LOAD - 40 PSF
WIND LOAD - 30 PSF (110 mph)
STORAGE LOAD - 250 PSF (MAX. RECOMMENDED)

DESIGN AND LOADING (continued)

WALL STRUCTURE	-	2 HOUR FIRE RATED i/a/w U.L. U425
ROOF STRUCTURE	-	CLASS A FLAME SPREAD RATING - U.L.
	-	WIND UPLIFT RATING, I-60
DOOR, FRAME & HARDWARE	-	1½ HOUR FIRE RATED - U.L. LABELED
VENTILATION	-	1½ HOUR FIRE DAMPER - U.L. (ALBR)
BASE STRUCTURE	-	4" DEPTH, UNDERFLOOR SPILL CONTAINMENT

SPECIFIC STRUCTURAL NOTES

1. BASE - STRUCTURAL STEEL

STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE AISC "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" AND THE AISI "CODE OF STANDARD PRACTICE." ALL SHOP WELDING SHALL BE IN ACCORDANCE WITH A.W.S. D1.1-81 "CODE FOR WELDING IN BUILDING CONSTRUCTION."

ALL STRUCTURAL STEEL SHALL BE COATED OR PROTECTED BY CORROSION RESISTANT MATERIAL.

2. SUMP PAN

SUMP PAN STEEL SHALL BE COMMERCIAL QUALITY HAVING A MINIMUM YIELD STRENGTH OF 25,000 PSI.

SUMP PANS SHALL BE WELDED AS SHOWN ON PLAN TO PROVIDE A LIQUID TIGHT SEAL.

SUMP PANS SHALL BE COATED OR PROTECTED BY CORROSION RESISTANT MATERIAL.

3. BASE - FLOORING

FLOOR GRATING

FLOOR GRATING SHALL BE CAPABLE OF SUPPORTING A MINIMUM LIVE LOAD OF 250 PSF. GRATING SHALL HAVE ENOUGH VOIDS TO ALLOW PROPER DRAINAGE INTO SUMP PAN WITHOUT BUILD-UP OF WASTE.

FLOOR DECKING

PLYWOOD DECK SHALL MEET ALL REQUIREMENTS OF U.S. PRODUCT STANDARD, P.S.-1, LATEST EDITION. PLYWOOD SHALL BE A MINIMUM OF 1" THICK.

SPECIFIC STRUCTURAL NOTES (continued)

4. LIGHT GAUGE STEEL

STEEL ROOF JOISTS, FLOOR JOISTS AND STUDS SHALL BE FORMED FROM STEEL MEETING THE REQUIREMENTS OF ASTM A-570-79 AND ASTM A-611-79 (16,18 and 20 ga.) MATERIAL WITH A MINIMUM YIELD STRENGTH OF 40,000 PSI.

STEEL JOISTS AND STUDS SHALL BE GALVANIZED.

SECTION PROPERTIES FOR THE LIGHT-GAUGE SHALL BE AT LEAST EQUAL TO THOSE MANUFACTURED BY THE UNITED STATES GYPSUM COMPANY - USG STEEL FRAMING.

CONNECTIONS OF MEMBERS SHALL BE WELDED UNLESS NOTED ON PLAN.

MEMBER SIZES ARE AS FOLLOWS:

ROOF JOISTS ----------	362 SJ 16
STUDS ----------	362 SJ 20
BRIDGING ----------	1½ x 16 gauge
RUNNERS ----------	362 CR 18
STRAPPING ----------	3" x 20 gauge

5. ROOFING

THE ROOFING SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDED PROCEDURES.

ROOF DECK SHALL BE ½" THICK PLYWOOD AND FASTENED TO ROOF JOISTS.

ROOF OVERLAYMENT SHALL BE ½" THICK "DENS-GLAS."

RUBBER MEMBRANE AND TRIM SHALL BE INSTALLED.

6. SIDING

SIDING SHALL BE A MINIMUM OF 24 ga. MATERIAL AND PROTECTED TO RESIST CORROSION.

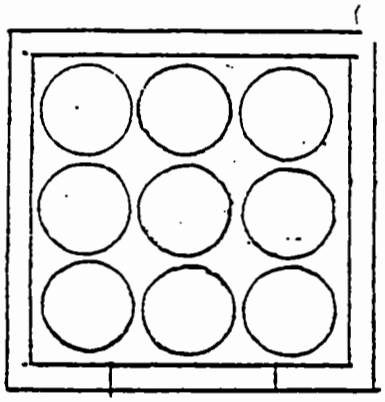
HAZ-STOR

DIMENSIONS

	LENGTH	WIDTH	HEIGHT	SUMP CAP.	DRUM CAP.	SHIPPING WEIGHT LBS.
	8	8	8			
OD	7-10	7-10	8-1	132 gal.	9	4900
ID	6-8½	6-8½	7-0			
	12	8	8			
OD	11-10	7-10	8-1	210 gal.	15	6200
ID	10-8½	6-8½	7-0			
	16	8	8			
OD	15-10	7-10	8-1	288 gal.	21	7500
ID	14-8½	6-8½	7-0			
	20	8	8			
OD	19-10	7-10	8-1	366 gal.	27	8800
ID	18-8½	6-8½	7-0			

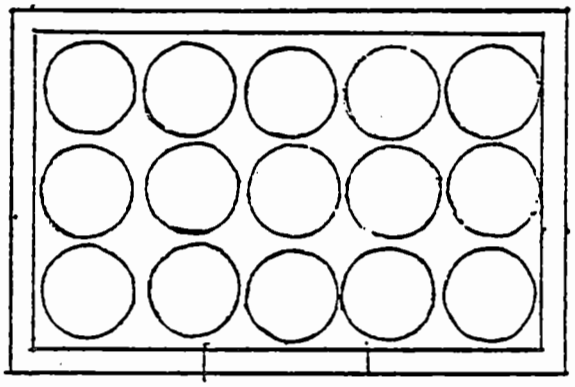
HAZ-STOR

SUMP CAPACITY = 25%
STORAGE CAPACITY



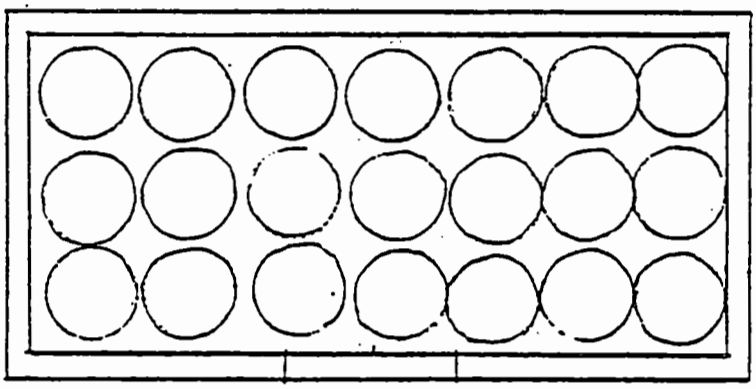
8 x 8 495 GAL.

132 GAL. SUMP CAP.



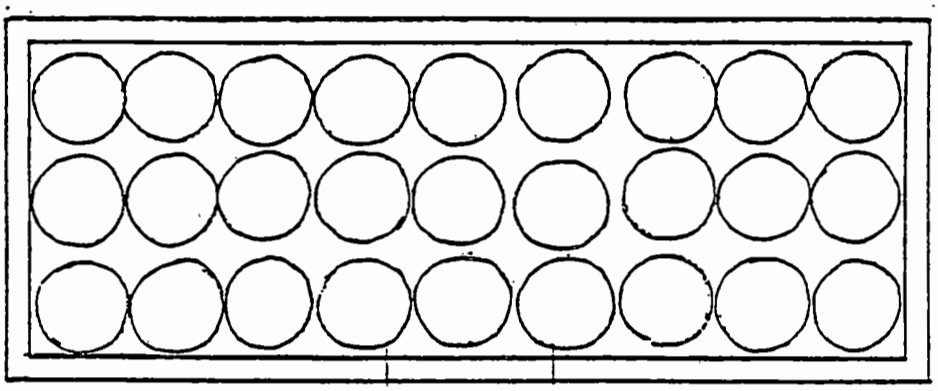
8 x 12 825 GAL.

210 GAL. SUMP CAP.



8 x 16 1155 GAL.

288 GAL. SUMP CAP.



8 x 20 1485 GAL.

366 GAL. SUMP CAP.

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JUSTRITE
MANUFACTURING
COMPANY

2454 DEMPSTER STREET / DES PLAINES, ILLINOIS 60016 / (312) 298-9250 / Cable: JUSTRITE, DES PLAINES

STANDARD/OPTIONAL EQUIPMENT - HAZ-STOR

1. One hour rated firewalls ..... Standard
2. Two hour rated firewalls ..... Standard
3. Epoxy coated plywood & steel floor grate ..... Standard
4. Corrosion resistant fiberglass floor grate ..... Optional
5. Crane hook plates ..... Standard
6. Building hold-down assembly ..... Optional
7. Gas Cylinder wall mounts ..... Optional
8. Explosion proof light fixtures, inside; Class I Division I, or Class I Division II, one or two per unit ..... Optional
9. Exterior lights, photocell sensor, not explosion rated ..... Optional
10. Bonding, bus bars, and grounding system ..... Standard
11. Explosion proof electric service, Class I Division I or Class I Division II panel, wiring, junction box, switch ..... Optional
12. Heat sensor/fan cutoff for above ..... Optional
13. Explosion proof ventilation Class I Division I or Class I Division II, Group C & D, 175 CFM to 1200 CFM ..... Optional
14. Loading ramp ..... Optional
15. Special paint finish ..... P.O.R.
16. Portable emergency eye/face wash - 5 or 10 gallon ..... Optional
17. Wash station outlet head covers ..... Optional
18. Fire extinguishing systems - ABC dry chemical or Halon 1301 ..... Optional
19. Explosion proof heating systems, Class I Divison I Group D ..... Optional
20. 2½ inch Fire Department connection, two deluge sprinkler heads with piping ..... Optional
21. One and one-half hour rated fire door, self-closing, 42 inches wide ..... Standard
22. Extra door (maximum 2 doors per structure). Must be same wall. 1½ hour rated. (Not available on 8 foot units) ..... Optional
23. 5 ft. wide door - 1½ hour rated ..... Optional
24. Air inlet vents with fuselink activated closures. U.L. fire rated ... Standard
25. Air conditioning, Cl. I Div. I or Div II, Group C & D ..... Optional
26. Liquid level indicator for sump pan ..... Optional
27. Epoxy coated plywood shelves, 15 inch deep ..... Optional

ADDITIONAL OPTIONAL FEATURES AVAILABLE ON REQUEST

* ALL HAZ-STOR STRUCTURES HAVE 5 INCH DEEP EPOXY COATED STEEL FULL SIZE SPILL CONTAINMENT SUMP.

HAZ-STOR SPECIFICATIONS

SIZE	LENGTH	WIDTH	HEIGHT
OD	7-10	7-10	8-1
ID	6-8½	6-8½	7-0
OD	11-10	7-10	8-1
ID	10-8½	6-8½	7-0
OD	15-10	7-10	8-1
ID	14-8½	6-8½	7-0
OD	19-10	7-10	8-1
ID	18-8½	6-8½	7-0

DESIGN & LOADING

Snow Load	- 40 PSF
Wind Load	- 30 PSF (110 MPH)
Storage Load	- 250 PSF
Wall Structure	- Firewalls - 1 or 2 Hour Rated - U.L. - U425
Roof Structure	- Class A Flame Spread Rating - UL Wind Uplift Rating - 1-60
Ceiling	- 1 Hour Fire Rated - UL
Door, Frame & Hardware	- 1½ Hour Fire Rated - UL
Ventilation	- 1½ Hour Fire Damper - UL

CONSTRUCTION

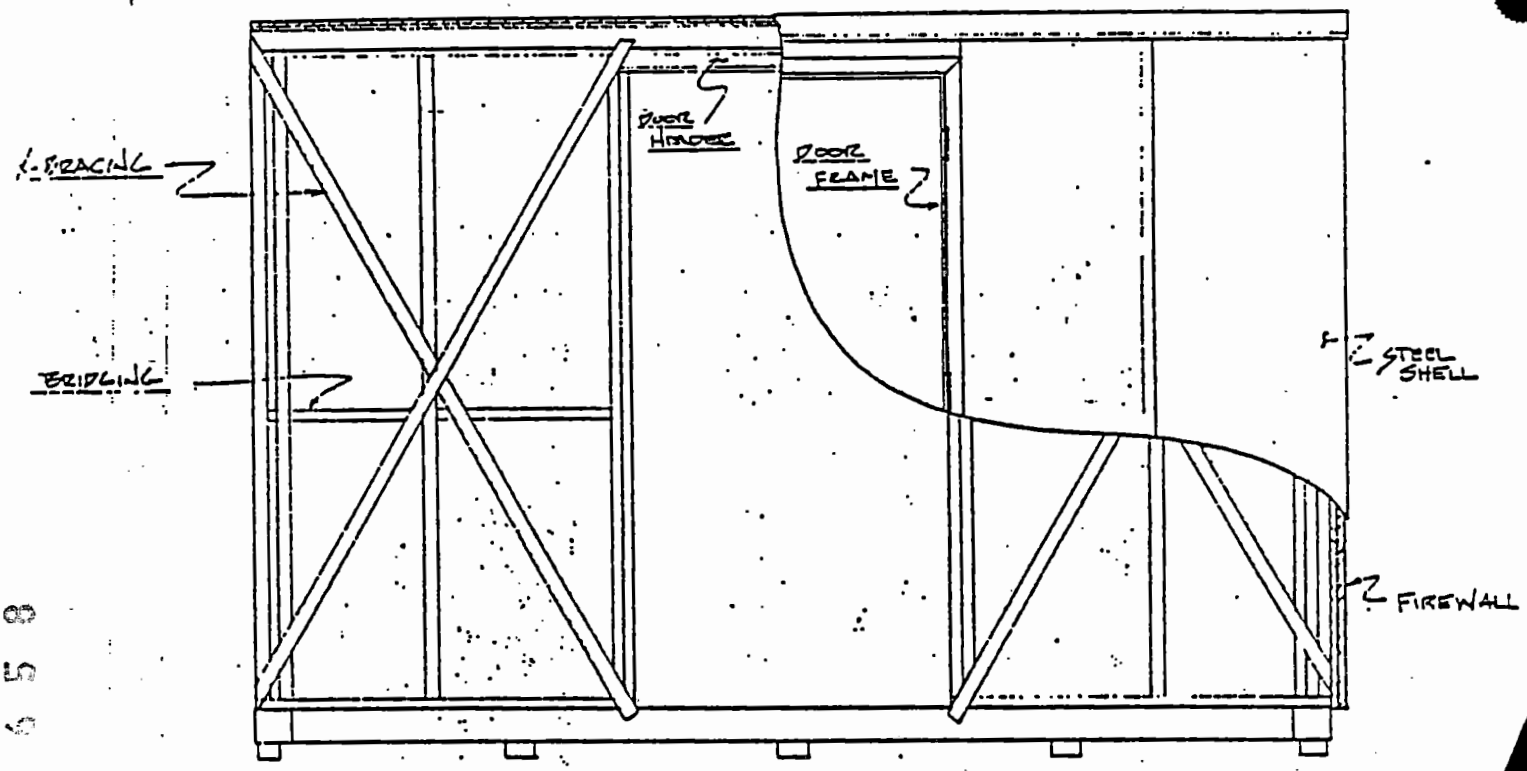
WALLS

24 gauge steel siding, over 5/8" fire rated gypsum board, mechanically attached to 20 gauge galvanized steel studs. Gypsum board inside and out. Interior finish - epoxy. Exterior finish - weather resistant alkyd.

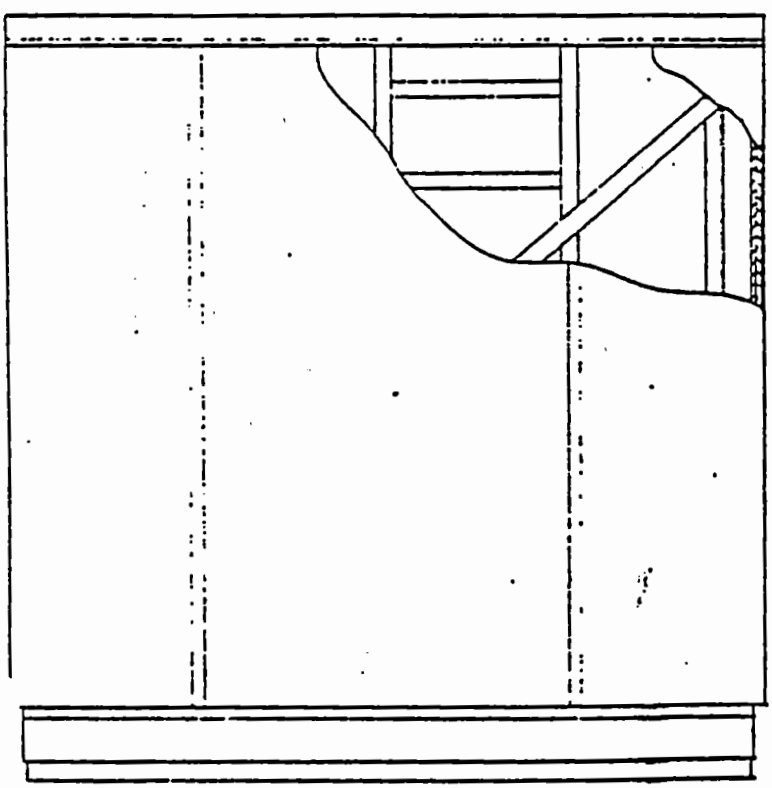
BASE

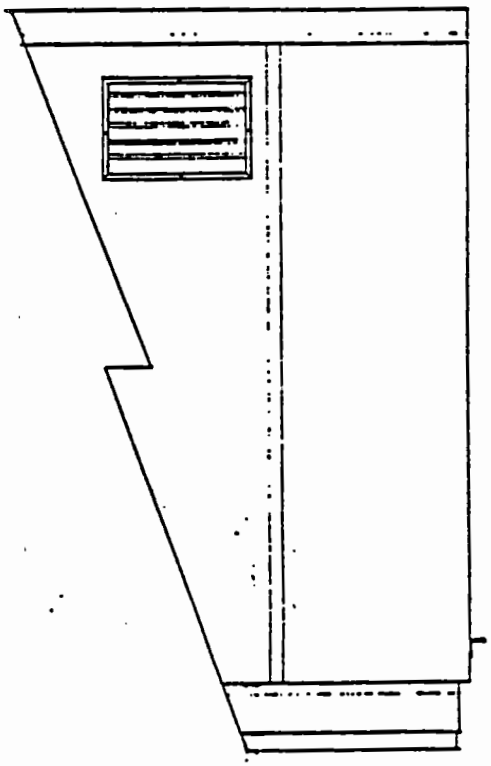
Frame is welded of 5 x 5 x 3/16" steel tubing, with floor supports as required. Sump bottom is 16 gauge hot rolled steel having a minimum yield strength of 25,000 PSI. Entire sump is coated with a corrosion resistant epoxy after leak testing.

HAZ-STOR



FRAMING, ELEVATION (TYPICAL)





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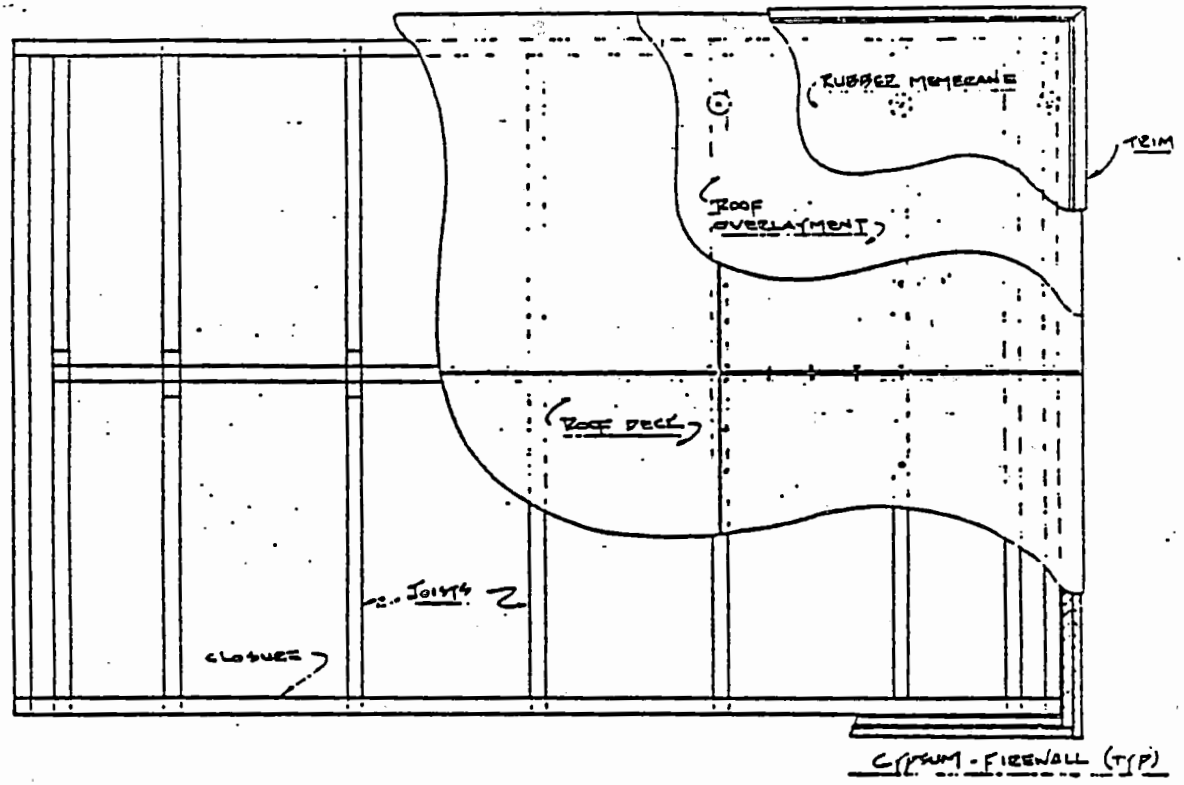
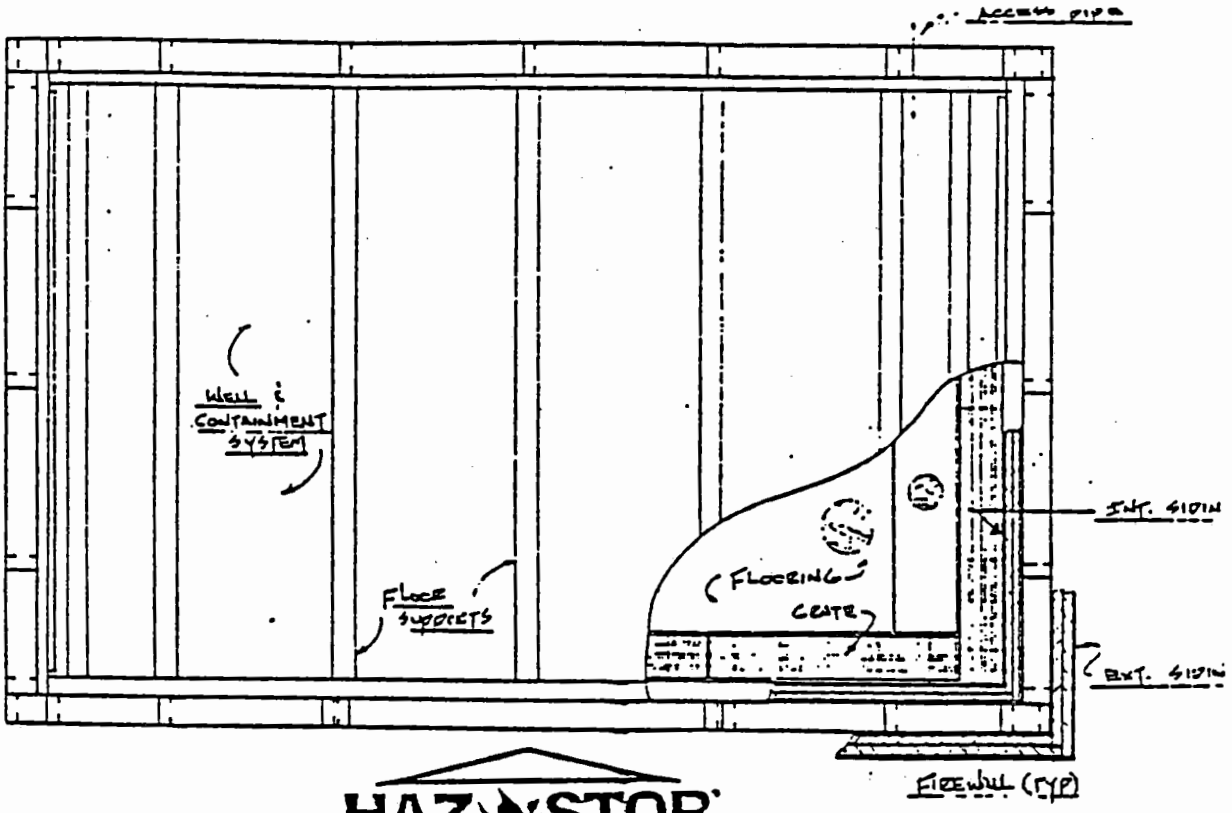
HAZ-STOR



ROOF & FLOOR CONSTRUCTION, DETAILS



HAZSTOR

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FLOOR GRATING

6" perimeter grating will support a live load of 250 PSF. Sufficient voids are provided to allow proper drainage into sump pan. Coating is enameled steel.

FLOOR DECKING

Plywood deck will support a live load of 250 PSF and meet all requirements of U.S. Product Standard, PS-1. Plywood shall be a minimum of 1" thick. Protected by corrosion resistant epoxy. Corrosion resistant fiberglass flooring is optional.

ROOFING

Roof deck is ½" thick plywood fastened to galvanized roof joists. Overlayment is ½" Dens-Glas. Single rubber membrane stretched over entire roof surface wraps around walls providing liquid tight seal. Galvanized trim finished roof line.

DOORS

A single 42" x 80" steel clad 1½ hour fire door is standard on all flammables buildings. A self-closing device is installed on each door as required by U.L. A single cylinder dead bolt lock provides security and protection against unauthorized entry.

UNDERCARRIAGE

3" high channel facilitates use of fork lift for positioning of building and allows for visual inspection of base.

VENTILATION

Ventilation is provided by two 12" x 18" louvered vents positioned for maximum air flow. Each vent is protected by a 1½ hour fire rated UL labeled fire damper activated by a 160° fuse link. Mechanical explosion proof venting is optional.

GROUNDING

Interior grounding and bonding is facilitated by an aluminum bar along three walls of the building at a convenient 42" height. A grounding lug and copper rod are provided for a positive ground.

SPECIFICATIONS FOR JUSTRITE HAZARDOUS MATERIALS STORAGE BUILDING

PURPOSE: To provide controlled access, security and spill containment protection in a self-contained pre-constructed building for the storage or dispensing of chemicals and/or items designated as hazardous materials.

The self-supporting, self-contained building is to incorporate the following features as a minimum requirement and be designed in accordance with the BOCA, Uniform and Standard Building Codes, National Electric Code, EPA, OSHA, and NFPA requirements and shall be UL Classified and FM Approved.

APPROXIMATE PHYSICAL REQUIREMENTS

Nominal Size: 8', 12', 16' or 20' length, by 8' width, by 8' height

Weight: Approximately -

Nominal 8' length - 4900 lbs.
Nominal 12' length - 6200 lbs.
Nominal 16' length - 7500 lbs.
Nominal 20' length - 8800 lbs.

DESIGN FEATURES

WALLS - Steel frame construction sheathed on both sides with a double layer of 5/8" gypsum giving a UL Classified U425 two hour fire wall. All openings shall be UL Classified to provide 1½ hour fire protection.

CEILING/ROOF - Steel frame construction sheathed on inside with a double layer of 5/8" gypsum giving a UL Classified one hour fire rating. The exterior shall be provided with an FM Approved and U.L. Classified Class A roof covering.

FLOOR - A liquid tight secondary spill containment sump shall be provided beneath the floor. The sump shall be 4 inches deep and capable of holding 20 percent of the rated capacity of the building. The floor deck shall be one inch thick epoxy coated plywood. The perimeter of the floor shall be a six inch wide open grate to allow for unrestricted flow of spills into the sump. The sump is to be coated with chemical resistant epoxy.

SPECIFICATIONS FOR JUSTRITE HAZARDOUS MATERIALS STORAGE BUILDING

DOORS - All doors and frames shall be UL Classified for 1½ hour fire protection and be provided with listed door closures The doors shall be 6'8" high and (3'6", 4'6", 5'0") wide. Each door shall be provided with a permanent DOT placard and a pressure sensitive NFPA 704M rating sign.

STRUCTURAL - Each building shall be designed and constructed in accordance with the procedures and requirements of the following codes:

BOCA (Building Officials and Code Administrators International), Basic Building Code, 1984 Edition

Uniform Building Code, 1985 Edition

Standard Building Code, 1985 Edition with 1986 Revisions

National Electric Code, EPA OSHA, NFPA 70, 30, etc.

The minimum design loads shall comply with the following:

Snow:	40 PSF	
Wind:	30 PSF	(110 m.p.h.)
Floor:	250 PSF	(Heavy storage)
Explosive:	100 PSF	(Required only when explosure vents are provided.)

CERTIFICATION - A Certificate of Approval shall be furnished with every building. The Certificate of Approval shall certify that the buildings design and construction has been inspected and meets the requirements of the codes listed above. Every Certificate of Approval shall be made by an approved independent agency. All U.L.Classified buildings meet this requirement.

92 2 2 5 5 1 5 6 2

RICE

RICE SAFETY EQUIPMENT COMPANY

October 31, 1988

Westinghouse Hanford Company
P.O. Box 1970
Richland, WA 99352

ATTN: Judy Gustafson M.S G1-61
REF: Purchase order: #WJG-XVV-581739
HAZ - STOR BUILDINGS

Dear Judy,

Enclosed are three (3) copies of the specifications and layout drawings for the referenced buildings.

Please review these specifications and drawings and return two (2) signed copies with your approval so the manufacture can commence production.

Very truly yours,

Al Smith

AS/tg
Enclosure:

9212365163

[illegible] 4th Ave. S • P.O. Box 80467 Seattle, WA 98108 • 206/767-4500
[illegible] 2523 N.E. Argyle • Portland, OR 97211 • 503/284-7423
[illegible] 2. 3405 Sharp Suite B-5 • Spokane, WA 99212 • 5[illegible] 535-[illegible]

CC: J. MAIER
B. BUCCI
T. WINWARD

L. [illegible]
M. RISTE

S1-54

JUSTRITE
MANUFACTURING
COMPANY

2454 DEMPSTER STREET / DES PLAINES, ILLINOIS 60016 / (312) 298-9250 / Cable: JUSTRITE, DES PLAINES

CONFIRMATION

P.O. WJG-XVV-581739 - WESTINGHOUSE HANFORD CO., RICHLAND, WA

GENERAL

THE HAZ-STOR FLAMMABLE LIQUIDS AND HAZARDOUS MATERIALS STORAGE BUILDINGS ARE CONSTRUCTED IN ACCORDANCE WITH VARIOUS NFPA AND MODEL BUILDING CODES. THE BUILDINGS ARE DESIGNED AS SEPARATE, DETACHED STRUCTURES INTENDED FOR THE STORAGE OF CLASS I, II, AND III FLAMMABLE LIQUIDS AND HAZARDOUS MATERIALS.

DESIGN SPECIFICATIONS

GENERAL

THIS BUILDING HAS BEEN DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS:

NFPA 30:	1984 EDITION
NFPA 70:	1987 EDITION, CLASS I, DIVISION 1, GROUP D-?
UBC:	1985 EDITION, GROUP H, DIVISION 2, TYPE V
STANDARD:	1985 EDITION WITH 1986 REVISIONS, GROUP H, TYPE V
BOCA:	1984 EDITION, GROUP H, TYPE 5A

STRUCTURAL

ROOF: SPREAD OF FLAME - UL CLASS "A" FULLY ADHERED SYSTEM
WIND UP - LIFT - FM APPROVED I-60

WALLS: PANELS - UL U425 1-HOUR FIRE RESISTANCE RATING
OPENINGS - UL CLASSIFIED 1½-HOUR FIRE DAMPERS
DOORS - UL CLASSIFIED 1½-HOUR FIRE DOORS

FLOOR: DECK - REMOVABLE PANELS FOR SUMP INSPECTION
SUMP - 292 GALLON SPILL CONTAINMENT RESERVOIR
FINISH - SUMP AND DECK CHEMICAL RESISTANT EPOXY COATED

LOADS: ROOF LIVE LOAD - 40 PSF
FLOOR LIVE LOAD - 250 PSF (HEAVY STORAGE)
WIND LOAD - 30 PSF (110 MPH)

ELECTRICAL

SERVICE: 60 AMP/240 VOLT

CIRCUITS: NO. 1 - MECHANICAL VENTILATOR

MECHANICAL

VENTILATION 350 CFM CLASS I, DIVISION 1, GROUP D

9 2 1 2 7 5 5 1 5 6 4

INSTALLATION AND GENERAL MAINTENANCE INSTRUCTIONS

GENERAL

WARNING: HAZ-STOR BUILDINGS ARE SPECIFICALLY DESIGNED FOR THE STORAGE OF HAZARDOUS MATERIALS AND FLAMMABLE LIQUIDS. THESE UNITS SHOULD NOT BE INSTALLED IN A MANNER OR LOCATION WHICH CONSTITUTES A VIOLATION OF A BUILDING OR FIRE CODE. THESE UNITS ARE DESIGNED FOR EXPLOSION VENTING.

HAZ-STOR BUILDINGS MAY REQUIRE A BUILDING PERMIT AND/OR AN APPROVAL FROM THE AUTHORITY HAVING JURISDICTION. IT IS THE RESPONSIBILITY OF THE END USER TO INSURE THAT THE INSTALLATION PROCEDURES ARE IN COMPLIANCE WITH LOCAL REGULATIONS.

SITE LOCATION WITH RESPECT TO ADJACENT BUILDINGS AND PROPERTY LINES, FOUNDATION OR GROUND PREPARATION, STATIC GROUNDING AND UNIT ANCHORAGE ARE SUBJECT TO INSPECTION BY THE AUTHORITIES HAVING JURISDICTION.

FOUR LIFT BRACKETS ARE PROVIDED FOR INSTALLATION OF THE HAZ-STOR UNIT WITH A CRANE. THE BRACKETS ARE FASTENED TO THE BASE WITH THE BOLTS PROVIDED. LOCATION OF THE BRACKETS ARE SHOWN ON THE BUILDING'S SCHEMATIC.

NOTE: IT IS THE RESPONSBILITY OF THE END USER TO PROVIDE PROPER ATTACHMENTS SUCH AS SPREADER BARS, CHAINS, ETC., TO PREVENT DAMAGE TO THE UNIT DURING INSTALLATION.

IF A FORK LIFT IS USED TO INSTALL THE UNIT THE FORKS MUST BE 8 FEET LONG AND EXTEND COMPLETELY UNDER THE BASE TO PREVENT DAMAGE TO THE SUMP.

HAZ-STOR STORAGE UNITS ARE SPECIFICALLY DESIGNED WITH A SECONDARY CONTAINMENT SYSTEM TO MINIMIZE THE ESCAPE OF SPILLS OR LEAKAGE. ALTHOUGH THE SYSTEM WAS TESTED AT THE FACTORY, IT IS POSSIBLE THAT DURING HANDLING OR SHIPMENT, A FRACTURE OR RUPTURE MAY OCCUR. AFTER THE UNIT IS LEVELED, FILL THE SUMP WITH WATER AND ALLOW TO STAND OVERNIGHT. LEAKS SHOULD THEN BE APPARENT. IT IS RECOMMENDED THAT THIS PROCEDURE BE FOLLOWED AFTER ANY RELOCATION OF THE UNIT OR AFTER A SPILL CLEAN-UP.

NOTE: SOME LOCAL CODES MAY REQUIRE ADDITIONAL CONTAINMENT AREAS, DIKES OR BURGS. CHECK YOUR LOCAL CODES.

THE FIRE DAMPERS SHOULD BE CHECKED TO INSURE THAT THE FUSIBLE LINK IS IN PLACE AND ANY OBSTRUCTIONS ARE REMOVED TO INSURE PROPER OPERATION.

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ELECTRICAL

WARNING: ALL WIRING SHOULD BE CONDUCTED BY A COMPETENT LICENSED ELECTRICIAN. THE WIRING SHALL CONFORM TO THE 1987 NFPA 70, NATIONAL ELECTRIC CODE, IN ADDITION TO ALL LOCAL CODES.

ELECTRIC SERVICE

- THESE UNITS ARE DESIGNED FOR 60 AMP, 240 VOLT SINGLE PHASE SERVICE.

EXPLOSION RELIEF

INSTALLATION

WOODEN BLOCKS HAVE BEEN INSTALLED AROUND THE PERIMETER OF THE EXPLOSION RELIEF PANELS ON THE EXTERIOR SIDE OF THE BUILDING. REMOVE THE WOODEN BLOCKS AND SEAL THE SCREW HOLES WITH THE CAULK PROVIDED.

CAUTION

CONSULT LOCAL CODES FOR REQUIREMENTS CONCERNING THE AREA BEHIND THE BUILDING. (RELIEF AREA.) DO NOT STACK MATERIALS OR PLACE ANYTHING IN FRONT OF OR BEHIND THE EXPLOSION RELIEF PANELS. OCCUPANTS OF THE BUILDING SHOULD USE CAUTION TO AVOID HITTING THE PANELS OR LEANING OBJECTS OR THEMSELVES AGAINST THE PANELS WHICH MAY CAUSE THE PANELS TO OPEN.

NOTE: THESE SPECIFICATIONS AND INFORMATION ARE LIMITED TO THE 3 - 8'x8'x20 BUILDINGS ORDERED ON P.O.WJG-XVV-581739 BY WESTINGHOUSE HANFORD CO. AND REFERENCED BY JUSTRITE'S B/L NO. 51217.

REVIEWED AND ACCEPTED: WITH COMMENTS

BY: D. A. [illegible]

DATE: 11-11-88

1. HOW IS 1 HOUR RATING ESTABLISHED FOR THE PLYWOOD ROOF DECK? (REFER TO BID PROPOSAL)

9 2 1 2 7 5 6 1 5 5 6

JUSTRITE
MANUFACTURING
COMPANY

2454 DEMPSTER STREET / DES PLAINES, ILLINOIS 60016 / (312) 298-9250 / Cable: JUSTRITE, DES PLAINES

December 1, 1988

Ms. Judy Gustafson
WESTINGHOUSE HANFORD CO.
P.O. Box 1970
Richland, WA 99352

SUBJECT: P.O. # WJG-XVU-581739
HAZ-STOR Building

Dear Ms. Gustafson:

This letter is to certify that the HAZ-STOR buidlings you currently have on order meet the following codes pertaining to the fire rating on the walls, roof, and ceiling:

Walls - U.L. U425

Roof - Class A Flame Spread Rating, U.L.

Ceiling - 1 hour fire rating

Attached you will find additional information pertaining to the construction of these buildings to meet these requirements.

Please advise if further information is required.

Very truly yours,

David A. Evans

David A. Evans, Manager
Sales & Marketing Support

DAE/bd
cc: Rice Safety
Atwood/Prior
Allyn Buric
Michael Sommers
David Bruce
Arthur Stevens

UNDERWRITERS LABORATORIES INC.®

2000-20

Card Service
(Effective February 1, 1987)

Your most recent listing is shown on the enclosed card, duplicates of which have been forwarded to insurance organizations, inspection authorities, and others receiving such cards. You are asked to verify the information on the card and report any inaccuracies to UL before placing your card order.

The price of Card Orders provide for shipment to U.S. destinations by Third Class, Fourth Class, or United Parcel Service, whichever is most economical. Shipments to U.S. destinations by First Class and to all foreign destinations will be handled only upon addition of a 10 percent premium to the cost of the order.

Due to the substantial costs involved in preparation and collection of invoices we ask that all orders be placed by mail and be accompanied by your remittance for prepayment. We are unable to accept telephone orders. Please be sure to include with your order the guide number, file number, and date of your Listing Card.

Send your order and remittance to:

Underwriters Laboratories Inc.
List Editor, Corporate Progress
333 Pfingsten Road
Northbrook, IL 60062

To eliminate the cost of billing and collection you are requested to make prepayment of the indicated amount. If prepayment is not made a $4.00 handling charge will be added to the cost of the order.

QRNZ January 19, 1988
Commercial and Industrial Buildings

HAZ-STOR , CHARLESTON IL 61920 **MH14532 (N)**

Prefabricated flammable liquid and hazardous materials storage buildings, classified in accordance with the BOCA Basic Building Code, 1984 Edition; Uniform Building Code 1984 Edition; Standard Building Code 1985 Edition with 1986 revisions.

851 NORTH 5TH ST

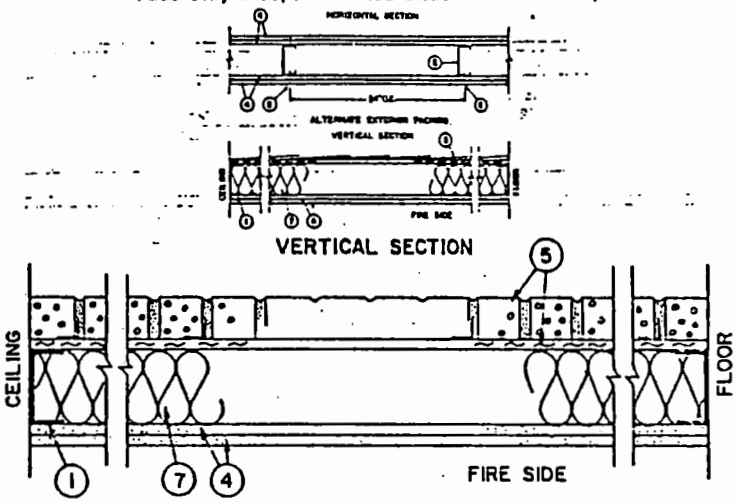
LOOK FOR CLASSIFICATION MARKING ON PRODUCT

180483001 Underwriters Laboratories Inc.® AIV0150106

FIRE RESISTANCE RATINGS (BXUV)—*Continued*

Design No. U425

Assembly Ratings—45 min, 1, 1-½ and 2 Hr (See Item 4)
Bearing Wall (See Items 2 and 4)
(For Exterior Walls, Ratings Applicable For Exposure To Fire On Interior Face Only Except As Noted Under Items 4 and 5)



1. **Steel Floor and Ceiling Tracks**—Top and bottom tracks of wall assemblies shall consist of steel members, min No. 20 GSG (0.036 in. thick) galv steel or No. 20 MSG (0.033 in. thick) primed steel, that provide a sound structural connection between steel studs, and to adjacent assemblies such as a floor, ceiling, and/or other walls. Attached to floor and ceiling assemblies with steel fasteners spaced not greater than 24 in. O.C.
2. **Steel Studs**—Corrosion-protected steel studs, min 3-⅛ in. wide, min No. 20 GSG (0.036 in. thick) galv steel or No. 20 MSG (0.033 in. thick) primed steel, cold-formed, shall be designed in accordance with the current edition of the Specification for the Design of Cold-Formed Steel Structural Members by the American Iron and Steel Institute. All design details enhancing the structural integrity of the wall assembly, including the axial design load of the studs, shall be as specified by the steel stud designer and/or producer, and shall meet the requirements of all applicable local code agencies. The max stud spacing of wall assemblies shall not exceed 24 in. Studs attached to floor and ceiling tracks with ⅛ in. long Type S-12 pan head, self-drilling, self-tapping steel screws on both sides of studs or by welded or bolted connections designed in accordance with the AISI specifications.
3. **Lateral Support Members**—(Not shown)—Where required for lateral support of studs, support may be provided by means of steel straps, channels or other similar means as specified in the design of a particular steel stud wall system.
4. **Wallboard, Gypsum***—Any gypsum wallboard bearing the UL Classification Marking as to Fire Resistance. Applied vertically with joints between layers staggered. Outer layer of 3 layer construction may be applied horizontally. The thickness and number of layers and percent of design load for the 45 min, 1 hr, 1⅛ hr and 2 hr ratings are as follows:

Interior Walls

Rating	Wallboard Protection Both Sides of Wall - Number of Layers and Thickness of Boards in Each Layer	Percent of Design Load
45 min	*1 layer, ½ in. thick	100
1 hr	*1 layer, ⅝ in. thick	100
1-⅛ hr	*2 layers, ½ in. thick	100
2 hr	*2 layers, ⅝ in. thick or	80
	*3 layers, ½ in. thick	100

*Ratings applicable to assemblies serving as exterior walls where Classified fire resistive gypsum sheathing type wallboard is substituted on the exterior face.

Exterior Walls

Rating	Wallboard Protection On Interior Side of Wall - Number of Layers and Thickness of Boards in Each Layer	Percent of Design Load
45 min	1 layer, ⅝ in. thick	100
1 hr	2 layers, ½ in. thick	100
1⅛ hr	2 layers, ⅝ in. thick	100
2 hr	3 layers ½ in. thick	100

See Wallboard Gypsum (CKNX) Category for names of Classified Companies.

5. **Gypsum Sheathing and Exterior Facings**—For exterior walls, ½ or ⅝ in. thick exterior regular gypsum sheathing applied vertically and attached to studs and runner tracks with 1 in. long Type S-12 bugle head screws spaced 12 in. O.C. along studs and tracks. Exterior facings consisting of aluminum siding, steel siding, brick veneer, or stucco attached to studs over gypsum sheathing and meeting the requirements of local code agencies. When a min 3-⅝ in. thick brick veneer facing is used, the Exterior Wall Rating is applicable with exposure on either face. Brick veneer wall attached to studs with corrugated metal wall ties attached to each stud with steel screws, not more than each sixth course of brick.

5A. **Alternate Exterior Facing**—Mineral and Fiber Boards—Exterior hardboard paneling, chemically treated with primed or finished face, 7/16 in. thick by 48 in. wide. Attached to studs with 1 ⅝ in. long buglehead TEK fasteners 16 in. O.C. at the intermediate supports Or, exterior lap siding, chemically treated, 7/16 in. thick by 8 in. or 12 in. wide. Attached to studs with 1⅝ in. long, buglehead Type TEK fasteners at each lap. Panels lapped minimum 1 in.
Masonite Corp.—Type FT.

6. **Fasteners**—Screws used to attach wallboard to studs: self-tapping bugle head sheet steel type, spaced 12 in. O.C. First layer Type S-12 by 1 in. long; second layer Type S-12 by 1⅝ in. long; third layer Type S-12 by 1⅝ in. long.
7. *Batts and Blankets—Placed in stud cavities of all exterior walls. May or may not be used in interior walls. Any glass fiber or mineral wool batt material bearing the UL Classification Marking as to Fire Resistance, of a thickness to completely fill stud cavity.
See Batts and Blankets (BZJZ) Category for names of Classified Companies.
8. **Joint Tape and Compound**—Vinyl or casein, dry or premixed joint compound applied in two coats to joints and screwheads of outer layer. Perforated paper tape, 2 in. wide, embedded in first layer of compound over all joints of outer layer.

*Bearing the UL Classification Marking

FIRE RESISTANCE RATINGS (BXUV)—*Continued*

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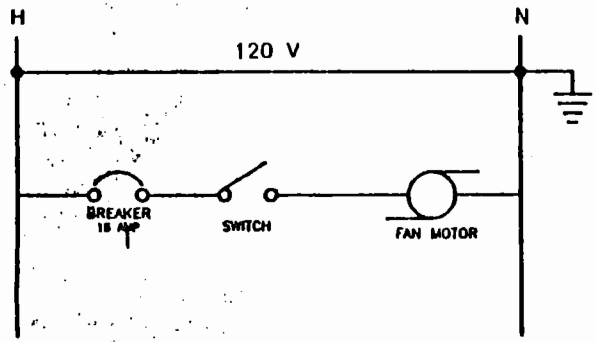
OPER. NO.	OPERATION DESCRIPTION	TOOL NO.



WESTINGHOUSE HANFORD CO.
RICHLAND, WA
P.O. NO. WJF-XW-581739
B/L NO. 51217

WIRING SCHEMATIC

HAZ STOR
HAZARDOUS MATERIAL STORAGE

UNLESS OTHERWISE SPECIFIED HOLD DIMENSIONS IN DECIMALS TO ± .005 DIMENSIONS IN FRACTIONS TO ± 1/16"

PART NO. 20028GW

CHANGE NOTICE	CHANGE	DATE

PART USED ON ASSEMBLIES ABOVE:
MATERIAL

FINISH	R. M.
REQ'D PER M	
DR. J. AUSTIN	CHK'D PTV
SCALE —	DATE 10-27-88

TITLE:
CS 20028G
WIRING SCHEMATIC

JUSTRITE MFG. CO.
MATTOON, ILL. 61938

APPENDIX 4A-7

CONSTRUCTION SPECIFICATION ER1372-C1 FOR RADIOACTIVE MIXED WASTE STORAGE PADS

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ER1372-C1

CONSTRUCTION SPECIFICATION FOR RADIOACTIVE MIXED WASTE STORAGE PADS

Work Order ER1372

OFFICIAL RELEASE BY WHC (4)
DATE APR 01 1988
Sta # 4

Prepared By:

KAISER ENGINEERS HANFORD COMPANY
Richland, Washington

For the US Department of Energy

Contract DE-AC06-87RL10900

KFS Work Order 245080

Ronald D. Betchum	3/22/88	A. J. Wittelman	3.18.88
Lead Engineer	Date	Specifications Department	Date
CE Kennedy	3/22/88	J. K. Rose	3/22/88
Safety	Date	Chief Design Engineer	Date
J E Breed	3/23/88	Edward R. Lerga	3/25/88
Quality Assurance	Date	Project Engineer	Date

WESTINGHOUSE HANFORD COMPANY

D. E. Palmer, Project Engineer — 3/31/88 Date

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Section 02720	Storm Sewage Systems	3
DIVISION 3 - CONCRETE		
Section 03300	Cast-In-Place Concrete	5
DIVISION 5 - METALS		
Section 05500	Metal Fabrications	3
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SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 INTRODUCTION

1.1.1 The Radiation Mixed Wastes Storage Pads are to be located in the 200 West Area of the Hanford Site, Richland, Washington.

1.1.2 This specification is for the construction of the complete facility.

1.2 STATEMENT OF WORK

1.2.1 Work Included: The itemization included herein is intended to be broad in scope to identify major elements. The work shall include, but not be limited to, the following:

1.2.1.1 Site work: Truck unloading and drive areas shall be stabilized with gravel.

1.2.1.2 Construction: The work shall include nine curbed concrete slabs-on-grade. Eight of the slabs will be approximately 50 square feet in area and shall have individual rainwater removal systems including drywells. The area around and between these eight slabs shall have a compacted gravel surfacing for truck access.

The other slab will be approximately 9,000 square feet in area with a rainwater removal system consisting of a sloped trench covered with grating, sump, and short run of pipe ending in a drain sump. Access to the slab shall be provided from both Dayton Avenue and the existing storage area to the south.

All slabs shall be coated with a protective coating to provide an impervious containment area.

1.3 SEQUENCE OF WORK

1.3.1 Work must be accomplished in the following sequence to ensure that the coating specified for the concrete slab can be properly applied.

1.3.1.1 Concrete slabs shall be placed first.

1.3.1.2 Special protective coating (SPC) shall be applied to concrete and steel angle curbing.

1.4 SPECIFICATIONS AND DRAWINGS

1.4.1 The Specifications and Drawings which describe the work covered by these Contract Documents are listed in Contract Modification Document.

1.4.2 Five sets of Specifications and Drawings will be furnished to the Contractor without charge.

1.4.3 Refer to Specification W018-C1 for Division 1; General Requirements, Sections 01019 through 01630.

END OF SECTION

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SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

D 653-86	Standard Terms and Symbols Relating to Soil and Rock
D 448-80	Standard Specification for Standard Sizes of Coarse Aggregate for Highway Construction

1.1.1.2 Washington State Department of Transportation (WSDOT)

M41-10-84	Standard Specifications for Road, Bridge, and Municipal Construction

1.2 SUBMITTALS: Refer to Specification W018-C1, Section 01300, for submittal procedures.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 General: Obtain select soils from excavation or other designated locations. Obtain onsite approval for soils.

2.1.2 Fill or Backfill

2.1.2.1 Structural: Well-graded soil mixtures which may contain cobbles up to 3 inches in greatest dimension if uniformly distributed and not constituting more than 20 percent of volume of fill.

2.1.2.2 Common: Well-graded soil mixtures containing cobbles up to 8 inches in greatest dimension if uniformly distributed and not constituting more than 40 percent of volume of fill.

2.1.3 Bedding for Underground Pipe: Sand, defined in ASTM D 653, or excavated sandy material having less than 20 percent gravel particles and maximum dimension of 1/2 inch.

2.1.4 Base course, subbase and gravel surfacing: Meeting the requirements of WSDOT M41-10, Section 9-03.9(3), Base Course Classification.

2.1.5 Clean Coarse Gravel: Gravel backfill for french drain shall be thoroughly washed and be size number 2 as described in ASTM D 448.

2.1.6 Stabilization: Gravel, defined in ASTM D 653. Maximum size of particles 2 inch minus.

PART 3 - EXECUTION

3.1 EXCAVATION

3.1.1 Before performing excavation, obtain excavation permit for area to be excavated. Excavation permits will be furnished by the Government upon advance notice of scheduled activity.

3.1.2 Locate and expose underground utilities by hand tools. Use of heavy equipment and machinery is subject to approval of the Government's Representative.

3.1.3 Shore excavations more than 4-feet deep and with sides sloped steeper than 1-1/2 horizontal to 1 vertical. Install shoring as excavation progresses and remove as backfilling is accomplished.

3.1.4 Do not store excavated or other material closer than 2 feet from edge of excavation unless barrier is erected to retain excavated materials. Store and maintain materials in manner that they are prevented from falling or sliding into excavation.

3.1.5 Wherever slopes of excavations will intersect existing underground lines or structures such as building foundations, underground piping, electrical ducts or direct-buried electrical lines, install shoring or other means of support to prevent overstressing existing structure or underground lines or to prevent interrupting service to existing buildings.

3.1.6 Slabs on Grade

3.1.6.1 Make excavations for slabs to depth shown on the Drawings. Make excavations to proper width with allowances made for forms and bracing. Make bottom of excavations compact, level, true, and free of loose material.

3.1.6.2 If over-excavation occurs where slabs are designed to be placed on undisturbed earth, correct at time of placing concrete by placement of backfill, compacted in accordance with Subparagraph 3.2.2.2a.

3.1.7 Drain Sump Excavation

3.1.7.1 Make excavation to the depth and cross-section shown on the Drawing. Make bottom of excavation level and true.

3.1.7.2 If over-excavation occurs, correct by backfilling with gravel stabilization.

3.1.8 Trench for PVC Pipe

3.1.8.1 Make excavations to line and grade shown on the Drawings. Trench width shall be 1 foot 4 inches minimum to 2 feet 4 inches maximum. Excavate trench deep enough to permit placement of 4 inch minimum thickness compacted sand bedding except where excavation is in undisturbed sand which will serve as bedding. Pare holes in trench bottom for pipe couplings so pipe will bear full length of barrel.

3.1.8.2 Keep trench free of standing water.

3.1.8.3 If over-excavation occurs correct by placement of structural backfill.

3.1.9 Where stabilization is required, finish subgrade 3 inches below elevations shown on the Drawings.

3.2 FILLING AND BACKFILLING

3.2.1 General

3.2.1.1 Backfill Permit: Obtain signatures required on backfill permit for area to be backfilled. Forms will be furnished by the Government's Representative. Work not started within 5 calendar days from time permit is approved shall not be started until new permit has been approved. A continuing job that has not had backfill installed within past 5 calendar days will require new backfill permit.

3.2.1.2 Remove debris and organic matter from area to be filled or backfilled.

3.2.1.3 Use only select materials for fill or backfill. Keep materials free of frozen particles, lumps, organic matter, and trash.

3.2.1.4 Do not place fill or backfill on frozen ground.

3.2.1.5 Filling or backfilling by sluicing or flooding with water will not be permitted.

3.2.1.6 Bring fill or backfill up evenly on sides of trenches, structures, and buried pipe to avoid unbalanced loading.

3.2.1.7 Do not place fill or backfill against concrete structure less than 14 days after completion of structure unless written permission from the Government's Representative is obtained.

3.2.2 Structural Fill or Backfill

3.2.2.1 Before placement of fill or backfill, demonstrate, to the Government's Representative, by physical test at jobsite, that procedure proposed for installation and compaction of soils will provide degree of compaction specified. Prepare "Soil Compaction Procedure" Form KEH-382 (sample appended) in accordance with printed instructions. Forms will be furnished by the Government's Representative.

3.2.2.2 Place backfill in accordance with WSDOT M41-10, Section 2-03.3(14)C and approved procedures as follows:

a. Use Method C under slabs and pipelines.

b. Use Method B under paved areas, and within 5 feet of the unloading pads.

3.2.2.3 Compaction control tests will be in accordance with WSDOT M41-10, Section 2-03.3(14)D.

3.2.3 Common Fill or Backfill

3.2.3.1 Place fill or backfill in layers not more than 12-inches thick, loose measurement.

3.2.3.2 Compact each layer, full width, by at least 1 pass of vibratory or rammer-type compactor, pneumatic-tired roller, loaded scraper wheel, grader wheel, or power roller.

3.2.3.3 Mound over top layer of backfill to depth of 1 inch for each 12 inches of trench depth to maximum mound height of 6 inches.

3.2.4 Basecourse and Subbase Filling or Backfilling

3.2.4.1 Place and compact subbase in accordance with Subparagraph 3.2.2.2a.

3.2.4.2 Basecourse construction shall be in accordance with the following sections of WSDOT M41-10.

a. Subgrade preparation: Section 2-06.3.

b. Equipment: Section 4-04.3(1).

c. Mixing: Section 4-04.3(3).

d. Placing and spreading: Section 4-04.3(4).

e. Miscellaneous requirements: Section 4-04.3(7).

f. Weather limitations: Section 4-04.3(8).

g. Hauling: Section 4-04.3(9).

3.2.4.3 Gravel surfacing construction shall be in accordance with the following sections of WSDOT M41-10:

a. Subgrade preparation: Section 2-06.3.

b. Placing and spreading: Section 4-04.3(4).

c. Shaping and compacting: Section 4-04.3(5).

3.2.5 Filling or Backfilling for PVC Pipe

3.2.5.1 Place and compact sand bedding beneath pipe as specified for structural backfill.

3.2.5.2 Place backfill over joints only after leak test has been completed.

3.2.5.3 Backfill around pipe and to 12 inches above pipe with sand material compacted as specified for structural backfill. Backfill remainder of trench with common backfill.

3.2.6 Filling for Drain Sump

3.2.6.1 Place 3 inch minimum layer of gravel stabilization on bottom and sides of sump.

3.3 FINISH GRADING AND STABILIZATION

3.3.1 Rake area disturbed by work, remove surface stones larger than 6 inches, and dispose of excess material and debris at area designated by the Government's Representative.

3.3.2 Stabilize area indicated on Drawings with 2-inch course of gravel meeting the requirements of Paragraph 2.1.6. Finish stabilization course to elevations shown on the Drawings.

3.4 FIELD QUALITY CONTROL

3.4.1 Soil Compaction Tests: Sampling and testing of compacted fill and backfill will be performed by the Government's Representative.

SOIL COMPACTION PROCEDURE

Project No.	Project Title		Date
Contract No.	Procedure No.	Location of Demonstration	

A

REQUIREMENTS	EQUIPMENT DEMONSTRATED
Applicable Spec./Dwg.	Type
Compaction Required %	Manufacturer
Maximum Lift Size	Model

B

LABORATORY SOIL TEST RESULTS

☐ Non-granular Materials (WSDOT Test Method No. 609)

☐ Granular Materials (WSDOT Test Method No. 606-A)

C

COMPACTION DEMONSTRATION TEST RESULTS

Formula for Percent Compaction:

$$\frac{\text{dry density}}{\text{max density}} \times 100 = \text{Percent Compaction}$$

No. of Passes	Depth of Lift	Percent Moisture	Lbs/ft^3 Dry	Maximum Density	Percent Compaction	Accept	Rejec

Observations or Comments

TEST METHOD USED FOR DEMONSTRATION

☐ Nuclear Gage (ASTM D2922 & D3017)

☐ Sand Cone (ASTM D1556)

Apparatus No. _____

☐ Other _____

D

Contractor Representative		Date
Government Representative		Date

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INSTRUCTIONS

This Soil Compaction Procedure form, when approved by the Government Representative, constitutes an approved compaction procedure.

Section A is the responsibility of the Construction Contractor. It is to be completed at the time of backfill compaction demonstration and presented to the Government Representative.

Section B is completed by the Government Representative. Data entered is obtained from the agency that performs the laboratory testing.

Section C is completed by the Government Representative as the demonstration is performed. Using the applicable formula, the percent compaction achieved is determined and entered. Acceptance is based on the results as compared with the compaction percent required in Section A.

Section D is signed and dated by the Construction Contractor Representative acknowledging responsibility for this procedure and compliance thereto for applicable backfill operations. Section D is signed and dated by the Government Representative to signify approval.

END OF SECTION

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SECTION 02512

HOT-LAID ASPHALTIC CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

ANSI D6.1-1978, w/Rev through Dec 1983	American National Standard Manual on Uniform Traffic Control Devices for Streets and Highways

1.1.1.2 Washington State Department of Transportation (WSDOT)

M41-10-84	Standard Specification for Road, Bridge, and Municipal Construction

1.2 SUBMITTALS: Refer to Specification W018-C1, Section 01300, for submittal procedures.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Asphalt: Meeting the requirements of WSDOT M41-10, Sections 9-02.1(2) and 9-02.1(4). Grade of paving asphalt for use in asphaltic concrete mixture shall be AR-4000-W unless directed otherwise by the Government's Representative. Grade of liquid asphalt for prime coat shall be MC-250.

2.1.2 Aggregate: Class "B" meeting the requirements of WSDOT M41-10, Section 9-03.8(1),(2), (3)B.

2.1.3 Blending Sand: Meeting the requirements of WSDOT M41-10, Section 9-03.8(4).

2.1.4 Mineral Filler: Meeting the requirements of WSDOT M41-10, Section 9-03.8(5).

2.2 MIXES

2.2.1 Proportioning of Asphalt Concrete Materials: Meeting the requirements of WSDOT M41-10, Section 9-03.8(6) Class "B" asphalt concrete.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Construction: In accordance with following sections of WSDOT M41-10.

3.1.1.1 Asphalt mixing plants: Section 5-04.3(1).

3.1.1.2 Hauling equipment: Section 5-04.3(2).

3.1.1.3 Asphalt pavers: Section 5-04.3(3).

3.1.1.4 Rollers: Section 5-04.3(4).

3.1.1.5 Asphalt material heating: Section 5-04.3(6).

3.1.1.6 Aggregate preparation: Section 5-04.3(7).

3.1.1.7 Mixing: Section 5-04.3(8).

3.1.1.8 Spreading and finishing: Section 5-04.3(9).

3.1.1.9 Compaction: Section 5-04.3(10).

3.1.1.10 Joints: Section 5-04.3(11).

3.1.1.11 Samples: Section 5-04.3(12).

3.1.1.12 Surface smoothness: Section 5-04.3(13).

3.1.1.13 Heating-planing bituminous pavement: Section 5-04.3(14).

3.1.1.14 Weather limitations: Section 5-04.3(16).

3.1.1.15 Asphalt change in grade: Section 5-04.3(18).

3.1.1.16 Driving surface sealing: Section 5-04.3(19).

3.1.2 Construct shoulders of the width shown on the Drawings, after placement of the asphalt wearing course. Material shall be the same as used for base course.

3.2 FIELD QUALITY CONTROL

3.2.1 Sampling and testing will be performed by the Government's Representative.

3.3 PROTECTION

3.3.1 Traffic Control: Institute and maintain in accordance with WSDOT M41-10, Section 1-07.23, Subsections (1) through (4).

END OF SECTION

SECTION 02720

STORM SEWAGE SYSTEMS

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

ANSI Z53.1-1979	American National Standard Safety Color Code for Marking Physical Hazards

1.1.1.2 American Society for Testing and Materials (ASTM)

C 118-83	Standard Specification for Concrete Pipe for Irrigation or Drainage
D 2665-85	Standard Specifications for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings

1.1.1.3 Federal Specifications (FS)

RR-C-271C	Chains And Attachments, Welded And Weldless
RR-F-221/3A	Fence Posts And Accessories (Detail Specification)
TT-E-489G	Enamel, Alkyd, Gloss (For Exterior And Interior Surfaces)

1.2 SUBMITTALS: Refer to Specification W018-C1, Section 01300, for submittal procedures.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Clean Coarse Gravel: See Section 02200.

2.1.2 Filter Fabric: Mirafi 140S manufactured by Mirafi, Inc.

2.1.3 Drainage Piping

2.1.3.1 Duriron Type MJ with mechanical joints and fittings as shown on the Drawings and manufactured by the Duriron Co.

2.1.3.2 PVC pipe: Schedule 40 pipe and fittings meeting the requirements of ASTM D 2665 with solvent cement joints.

2.1.4 Drainage Structures: Nonreinforced concrete pipe meeting the requirements of ASTM C 118, heavy-duty.

2.1.5 Chain Barricade

2.1.5.1 Posts: Meeting the requirements of FS RR-F-221/3, minimum 6 feet long, and designed for driving into earth. Clean and paint with 2 coats of yellow enamel meeting the requirements of FS TT-E-489, Class A.

2.1.5.2 Chain: Trade No. 10 galvanized steel jack Type II meeting the requirements of FS RR-C-271.

2.1.5.3 Signs: Galvanized steel plate painted with 2 coats of yellow enamel. Signs shall state "DRAIN SUMP" in 1 inch high black letters.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Storm Sewers

3.1.1.1 Install piping in accordance with the Drawings and this Section.

3.1.1.2 Trenching and backfilling for underground pipe shall be in accordance with Section 02200.

3.1.1.3 Keep piping systems clean during work.

3.1.1.4 Where piping is laid in trench, trench shall be free of frost or frozen earth or standing water.

3.1.1.5 Protect PVC and concrete pipe from impact shocks and dropping. Before installation inspect and discard damaged sections.

3.1.2 Drywells: Install drywells in accordance with the Drawings.

3.1.3 Drain Sump: Construct drain sump in accordance with the Drawings and Section 02200.

3.1.4 Hydrostatic Testing

3.1.4.1 Test PVC pipe as follows:

a. Provide temporary cap at low end of 4 inch PVC pipe drain line.

b. Fill pipe and sump with water and allow to stand for 30 minutes with no visible leaks or loss of test water.

c. Examine joints, fittings, and other potential leak sources. Repair detectable leaks and retest.

3.1.4.2 Test Duriron pipe as follows:

a. Install cleanout plug.

b. For storage slab test Duriron pipe after testing PVC pipe. Fill pipe and trench with water and allow to stand for 30 minutes with no visible leaks or loss of test water.

c. For loading pad fill containment area with water to top of curb and allow to stand for 30 minutes with no visible leaks or loss of test water.

d. During b and c above examine joints, fittings, and other potential leak sources. Repair detectable leaks and retest.

3.1.5 Install chain barricade posts plumb and true at 20 foot maximum spacing. Install chain on posts. Mount signs on posts; one sign at each end of trench and two on each side, equally spaced.

3.1.6 Install drywell guard posts as shown on the Drawing. Prepare surface and paint in accordance with Section 09900. Paint entire length of each post with primer and above ground portion with two coats of yellow enamel. Yellow color is defined in ANSI Z53.1.

END OF SECTION

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SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Concrete Institute (ACI)

ACI 301-84 (Revised 1985)	Specifications for Structural Concrete for Buildings
ACI 305R-77 (Revised 1982)	Hot Weather Concreting
ACI 306-1-87	Standard Specification for Cold Weather Concreting

1.1.1.2 American Society for Testing and Materials (ASTM)

A 185-85	Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
A 615-86	Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
C 94-86b	Standard Specification for Ready-Mixed Concrete

1.1.1.3 National Ready Mixed Concrete Association (NRMCA)

January 1, 1976 (Third Revision)	Certification of Ready Mixed Concrete Production Facilities

1.2 SUBMITTALS: Refer to Specification W018-C1, Section 01300, for submittal procedures.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Concrete

2.1.1.1 Furnish 4,000 psi concrete, pre-approved ACME No. 6452, ACME Concrete Company.

2.1.1.2 Mixing: In accordance with ASTM C 94.

2.1.1.3 Delivery: In accordance with ASTM C 94.

2.1.2 Reinforcing Steel

2.1.2.1 Steel bars: ASTM A 615, deformed, Grade 60.

2.1.2.2 Welded wire fabric: ASTM A 185.

2.1.2.3 Tie wire: Black annealed steel, 16 gauge minimum.

2.1.3 Forms: Wood, steel, plywood, or Masonite Corporation "Concrete Form Presdwood," as required for various specified finishes.

2.1.4 Construction joint and control joint materials.

2.1.4.1 Sealant: See Section 09805.

2.1.5 Nonshrink Grout

2.1.5.1 Nonmetallic type: "Five Star Grout" by US Grout Corp; "Por-Rok" Anchoring Cement by Hallemite; or "Masterflow 713" by Master Builders.

PART 3 - EXECUTION

3.1 PREPARATION

3.1.1 Form Construction

3.1.1.1 Install formwork in accordance with ACI 301, Section 4.2. Interior shape and rigidity shall be such that finished concrete will meet the requirements of the Drawings within tolerances specified in ACI 301, Table 4.3.1.

3.1.1.2 Prepare form surfaces in accordance with ACI 301, Section 4.4.

3.1.1.3 Forms for surfaces which will be permanently concealed from view may be saturated with water before placing concrete instead of other treatment, except in freezing weather forms shall be treated with oil or stearate.

3.1.1.4 Clean forms of foreign material before placing concrete.

3.2 INSTALLATION

3.2.1 Reinforcing Steel

3.2.1.1 Fabricate reinforcing bars accurately to dimensions shown on Drawings, within tolerances shown in ACI 301, Section 5.4.

3.2.1.2 Tag steel in accordance with Bar List.

3.2.1.3 Place reinforcing steel as shown or noted on the Drawings within tolerances specified in ACI 301, Sections 5.4 and 5.5.

3.2.1.4 Tie bars to prevent displacement during placement of concrete.

3.2.1.5 Do not force reinforcing bars into concrete after initial set has started.

3.2.1.6 Place reinforcing with dimension of concrete protection equal to minimum given in ACI 301, Section 5.5, except where shown otherwise on the Drawings.

3.2.1.7 Place welded wire fabric on chairs and lap two mesh at splices. Tie splices with wire.

3.2.2 Concrete

3.2.2.1 Before ordering concrete, obtain approval of required submittals.

3.2.2.2 Before concrete is batched, obtain approval of formwork and reinforcement by the Government's Representative.

3.2.2.3 Before placing concrete:

a. Obtain approval of "Pour Slip" by the Government's Representative. "Pour Slip" shall include appropriate reference to specific portion of structure to be placed, maximum size of coarse aggregate, design strength, admixture, and slump. "Pour Slip" forms can be obtained from the Government's Representative.

b. For each truck load of concrete, deliver "Trip Ticket" to the Government's Representative. "Trip Ticket" shall contain information listed in ASTM C 94, Subparagraphs 16.1.1 through 16.1.10, and include water/cement ratio.

3.2.2.4 Place concrete in accordance with ACI 301, Sections 8.1, 8.2, and 8.3. Do not drop (free fall) more than 5 feet. Insert vibrator (vertically if possible) into concrete and reach small distance into concrete in next lower layer. Do not insert vibrators into lower courses that have reached initial set. Take care to avoid allowing head of vibrator to come in contact with forms or embedded items.

3.2.2.5 Temper concrete only as permitted in ACI 301, Section 7.5.

3.2.2.6 Construction joints: Make construction joints in accordance with ACI 301, Section 6.1, and as detailed on the Drawings.

3.2.2.7 Embedded items: Install embedded items in accordance with ACI 301, Sections 6.4 and 6.5.

3.2.2.8 Placing concrete against earth: Place on or against firm, damp surfaces free of frost, ice, and free water. Do not place until required compaction has been obtained. Dampen earth surfaces to receive fresh concrete.

3.2.2.9 Consolidation: Consolidate concrete slabs in accordance with ACI 301, Section 11.6.

3.2.3 Concrete Repair and Form Removal

3.2.3.1 Form removal: Remove in accordance with ACI 301, Section 4.5.

3.2.3.2 Cut back form ties and examine concrete surfaces for defects. Repair only after permission for patching is given by the Government's Representative.

3.2.3.3 Place concrete repair mortar within one hour after mixing. Do not retemper mortar.

3.2.3.4 Surface defect repair: Repair in accordance with ACI 301, Sections 9.1, 9.2, and 9.3. Cure concrete repairs same as new concrete.

3.2.4 Concrete Finishes and Tolerances

3.2.4.1 Formed surfaces: Start finishing following concrete repair and complete within 96 hours after forms have been removed. Finish in accordance with sections of ACI 301 noted below:

a.	Surfaces exposed to earth backfill	Section 10.2.1
b.	Exterior surfaces exposed to weather	Section 10.2.2
c.	Related unformed surfaces	Section 10.5
d.	Surfaces to receive special protective coating	Section 10.3.1

3.2.4.2 Unformed surfaces: Finish in accordance with sections of ACI 301 noted below:

a.	Exterior slabs to receive special protective coating	Section 11.7.4

3.3 FIELD QUALITY CONTROL

3.3.1 Concrete Testing: Sampling and testing of concrete will be the responsibility of the Government's Representative. Concrete will be tested in accordance with ACI 301, Sections 16.3.4, 16.3.5, 16.3.6, and 16.3.8.

3.4 CURING AND PROTECTION

3.4.1 Curing

3.4.1.1 Cure concrete in accordance with ACI 301, Section 12.2. Clear curing compounds shall be tinted or applied surfaces marked to delineate extent of spraying.

3.4.1.2 Do not use curing compound on concrete surfaces to receive special protective coating.

3.4.2 Protection

3.4.2.1 Cold weather: Maintain concrete at a temperature of at least 50 F for 72 hours after it is placed. Protect concrete from freezing and rapid temperature drop for not less than four days, in accordance with ACI 306R.

3.4.2.2 Hot weather: Protect exposed concrete surfaces from drying during placement in accordance with ACI 305R. Finish and maintain exposed surfaces wet continuously until the specified curing is commenced.

3.4.2.3 Protection from mechanical injury: During the curing period, the concrete shall be protected from damaging mechanical disturbances, particularly load stresses, shock, and excessive vibration. All finished concrete surfaces shall be protected from damage caused by construction equipment, materials, methods, and by rain or running water. Structures shall not be loaded in such a way as to overstress the concrete.

END OF SECTION

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1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Deliver metal fabrications to jobsite at time convenient for installation. If exposed to inclement weather, protect fabrications with paper, plastic, or other weatherproof covering and store off ground.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Rolled Steel Shapes, Plates, and Bars: ASTM A 36.

2.1.2 Steel Pipe: ASTM A 53, black, standard weight, Schedule 40.

2.1.3 Fasteners

2.1.3.1 Weld studs: Nelson Stud Welding Company type H4L.

2.1.4 Paint: See Section 09900.

2.2 FABRICATION

2.2.1 General

2.2.1.1 Verify measurements and take field measurements necessary before fabrication. Provide miscellaneous bolts and anchors, supports, braces, and connections necessary for completion of metal fabrications. Cut, reinforce, drill, and tap metal fabrications shown to receive finish hardware and similar items. Weld or bolt connections as shown on the Drawings.

2.2.1.2 Workmanship: Form metal fabrications to shape and size, with sharp lines, angles, and true curves. Drilling and punching shall produce clean, true lines and surfaces. Execute and finish work in accordance with Fabrication Drawings.

2.2.1.3 Jointing and intersections: Accurately made, tightly fitted, and in true planes with adequate fastenings.

2.2.1.4 Perform welding of steel connections in accordance with AWS D1.1, using E70XX electrodes.

2.2.2 Guard Posts: Fabricate using steel pipe in accordance with the Drawings.

2.2.3 Miscellaneous Steel Items: Supply required clips, frames, equipment supports, and other fabrications as shown on the Drawings. Fabricate parts from standard structural sections or shapes, to sizes required. Wherever miscellaneous parts are exposed, grind edges, corners, and rough cuts smooth and free of snags. Shop paint parts except those to be embedded in concrete or masonry, or those which require other specific finishes.

2.2.4 Finishes: Prime ferrous metal in accordance with Section 09900 unless specified otherwise in Section 09805. Do not coat members to be embedded in concrete or masonry, surfaces and edges to be field welded, or items to be galvanized.

PART 3 - EXECUTION

3.1 INSPECTION: Examine areas where metal fabrications are to be installed and notify the Government's Representative in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner compatible with requirements for installation. Furnish setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, anchor bolts, and miscellaneous items having integral anchors, to be embedded in concrete or masonry construction. Coordinate with the Government's Representative for delivery of items to jobsite.

3.2 INSTALLATION

3.2.1 Install metal fabrications plumb, level, or as shown on the Drawings.

3.2.2 Make field connections as neatly as possible with joints flush and smooth. Grind smooth exposed field welds and polish before field painting.

3.2.3 After installation has been approved, clean and paint connections with primer. Touch-up shop prime coat wherever damaged.

END OF SECTION

SECTION 06610

GLASS FIBER AND RESIN FABRICATIONS

PART 1 - GENERAL

1.1 SUBMITTALS: Refer to Specification W018-C1, Section 01300, for submittal procedures.

1.2 DELIVERY, STORAGE, AND HANDLING

1.2.1 Deliver fabrications to project at time convenient for installation. If exposed to inclement weather, protect with paper, plastic or other weatherproof covering and store off ground.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Glass Fiber Reinforced Grating: Composition to be vinyl ester resin type. Grating shall be coated or contain additive to provide resistance to ultraviolet degradation. Grating shall have anti-slip grit type surface, be size shown on the Drawings, and be Duradek Standard Fiberglass Grating by AFC, Inc.

2.2 FABRICATION

2.2.1 General: Verify measurements and take field measurements necessary before fabrication.

2.2.2 Workmanship: Form fabrications to indicated shape and size, with sharp lines and angles. Drilling and punching shall produce clean, true lines and surfaces. Execute and finish work in accordance with fabrication drawings.

2.2.3 Intersections shall be accurately made, tightly fitted and in true planes.

PART 3 - EXECUTION

3.1 INSPECTION

3.1.1 Examine areas and conditions under which glass fiber and resin fabrications are to be installed and notify the Government's Representative in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner compatible with requirements for installation.

3.2 INSTALLATION

3.2.1 Install fabrications as shown on the Drawings.

3.2.2 Make field connections as neatly as possible with joints flush and smooth.

END OF SECTION

SECTION 09805

SPECIAL PROTECTIVE COATING

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 Steel Structures Painting Council (SSPC)

Surface Preparation Specifications

SSPC-SP 6-85 No. 6 Commercial Blast Cleaning

1.2 SUBMITTALS: Refer to Specification W018-C1, Section 01300, for submittal procedures.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Deliver materials to jobsite in manufacturer's unopened containers with labels intact. Do not open containers or remove labels until after inspection and acceptance by the Government's Representative.

1.3.2 Store materials in accordance with manufacturer's written instructions and in well ventilated area not exposed to excessive heat, sparks, flame, or direct rays of sun.

1.4 PROJECT CONDITIONS

1.4.1 Environment for Coating: Coat exterior surfaces only when ambient and surface temperatures are between 50 F and 120 F, and temperature is 5 F above dewpoint. Coating should not be applied if rain is anticipated within 4 hours of application.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 The materials for the coating system shall be manufactured by United Coatings and supplied by Northwest Specialty Paint and Coatings as follows:

2.1.1.1 Basecoat and topcoat: Uniflex 455.

2.1.1.2 Concrete sealer: Uniflex Sealer 100.

2.1.1.3 Primer for ferrous metals: Primer 302.

2.1.1.4 Joint sealant: Uniflex Sealant 200.

2.1.1.5 Material for non-skid texture: Walnut shell aggregate.

PART 3 - EXECUTION

3.1 INSPECTION

3.1.1 Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence, or quality of work and which cannot be put into acceptable condition through preparatory work included in Article 3.2.

3.1.2 Report in writing to the Government's Representative conditions that may potentially affect proper application of finish. Do not commence surface preparation or coating application until defects have been corrected and conditions are made suitable.

3.2 PREPARATION

3.2.1 General

3.2.1.1 Before application, power vacuum space or area to receive coating.

3.2.2 Pre-Priming

3.2.2.1 Prepare ferrous metals and concrete surfaces in accordance with SSPC-SP 6 Commercial Blast Cleaning. Remove abrasive residue and dust, and prime metal within four hours after preparation.

3.2.2.2 Allow concrete to cure 28 days before coating is applied.

3.2.3 Post Priming

3.2.3.1 Feather abrasions, chips, skips, and holidays occurring in prime coat by sanding and recoat with material and color to minimum dry film thickness specified.

3.2.3.2 Coated surfaces may be recoated as soon as previous coats have dried sufficiently to allow walking upon by applicator.

3.2.3.3 Protect coating from rain until dry to touch.

3.2.4 Protection

3.2.4.1 Provide and install drop cloths, shields, and other protective devices required to protect surfaces adjacent to areas being coated. Keep spatter, smears, droppings, and overrun of coating materials to minimum and remove as coating work progresses.

3.3 APPLICATION

3.3.1 Apply coating materials and walnut shell aggregate non-skid texturing in accordance with manufacturer's written instructions. Uniflex 455 shall be applied and cured in temperatures of 50 F or warmer.

3.3.2 Apply with equipment recommended by manufacturer.

3.3.3 Fill all construction and control joints within curbed area with Uniflex Sealant 200 in accordance with manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

3.4.1 Government Inspection: The Government's Representative will perform tests to ascertain that coating materials have been applied in accordance with this Section.

3.5 CLEANING

3.5.1 Furnish and maintain at jobsite, closed metal containers for disposal of waste materials. Place materials spotted or soaked with paint, oil, or solvents in containers.

3.5.2 Brushes, rollers, spatulas, and spray equipment shall be thoroughly cleaned after each use and shall contain no oils, thinners, or other residue after such cleaning.

3.5.3 Remove empty cans from jobsite at end of each shift.

3.5.4 At completion of coating work, remove materials, containers, rags, cloths, brushes, and other equipment from jobsite. Clean up spills.

3.6 COATING SCHEDULE

3.6.1 Concrete and Ferrous Metals:

		Sq Feet Per Gallon	Min. Wet Film Thick.	Minimum Dry Film Thickness
Primer:	Primer 302 (metal)	250-300		
Primer:	Uniflex Sealer 100 (concrete)	250		
Second:	Uniflex 455 (basecoat)		20 mils	14 mils
Third:	Uniflex 455 (basecoat)		20 mils	14 mils
Fourth:	Uniflex 455 (topcoat)		20 mils	14 mils

END OF SECTION

SECTION 09900

PAINTING

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

D 16-84	Standard Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products

1.1.1.2 Federal Specifications (FS)

TT-E-489G	Enamel, Alkyd, Gloss (For Exterior And Interior Surfaces)
TT-P-641G, Including AMD 1	Primer Coating; Zinc Dust-Zinc Oxide (For Galvanized Surfaces)
TT-P-645A	Primer, Paint, Zinc Chromate, Alkyd Type

1.1.1.3 Military Specification (MS)

DOD-P-15328D, Including AMD 1	Primer (Wash), Pretreatment (Formula No. 117 For Metals)

1.1.1.4 Steel Structures Painting Council (SSPC)

Surface Preparation Specifications

SSPC-SP 2-82	No. 2 Hand Tool Cleaning
SSPC-SP 3-82	No. 3 Power Tool Cleaning

1.2 SUBMITTALS: Refer to Specification W018-C1, Section 01300, for submittal procedures.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Deliver materials to jobsite in sealed, original, labeled containers, each bearing manufacturer's name, type of paint, brand name, color designation, and instructions for mixing and reducing.

1.3.2 Store materials at minimum ambient temperature of 45 F in well ventilated and heated area or areas.

1.3.3 Take precautions to prevent fire hazards and spontaneous combustion.

1.4 PROJECT CONDITIONS

1.4.1 Environmental Requirements

1.4.1.1 Temperature

a. Unless otherwise recommended by paint manufacturer, apply coatings when ambient and surface temperatures are between 45 F and 95 F except water-thinned paints and other special coatings. Apply water-thinned paints when ambient and surface temperature is between 50 F and 90 F.

b. Should temporary heat be required, provide until specified surface and air temperatures exist for required time period. Maintain temporary heat for 24 hours after paint and finish application.

1.4.1.2 Weather

a. Do no exterior work on unprotected surfaces if it is raining or moisture from other source is present, or expected before applied paints can dry or attain proper cure without damage.

b. Allow wet surfaces to dry and attain required temperatures and conditions specified before proceeding with work, or continuation of previously started work.

c. Do not apply finish in areas where dust is being generated.

1.4.1.3 Ventilation: Provide adequate continuous ventilation required for drying various materials as recommended by paint manufacturer.

1.4.1.4 Illumination: Do not proceed with work unless minimum lighting level of 15 foot-candles is provided on surfaces to be painted or finished. Provide temporary lighting to attain lighting level specified.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Terms used are defined in ASTM D 16.

2.1.2 Sealers

2.1.2.1 Concrete slabs: Refer to Section 09805.

2.1.3 Primers

2.1.3.1 Zinc chromate: FS TT-P-645, (alkyd type). Tint with lamp black to produce color other than yellow.

2.1.3.2 Zinc dust-zinc oxide: FS TT-P-641, Type II.

2.1.4 Paints

2.1.4.1 Gloss enamel, exterior: FS TT-E-489, Class A.

2.1.5 Other Materials: Materials not specifically described but required to achieve specified finishes shall be of high quality and of manufacture approved by the Government's Representative.

2.1.6 Special Protective Coatings: See Section 09805.

2.1.7 Hazardous Material Restrictions: Do not use mercurial fungicides in exterior oil paints.

2.1.8 Colors and Tints: Paint manufacturer's standard colors and tints.

PART 3 - EXECUTION

3.1 INSPECTION

3.1.1 Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence or quality of work and which cannot be put into acceptable condition through preparatory work included in Article 3.2.

3.1.2 Report in writing to the Government's Representative conditions that may potentially affect proper application of finish. Do not commence surface preparation or coating application until defects have been corrected and conditions are made suitable.

3.2 PREPARATION

3.2.1 New Surface

3.2.1.1 Surfaces to be coated shall be in proper condition to accept, and assure proper adhesion of coating system.

3.2.1.2 Ferrous metals

a. For shop primed surfaces, apply phosphoric acid etch solution at field welded or abraded spots and let set for time recommended by acid etch manufacturer, rinse with potable water, and when dry, apply prime coat. Wash primed surfaces free of dirt, oil, and grease.

b. Prepare ferrous metals in accordance with SSPC-SP 2 Hand Tool Cleaning and/or SSPC-SP 3 Power Tool Cleaning. Mill scale may be present on cleaned surface providing it is fully anchored, gives metallic appearance and does not cover more than 30 percent of surface. Prime ferrous metals within four hours after preparation.

3.2.1.3 Galvanized metals: Remove surface contamination, wash metal with phosphoric acid or approved solution, (or) apply one coat of etching type primer.

3.2.2 Mixing and Thinning

3.2.2.1 General: Packaged paint may be thinned before application where necessary to suit conditions of surface, temperature, weather, and method of application. Follow manufacturer's written instructions for thinning packaged paint. Use of thinner shall not relieve Contractor from obtaining complete hiding. Do not mix paints of different manufacturers.

3.2.2.2 Pretreatment wash: Mix by adding one volume of acid component to four volumes of resin component. Add acid component slowly to resin component with constant stirring. Use within eight hours. Material may be reduced with normal butyl alcohol or 99% isopropyl alcohol, if thinning is required to maintain wet spray.

3.2.3 Protection

3.2.3.1 Cover or otherwise protect finished work of other trades, surfaces not to be painted, or surfaces not concurrently being painted.

3.2.3.2 Provide sufficient drop cloths, shields, and protective equipment to prevent spray or drippings from fouling surfaces not being painted, including surfaces in paint storage and preparation areas.

3.2.3.3 Place cotton waste, cloths, and materials which may constitute fire hazard in closed metal containers and remove daily from jobsite.

3.2.3.4 Where toxic materials, and both toxic and explosive solvents are used, take appropriate precautions in accordance with manufacturer's written instructions and applicable safety regulatory agencies. In applying acid etch coating or solutions to metals or concrete, provide ventilation and take protective measures to meet requirements of safety regulatory agencies.

3.3 APPLICATION

3.3.1 Surfaces to be Painted and Finished: Paint surfaces scheduled or shown. Finish factory-primed materials in accordance with this Section.

3.3.2 General: Paint may be applied by brush, roller, or spray unless otherwise specified. At time of application, paint shall show no signs of deterioration. Maintain uniform suspension of pigments during application.

3.3.2.1 Apply paint so finished surfaces are free of runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. Hiding shall be complete. Apply each coat as film of uniform thickness. Use rollers of type designed for coating to be applied and surface to be coated. Ensure that surfaces including edges, corners, crevices, welds, and rivets receive film thickness equivalent to adjacent painted surfaces.

3.3.3 Coating Progress: Allow time between successive coats to permit proper drying. Modify drying times to suit abnormal environmental conditions. Oil base or oleoresinous solvent-type paints are ready for recoating when paint feels firm, does not deform or feel sticky under moderate pressure of thumb, and application of another coat of paint does not cause lifting or loss of adhesion of undercoat.

3.3.4 Time Between Surface Preparation and Painting: Apply first coat on surfaces that have been cleaned, pretreated, and otherwise prepared for painting as soon as practicable after such pretreatment has been completed, but before deterioration of prepared surface.

3.3.5 Pretreatment Wash Coat: Apply vinyl-type wash coat by brush or spray. Maintain wet spray at all times.

3.4 CLEANING

3.4.1 At completion of each day, remove painting materials, empty containers, rags, cloths, brushes, or other equipment. Store or dispose of as appropriate.

3.4.2 As work proceeds and upon completion, promptly remove paint where spilled, splashed, or spattered.

3.4.3 At conclusion of work, leave premises neat and clean to satisfaction of the Government's Representative.

3.5 PAINTING AND FINISH SCHEDULE

		Minimum Dry Film
3.5.1	Exterior	
3.5.1.1	Ferrous Metal, Enamel, Gloss	
	Pretreatment: MS DOD-P-15328	0.5 mil
	Prime Coat: FS TT-P-645	1.5 mil
	2nd Coat: FS TT-E-489, Class A	1.5 mil
	Finish: FS TT-E-489, Class A	1.5 mil
3.5.1.2	Galvanized Metal, Enamel, Gloss	
	Pretreatment: MS DOD-P-15328	0.5 mil
	Prime Coat: FS TT-P-641, Type II	1.5 mil
	2nd Coat: FS TT-E-489, Class A	1.5 mil
	Finish: FS TT-E-489, Class A	1.5 mil

3.5.2 Use products of same manufacturer within coating system.

3.6 COLOR SCHEDULE: Colors shall be as follows:

3.6.1 Barricade Posts and Drain Sump Signs: Safety yellow, PPG No. 23-780.

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APPENDIX 4A-8

CONSTRUCTION SPECIFICATION ER-1372-C2 FOR RMW STORAGE PADS/SPECIAL PROTECTIVE COATING

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V-ER1372-0006

ER-1372-C2

CONSTRUCTION SPECIFICATION FOR

RMW STORAGE PADS/SPECIAL PROTECTIVE COATING

Work Order ER-1372

Prepared By:

KAISER ENGINEERS HANFORD COMPANY
Richland, Washington

For the US Department of Energy

Contract DE-AC06-87RL10900

OFFICIAL RELEASE BY WHC (18)
DATE MAY 19 1988
Ltr #4

Lead Lead Engineer	5/13/88 Date	Specifications	5/13/88 Date
Safety	5/13/88 Date	Chief Design Engineer	5/13/88 Date
Quality Assurance	5/13/88 Date	Project Engineer	5/13/88 Date

WESTINGHOUSE HANFORD COMPANY

D. L. Kelly - PROJECT ENG. 5/13/88

D. Kelley, Cognizant Engineer — Date

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Section 01027	Application for Payment	3
Section 01040	Coordination	2
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Section 01300	Submittals	3
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Section 01720	Project Record Documents	2
DIVISION 9 - FINISHES		
Section 09805	Special Protective Coating	3

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SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 INTRODUCTION

1.1.1 The RMW Storage Pads are located in the 200-West Limited Area of the Hanford Site, approximately 28 road miles north of Richland, Washington.

1.1.2 This specification is for the application of a Special Protective Coating (SPC) to an approximately 9000 SF concrete storage pad and two approximately 80 SF concrete unloading pads.

1.2 STATEMENT OF WORK

1.2.1 The work consists of furnishing labor, equipment, and materials to perform surface preparation and coating application on three RMW pads in accordance with these contract documents.

1.2.2 Work Included: The following itemization of work elements is intended to be broad in scope to identify major tasks and is not all inclusive.

a. Clean existing concrete surface using a power vacuum.
b. Sandblast ferrous metals and concrete surfaces.
c. Seal control and construction joints.
d. Apply SPC basecoats.
e. Apply SPC topcoat.

1.2.3 Work Not Included.

1.2.3.1 With the exception of SPC application to the three RMW Pads noted, all remaining work shown on the drawings shall be performed by others. SPC on the six remaining unloading pads is not included.

1.2.3.2 Repairs to the existing concrete surface to facilitate the SPC application will be by others.

1.3 SEQUENCE OF WORK

1.3.1 Work shall be completed on the 9000 SF storage pad prior to commencing work on the two unloading pads.

1.4 DRAWING LIST

1.4.1 The Drawings which show the work to be accomplished by these Contract Documents are listed in the Schedule of Drawings.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01027

APPLICATION FOR PAYMENT

PART 1 - GENERAL

1.1 REFERENCES: Not Used.

1.2 SUBMITTALS: Not Used.

1.3 APPLICATION PROCEDURE

1.3.1 Payment to Contractor as set forth in Section 15 of Contract General Conditions are initiated by the Contractor making an application for payment as follows:

1.3.1.1 Complete Form KEH-1026.00, Progress Estimate Backup, (sample appended) furnished by KEH and include the following either in the letter requesting payment or at the end of the Progress Estimate Backup:

Total Value Completed to Date*		$XX,XXX.XX
Retainage (10%)	X,XXX.XX	
Less Previous Payments	XX,XXX.XX	
Other Charges from KEH	XX.XX	
Subtotal	(X,XXX.XX)	
Total Amount this Payment		$XX,XXX.XX

*Includes amount for payment on stored materials and contract modifications.

1.3.1.2 Review the information with KEH approximately 5 days before end of the pay period, adjust the data, if required, initial, and return to KEH.

1.4 PAYMENT PROCEDURE

1.4.1 Upon receipt of an approved application, KEH will prepare the payment documents and send the original and two copies to the person authorized by the Contractor to sign such documents.

1.4.2 After signing the payment documents the original and one copy shall be returned to KEH for processing. No processing of checks will be done by KEH until the signed payment document is returned.

1.4.3 KEH will mail the check to the Contractor's designated office.

1.5 ADDITIONAL DATA REQUIRED

1.5.1 When processing applications for payment and preparing payment documents, KEH may require data to substantiate and justify amounts requested. Processing of payment documents may be delayed if data is not forwarded expeditiously to KEH.

1.5.2 Requests for payment for equipment of material which the Contractor has received, but has not installed, shall be accompanied by invoice or other data to provide evidence that the title to such equipment or material is held by the Contractor.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

KAISER ENGINEERS
HANFORD

PROGRESS ESTIMATE BACKUP

Sheet _____ of _____

Contractor:	Contract No.:
Subject:	
Backup For Progress Estimate No.:	Dated:

Item	Description	Estimated Cost	Weighted Percent	Percent Complete to Date	W'T'D % Complete to Date	Total $ to Date

KEH-1026.00 (03-87)

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SECTION 01040

COORDINATION

PART 1 - GENERAL

1.1 REFERENCES

Not Used

1.2 SUBMITTALS

Not Used

1.3 CONSTRUCTION ACTIVITIES

1.3.1 Coordinate construction activities to assure efficient and orderly sequence of work, with provisions for accommodating items to be installed later.

1.3.2 As noted in Section 29 of Contract General Conditions, other contracts may be under construction concurrently with the work included in this Specification. The Contractor shall coordinate his activities with those of other contractors for the mutual benefit of all. Coordination meetings may be required in addition to progress meetings to keep all parties informed of scheduled activities at interface points.

1.3.3 Certain work related to this project will be performed by others. The Contractor shall cooperate and coordinate his work to eliminate interferences and delays.

1.4 ACCESS TO WORK AFTER POSSESSION

1.4.1 Access to warranty work as set forth in Section 24 of Contract General Conditions or access to work after possession as designated in Section 20 of Contract General Conditions shall be coordinated by KEH with other contractors, and users of the facility. Notify KEH in advance of proposed work to minimize disruptions.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 01043

JOB SITE ADMINISTRATION

PART 1 - GENERAL

1.1 REFERENCES

Not Used

1.2 SUBMITTALS

Not Used

1.3 BADGE, DOSIMETER, AND ORIENTATION

1.3.1 Definitions

1.3.1.1 Limited Area: Inside single chain link fence with access permitted only through a guard station.

1.3.2 The work site being within the Controlled Access Area and inside a Limited Area the badge, basic dosimeter requirements, and orientation will be in accordance with Section 56 of Contract General Conditions.

1.4 SECURITY

1.4.1 Policy and Procedures: All Contractor employees are required to comply with security policy and procedures as set forth in Section 56 and Section 87 of Contract General Conditions. Copies of the KEH Safeguards and Security Manual (KEH-MA-6) will be provided to the Contractor upon request after award of contract.

1.4.2 Security Escorts

1.4.2.1 Contractor personnel not having an "5" or "3" security clearance working within the 200-West Limited Areas require security escorts. Escorts are provided by KEH at no cost to the contractor except as set forth in subparagraph 1.4.2.4.

1.4.2.2 The Contractor shall provide a list of employees and vehicles to be used and the anticipated start and duration of utilization. The list shall be provided one week before start of work in the Limited Area for determination of escort requirements. The Contractor shall provide weekly work schedules of employees, not later than Thursday of the preceding week (minimum 24 hour notice required for changes), for KEH to provide sufficient escorts.

1.4.2.3 Escorts will be assigned from the KEH trailer located outside the 200 East Limited Area near Access Gate No. 814. Contractor personnel shall arrange to meet and transport assigned escorts from that location. Space shall be provided within contractor vehicles to accommodate the number of escorts required. Each contractor vehicle entering the Limited Area shall have a minimum of one security escort.

1.4.2.4 The Contractor may be charged for escorts when escorts have been requested and the Contractor personnel does not show up at time and place specified. The charges will be made at the rate of $15.00 per hour for each escort for time lost waiting for Contractor personnel.

1.5 WORK NEAR ELECTRICAL LINES

1.5.1 In addition to requirements of Subsection 50.2 of Contract General Conditions, when cranes or hoists are operated under or adjacent to existing overhead electrical lines, a standby lineman must be in attendance. The Contractor shall notify KEH not less than 3 working days before the standby lineman will be required. The standby lineman will be furnished by KEH at no cost to the Contractor.

1.6 FIRE SAFETY

1.6.1 The Contractor is required to address fire safety as part of his construction safety plan as required by Section 55 of Contract General Conditions. The following fire safety requirements are to be incorporated into the construction safety plan. The Contractor is to maintain a fire watch for a period of one-half hour after the cessation of welding, cutting, or grinding. Portable shields are to be utilized wherever the Contractor is welding, cutting, or grinding.

1.6.2 The Contractor is to have fully charged fire extinguishers available whenever welding, cutting, or grinding. A means to control the ignition of brush fires must also be addressed in the fire safety plan.

1.6.3 See Section 01500 for requirements for off road driving and grass fire prevention.

1.7 SPECIAL LIMITATIONS, REQUIREMENTS AND WORKING CONDITIONS

1.7.1 Working Hours

1.7.1.1 The regular working hours for this project are 7:30 a.m. to 4:00 p.m., Monday through Friday. The Contractor shall not perform work at any time other than the regular day shift working hours without prior approval from the KEH Representative. The Contractor shall give the KEH at least two (2) hours notice if its employees are to be working after the normal shift period, Monday through Friday. The Contractor shall give the KEH notice on the prior working day if its employees will be working

before normal shifthours, Monday through Friday, or will be working at any time on Saturdays, Sundays, or Holidays.

1.7.2 Evacuation

1.7.2.1 All employees of the Contractor and his Subcontractors shall participate in emergency evacuation drills (duration approximately one hour each). Such drills will occur not more often than once every three months. Also, the Contractor shall maintain a daily log (or other suitable record) of the names of all of his employees, including those of Subcontractors, working at the jobsite.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

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SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.1 REFERENCES

Not Used

1.2 SUBMITTALS

Not Used

1.3 MEETING PROCEDURES

1.3.1 Representatives from KEH, Operating Contractor, and the Contractor, including major subcontractors, shall participate in all project meetings.

1.3.2 All meeting times and locations shall be mutually agreed to by the Contractor and KEH. All meetings will be held at the Hanford Site in Richland, Washington. Kaiser Engineers Hanford will be responsible for issuing notices of meetings and for preparation of minutes of meetings. Meeting minutes will be distributed to all project participants.

1.4 SITE LABOR CONFERENCE

1.4.1 Before starting construction onsite, the Contractor shall attend an informational conference on Hanford Site labor requirements applicable to this project. Kaiser Engineers Hanford will schedule, give advance notice, and chair the meeting to be attended by representatives from labor organizations whose members may be utilized in the course of construction. Labor provisions of the Contract General Conditions will be reviewed.

1.5 PRECONSTRUCTION MEETING

1.5.1 Meeting will be scheduled by KEH prior to start of onsite work. The authorized representatives of the Contractor and his major subcontractors shall attend. Kaiser Engineers Hanford will advise all others having an interest in the project. The meeting will be chaired by KEH.

1.5.2 The following items, as a minimum, will be incorporated into the agenda for the meeting.

a. Point of contact, key personnel (Operating Contractor, Safety, QA/QC, Acceptance Inspectors, etc) and Contracts Personnel.

b. Schedule requirements and restraints, submittals and work limitations.

c. Safety, construction progress meetings and frequency, and certified payrolls.

d. Report requirements and frequency.

e. Major material and equipment lists.

f. Other pertinent items.

1.6 CONSTRUCTION PROGRESS MEETINGS

1.6.1 Meetings shall be held weekly unless determined otherwise at preconstruction conference. Meetings shall be held at time and location determined at preconstruction conference. Meeting will be approximately one hour long.

1.6.2 Kaiser Engineers Hanford will chair the meeting and request attendance of key personnel as required. The authorized representative of the Contractor and pertinent subcontractors shall attend.

1.6.3 Purpose of meetings is to monitor status and provide forum for exchange of pertinent project information. Major topics may include, but not be limited to, the following:

a. Schedule, cost and construction status.

b. Design and scope changes

c. Submittal status, key material and equipment delivery status.

d. Potential problem areas.

e. Action item status, goals for next meeting.

f. Other items as appropriate.

1.6.4 Minutes of meetings will be issued by KEH as promptly as possible following the meeting. Action items will be identified with assigned follow-up. Issues resolved will be reported in the minutes, as well as closed action items.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

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SECTION 01300

SUBMITTALS

1.1 DESCRIPTION

1.1.1 This section summarizes the submittals required in Part 1 of each Section of this Specification, it explains the type of submittals required, and it describes procedures for submittals and review.

1.1.2 Submittals required in Part 1 of each Section of this Specification are summarized in SCHEDULE OF SUBMITTALS. Each submittal is identified by Submittal Number, Reference Section, and Title. Submittals are required for either Review and Approval or Review for Record.

1.1.2.1 Submittals requiring Review and Approval are those which must receive approval before procurement, fabrication, or construction is commenced.

1.1.2.2 Submittals requiring Review for Record are those which the Contractor may proceed with procurement, fabrication, construction, or acceptance testing, but acceptance is contingent upon strict compliance with Drawings and Specifications.

1.1.3 Supplemental Submittals are initiated by the Contractor for consideration of substitute products or corrective procedures and require Review and Approval.

1.2 SUBMITTAL PROCEDURES

1 2.1 All submittals shall be transmitted to KEH by use of a Data Transmittal form.

1.2.2 Each submittal shall be identified by the Submittal Number, Reference Section, and Title noted in the Schedule of Submittals. The number of copies required for retention by the KEH are shown in the Schedule and include two copies to be returned to the Contractor. Additional copies required for Contractor uses must be added.

1.2.3 Each submittal shall be reviewed for completeness, for compliance with contract documents, and for proper identification before being sent to KEH. The submittal data shall either be stamped indicating that the review process has taken place or the Data Transmittal form may be signed with a statement of "Reviewed for Compliance." All submittals which have not been stamped or signed to indicate review will be returned without consideration.

1.2.4 Submittals requiring Review and Approval shall be stamped by KEH and marked as "Approved", "Approved with Exception," or "Not Approved, Revise and Resubmit." Approval of submittals does not relieve the Contractor of responsibility for errors which may be contained therein.

1.2.4.1 Approved submittals are identified by submittal stamp with "Approved" or "Approved with Exception" box checked. "Approved" signifies general concurrence to achieve conformance with design concept of the Project and compliance with requirements of Contract Documents. "Approved with Exception" signifies general concurrence with noteworthy comments or clarifications. Approval of submittals does not relieve Contractor of responsibility for errors contained therein. Approval of a specific item shall not be construed as approval of a system or an assembly of which the item is a component.

1.2.4.2 A submittal which is Not Approved is identified as "Not Approved, Revise and Resubmit." Such submittal is considered by KEH to be technically deficient or incomplete and therefore, unacceptable. Resubmittal is required, hence fabrication, procurement, or performance of procedures shall not proceed.

1.2.4.3 Upon receipt of deficient submittal data, the Contractor shall make corrections noted on the transmittal and shall resubmit the data to KEH within ten (10) calendar days.

1.2.5 Materials and equipment fabricated or installed without required approved submittals, or which differ from approved Drawings or vendor data are subject to rejection and replacement at the Contractor's expense.

1.2.6 Delays arising out of the Contractor's failure to submit in a timely manner all required Drawings and other related data as described in the contract documents shall not constitute excusable delays for extensions, unless excusable under other provisions of the contract. The Contractor shall allow a reasonable time for KEH review and disposition of submittals (including shop drawings and vendor information) required to be furnished by the Contractor. The period shall be measured from the date of receipt of the submittal in KEH's office to the date of return mailing to the Contractor.

1.2.7 The Contractor is responsible for dimensions to be confirmed and correlated at the worksite.

1.2.8 Submittals for Review and Record will be reviewed and filed. Incomplete or inaccurate data will be returned to the Contractor marked "Resubmit" with appropriate comments, and items procured or work performed shall be corrected. Payment for equipment will not be made unless all required Commercial Vendor Information (CVI) has been furnished.

1.2.9 Supplemental Submittals shall contain sufficient data to indicate substantial compliance with Drawings and Specifications. Substitute product submittals must contain as a minimum, outline dimensions, operating clearances, and engineering data. Each submittal shall be identified by the Specification section number and paragraph number or a referenced drawing number and detail. Improperly identified or incomplete submittals will be returned without consideration.

1.2.10 Procedures for performing certain items of work are required to be submitted for Review and Approval before work is commenced. Those work procedures which have been approved by KEH for work similar to that to be accomplished on this project may not need to be reapproved. One copy of the previously approved procedure shall be forwarded to KEH by Data Transmittal form and identified by Submittal Number, Reference Section, Title, and either Contractor's procedure number or project number for which procedure was approved. The submittal will be reviewed by KEH and if acceptable will be retained for record. If previously approved procedure is not acceptable the submittal will be returned with requirements for resubmittal.

1.3 SCHEDULE OF SUBMITTALS

Submittal Number	Submittal Title	Quantity	Review and Approval	Review for Record
Contract General Conditions				
55/1	Safety Program, Industrial Injury/ Illness Experience; Equipment and Operator Certificates	10	Prior to Badging	

END OF SECTION

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SECTION 01400

QUALITY ASSURANCE

PART 1 - GENERAL

1.1 REFERENCES

Not Used

1.2 SUBMITTALS

Not Used

1.3 INSPECTION AND TESTING

1.3.1 Performed by KEH

1.3.1.1 In accordance with Section 19 of Contract General Conditions, KEH (or its designated representative) will perform inspections and tests as follows:

- Specific inspection points.
- Testing of Special Protective Coatings.
- Final Acceptance Inspection.

1.3.2 Specific Inspection Points

1.3.2.1 Contractor shall adhere to inspection points specified. Contractor shall assure their personnel have completed inspections of and approved portions of work in accordance with Contract requirements before notifying KEH.

a. Specific inspection points are defined as follows.

1) Construction inspection (H): Required for witnessing of specific construction features, before further construction is allowed to proceed.

2) Witness (W): Selected for inspection at option of KEH. Work may proceed upon verbal release by KEH or upon expiration of 1 hour beyond scheduled time of witness.

b. Specific Inspection Points: Apply to onsite work. Except where a longer notification period is specified, the Contractor shall notify the KEH not less than four (4) working hours prior to each inspection point for onsite work.

1.3.2.2 The Inspection Points; Construction Inspection (H), and Witness (W), for the contract work will be for the following items and stages of work:

H - Initial Application of Primer

W - Any Application of Basecoat and Topcoat

1.4 NONCONFORMANCE REPORTING AND RESOLUTION

1.4.1 Three degrees of nonconformances are used to show noncompliance with contract requirements.

1.4.1.1 Obvious nonconformance: Corrective action is as obvious as nonconformance, not identified by tag, and normally corrected by Contractor without notification.

1.4.1.2 Open items nonconformance: May be identified by blue nonconformance report (NCR) tag, is readily correctable to meet Drawings and Specifications and does not require deviation from Contract requirements or design. Can be corrected by Contractor without additional direction, deviation, or change to Contract requirements.

1.4.1.3 Report nonconformance: May be identified by blue NCR tag or red construction hold (CH) tag, requires change to or deviation from Contract requirements and additional direction to Contractor. Changes or deviations must be approved by KEH. Do not proceed with portion of the Work bearing red tag until installation is determined by KEH to be in compliance with Contract requirements, or specific permission to proceed is received from KEH. Tags are not to be removed by anyone other than inspector who applied tag or by direction of inspector's supervisor.

1.4.2 Differing degrees require different methods of reporting, resolving, and documenting.

1.4.2.1 Obvious nonconformance: Requires documenting only if it remains at time of completion of final punchlist. Documented on final punchlist.

1.4.2.2 Open item nonconformance: Documented for verification of correction on open items list available from KEH upon request.

1.4.2.3 Report nonconformance: Documented on Construction Nonconformance Report (CNCR) or an Audit Finding Report (AFR) and requires formal approved resolution.

1.4.3 Contractor shall ensure its organization is represented by a knowledgeable individual with sufficient authority to commit Contractor to corrective action requests identified by KEH.

1.4.4 Nonconformances noted during performance of Contract, require resolution before completion and final payment.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1- GENERAL

1.1 REFERENCES

1.1.1 National Fire Protection Association (NFPA)

NFPA 701-1977	Standard Method of Fire Tests for Flame-Resistant Textiles and Films

1.1.2 Washington State Department of Transportation (WSDOT)

M41-10-84	Standard Specification for Road, Bridge, and Municipal Construction

1.2 SUBMITTALS: Refer to Section 01300 for procedures

1.2.1 Anchoring and Enclosure Methods: Submit for review for record the methods proposed for anchoring portable structures and enclosing the underfloor area to meet the requirements of this Section.

1.3 CONSTRUCTION FACILITIES

1.3.1 First Aid: Facilities are available at Building 2719WA in the 200 West Area to provide first line medical attention.

1.3.2 Operation and Storage Areas: The onsite operations of the Contractor including storage of materials shall be confined to area identified in the field by the KEH Representative.

1.3.3 Disposal Site for waste: Disposal of excess excavation, broken asphalt, and broken concrete shall be at a Site approximately 12 road miles from the project location. The disposal Site is open only during regular working hours as stated in these Contract Documents. The disposal site will not accept empty SPC containers.

1.4 TEMPORARY UTILITIES

1.4.1 Water

1.4.1.1 Drinking Water: Water for drinking purposes will be made available within the 200-East and 200-West Areas. The Contractor is responsible for furnishing adequate drinking water to his employees that conforms to health and safety requirements.

1.4.2 Electrical Power: The Contractor shall provide his own temporary power.

1.4.3 Sanitary Facilities: The Contractor shall furnish and service chemical or other approved sanitary toilets for use of his employees. The facilities shall conform to requirements of KEH which are available upon request.

1.5 ACCESS ROADS PARKING AREAS

1.5.1 Access to 200 West Area shall be through the main gate.

1.5.2 Parking for Contractor's Company vehicles will be made available in the vicinity of the work outside the limited area. "No Parking" signs are posted to indicate fire and emergency lanes. No on-street parking will be allowed.

1.5.3 Grass Fire Prevention: To reduce the potential for grass fires, all off-road driving shall be kept to a minimum. Each vehicle driving off-road or to remote locations, shall carry a portable fire extinguisher (10 pound ABC dry chemical, minimum), communications equipment consisting of a two-way radio or mobil phone (CB type radios are not acceptable) and a shovel. All fires shall be reported immediately to the nearest Hanford Patrol and the Hanford Fire Department.

1.6 TEMPORARY CONTROLS

1.6.1 Dust Control: The Contractor shall maintain all work areas to prevent a hazard or nuisance to others. Residue from sandblasting shall be removed from the jobsite.

1.6.2 Temporary enclosures: Plastic sheeting materials used to form enclosures shall have fire retardant capabilities meeting the requirements of NFPA 701. Acceptable manufacturers are Winman Corporation (Plastic Division), St. Cloud, Minnesota; Lancs Industries, 1270 N.E. 124th Street, Kirkland, Washington 98034; and Protective Plastics, Inc. 230 Silver Creek Road, Greer, South Carolina 29651. Other manufacturers may be submitted to KEH for approval.

1.6.3 Traffic Control: Temporary traffic control and barricades shall be in accordance with WSDOT M41-10, Section 1-07.23(3).

PART 2 - <u>PRODUCTS</u>

Not Used

PART 3 - EXECUTION

Not Used

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SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 REFERENCES

Not Used

1.2 SUBMITTALS

Not Used

1.3 RECORD REQUIREMENTS

1.3.1 The nature of the work at the Hanford Site requires that certain documents, as defined herein, be held to record the construction process and the administration of the Contract. KEH is responsible for assembling all pertinent data for final disposition. The Contractor is responsible for preparing, preserving, and delivering those Project Record Documents to KEH required by this Contract. These documents are in addition to those submittals required in Section 01300.

1.3.2 Project Record Documents shall be marked by the Contractor to identify those copies for record and to prevent their use for construction. Record copies of construction documents shall be kept in the Contractor's Field Office and shall be available to KEH during the progress of the work.

1.3.3 Some data required for Project Records are delivered to KEH during the course of construction and contract administration, while other required records are assembled after completion of construction for delivery to KEH. In all situations the Contractor is required to document the delivery by retaining a copy of reports delivered during course of work until construction completion, retaining a copy of letter of transmittal itemizing delivered items, or other means acceptable to KEH.

1.4 PROJECT RECORD DOCUMENTS

1.4.1 General: The documents required for Project Record are itemized herein. Each document shall be identified by Title or Number and shall be complete. All notes or markings added by hand shall be legible utilizing a permanent non-smearing marking media, such as ink or felt tip markers, in contrasting color.

1.4.2 Contract Documents: One set of Drawings and the Contract Documents, including Addenda and Modifications to the Contract, shall be stored in the Field Office apart from documents used in construction and shall be maintained in a clean, dry, and legible condition. Legibly mark each item to record actual construction, including changes to dimensions and details, manufacturer's name, catalog number, and substitute products.

1.4.3 Certified Payrolls: Each week certified payrolls, as required by Section 108 of the Contract General Conditions, shall be filed with KEH and copies kept in Field Office until Contract completion. No progress payments will be processed unless all certified payrolls for the work period have been received by KEH.

1.4.4 Weekly Manpower Report: A weekly manpower report completed daily and submitted weekly (before 10:00 a.m. on Monday for the previous week) is required during the performance period of subject contract. Forms for Contractor's use in documenting the foregoing will be furnished by KEH.

1.4.5 Product Samples and Manufacturer's Instructions: In addition to submittal required in Section 01300 and requirements of this Section, any information received by the Contractor from suppliers that can document products used and how they were installed shall be forwarded to KEH for Project Records.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

9 2 1 2 3 5 5 1 7 3 4

SECTION 09805

SPECIAL PROTECTIVE COATING

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 Steel Structures Painting Council (SSPC)

Surface Preparation Specifications

SSPC-SP 6-85 No. 6 Commercial Blast Cleaning

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.3 DELIVERY, STORAGE AND HANDLING

1.3.1 Deliver materials to jobsite in manufacturer's unopened containers with labels intact. Do not open containers or remove labels until after inspection and acceptance by the Government's Representative.

1.3.2 Store materials in accordance with manufacturer's written instructions and in well ventilated area not exposed to excessive heat, sparks, flame or direct rays of sun.

1.4 PROJECT CONDITIONS

1.4.1 Environment for Coating: Coat exterior surfaces only when ambient and surface temperatures are between 50° F and 120° F, and temperature is 5° F above dewpoint. Coating should not be applied if rain is anticipated within 4 hours of application.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 The materials for the coating system shall be manufactured by United Coatings and supplied by Northwest Specialty Paint and Coatings as follows:

2.1.1.1 Basecoat and topcoat: Uniflex 455.

2.1.1.2 Concrete sealer: Uniflex Sealer 100.

2.1.1.3 Primer for ferrous metals: Primer 302.

2.1.1.4 Joint sealant: Uniflex Sealant 200.

2.1.1.5 Material for non-skid texture: Walnut shell aggregate.

PART 3 - EXECUTION

3.1 INSPECTION

3.1.1 Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence, or quality of work and which cannot be put into acceptable condition through preparatory work included in Article 3.2.

3.1.2 Report in writing to the Government's Representative conditions that may potentially affect proper application of finish. Do not commence surface preparation or coating application until defects have been corrected and conditions are made suitable.

3.2 PREPARATION

3.2.1 General

3.2.1.1 Before application, power vacuum space or area to receive coating.

3.2.2 Pre-Priming

3.2.2.1 Prepare ferrous metals and concrete surfaces in accordance with SSPC-SP 6 Commercial Blast Cleaning. Remove abrasive residue and dust, and prime metal within four hours after preparation.

3.2.2.2 Allow concrete to cure 28 days before coating is applied.

3.2.3 Post Priming

3.2.3.1 Feather abrasions, chips, skips, and holidays occurring in prime coat by sanding and recoat with material and color to minimum dry film thickness specified.

3.2.3.2 Coated surfaces may be recoated as soon as previous coats have dried sufficiently to allow walking upon by applicator.

3.2.3.3 Protect coating from rain until dry to touch.

3.2.4 Protection

3.2.4.1 Provide and install drop cloths, shields, and other protective devices required to protect surfaces adjacent to areas being coated. Keep spatter, smears, droppings, and overrun of coating materials to minimum and remove as coating work progresses.

3.3 APPLICATION

3.3.1 Apply coating materials and walnut shell aggregate non-skid texturing in accordance with manufacturer's written instructions. Uniflex 455 shall be applied and cured in temperatures of 50° or warmer.

3.3.2 Apply with equipment recommended by manufacturer.

3.3.3 Fill all construction and control joints within curbed area with Uniflex Sealant 200 in accordance with manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

3.4.1 Government Inspection: The Government's Representative will perform tests to ascertain that coating materials have been applied in accordance with this Section.

3.5 CLEANING

3.5.1 Furnish and maintain at jobsite, closed metal containers for disposal of waste materials. Place materials spotted or soaked with paint, oil, or solvents in containers.

3.5.2 Brushes, rollers, spatulas, and spray equipment shall be thoroughly cleaned after each use and shall contain no oils, thinners, or other residue after such cleaning.

3.5.3 Remove empty cans from jobsite at end of each shift.

3.4.5 At completion of coating work, remove materials, containers, rags, cloths, brushes, and other equipment from jobsite. Clean up spills.

3.6 COATING SCHEDULE

3.6.1 Concrete and Ferrous Metals:

		Sq. Feet Per Gallon	Min. Wet Film Thick.	Minimum Dry Film Thickness
Primer:	Primer 302 (metal)	250 - 300		
Primer:	Uniflex Sealer 100 (concrete)	250		
Second:	Uniflex 455 (basecoat)		20 mils	14 mils
Third:	Uniflex 455 (basecoat)		20 mils	14 mils
Fourth:	Uniflex 455 (topcoat)		20 mils	14 mils

END OF SECTION

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APPENDIX 4A-9

SPECIFICATION FOR THREE EACH FLAMMABLE STORAGE MODULES 4, 5, AND 6 (WFJ-XVV-638457 CHEM-STOR, INC., MFGR.)

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54-9600-161 (11-87)

PURCHASE ORDER

Westinghouse Hanford Company

Westinghouse Hanford Company
A subsidiary of Westinghouse Electric Corporation
P. O. Box 1970 Richland, Wa. 99352

88 U4C063 Telephone 509/ 376-5151

U. S. Government Contract No. DE-AC06-87RL10930 | Total Pages (Buyer Insert) 6

Mo./Day/Yr.	Page	Inquiry No.	This order is priority rated	Certified Under D.P.A.S. Reg. (15CFR350)	Vendor Code	Order No.
10 18 88	1	W-638457	DO-E 2		52445	WFJ-XVV-638457

IMPORTANT
Show Order No. on all packages, invoices, and correspondence. Complete packing list must accompany each shipment. Failure to properly identify w delay receipt of shipment and payment.

CHEM-STOR
371 EAST NINTH ST
GILROY CA 95020

SHIP TO: 1. Westinghouse Hanford Company, Central Receiving, 2401 Stevens Drive, Richland, Washington 99352
2. As indicated below.

F.O.B.	Date Delivery Required at F.O.B. Point	Buyer
GILROY, CA	12-23-88	B. F. JOHNSTON G1-63

Terms of Payment	Code	Ship Via
2 % 10 DAYS NET 30 DAYS	35	ROADRUNNER - SHIP COLLECT

ITEM	QUANTITY	U/M	DESCRIPTION	UNIT PRICE	TOTAL PRICE

Confirming Order if Checked [X] DO NOT DUPLICATE

3 EA CONTAINER, OUTDOOR STORAGE, DESIGNED TO MEET OR EXCEED THE REQUIREMENTS OF NFPA 30, NFPA 70, AND THE UNIFORM BUILDING CODE FOR THE STORING AND DISPENSING OF CLASS 1B FLAMMABLE LIQUIDS, WITH THE FOLLOWING SPECIFICATIONS:

- 10' X 24' X 8' APPROXIMATE EXTERIOR DIMENSIONS. CHEM-STOR MODEL L, 9'9" WIDE X 23'3" LONG X 8' 7 1/2" HIGH
- INTERNAL CHEMICAL RESISTANCE EPOXY COATING.
- INTERNAL SPILL CONTAINMENT CAPACITY - MINIMUM 10% OF THE AGGREGATE VOLUME OF THE MAXIMUM STORAGE CAPACITY OF THE STORAGE CONTAINER.
- LIFT OUT FLOOR PANEL(S) TO PROVIDE

Copies sent to: 9m
QAE ✓ Date: 10/24/88
PQS ✓ Date: 10/24/88

POOR COPY RECEIVED

Westinghouse Hanford Company
Signature Date

Item	C Center	MC	C Elem.	Chrg. Code	%	Author	MISN	Area	Approva
			100			Co-Author	R3-MISN	200 Area	
						Deliver To	R3-MISN	200 Area	

DS KELLY 3 272WA 200W

PURCHASING NUMERICAL FILE

54-9600-161 (11-87)

PURCHASE ORDER

Westinghouse Hanford Company

Westinghouse Hanford Company
A subsidiary of Westinghouse Electric Corporation
P. O. Box 1970 Richland, Wa. 99352

JBB U4C083 Telephone 509/ 376-5451

U. S. Government Contract No. DE-AC06-87RL10930 | Total Pages (Buyer Insert)

Mo./Day/Yr.	Page	Inquiry No.	This order is priority rated	Certified Under D.P.A.S. Reg. (15CFR350)	Vendor Code	Order No.
10 18 88	2	U-638457	DO-E 2		52445	WF1-SUW-638457

CHEM-STOR

IMPORTANT
Show Order No. on all packages, invoices, and correspondence. Complete packing list must accompany each shipment. Failure to properly identify will delay receipt of shipment and payment.

SHIP TO: 1. Westinghouse Hanford Company
Central Receiving
2401 Stevens Drive
Richland, Washington 99352

☐ 2. As indicated below.

O.B.	Date Delivery Required at F.O.B. Point	Buyer
		EJ

Terms of Payment	Code	Ship Via

ITEM	QUANTITY	U/M	DESCRIPTION	UNIT PRICE	TOTAL PRICE

Confirming Order if Checked ☐

VISUAL INSPECTION OF THE SECONDARY CONTAINMENT.

- EXPLOSION VENTING CAPABILITY.
- AIR INLET VENT SYSTEM.
- TWO OR THREE DOORS WITH LOCK SETS ON SAME WALL

TOTAL VALUE OF THIS ORDER

POOR COPY RECEIVED

10/24/88
10/24/88

Westinghouse Hanford Company

Signature Date

Item	C Center	MC	C Elem.	Chrg. Code	%	Author	MISN	Area	Approval
001-001NU	24320		100	JK7KA	100	DS KELLY	R3-MISN	200E Area	
						Delivered To: KELLY	R3-MISN	200E Area	
						DS KELLY 3	2/2WA	200W	

PURCHASING NUMERICAL FILE

9212565174 0

CONFIRMATION [AS4]

THIS CONFIRMS OUR ORDER PLACED BY B.F. JOHNSTON ON 10-21-88 WITH YOUR KRISTEEN ANDERSON WHEREIN WE ACCEPTED YOUR OFFER.

SMALL BUSINESS SET ASIDE ORDER [AS1]

THIS ORDER IS THE RESULT OF A SMALL BUSINESS SET ASIDE SOLICITATION. ALL EFFORTS UNDER THIS ORDER ARE TO BE PERFORMED OR ACCOMPLISHED BY A SMALL BUSINESS.

ALTHOUGH WE ARE ACCEPTING YOUR DELIVERY OF 12/23/88, OUR PLANT SITE REQUIREMENT IS 11/30/88. ANY IMPROVEMENT IN DELIVERY WILL BE APPRECIATED.

SECTION "C" PACKAGING AND MARKING

IDENTIFICATION OF ITEMS [C02]

ALL ITEMS SHALL BE IDENTIFIED WITH THE PART NUMBER AND PO NUMBER. IDENTIFICATION SHALL BE ON THE ITEM OR THE PACKAGE CONTAINING THE ITEM. WHERE THE IDENTIFICATION IS ON THE ITEMS, SUCH MARKINGS SHALL NOT IMPAIR THE SERVICE OF THE ITEM OR VIOLATE DIMENSIONAL, CHEMICAL OR PHYSICAL REQUIREMENTS.

SECTION "D" TRANSPORTATION

TRANSPORTATION CHARGES - COLLECT [D08]

THE SELLER SHALL SHIP THE ORDER ITEM(S) TO WHC ON A COLLECT BASIS. WHC SHALL PAY THE CARRIER FOR ALL FREIGHT CHARGES. THE SELLER IS CAUTIONED TO ENSURE THAT FREIGHT ARRANGEMENTS ARE COORDINATED WITH WHC TRAFFIC AND ALL FREIGHT INSTRUCTIONS ARE FULLY COMPLIED WITH. ORIGINAL BILL OF LADING IS TO BE SUBMITTED TO WHC WITH INVOICE. THE SELLER BEARS ALL RESPONSIBILITY FOR DAMAGE OR LOSS

9212162741

UNTIL DELIVERY IS MADE TO THE FOB POINT SPECIFIED HEREIN.

TRANSPORTATION INSTRUCTIONS [D12]

THE TRANSPORTATION INSTRUCTIONS SET FORTH IN PMM-47-001 [7/87] SHALL APPLY TO THIS PURCHASE ORDER.

THE SELLER SHALL CONTACT THE BUYER PRIOR TO SHIPMENT, [509] 376-5151. THE BUYER WILL ARRANGE SHIP WITH THE CARRIER AND COORDINATE WITH THE SELLER.

SECTION "E" QUALITY ASSURANCE AND INSPECTION

MANUFACTURER'S DATA [E22A]

THE SELLER SHALL SUBMIT TWO [2] LEGIBLE COPIES [UNLESS OTHERWISE SPECIFIED] OF PRODUCT DATA; I.E., DRAWINGS, CATALOG PAGES, OR BROCHURES, THAT PROVIDE ADEQUATE INFORMATION TO ENABLE THE BUYER'S TO VERIFY THE FORM AND FUNCTION OF THE ARTICLES PROCURED.

SECTION "F" DELIVERY/PERFORMANCE

SINGLE SHIPMENT [F02]

MAKE ONE COMPLETE SHIPMENT UNLESS NOTED OTHERWISE HEREIN OR REQUESTED OTHERWISE BY THE BUYER.

SECTION "G" ORDER ADMINISTRATION

ADMINISTRATIVE REQUIREMENTS [G08]

THE ADMINISTRATIVE REQUIREMENTS SET FORTH IN PMM-42-077, [7/87], SHALL BE INCORPORATED INTO THIS ORDER.

AUTHORIZED PERSONNEL [G09]

ONLY THE FOLLOWING NAMED INDIVIDUALS ARE AUTHORIZED TO MAKE CHANGES TO THIS DOCUMENT:
B.F. JOHNSTON, BUYER, PURCHASING; W.E. KIMBALL, SECTION MANAGER, PURCHASING; J.H. SMITH, JR., GROUP MANAGER, PURCHASING.

SECTION "H" SPECIAL REQUIREMENTS

AUDIT RIGHTS - ESTABLISHED CATALOG OR MARKET PRICE WARRANTY [H13]

AWARD OF THIS ORDER WAS PREDICATED ON SELLER'S WARRANTY THAT HIS PROPOSED PRICE WAS BASED ON HIS ESTABLISHED CATALOG OR MARKET PRICE, THEREFORE THE BUYER OR AN AUTHORIZED REPRESENTATIVE HAS THE RIGHT TO EXAMINE THE RECORDS OF THE SELLER AS NECESSARY TO ASSURE THAT THE PRICES CHARGED FOR THE ITEMS UNDER THIS ORDER ARE AS WARRANTED.

SECTION "I" TERMS AND CONDITIONS

THE TERMS AND CONDITIONS SET FORTH OR REFERENCED IN THE BODY OF THIS DOCUMENT BY WHC SHALL APPLY AND WHC OBJECTS TO AND SHALL NOT BE BOUND BY ANY ADDITIONAL OR DIFFERENT TERMS AND CONDITIONS.

GENERAL PURCHASE PROVISIONS [I18]

THIS PURCHASE ORDER IS SUBJECT TO THE PROVISIONS SET FORTH IN PMM-44-006 [7/87] ENTITLED "GENERAL PURCHASE PROVISIONS" IN ADDITION TO ANY OTHER PROVISIONS SET FORTH OR REFERENCED IN THE BODY OF THIS DOCUMENT.

SECTION "J" LIST OF ATTACHMENTS

LIST OF ATTACHMENTS [J03]

THE FOLLOWING ATTACHMENTS ARE PROVIDED WITH THIS PURCHASE ORDER, [PO], AND SHALL HAVE THE SAME EFFECT AS IF SET FORTH IN THE BODY OF THE PO:

GENERAL TRANSPORTATION INSTRUCTIONS [7/87]
PURCHASE ORDER ADMINISTRATIVE REQUIREMENTS [7/87]
GENERAL PURCHASE PROVISIONS [7/87]

SECTION "K" SIGNATURES

SELLER ACKNOWLEDGEMENT [K03]

SELLER SHALL ACKNOWLEDGE THIS DOCUMENT AS PROVIDED HEREIN REGARDLESS OF DOLLAR VALUE BY SIGNING AND RETURNING THE ENCLOSED SELLER ACKNOWLEDGEMENT COPY OF THIS DOCUMENT.

9212356174 4

CHEM-STOR, INC.
GILROY, CALIFORNIA

• SPECIFICATIONS •

SIZE 9'9" X 23' 8"
HEIGHT 8' 5"
WEIGHT 9700 LBS
RESERVOIR CAPACITY: 750 GALLONS
EXPLOSION VENT AREA 24 SQ FT
AIR VENT 822 SQUARE INCHES
STORAGE CAPACITY: UP TO 48 EACH, 55 GALLON DRUMS

• OPTIONAL FEATURES:

only option included

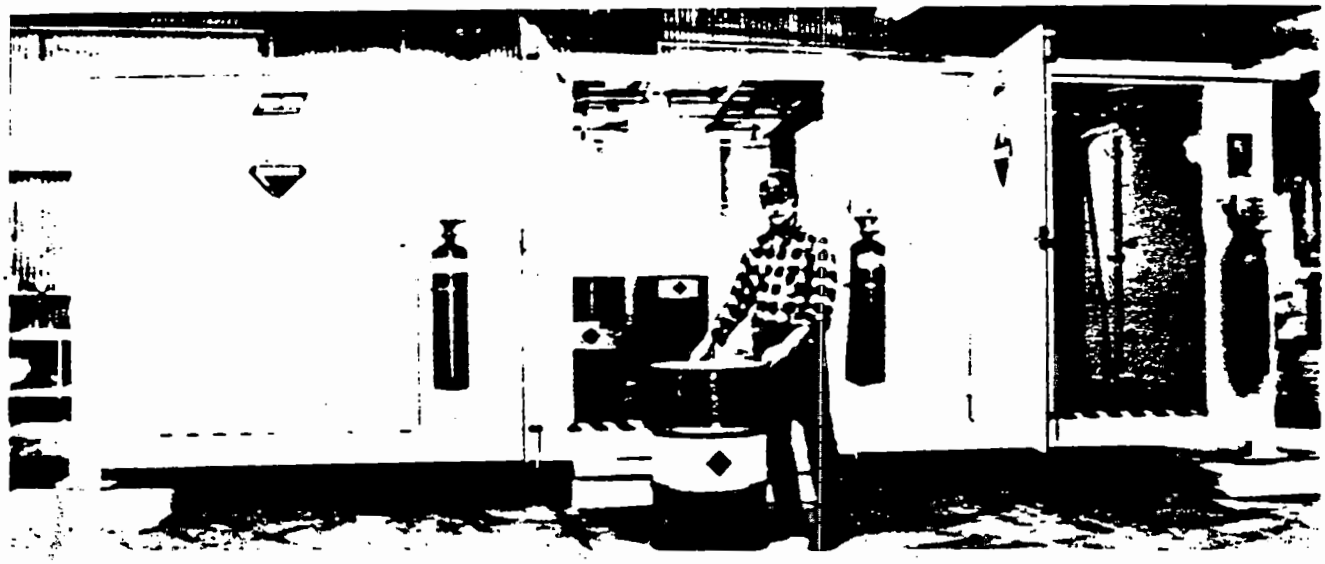
- Forced air ventilation.
- Automatic fire-extinguisher systems.
- Corrosion-resistant fiberglass grating.
- Explosion proof lighting systems.
- Convenient shelving for storage.
- Emergency eye wash stations.
- 'I' beam hoist system and 'drum lifter' for convenient loading and unloading of 55 gallon drums.
- Loading ramps
- Polypropylene sump liners
- Fire Department Hook-up
- Chemical Separation Walls
- Liquid level detector.
- 2 hour UL listed exterior firewall.
- Double doors for convenient loading and unloading
- Emergency Eye Wash
- Pressure Relief Venting Skylight
- Steel Grate Flooring

CHEMICAL STORAGE LOCKERS

CHEM-STOR, INC.
GILROY, CALIFORNIA

MODEL 'L'

'Chem-Stor' secondary containment chemical storage lockers are designed to move hazardous materials storage outside of buildings into situations providing sound environmental protection against contamination due to spills or leaks. At the same time, these lockers provide a high level of security as well as protection from the elements.



• STANDARD FEATURES:

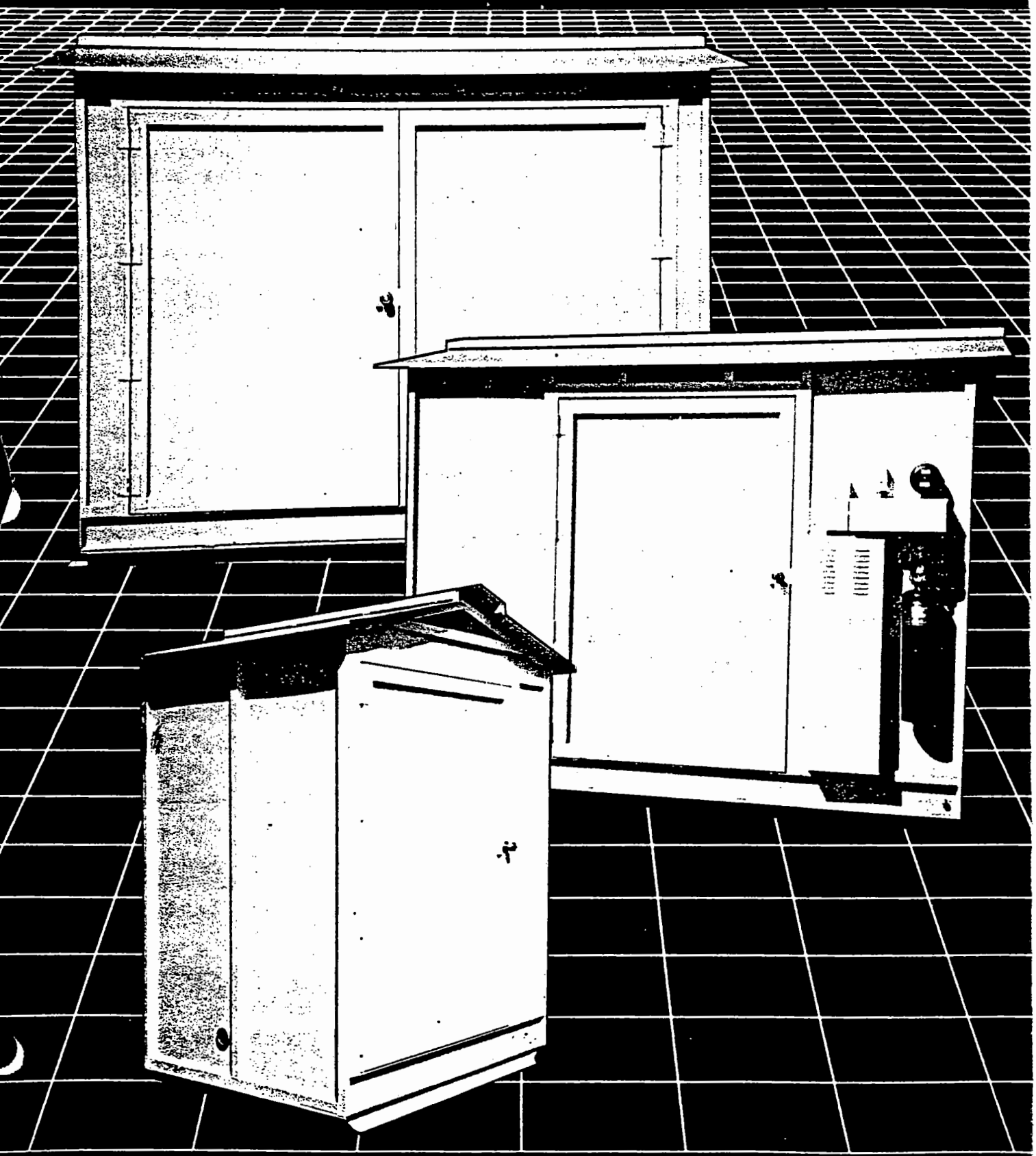
- Explosion venting to meet the requirements for storage of hazardous materials.
- Static ground connection provided to protect flammable or combustible materials from ignition by electrical discharge.
- All interior and exterior surfaces are painted with a two-part chemical resistant epoxy paint to protect the steel construction from corrosion.
- Additional coal tar sealant coating in reservoir containment.
- Constructed with structural grade 14 and 16 gauge steel providing maximum security.
- Secondary containment up to 750 gallons for leaks and spills.
- Easy visual inspection of the secondary containment sump.
- Seismic Tie down pads.
- Screens are utilized to keep birds out.

P. O. Box BB • Gilroy, CA 95021 • (408) 847-2668

9 2 1 2 1 5 1 7 4 6

CHEM-STOR

CHEMICAL STORAGE LOCKERS



The Solution for Chemical Storage Problems

GENERAL INFORMATION

Whether or not specific codes, regulations or ordinances apply to the use of Chem-Stor Lockers depends on several factors: principally, the type, quantity and physical state of materials to be stored; whether or not dispensing is to take place, the location of the locker at the specific site and, of course, the interpretations of local code-enforcing authorities.

References used for the following comments include: Uniform Fire Code, 1985 Ed.; Uniform Building Code, 1985 Ed.; Santa Clara County Model Ordinance for Hazardous Materials Storage; Flammable and Combustible Liquids Code, NFPA 30, 1981 Ed.; California Administrative Code, Title 22, Div. 4, Chapter 30, Minimum Standards for Management of Hazardous Waste; Guide for Explosion Venting, NFPA 68, 1978 Ed.; and NFPA Annotated OSHA Regulations, Volume 1, published 1977.

Chem-Stor Lockers are designed to fill a very specific need, namely, to move hazardous materials storage outside of buildings into situations providing sound environmental protection against contamination due to spills or leaks while at the same time providing a high level of security and protection from the elements. Consideration has been given to the fact that certain types of materials must have separated or isolated storage as well as the fire-hazard nature of many materials. Chem-Stor Lockers offer an easy, safe and most practical method of separating and isolating hazardous material storage. Each locker contains all the necessary features for an outside hazardous materials storage facility and meets many of the basic requirements for explosion venting, natural ventilation of storage spaces, shelving construction and structural design for heavy storage. In addition, each locker is small enough and strong enough to be picked up with a fork lift and relocated.

STRUCTURAL APPLICATION & PERMITS

The Uniform Building Code defines a structure in Section 420 as ". . . an edifice or building of any kind or any piece of work artificially built up or composed of parts joined together in some definite manner." The Uniform Building Code, Section 301 regarding building permits required, exempts one-story detached accessory buildings used as tool or storage sheds from permit requirements provided the projected roof area does not exceed 120 sq. ft. The Uniform Fire Code and Local Hazardous Materials Storage Ordinances require permits be obtained prior to storing hazardous materials.

Chem-Stor Lockers may or may not require a building permit to install. Regardless of permit requirements, however, many local jurisdictions will require structural calculations and a site plan. Chem-Stor, Inc. will provide structural calculations upon request. Information regarding construction materials and loading is included in the specifications. Regardless of the Uniform Building Code permit requirements, Chem-Stor Lockers may not be installed in a manner or location which constitutes a violation of the Building or Fire Codes. Hazardous materials storage permits issued under the Uniform Fire Code or Local Ordinance generally specify types and quantities of hazardous materials permitted to be stored as well as approved locations and monitoring and containment methods. Chem-Stor Lockers simplify the permit process by presenting a complete storage facility with known quantity limits which can be relocated from one APPROVED location to another.

Pads or foundations are not required for Chem-Stor Lockers due to the load distribution design. Some jurisdiction may however require anchorage against seismic activity. Chem-Stor, Inc. will provide information on pre-engineering anchoring methods upon customer request.

SECONDARY CONTAINMENT

The Santa Clara County Model Ordinance and similar ordinances throughout California require that hazardous materials, whether stored in a usable state or as a waste, must be stored in an approved storage facility providing secondary containment so that escape of spills or leakage is prevented from contaminating the surrounding environment. The secondary containment construction must be such that it will not be structurally weakened through contact with leaked or spilled material for a period of time equal to the maximum time needed to clean up the leakage or spilled hazardous material. The secondary containment must have capacity to contain 150% of the volume of the largest primary container stored (110% if only one container) or 10% of the aggregate volume of all primary containers stored—whichever is greater. If the storage container is open to rainfall, the secondary containment must additionally have capacity to accommodate the volume of a 24-hour rainfall based on a 25-year history.

The Uniform Building Code, Chapter 9; Uniform Fire Code, Art. 79, and NFPA 30 which includes OSHA requirements in this instance, all have similar requirements for containing spills of flammable or combustible liquids in "inside storage areas." Methods include liquid-tight sill, floors depressed 4" below surrounding floors or grated trenching to direct spills to a safe area. These regulations also require that run-off water for fire suppression be controlled and impounded in a safe location. The Uniform Fire Code and NFPA 30 also require outside storage area to be contained within a 6" curb or be graded so as to direct spills to a safe impounding area.

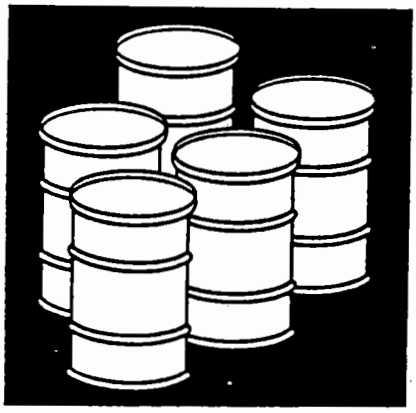
Uniform Fire Code, Art. 80, Hazardous Materials general requirements, states simply that, "satisfactory provisions shall be made for containing or neutralizing spills or leakage of hazardous materials."

California Administrative Code, Title 22, Chapter 30, Section 66535, pertaining to Storage of Hazardous Waste requires that storage shall be in such a manner so as to minimize the possibility of spills and escape from the area designated.

Chem-Stor Lockers are designated specifically to satisfy the requirements of the Model Local Ordinances. Locker Models A, B & D provide secondary containment of 125 gallons, which means as much as 1,250 gallons (22 55-gallon drums) could be stored in each of these lockers.

While Chem-Stor Lockers also meet the 4" non-combustible sill criteria for protection of openings in storage rooms, they are not designed with intent to qualify as storage rooms. The intended use is outside storage not open to rainfall and therewith providing containment not required to provide the additional 2" to 6" for a 24-hour rainfall or be surrounded by a curb 6" high.

Where local jurisdictions require fire sprinkler protection, provisions for fire flow run-off to a safe location may have to be developed by the user. Chem-Stor Locker secondary containment is static-tested for liquid tightness using water at the factory before application of any finish material. After the containment has proven to be liquid-tight, all surfaces are coated with a chemical-resistant epoxy to protect the steel construction from corrosion.



MONITORING

The model (local) hazardous material storage ordinances are all similar in that monitoring for leakage or spills is required. The Model Ordinance states "Monitoring methods shall include at least one system for detecting leakage from the primary container. A monitoring system capable of detecting that the hazardous material stored in the primary containment has entered the secondary containment shall be provided. **Visual inspection of the primary containment is the preferred method**: however, other means of monitoring may be required . . ." (Most enforcement authorities will require a monitoring plan wherein the frequency and method of inspection to detect leakage must be specified.)

Chem-Stor Lockers are designed with a 50" wide door for easy visual inspection of primary containers and an area of open grate (as well as lift-out floor panels) for quick, easy, visual inspection of the secondary containment.

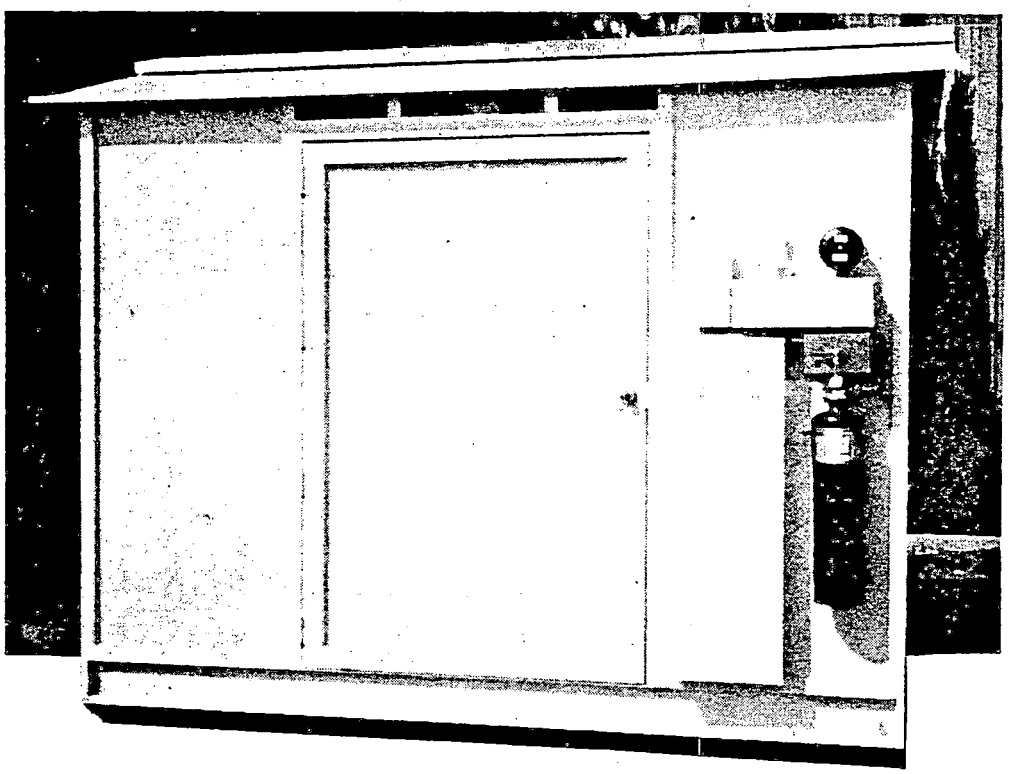
SECURITY

Storage of hazardous materials whether in waste or usable form requires security. The Uniform Fire Code, Art. 79 (Flammable Combustible Liquids), NFPA 30 (OSHA), the Model Ordinance, and California Administrative Code, Title 22, all make reference to security: NFPA 30, 4-8.4, "Storage area shall be protected against tampering or trespassers . . ."; UFC 79.403 repeats NFPA 30 for the storage of flammable or combustible liquids; Model Ordinance, "Secured facilities. Access to storage facilities shall be secured by means of fences and/or locks. The storage facilities shall be securely locked when unattended." California Administrative Code, Chapter 30, S66535 (f), "Storage of hazardous waste shall be in a secure enclosure, including but not limited to, a building, room or fenced area which shall prevent unauthorized persons from gaining access to the waste. . ."

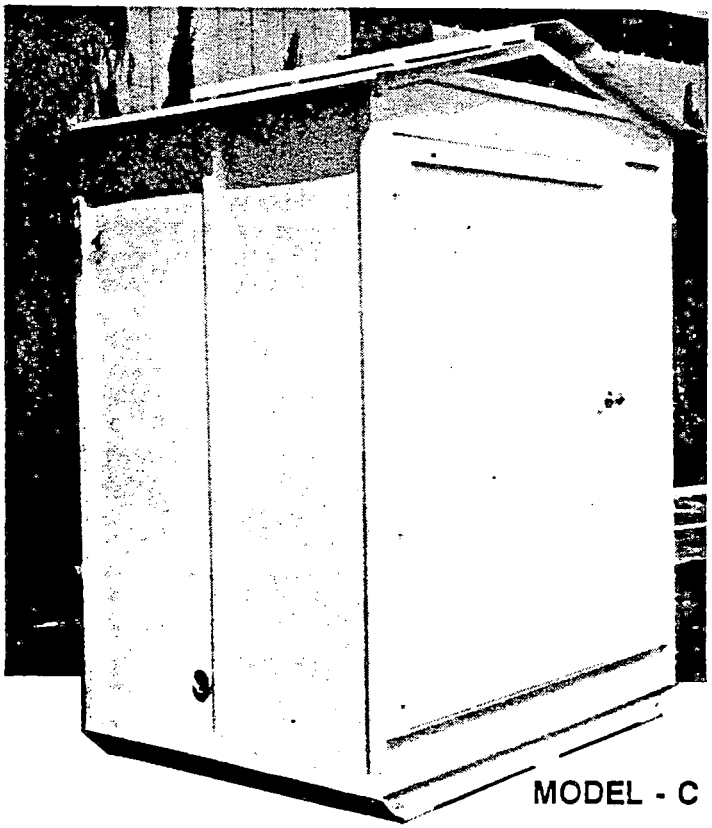
Chem-Stor Lockers provide excellent security for hazardous materials storage on properties which otherwise would not require a high level of security. The lockers also provide a method of isolating materials which may require special security measures while not restricting access to the general storage area. Chem-Stor Lockers' steel construction, versatile hardware and security bars on the roof hatch provide excellent security against unauthorized entry.

VENTILATION (Air Movement or Exchange)

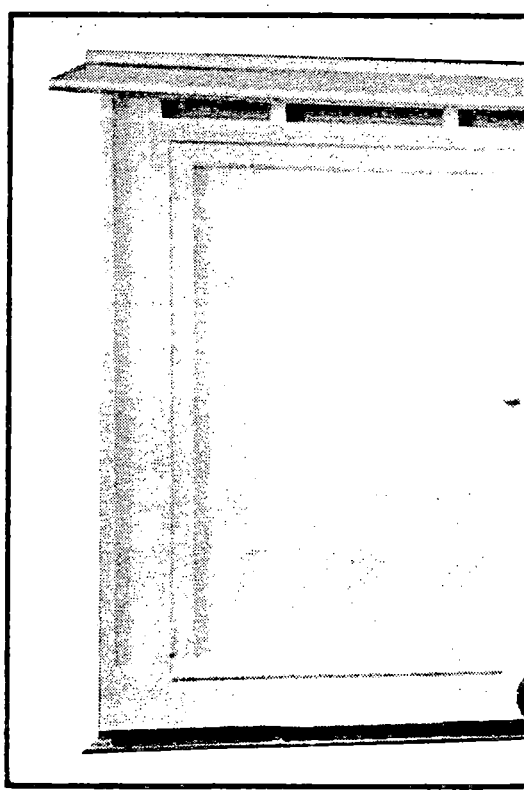
The requirements for ventilation generally depend on the material stored and associated activities. Uniform Fire Code ventilation requirements pertain principally to **inside storage mixing and handling rooms**. The general intent is to prevent accumulation of flammable vapors and to that end, six air changes per hour are required (Art. 79.804); NFPA 30 on the same subject does not specify air changes per hour for gravity ventilation but requires mechanical ventilation at 150 cfm if Class 1 liquids are dispensed (4.4-1-6). OSHA requires six air changes per hour by either gravity or mechanical exhaust ventilation. In all instances where flammable or combustible liquids are stored and ventilation is required, air changes must occur at the floor or within 12" of the floor. Where gases are stored, required ventilation must be designed to provide air outlets near the ceiling or roof and make up air inlets near the floor. Air changes per hour are not specified for gas storage, only that opening must be at least 1 sq. ft. for each 1,000 cu. ft. of room volume. OSHA 1910.103 (ii) (b).

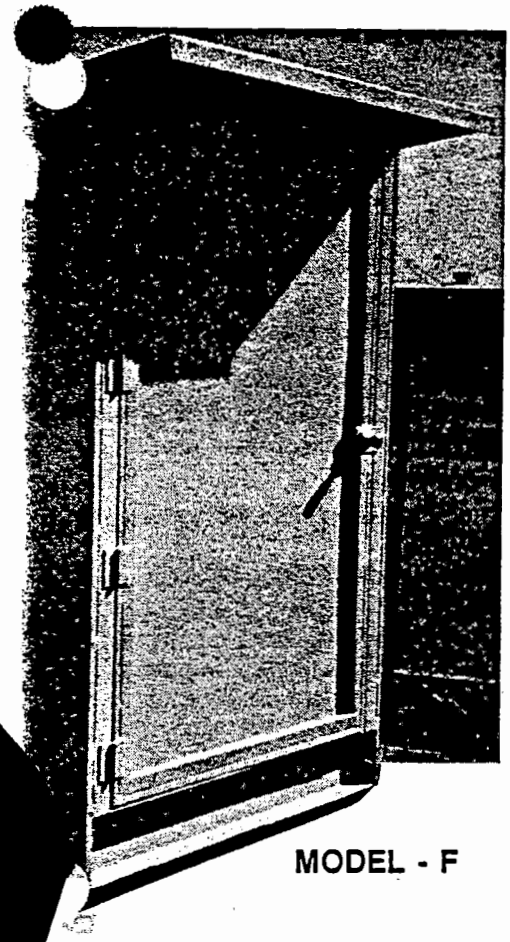


MODEL - A

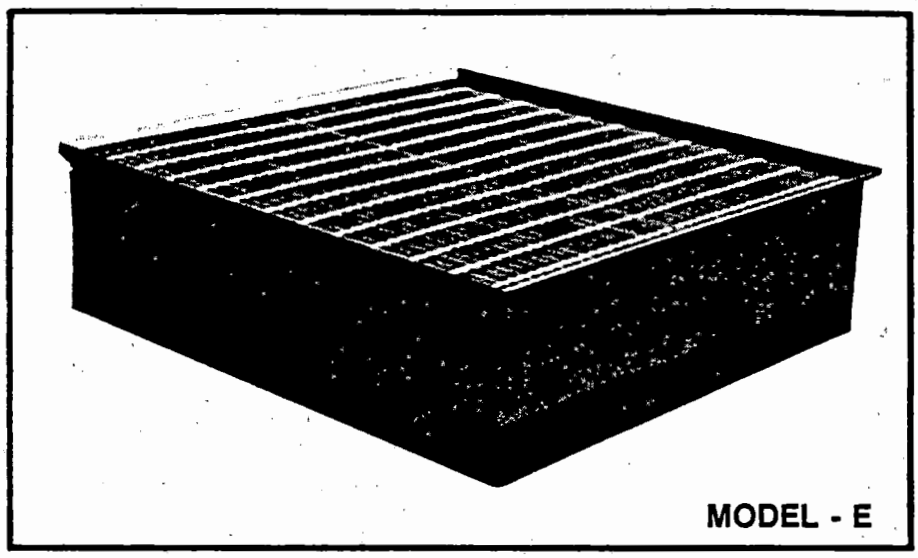


MODEL - C

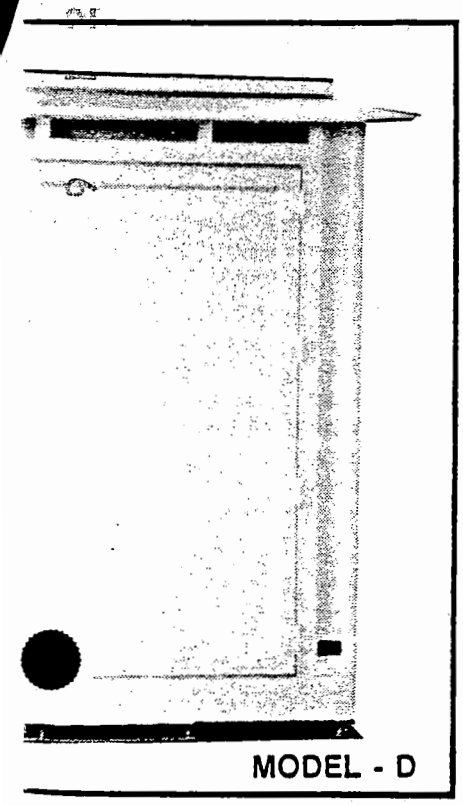




MODEL - F



MODEL - E



MODEL - D

MODEL - H

EXPLOSION VENTING

The UBC, UFC, NFPA 30 and OSHA all contain some requirement for explosion venting where flammable vapors, dusts or gases are stored or in some cases dispensed. UBC, Chapter 9, in referring to flammable dusts, requires explosion venting for dust collection or storage containers at the rate of 1 sq. ft. for each 80 cu. ft. of volume. This requirement does not apply to Chem-Stor Lockers specifically but is one of the few code sections which provides definite figures with which to work. UFC, Chapter 9, referring to "rooms used for **dispensing Class 1 B** liquids and "rooms used for **storing and dispensing Class 1 A** liquids shall have roofs or walls designed to relieve internal explosion pressures." The UFC for "inside use, dispensing and mixing rooms" requires "adequate explosion venting be provided in accordance with the approved design." OSHA and NFPA 30 have the same basic requirements.

NFPA 30, Chapter (4) on container and portable tank storage in 4-4.1.8 says that where dispensing is done compliance with Chapter 5 on industrial plants is required. Section 5-3.6 in turn says the storage handling and transfer of liquids shall comply with Chapter 8. Section 8-3.4.1 says that "Areas where Class 1 A or unstable liquids are processed shall have explosion venting through one or more following methods: (a) open air construction; (b) lightweight walls and roof; (c) lightweight wall panels and roof hatches; (d) windows of explosion-venting type." Section 8-3.4.1 then refers to NFPA 68 Guide for Explosion Venting. OSHA 1910.106 (h) (3) iv repeats the NFPA 30 process but makes no reference to NFPA 68. OSHA 1910.103 (3) (ii) (c) and NFPA 50A require explosion venting for "gaseous hydrogen systems in separate buildings at the rate of 1 ft.^{2} for each 30 ft.^{3} of room volume.

Chem-Stor Lockers comply with the intent of the codes by providing explosion relief in the form of an 11.6 ft.^{2} hinged roof cap constructed of 16-gauge metal. Internal volume of the largest locker is nominally 450 ft.^{3} (6' × 10' × 7.5'); this places the vent area to room volume ratio at 450 ÷ 11.6 = 38.8. Additional open ventilation totaling 5 ft.^{2} is located over the door and in the end panels at the roof line.

The purpose of explosion venting is to relieve internal pressures in the event of rapid combustion or deflagration in an enclosure so as to limit structural damage. The most common method is the so-called weak roof design; however, Chem-Stor's hinged cap design provides more functional certainty because it can be operated from time to time and it is not as likely to become a missile as would weakly-attached or lightweight roof panels.

FIRE PROTECTION

Portable fire extinguishers suitable for the type hazard will in all cases be required. Most jursidictions reference NFPA 10 or UFC Standard 10-1 for the selection and installation of portable fire extinguishers.

ABC 3802 (f) requires automatic fire extinguishing systems in buildings classed as H-1 occupancies (storing/handling hazardous **and** highly flammable or explosive materials other than Class I, II or IIIA liquids) and exceeding 1500 ft.^{2} in area; H-2 occupancies (storing/handling Class I, II or IIIA liquids) and exceeding 1500 ft.^{2} in area.

UFC 10.308 (f) requires automatic fire extinguishing systems as in UBC 3802 (f) but further includes rooms of apparently any size in H-2 occupancies of the quantities set forth in UCB Table 9-A or any combination of flammable liquids exceeding 240 gallons.

NFPA 30 4-4.1.4 and OSHA 1910.106 (d) (4) (ii) when referring to "inside storage rooms" do not specifically require automatic fire extinguishing systems but further limit quantities of storage when such protection is not provided.

It should be noted that the above-referenced regulations all require automatic systems which could be sprinklers, water spray, CO_2, dry chemical, halon or other approved systems.

UFC 79.202 and 203, however, specifically calls for automatic fire sprinkler systems in "liquid storage rooms" and "inside liquid storage rooms."

To really understand the implication of this discussion, consider that the difference between an "inside liquid storage room" and a "liquid storage room" is that the inside room has no exterior wall, but both are referred to as a room. The same general definitions apply to an "inside use, dispensing and mixing room." Reference UFC 79.102 (b) and 79.804.

The code requirements are obviously intended to protect other areas within a building exposed to liquid storage use, handling, mixing, etc. within the same building.

It would appear that some jurisdictions may classify the Chem-Stor Locker as a room and require that an automatic fire extinguishing system be installed. For that reason, Chem-Stor can provide an optional factory-installed U.L. listed dry chemical system.

The Chem-Stor Locker may also be classified as an H-1 or H-2 occupancy in accordance with the quantities and type of materials stored, in which case special consideration must be given to location in relation to property lines and other buildings on the same property.

SPECIFICATIONS

MATERIALS

- Sheet Steel/12-, 14-, & 16-Gauge—ASTM 569
- Structural Steel—ASTM/A-36
- Tubing—ASTM A500
- Welding Wire—Class ER70S-3, Spec. AWS A5 18-79
- Painting Interior & Exterior—Two-part high solids epoxy
- Chemical Resistance Tests—Spot resistance after 48 hrs. of contact
  Organic Acids: Acetic (5% & 50%). Oleic—no change. Lactic—slight softening after 48 hrs.
  Mineral Acids: Hydrochloric (5%), Sulfuric (5% & 25%), Phosphoric (10%)—no change
  Oxidizing Agents: Nitric Acid (5%), Hydrogen Peroxide (30%)—no change. Household Bleach (6% hydrochlorite solution). Saturated chlorine water. Chromic Acid (20%)—may cause some discoloration after 24–48 hours.
  Alkali Solutions: Ammonium Hydroxide (30%), Sodium Hydroxide (5% & 50%)—no change.
  Solvents: Mineral Spirits, Xylol, Ethyl Alcohol, Trichloroethylene, Methyl Ethyl Ketone, Skydrol 500, Premium Gasoline—no change.
  Salt Solutions: Sodium Chloride (5% & 30%), Copper Chloride (20%)—no change.
  Water: Fresh Tap Water, Sea Water, Deionized Water—no change.
  Grease & Oils: Mineral Oil, Sour Crude Oil, Vegetable Oil—no change.
  Miscellaneous: Laundry Detergent (5%), Formaldehyde (37%), Styrene, Saturated Sugar—no change. Saturated Phenol—slight discoloration and softening.
- **Physical Tests**
  Abrasion: Tabor, 17CS Wheel, 1000 gm. Load 200 rev. Weight Loss: 20.7 mg.
  Humidity: Federal Test 141A, Method 6201—no change after 200 hours.
  Salt Spray: ASTM B-117—64 & Federal Test 141A, Method 6061—1/16" creepage after 1000 hours.
  Fresh Water Immersion: 80°F—no change after 3000 hours.
  Fire Retardance: ASTM E-84-70—Flame Spread 3, Fuel Contribution 0, Smoke Density 14.
  Hardness: Pencil—fully cured film—2H
  Dielectric Strength: ASTM D-149-59—Primer 5251/5252—800 Volts, Lt. Gray 5243/5242—1600 Volts, White 5240/5242—2000 Volts.
- **Sump Epoxy Coating**
  —Corps of Engineering C-200, SSPC 16-68T and Military P-23236
  —Chemical Resistance Tests: Excellent resistance (after 24 months immersion at 77°F) to 10% hydrochloric acid, 10% sulfuric acid, 10% sodium hydroxide, 5% commercial bleach (hypochlorite type) and hydrogen sulfide water.
- **Physical Tests:**
  —Flexibility: Conical Mandrel—No cracks after 7-day cure (Fed. Test 141a, Method 6222)
  —Impact: Passes 60" pounds (ASTM D-256)
  —Salt Spray: (5% Sol)—1/32" creepage at 400 hrs. (ASTM C 116-64 and Fed. 141a, Method 6061)
  —Humidity: 800 hours—no change (Fed. Test 141a, Method 6201)
  —Fresh Water Immersion: 800 hours—no change (ASTM D-570-63)
  —Salt Water Immersion: 800 hours—no change (Fed. Test 141a, Method 6011)

STRUCTURAL

- Floor Pan and End Panels are 12-gauge sheet
- Explosion Cap is 16-gauge sheet
- All other sheet steel is 14-gauge
- Roof Loading = 23 lbs/ft²
- Floor Loading = 300 lbs/ft²
- Roof vents have security bars to prevent unauthorized entry and bird screens
- Forced air ventilation provides 20 air changes per hour (code requires 6 changes per hour)
- Optional Dry Chemical fire system is installed at factory
  —inspected, armed and certified by licensed technicians at customer's site. This service is included in price for locations within 70 mile radius of factory.
  —Some municipalities will require a "dump test" of the fire system. There is an additional charge of $150.00 for this service.
  —The system can be provided with a 120 Volt local alarm.
  —Additional contacts (dry) can be used for remote alarm.
- If any one (or all) of the electrical options is required, light, fan or alarm bell, the customer must supply a 120 Volt, 15 Amp circuit to the locker.
- If Hoist Option is installed, locker must be securely anchored to pad.

	Outside Dimensions			Inside Dimensions			Weight Lbs.	Doorway	Minimum Reservoir In Gallons	Explosion Vent	Air Vent
	Length	Width	Height	Length	Width	Height					
A	10'0"	6'0"	8'10"	9'9¾"	5'8"	6'10"	2798	4'2" × 6'4"	126	11.6 sq. ft.	200 sq. in.
B	10'0"	6'0"	8'10"	9'9¾"	5'8"	6'10"	2798	4'2" × 6'4"	126.4	11.6 sq. ft.	200 sq. in.
C	5'0"	6'0"	8'10"	4'8¾"	5'8"	6'9"	1822	4'2" × 6'4"	83.4	5.8 sq. ft.	102 sq. in.
D	10'0"	6'0"	8'10"	9'9¾"	5'8"	6'10"	2798	8'4" × 6'4"	126.4	11.6 sq. ft.	200 sq. in.
E	51"	50"	15¼"				479		86.0		
F	4'11"	4'4"	7'11"	4'8½"	4'⅜"		1203	4'2" × 6'4"	85.0	1.54 sq. ft.	254 sq. in.
H	4'11"	4'4"	7'11"	4'⅜"	4'3½"		1089	4'2" × 6'4"	83.0	28.7 sq. ft.	4029 sq. in.

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Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

September 26, 1988 PMM-WEK-549

^F1^

Gentlemen:

WESTINGHOUSE HANFORD COMPANY REQUEST FOR PROPOSAL W638457-FJ

This is to clarify specification requirements. The dimensions of the container are 10 feet high x 24 feet long x 8 feet wide. The required door size is approximately 4 feet, 5 inches wide. The unit will be explosion proof, and there are no shelves or partitions inside. Wiring and air inlet venting system is per NFPA codes referenced.

For questions, contact B. F. (Bev) Johnston, (509) 376-5151.

Very truly yours,

B. F. Johnston

B. F. Johnston, Sr. Buyer (G1-61)
Reactor Equipment Fuels & Projects Procurement

pjd

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Westinghouse Hanford Company

PURCHASE REQUISITION

DATE 7/25/88 PAGE 1 of 2

BUYER		PRI RATE	VENDOR CODE	ZIP CODE
	638457	DO-E		

SHIP TO
1. Westinghouse Hanford Co.
2401 Stevens Dr.
Richland, WA 99352
2. Other

VENDOR TELEPHONE

F.O.B. DELIVERY PROMISE	THIS ORDER PLACED VERBALLY ON WITH	CONF. ☐ YES	EMER ☐ YES	PROPOSAL DUE DATE

F.O.B. ☐ ☐ RICHLAND, WASHINGTON	CODE	SHIP VIA	☐ PREPAID ☐ COLLECT	PROPERTY REVIEW TAGGING REQUIRED YES ☐ SENSITIVE YES ☐

TERMS OF PAYMENT	PURCHASING CLAUSES	COMMENTS
SHIPPING POINT		

DESTINATION DELIVERY DATE	PREMIUM TRANSPORTATION AUTH'D	HAZARDOUS ☐ YES ☐ NO	IF REQUISITION ALTERATION PROVIDE ORIGINAL REQ. NO.
9-30-88 X MANDATORY ☐ DESIRED			

AUTHOR	MSIN	AREA	PHONE
DS Kelly	R3-38	200E	3-3279

TECHNICAL QUESTIONS CONTACT	MSIN	AREA	PHONE
same as above			

DELIVER TO	BLDG.	ROOM	AREA	PHONE
DS Kelly	272WA/200W			3-3279

ITEM	CO ID	COST CENTER	MC	COST ELEMENT	CHARGE CODE	% OF COST	COST ESTIMATE
1	W	24320		100		100	=

PROGRAM CODE | TOTAL ESTIMATED COST:

ITEM NO.	QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE	DEL. DATE
1	3		Container, outdoor storage, designed to meet or exceed the requirements of NFPA 30, NFPA 70, and the uniform building code for the storing and dispensing of Class 1B flamable liquids, with the following specifications:			
			- 10' x 24' x 8' approximate exterior dimensions.			
			- Internal chemical resistance epoxy coating.			
			- Internal spill containment capacity - minimum 10% of the aggregate volume of the maximum storage capacity of the storage container.			
			- Lift out floor panel(s) to provide visual inspection of the secondary containment.			
			- Explosion venting capability.			
			- Air inlet vent system.			
			- Two or three doors with lock sets on same wall.			
			(Continued on Next Page)			

INPUT - PIDS

CONTACT QA FOR ASSISTANCE IN COMPLETING THE BLOCKS BELOW

SEP 08 1988

IMPACT LEVEL	APPLICABLE QA CLAUSES
III	C02, E32

RECEIVED PROCESSED BY

END USE: 200W Class 1B RMW Storage Bldgs.

SEP 1 1988

QA APPROVED SUPPLIER REQ'D ☐ YES X NO

SURVEYED TO

QA REVIEW OF PROPOSAL ☐ YES X NO

ACCTS ASSIGNMENT

REQUISITION APPROVED BY	Date	Bldg	Area	MSIN	Phone
DS Kelly		2752E/200E/R3-38		3-3279	
DR Lucas		2752E/200E/R3-43		3-4667	
Stuart Pluskite		2752/200E/R3-51		3-3536	
FIRE PROTN. ENGR.					
QA ENGINEER	Date	Bldg	Area	MSIN	Phone
Donna Turmo	8-25-88	81-54		3-5222	
FINANCIAL CONTROL	Date	COST APPROVAL		Date	

SOURCE INSP. REQ'D ☐ YES X NO PLAN PREPARED BY	RECEIPT INSP. REQ'D X YES ☐ NO PLAN PREPARED BY D. J. Turmo	RECEIPT INSP. LOCATION BLDG. 1166 Bldg. PHONE:	Buyer's Signature	Date

7600-001 (8-87)

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CONTINUATION SHEET

PURCHASE REQUISITION

REQUISITION NO.	VENDOR	VENDOR NO.	PURCHASE ORDER NO.	PAGE
638457				2 of 2

ITEM NO	QUANTITY	U/M	DESCRIPTION	U/P	T/P	DEL. DATE	RECEIVED
			- Bidders shall submit sufficient information on a proposal to allow an engineering review prior to award.				
			- Suggested Sources:				
			Chem-Stor Model L Storage Locker A3 Chem-Stor 716 NW 15th Corvallis, OR 97330 (509) 758-7321				
			Hazardous-Stor 8820 Storage Unit A3 Rice Safety Equipment Company 5516 Fourth Ave. South Seattle, WA 98108 (206) 767-5600 ATTN: Stan Luce				
			Chem Stor Model L Storage Locker A3 General Facility and Safety Supply P. O. Box 360883 Milpitas, CA 95035 (409) 946-5364				
			Guardian Storage Units P. O. Box 643 Osburn, ID 83849 (208) 786-0751				
			Per telecon on 9/23/88 DAVE Kelly of WHC Dimensions given - 8' is width size. Dock approximately 4' 5" width required				

RECEIVED FROM	SHIPPED VIA	SHIPPING POINT

FRT. BILL NO.	FRT. BILL WEIGHT	DATE RECEIVED	DATE SHIPPED	PCS. FRT. BILL	DAMAGE REPORT	O&S RP

FRT. CHARGES	COLLECT	PPD.	CAR INITIAL AND NO.	ABOVE MATERIAL RECEIVED BY	RECEIPT FOR MATERIAL & DATE	PIECES

ITEM	CO ID	COST CENTER	FORE CODE	ACCOUNT CLASS	W/O VEHICLE SUPPORT CODE	% OF COST	AUTHOR	BLDG-ROOM	AREA	PACKING SL YES NO
							D. S. Kelly	2752E/B107	200E	
							CO-AUTHOR			Q AND Q YES NO
1	W	24320					DELIVER TO Same as above	272WA	200W	WRITE-UP DATE

54-3000-282 (7-87)

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APPENDIX 4A-10

SPECIFICATION FOR TWO EACH FLAMMABLE STORAGE MODULES 7 AND 8 (RDV-EXV-552432 SAFETY STORAGE INC., MFGR.)

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54-9600-161 (07-87)

PURCHASE ORDER

Westinghouse Hanford Company

Westinghouse Hanford Company
A subsidiary of Westinghouse Electric Corporation
P. O. Box 1970 Richland, Wa. 99352

.A.B. U4C001 Telephone 509/ 376-6949

U.S. Government Contract No. DE-AC06-87RL10930

Mo.	Day	Yr.	Page	Inquiry No.	This order is priority rated	Certified Under D.P.A.S. Reg. (15CFR350)	Vendor Code	Order No.
3	25	87	1	W-552432	DO-E 2		50498	RDV-EXV-552432

SAFETY STORAGE INC

18900 STEVENS CREEK BLVD
CUPERTINO CA 95014

IMPORTANT
Show purchase Order No. on all packages, invoices, and correspondence. Complete packing list must accompany each shipment. Failure to properly identify will delay receipt of shipment and payment.

SHIP TO: 1. Westinghouse Hanford Company
Central Receiving
2401 Stevens Drive
Richland, Washington 99352
2. As indicated below

.B.	Date Delivery Required at F.O.B. Point	Buyer
RIO VISTA, CA	10-16-87	D. J. VANCE

ms of Payment	Code	Ship Via
% 10 DAYS	35	SEE BELOW

M	QUANTITY	U/M	Description	Unit Price	Total Price
			Confirming order if checked ☐		
			SHIP VIA: NATION WIDE DISTRIBUTORS - FREIGHT COLLECT		
			NOTE: CONTACT WHC'S TRAFFIC DEPARTMENT MS. ZONA RHOADES AT 509-376-7492 FIVE (5) DAYS PRIOR TO SHIPMENT TO NECESSARY SHIPPING ARRANGEMENTS CAN BE MADE.		
	1	EA	CONTAINER, SAFETY STORAGE, CHEMICAL PER THE FOLLOWING SPECIFICATIONS: A. OUTSIDE DIMENSIONS 8' X 8' X 22' B. INTERNAL CHEMICAL RESISTANT EPOXY COATING C. INTERNAL SPILL CONTAINMENT CAPACITY: 500 GALLONS D. THREE DOORS WITH SAFETY LOCKS E. PRESSURE RELIEF ROOF F. STATIC GROUNDING CONNECTION G. FIRE SPRINKLER SYSTEM WITH THREE SPRINKLER HEADS H. FIRE DEPARTMENT HOOKUP (2 1/2 NHT FITTINGS) I. EXPLOSION PROOF WIRING SYSTEM J. ONE EXPLOSION PROOF VENTILATION SYSTEM (1260 CFM)		

Westinghouse Hanford Company

Signature M. L. Taylor Date 9/25

Item	C Center	MC	C Elem.	Chrg. Code	%	Author	MISN	Area	APPROVAL
01-001TH	52500		110	2NMTP	100	BA SPRACKLEN	1407N	100N	
						Co-Author GR COX	MISN 105N	Area 100N	
						Deliver To GR COX 2	Bldg./Room 1723N	Area 100N	

PURCHASING NUMERICAL FILE

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54-9600-161 (07-87)

PURCHASE ORDER

Westinghouse Hanford Company

Westinghouse Hanford Company
A subsidiary of Westinghouse Electric Corporation
P. O. Box 1970 Richland, Wa. 99352

.A.B. U4C004 Telephone 509/ 376-6919

U.S. Government Contract No. DE-AC06-87RL10930

Mo.	Day	Yr.	Page	Inquiry No.	This order is priority rated	Certified Under D.P.A.S. Reg. (15CFR350)	Vendor Code	Order No.
8	25	87	2	W-552432	DO-E 2		50198	RDV-EXV-552432

SAFETY STORAGE INC

IMPORTANT
Show purchase Order No. on all packages, invoices, and correspondence. Complete packing list must accompany each shipment. Failure to properly identify will delay receipt of shipment and payment.

SHIP TO: 1. Westinghouse Hanford Company
Central Receiving
2401 Stevens Drive
Richland, Washington 99352
2. As indicated below

B.	Date Delivery Required at F.O.B. Point	Buyer

ms of Payment	Code	Ship Via

Item	QUANTITY	U/M	Description	Unit Price	Total Price
			Confirming order if checked ☐		
			K. THREE EXPLOSION PROOF LIGHTS L. ONE PERMANENT EMERGENCY EYE/FACEWASH M. ONE FIBERGLASS FLOOR GRATING (COMP) (GRAY) N. POLYPROPYLENE INSERT (SUMP LINER)		
			TOTAL VALUE OF THIS ORDER		

Westinghouse Hanford Company

Signature 8/28/87 Date

Item	C Center	MC	C Elem.	Chrg. Code	%	Author	MISN	Area	APPROVAL
01-001TH	52500		110	2NMTF	100	RA SPRACKLEN	1407N	100N	
						Co-Author GR COX	MISN 105N	Area 100N	
						Deliver To GR COX 2	Bldg./Room 1723N	Area 100N	

PURCHASING NUMERICAL FILE

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SECTION "A" AWARDS

AWARD NOTIFICATION

THE SELLER IS HEREBY NOTIFIED THAT EFFECTIVE THE DATE OF THIS DOCUMENT, THE SELLER IS AWARDED A FIRM FIXED PRICE PURCHASE ORDER FOR THE DELIVERY/PERFORMANCE OF THE ITEM(S) SET FORTH ABOVE IN ACCORDANCE WITH ALL THE REQUIREMENTS AND CONDITIONS SET FORTH OR BY REFERENCE ATTACHED HEREIN.

SMALL BUSINESS SET ASIDE ORDER

THIS ORDER IS THE RESULT OF A SMALL BUSINESS SET ASIDE SOLICITATION. ALL EFFORTS UNDER THIS ORDER ARE TO BE PERFORMED OR ACCOMPLISHED BY A SMALL BUSINESS.

SECTION "D" TRANSPORTATION

TRANSPORTATION CHARGES - COLLECT

THE SELLER SHALL SHIP THE ORDER ITEM(S) TO WHC ON A COLLECT BASIS. WHC SHALL PAY THE CARRIER FOR ALL FREIGHT CHARGES. THE SELLER IS CAUTIONED TO ENSURE THAT FREIGHT ARRANGEMENTS ARE COORDINATED WITH WHC TRAFFIC AND ALL FREIGHT INSTRUCTIONS ARE FULLY COMPLIED WITH. ORIGINAL BILL OF LADING IS TO BE SUBMITTED TO WHC WITH INVOICE. THE SELLER BEARS ALL RESPONSIBILITY FOR DAMAGE OR LOSS UNTIL DELIVERY IS MADE TO THE FOB POINT SPECIFIED HEREIN.

TRANSPORTATION INSTRUCTIONS

THE TRANSPORTATION INSTRUCTIONS SET FORTH IN PMM-47-001 (7/87) SHALL APPLY TO THIS PURCHASE ORDER.

DOCUMENTATION - GENERAL

POOR COPY RECEIVED

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SELLER SHALL SUBMIT AN ORIGINAL AND TWO COPIES OF ALL DOCUMENTATION REQUIRED BY THIS PURCHASE ORDER TO:

WESTINGHOUSE HANFORD COMPANY
P.O. BOX 1970
RICHLAND, WA 99352
PURCHASING DEPARTMENT
ATTENTION: DARLA VANCE, 3200 GWW/G9-L21

SECTION "G" ORDER ADMINISTRATION

AUTHORIZED PERSONNEL

ONLY THE FOLLOWING NAMED INDIVIDUALS ARE AUTHORIZED TO MAKE CHANGES TO THIS DOCUMENT:
DARLA VANCE BUYER, PURCHASING; MIKE TAYLOR SECTION MANAGER, PURCHASING; JOE SMITH, JR SECTION MANAGER, PURCHASING.

SECTION "I" TERMS AND CONDITIONS

THE TERMS AND CONDITIONS SET FORTH OR REFERENCED IN THE BODY OF THIS DOCUMENT BY WHC SHALL APPLY AND WHC OBJECTS TO AND SHALL NOT BE BOUND BY ANY ADDITIONAL OR DIFFERENT TERMS AND CONDITIONS.

GSA DELIVERY ORDER

THIS DELIVERY ORDER IS PLACED ON BEHALF OF THE DEPARTMENT OF ENERGY, RICHLAND OPERATIONS OFFICE, RICHLAND, WASHINGTON, IN FURTHERANCE OF U.S. GOVERNMENT CONTRACT DE-AC06-87RL10930, PURSUANT TO WRITTEN AUTHORIZATION THEREIN. A WRITTEN CONFIRMATION TO THIS AUTHORIZATION WILL BE FURNISHED ON REQUEST. THE TERMS AND CONDITIONS OF THIS ORDER ARE THOSE OF GSA FEDERAL SUPPLY SCHEDULE CONTRACT, NUMBER GS-00F-87550.

POOR COPY RECEIVED

GSA CONTRACT TERM

IT IS RECOGNIZED THAT THE TERM OF THIS DELIVERY ORDER

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2/26/87

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INCLUDE THE TERM OF THE CURRENT GSA CONTRACT. HOWEVER IT IS BUYER'S DESIRE TO MAINTAIN CONTINUITY OF SERVICES REQUESTED THROUGH THE TERM OF THIS ORDER. THEREFORE, IF A NEW CONTRACT FOR FY 1988 IS ESTABLISHED BETWEEN GSA AND SELLER, SELLER SHALL SUBMIT A COPY OF THE NEW CONTRACT TOGETHER WITH A LETTER WHICH LISTS THOSE CHANGES FROM THE FY87 CONTRACT FOR BUYER REVIEW AND ACCEPTANCE. SUCH ACCEPTANCE SHALL BE BY MODIFICATION TO THE ORDER. IN THE EVENT THAT BUYER IS NOT ADVISED OF A NEW GSA CONTRACT, ALL TERMS & CONDITIONS INCLUDING PRICING OF THIS ORDER SHALL REMAIN IN FULL FORCE AND EFFECT.

OUR LETTER DATED JULY 1, 1987 AUTHORIZING PROCUREMENT FROM GOVERNMENT SOURCES OF SUPPLY PER REDSTRIP ACTIVITY CODE NO. 890534 IS ATTACHED.

SECTION "J" LIST OF ATTACHMENTS

LIST OF ATTACHMENTS

THE FOLLOWING ATTACHMENTS ARE PROVIDED WITH THIS PURCHASE ORDER, (PO), AND SHALL HAVE THE SAME EFFECT AS IF SET FORTH IN THE BODY OF THE PO:

PMM-47-001 (7/87)
PMM-45.1-007 (7/87)
PROCUREMENT FROM GOVERNMENT SOURCES OF SUPPLY LETTER DATED 7-1-87
SAFETY STORAGE MODEL 22 SKETCH

SECTION "K" SIGNATURES

POOR COPY RECEIVED

SELLER ACKNOWLEDGEMENT

SELLER SHALL ACKNOWLEDGE THIS DOCUMENT AS PROVIDED HEREIN REGARDLESS OF DOLLAR VALUE BY SIGNING AND RETURNING THE ENCLOSED SELLER ACKNOWLEDGEMENT COPY OF THIS DOCUMENT.

REPRESENTATIONS AND CERTIFICATIONS

7/26/87

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CONTINUATION

Westinghouse Hanford Company

Richland, Wa. 99352

PAGE	NUMBER
6	RDU-PMU-552437

OFFEROR IS HEREBY REQUESTED TO COMPLETE REPRESENTATIONS AND CERTIFICATIONS, FORM PRM 15.1-007 (7/87) AND RETURN COPY WITH THE SELLER'S ACKNOWLEDGEMENT.

9212350176 4

8/26/87

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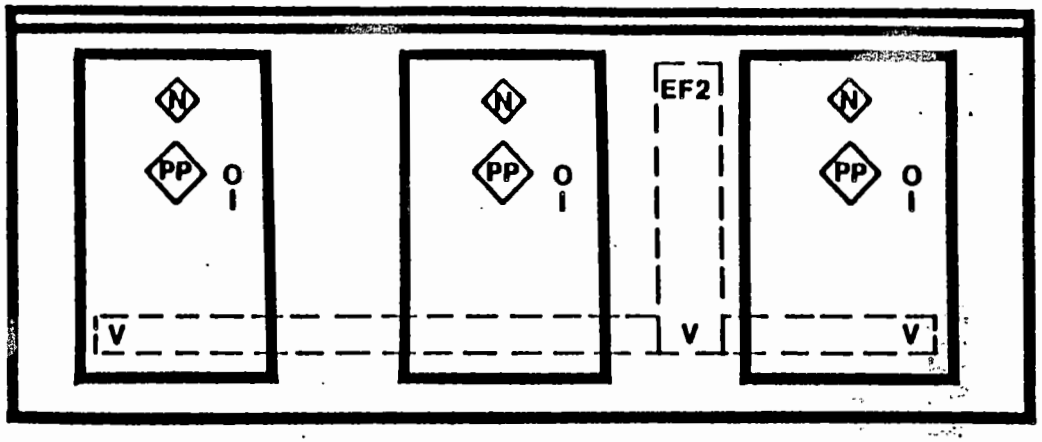
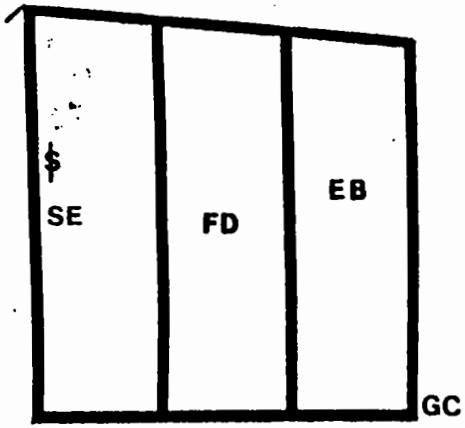
SAFETY STORAGE MODEL 22



FRONT VIEW



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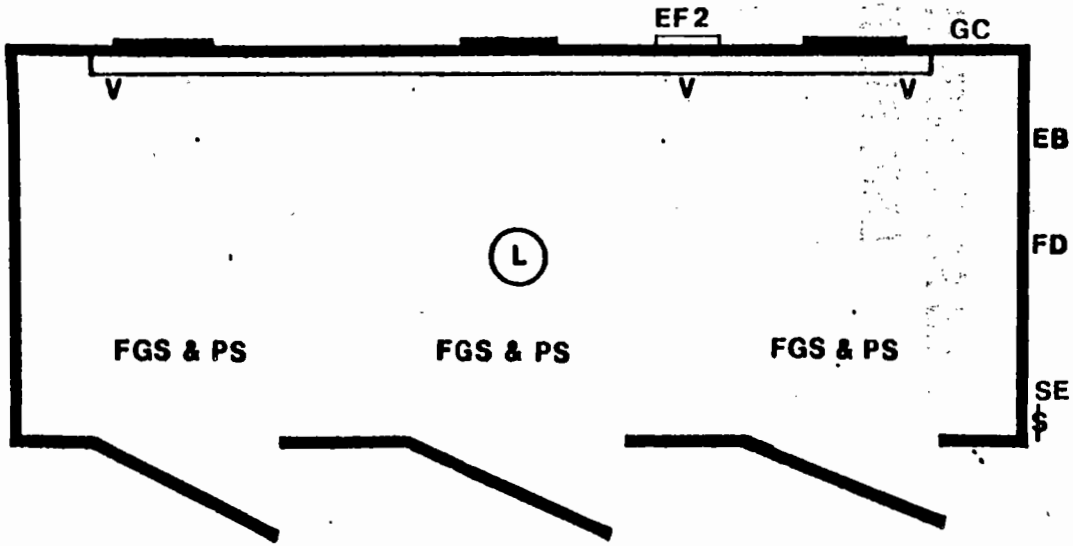

TOP VIEW

KEY

A:	Alarm	LL:	Liquid Level Detector
DC:	Dry Chemical System	M:	Metal Separation Wall
EB:	Electrical Breaker Box	N:	NFC 704M Rating Sign
EF1:	Exhaust Fan (12")	PE:	Padeye
EF2:	Exhaust Fan (16")	PP:	Permanent D.O.T. Placard
FD:	Fire Department Hookup	PS:	Polypropylene Sump Liner
FGC:	Fiberglass Floor Grating-Corrosives	PW:	Plywood Floor
FGS:	Fiberglass Floor Grating-Standard	S:	Shelf
FW:	2-Hour Fire Wall	SE:	Eye/Face Wash Fixture
GC:	Static Grounding Connection	SH:	Sprinkler Head
HD:	Holdown Assembly	$:	Lightswitch
IVM:	Inlet Vent Mechanism	TC:	Temperature Control
L:	Explosion-Proof Light	V:	Vent
		W:	Water Line Hookup
		T:	Thermostat

NOTES: Model 22 with the following options:

* Explosion-proof ventilation system-1260 CFM
* Explosion-proof light
* Fire department hookup
* Explosion-relief construction
* Fiberglass floor grating
* Polypropylene sump liner
* Eye/face wash fixture

JOB NO:

SHIP TO: Westinghouse Hanford Co.

Richland, WA 99352

PHONE: 509-376-6919

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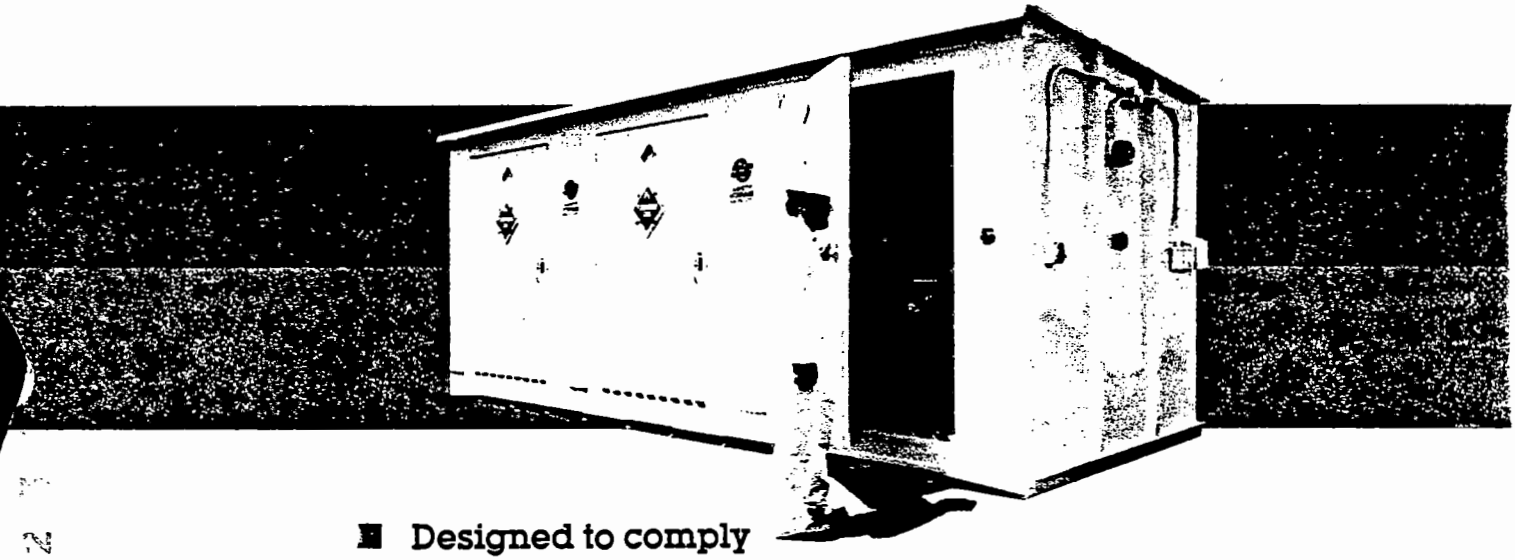
13145/SAF
BuyLine 5195

Safety Storage Containers

for packaged chemicals and hazardous materials



- Designed to comply with regulatory standards for storing hazardous materials
- Factory-built to user requirements
- Four model sizes
- Readily available
- Relocatable

SAFETY STORAGE, INC.
18900 Stevens Creek Blvd.
Cupertino, CA 95014
408/252-2750
1-800/621-0854 Ext. 926

Safety Storage
Spill Containment, Fire Protection, Security

Safety Storage chemical and hazardous material containers are readily available for delivery throughout the United States. Four different size models can be used immediately upon delivery. They are turnkey units which require a minimum of site preparation. These high-quality units meet government standards and regulations for hazardous-materials storage. You can gain in many ways when you order:

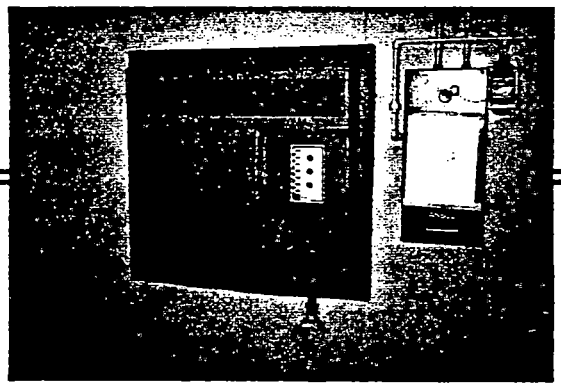
- More economical than comparable block or concrete structures.
- Can be tailored to fit your requirements.
- Avoid costly delays characteristic of on-site construction.
- Combine spill containment, security, fire protection and worker safety.
- Can be relocated on- or off-site.
- You pay only for the features you need.

Safety Storage container construction

Safety Storage containers are made of welded 10- and 12-gauge steel with supporting structural steel sections. Four models are available, the largest of which is the Model 22 with outside dimensions of 22'8" x 9' x 8'7". Three doors, each with three-point locking systems, provide access and security. The 500-gallon secondary spill-containment reservoir, the walls and the ceiling, all are covered with two coats of chemical-resistant epoxy. Maximum storage capacity is 10 tons of chemicals and hazardous materials (drums, boxes and cans). For example, thirty 55-gallon drums can be by conveniently accommodated. Loading can be by forklift or by hand. Standard floors are 1⅛" thick, epoxy-coated, fire-resistant plywood.

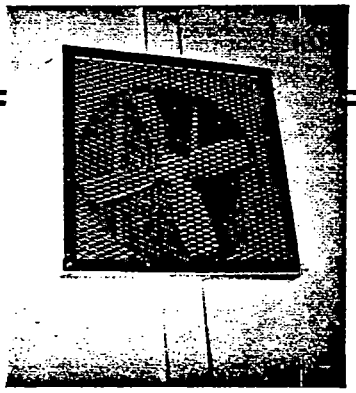
Safety features in this carefully engineered unit include a spill-containment sub-floor to prevent escape of hazardous liquids or solids. It is constructed of continuously welded 10-gauge steel which is epoxy coated to resist chemical attack. Blow-out panels are provided for pressure relief under explosive conditions. A static grounding connection helps to protect flammable materials from ignition by electrical discharge. And fire protection is supplied by three water sprinkler heads with a 2" NPT fitting located outside the container for sprinkler system hookup.

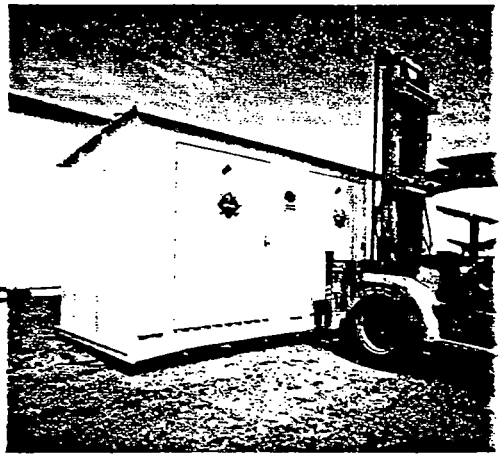
Permanent placards and NFC 704M rating signs are provided for flammable materials, corrosives, oxidizers, poisons and other hazardous materials stored within.



Optional temperature-control system for temperature-sensitive chemicals.

Non-sparking exhaust fan and protective aluminum shield (shown without louvered cover).





Forklift moving a Safety Storage chemical container to a new location.

Equipped to meet your needs

Optional features are determined by your specific storage requirements. For example: If you are going to store flammable liquids, we offer a dry chemical system to supplement or replace the standard sprinkler system. If you plan to store incompatible materials, we can install suitable separation walls. And, if you require shelf space for small containers, we can provide sturdy, epoxy-coated shelves of 15¼" depth.

Corrosives?...We offer a polypropylene spill-containment reservoir liner and fiberglass floor grating for additional protection. Do you want to monitor liquid spills continuously? Another option is a liquid-level detector that can either tie into your plant security system or an exterior audible alarm.

Worker safety?...We have selected only UL-approved equipment for lighting and explosion-proof electrical wiring systems—which also meet NEC, NFPA and NEMA requirements. The forced ventilation system is designed to provide one air change per minute and is powered by a Class I, Division I, totally enclosed explosion-proof motor. The fan has non-static aluminum blades, and the ductwork is epoxy-coated steel.

Safety Storage containers can be equipped with heating/cooling units to provide a moderated environment for stored chemicals. Double-wall insulated construction is also available.

Emergency eye/face wash units are still other worker-safety options.

How you can benefit from installing Safety Storage containers

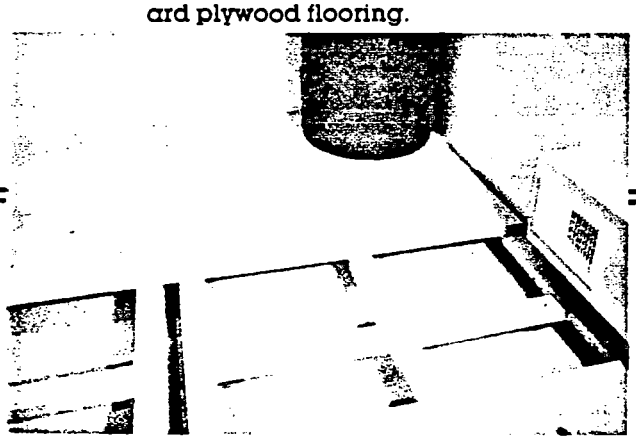
Regardless of how you equip your new Safety Storage chemical containers, you benefit in many ways:

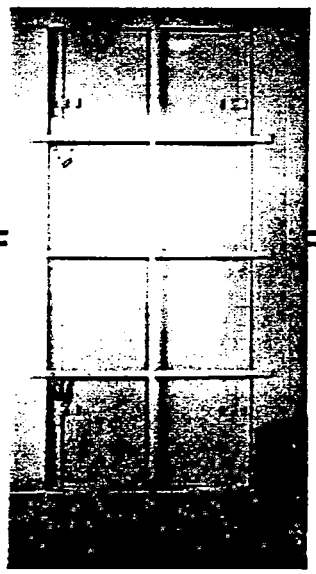
Spill containment. Soil and ground-water pollution from chemical leaks is of major concern throughout industry. Your company's possibility of liability can be reduced by using easily monitored Safety Storage containers with secondary containment for leaks and spills. We believe you will find them to be a safe, efficient solution to this potential environmental problem.

Fire protection. The risk of fire and/or explosion is always present when storing hazardous and flammable materials. Safety Storage design engineers have incorporated suggestions and recommendations from fire-protection specialists across the country to meet or exceed design and regulatory standards.

Security. Accountability and security are closely linked. It is essential in today's business climate to be

Spill-containment reservoir shown below standard plywood flooring.





Standard explosion vent panel is designed to relieve interior pressure.

A typical Model 22 plant-site installation.

Patent Pending. Copyright 1986. Safety Storage, Inc. All rights reserved.

able to document and account for the receipt, storage, handling, use and disposal of chemicals and hazardous materials. This includes tight control over access to Safety Storage containers with their three-point locking doors. Security is another Safety Storage cornerstone.

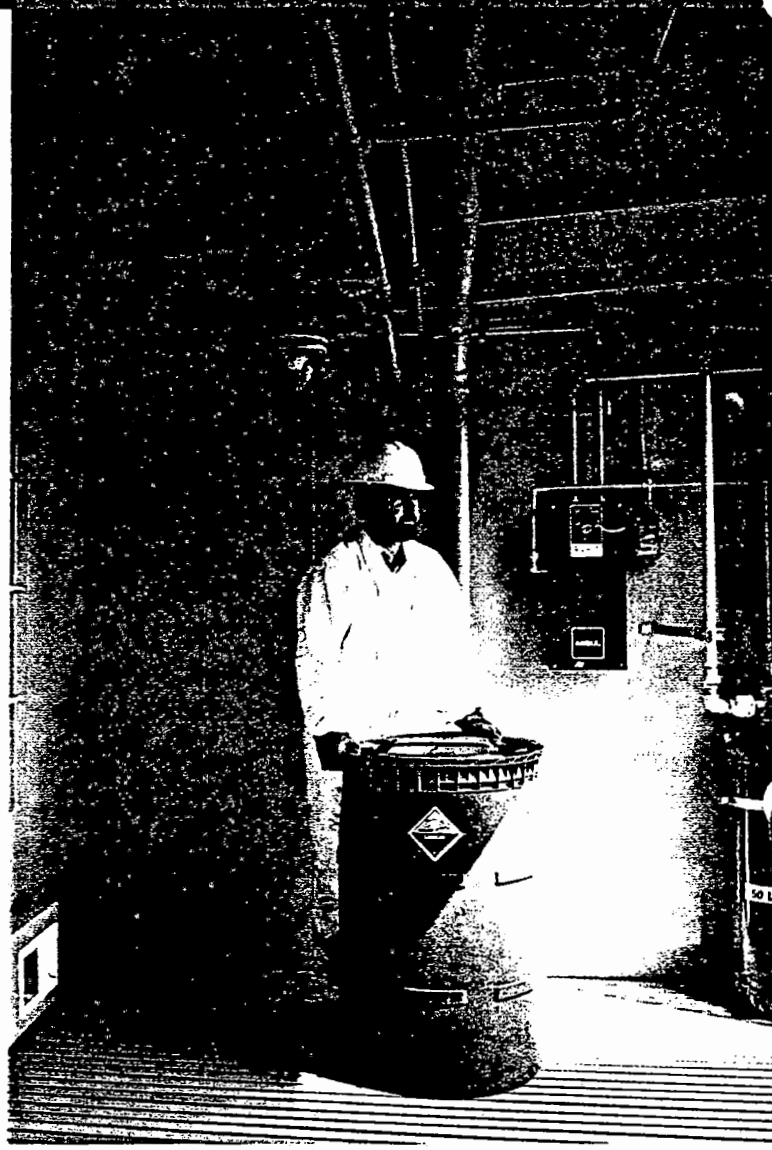
Worker safety. You can be assured that every effort has been made in the design and manufacture of these chemical storage containers to protect the safety of personnel. Safety features include warning placards, static grounding, alarms, security locks, fire and explosion protection, emergency washing facilities, ventilation, temperature control, exterior switches and sprinkler system hook-ups.

Ordering information

Features for containers manufactured by Safety Storage, Inc., can vary widely for each individual application. Therefore, design specifications are custom written to fit each model and usage. In addition, a leasing option is available to help serve your chemical-storage needs now, while conserving your capital.

Safety Storage Sales Representatives

Safety Storage sales representatives, located in most U.S. industrial communities, are trained to help you attain your safe chemical storage objectives. They will assess your chemical storage needs, prepare detailed storage-unit sketches and specifications, and provide written price quotations. Our manufacturing plants are strategically located to reduce delivery costs and shorten delivery times.



Models and basic statistics

Model	Outside Dimensions			Inside Dimensions			Weight (Lbs.)	Door Openings		Designed Storage Capacity			Sump Capacity (Gallons)
	Length	Width	Height	Length	Width	Height		Height	Width	Weight (Lbs.)	Sq. Ft.	Drums	
22	22'8"	9'0"	8'7½"	21'11¾"	8'0⅜"	7'0½"	8,600	6'9¾"	4'6"	20,000	176	24–40	570
15	15'3¾"	9'0"	8'7½"	14'7½"	8'0⅜"	7'0½"	6,000	6'9¾"	4'6"	14,000	117	16–28	380
7	8'0¼"	9'0"	8'7½"	7'3½"	8'0⅜"	7'0½"	3,400	6'9¾"	4'6"	7,000	58	8–12	190
4	6'0"	6'4½"	6'4½"	5'8½"	5'9"	4'11"	1,500	4'10"	4'7"	4,000	32½	4	85

SAFETY STORAGE, INC.
18900 Stevens Creek Blvd.
Cupertino, CA 95014
408/252-2750
1-800/621-0854 Ext. 926

The contents of this brochure outline the general capabilities of Safety Storage, Inc., containers, and should be used only as guidelines for capabilities and applicability. No warranty is implied or intended by the contents of this brochure. Individual warranties are written for each customer's specifications.

SS-101 Printed in U.S.A.

SAFETY STORAGE INC.

18900 Stevens Creek Blvd.
Cupertino, CA 95014
408/252-2750

July 29, 1987

Ms. Darla J. Vance
Purchasing Department
Westinghouse Hanford Company
P.O. Box 1970
Richland, WA 99352

Re: Request for Proposal W552432-DV
Chemical Storage Containers

Dear Ms. Vance:

Enclosed is our proposal in compliance with your subject RFP for two (2) Model 22 Safety Storage chemical containers. The unit price for each container is $22,624 which includes a 5% GSA discount off the current price list and specified options. A breakdown of this price is as follows:

One Standard Model 22 .....
* Outside Dimensions (22'8"L x 9'W x 8'7"H)
* Internal Chemical Resistant Epoxy Coating
* Internal Spill Containment Capacity (570 gal.)
* Three Doors with Three-Point Safety Locks
* Static Grounding Connection
* Fire Sprinkler System with Three Heads
* Three DOT Placards and NFC 704M Signs
* With Options:
  - One Explosion-Proof Interior Light .....
  - One Ventilation System (1260 CFM) .....
  - Explosion Relief Construction .....
  - Fire Department Hookup (2½" NHT Fitting) .....
  - Fiberglass Floor Grating (3 compartments or entire container) .....
  - Polypropylene Sump (entire container) .....
  - One Permanent Eye/Facewash .....

Subtotal
Less 5% Discount

Total

Based upon earlier conversations between Westinghouse Hanford Company (WHC) and our local manufacturers' representative (Corro-Tec in Seattle, WA), WHC might want to

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consider additional options. For example, if three (3) interior lights were requested rather than one (1), the base price would be adjusted to include instead of . Also, if an explosion-proof thermostat is desired to operate the ventilation system like the previous UNC Nuclear order RRV-XHH-17182, then an additional must be included in the base price. The 5% discount rate would then be applied to the new adjusted subtotal price to reach a revised unit price total.

If you have any questions on this proposal, please contact Mr. Mike Coyle at Corro-Tec 206/763-3091 or myself at Safety Storage 800/621-0854 Ext. 926.

Sincerely,

Bob Carlson

Robert Carlson
Regional Marketing Manager

RC:jd
CC: Mike Coyle, Corro-Tec

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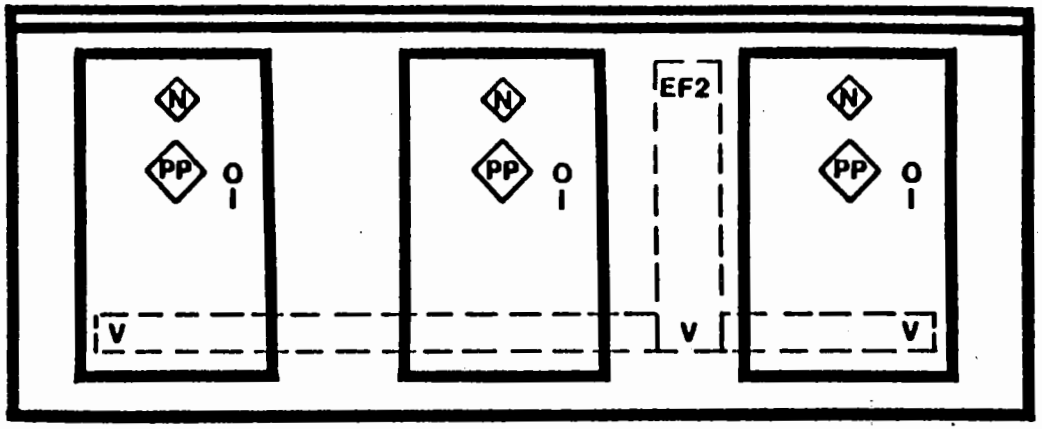
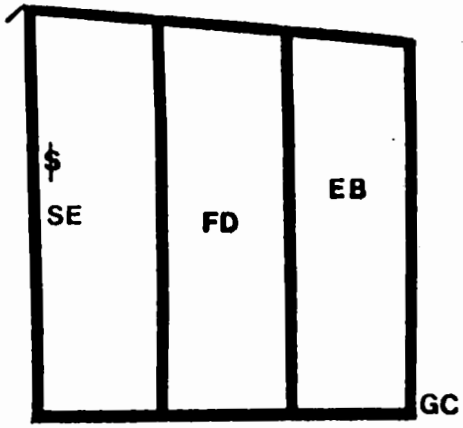
SAFETY STORAGE MODEL 22



FRONT VIEW



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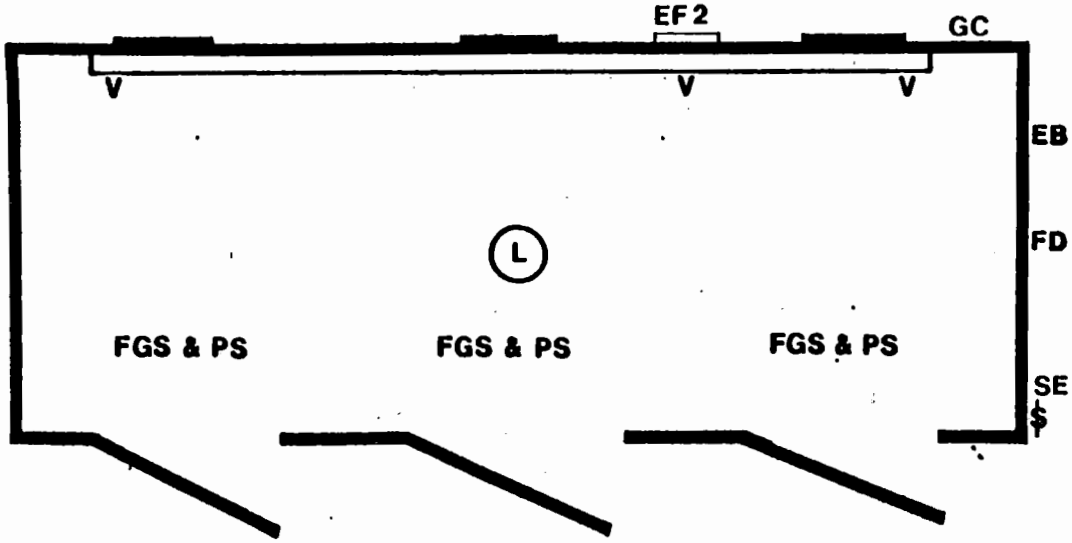

TOP VIEW

KEY

A:	Alarm	LL:	Liquid Level Detector
DC:	Dry Chemical System	M:	Metal Separation Wall
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HD:	Holdown Assembly	$:	Lightswitch
IVM:	Inlet Vent Mechanism	TC:	Temperature Control
L:	Explosion-Proof Light	V:	Vent
		W:	Water Line Hookup
		T:	Thermostat

NOTES: Model 22 with the following options:

* Explosion-proof ventilation system-1260 CFM
* Explosion-proof light
* Fire department hookup
* Explosion-relief construction
* Fiberglass floor grating
* Polypropylene sump liner
* Eye/face wash fixture

JOB NO:

SHIP TO: Westinghouse Hanford Co.

Richland, WA 99352

PHONE:

CONTACT:

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MODEL 22 SAFETY STORAGE BUILDING PRICE LIST
(Effective May 1, 1987)

A. MODEL 22 SAFETY STORAGE BUILDING .....

* Outside Dimensions (LxWxH): 22'8" x 9' x 8'7 1/2"
* Interior Chemical-Resistant Epoxy Coating
* Internal Spill Containment Capacity: 570 Gallons
* Three Doors, each with a 3-point Locking Mechanism
* Fire Sprinkler System with Three Fire Sprinklers
* Epoxy-Coated Plywood Flooring
* One Exterior Grounding Connection
* Three Interior Grounding/Bonding Lugs
* One Grounding Rod
* Three Permanent D.O.T. Placards
* Three Pressure Sensitive NFPA 704M Rating Signs

B. STRUCTURAL OPTIONS

1. Explosion Relief Construction .....
2. Chemical Separation Wall, Metal .....
3. Chemical Separation Wall, 2-Hour Fire Rated .....
4. General-Purpose Fiberglass Grating (Building) .....
5. General-Purpose Fiberglass Grating (Room) .....
6. Corrosive-Resistant Fiberglass Grating (Building) .....
7. Corrosive-Resistant Fiberglass Grating (Room) .....
8. Polypropylene Sump Liner (Building) .....
9. Polypropylene Sump Liner (Room) .....
10. Shelving (per linear foot) .....
11. Hold-down Assembly .....
12. Gas Cylinder Wall Mount (each) .....

C. EXPLOSION-PROOF ELECTRICAL OPTIONS

1. Ventilation System. 16" Fan. (Approx. 1,200 CFM) .....
2. Ventilation System. 12" Fan. (Approx. 450 CFM) .....
3. One Interior Light .....
4. Two Interior Lights .....
5. Three Interior Lights .....
6. One Exterior Light .....
7. Liquid Level Detector with Alarm (Per Room) .....

D. FIRE PROTECTION OPTIONS

1. Dry Chemical Fire Suppression System (Building) .....
2. Dry Chemical Fire Suppression System (Room) .....
3. Fire Department Hookup (21/2" NHT Fitting) .....

E. MISCELLANEOUS OPTIONS

1. Automatic Alarm-Dialing System .....
2. Emergency Eye/Face Wash (Permanent) .....
3. Emergency Eye/Face Wash (Portable) .....
4. Loading Ramp .....
5. Special Order Exterior Paint .....
6. Exterior Chemical-Resistant Finish .....

DELIVERY TERMS: F.O.B. our California or Pennsylvania factory.
PAYMENT TERMS: 10% down payment with order, balance due on delivery.

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alt RDV-552432

Westinghouse Hanford Company

PURCHASE REQUISITION

DATE: 8/25/87 PAGE ___ of ___

BUYER		547561	PRI RATE DO-E	VENDOR CODE	ZIP CODE

SHIP TO
1. Westinghouse Hanford Co.
2401 Stevens Dr.
Richland, WA 99352
2. Other

VENDOR TELEPHONE

F.O.B. DELIVERY PROMISE	THIS ORDER PLACED VERBALLY ON WITH	CONF. ☐ YES	EMER. ☐ YES	PROPOSAL DUE DATE

F.O.B. ☐ ☐ RICHLAND, WASHINGTON	CODE	SHIP VIA	☐ PREPAID ☐ COLLECT	PROPERTY REVIEW TAGGING REQUIRED YES ☐ SENSITIVE YES ☐

TERMS OF PAYMENT	PURCHASING CLAUSES	COMMENTS
SHIPPING POINT		

DESTINATION DELIVERY DATE ☐ MANDATORY ☐ DESIRED	PREMIUM TRANSPORTATION AUTH'D ☐	HAZARDOUS ☐ YES ☐ NO	IF REQUISITION ALTERATION PROVIDE ORIGINAL REQ. NO. 552432 A-2

AUTHOR	MSIN	AREA	PHONE
BA Spracklen	1107N	100N	3-1654
TECHNICAL QUESTIONS CONTACT	MSIN	AREA	PHONE
GR Cox	105N	100N	3-1374
DELIVER TO	BLDG. ROOM	AREA	PHONE
GR Cox	1723N	100N	3-4415

ITEM	CO ID*	COST CENTER	MC	COST ELEMENT	CHARGE CODE	% OF COST	COST ESTIMATE
		H52500	09	110			

PROGRAM CODE | TOTAL ESTIMATED COST:

ITEM NO.	QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE	DEL. DATE
			Change quantity of item 1, to 1 ea.			
			Delete QA clause C02, QI/C bid review not required			
			Emergency code 3: Present storage practices are out of compliance with state and EPA hazardous waste regulations.			
			Decrease Estimated Cost by TOTAL EST. COST			

CONTACT QA FOR ASSISTANCE IN COMPLETING THE BLOCKS BELOW

IMPACT LEVEL	APPLICABLE QA CLAUSES
2	

END USE

QA APPROVED SUPPLIER REQ'D ☐ YES ☐ NO
SURVEYED TO

QA REVIEW OF PROPOSAL ☐ YES ☐ NO

REQUISITION APPROVED BY	Date	Bldg.	Area	MSIN	Phone
LE Jordan	8/26/87				
D. Wegener	8-26-87				
G. Mettler	8-26-87				
QA ENGINEER	Date	Bldg.	Area	MSIN	Phone
R. Zabilka	8-26-87				
FINANCIAL CONTROL	Date	COST APPROVAL	Date		
	8/27/87				

SOURCE INSP. REQ'D ☐ YES ☐ NO PLAN PREPARED BY	RECEIPT INSP. REQ'D ☐ YES ☐ NO PLAN PREPARED BY	RECEIPT INSP. LOCATION BLDG. PHONE:	Buyer's Signature	Date

4-7600-001 (7/87)

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PRIORITY

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Alteration

Vance

Westinghouse Hanford Company

PURCHASE REQUISITION

DATE: 8/6/87 PAGE ____ of ____

BUYER		530765	PRI RATE DO-E	VENDOR CODE	ZIP CODE

SHIP TO
1. Westinghouse Hanford Co. 2401 Stevens Dr. Richland, WA 99352
2. Other

VENDOR TELEPHONE

F.O.B. DELIVERY PROMISE	THIS ORDER PLACED VERBALLY ON WITH	CONF. ☐ YES	EMER. ☐ YES	PROPOSAL DUE DATE

F.O.B. ☐ ARO – [illegible] ☐ RICHLAND, WASHINGTON | CODE | SHIP VIA | ☐ PREPAID ☐ COLLECT | PROPERTY REVIEW TAGGING REQUIRED YES ☐ SENSITIVE YES ☐

TERMS OF PAYMENT | PURCHASING CLAUSES | COMMENTS

SHIPPING POINT

DESTINATION DELIVERY DATE ☐ MANDATORY ☐ DESIRED | PREMIUM TRANSPORTATION AUTH'D ☐ | HAZARDOUS ☐ YES ☐ NO | IF REQUISITION ALTERATION PROVIDE ORIGINAL REQ. NO. 552432 A-1

AUTHOR	MSIN	AREA	PHONE
BA Spracklen	1107N	100N	3-1654
TECHNICAL QUESTIONS CONTACT	MSIN	AREA	PHONE
GR Cox	105N	100N	3-1374
DELIVER TO	BLDG. ROOM	AREA	PHONE
Rec. Insp.	1723N	100N	3-4415

ITEM	CO ID*	COST CENTER	MC	COST ELEMENT	CHARGE CODE	% OF COST	COST ESTIMATE
		H52500	9	~~100~~ 110			

PROGRAM CODE | TOTAL ESTIMATED COST:

ITEM NO.	QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE	DEL. DATE
			Add to K. of attachment "A":			
			and 2 additional lights			
			change deliver to, to: Rec. Insp.			
			Safety Storage Container			
			Attention: DJ Vance			

Note: BA Spracklen to send an alteration down revising quantity from 2ea to 1each.

BELOW

REQUISITION APPROVED BY	Date	Bldg.	Area	MSIN	Phone
DR Wegener	8/7/87	1160	100H	34389	
G. Conatore	8/7/87	1101N	100N	3-16	
LE Jordan	8-7-87				

IMPACT LEVEL 2 | CO2

END USE Hazardous waste storage

QA ENGINEER	Date	Bldg.	Area	MSIN	Phone
R. Zabilka	8-7-87	100N	1104		

QA APPROVED SUPPLIER REQ'D ☐ YES ☒ NO SURVEYED TO | QA REVIEW OF PROPOSAL ☒ YES ☐ NO | FINANCIAL CONTROL | COST APPROVAL

SOURCE INSP. REQ'D ☐ YES ☒ NO PLAN PREPARED BY | RECEIPT INSP. REQ'D ☐ YES ☒ NO PLAN PREPARED BY | RECEIPT INSP. LOCATION BLDG. 1166 PHONE: 66149

Buyer's Signature | Date

54-7800-001 (7/87)

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PURCHASE REQUISITION

UNC NUCLEAR INDUSTRIES

P.O. BOX 490
RICHLAND, WASHINGTON 99352

ESTIMATED COST

PROGRAM CODE

Date	Page	Requisition No.	Priority Rating	Certified Under DMS Regulation 1	Vendor Code	Purchase Order No.
7/2/87	1 of —	R- 552432	DO-E			R — —

Date Delivery Required: 7/19/87

Date Delivery Promised:

SHIP TO: 1 { 2401 Stevens Dr. Richland, WA 99352 } 2 { As Indicated Below }

Vendor | Vendor | Vendor | Vendor | Vendor | Vendor | Offer Due Date | Vendor | Vendor

VENDOR

Confirming Order ☐ If Checked Do Not Duplicate

F.O.B. ☐ RICHLAND, WASHINGTON ☐

Buyer: DV

Terms Of Payment | Code | Ship Via | ☐ Prepaid ☐ Collect | Screened Excess & Property: NO

Item	Quantity	Unit	Description	Unit Price	Total Price
1	2	ea	Container, safety storage, chemical, per ~~attached~~ the following		
			specifications: (attachment "A") THIS IS A		
			STANDARD ITEM		
			QA Clause: ~~5A, 5N, 5C, 7J, 7P~~ CORRO-TEC Inc		
			Suggested Suppliers: SEATTLE, WA 206-241938		
			Safety Storage Inc. — Microsafe, Inc.		
			18900 Stevens Creek Blvd — P.O. Box 9339		
			Cupertino, CA 95014 — San Jose, CA 95157-0339		
			408/395-7233		
			Emergency code 3: Present storage practices are out of		
			compliance with state and EPA harzardous waste		
			regulations.		
			QA Clause C02		
			Q/C BID REVIEW REQUIRED		

7/17 Delete per Bob Zab. to Bend 7-16-87

Item	Sys	Co/Ro	Org Acct	Fm	Acct Class	Charge Code	Cost	Req'n Approved By - type name	Author	Date	Bldg./Room	Area	Phone
09			H52500		110 ~~100~~			7-2-87 D. Wegener	BA Spracklen	7-2-87	1107N	100N	3-1654
								Signature / Date 7-2-87	Co-Author GR Cox		105N	100N	3-1374
									Deliver To GR Cox Rec Insp.		1723N	100N	3-4415

Premium Transportation Auth'd ☐ | Taxable | Cost Approved JAF 7/7 E.L. Thompson | Date 7/7/87

System Engineer Review: Phelan | Date 7/7/87 | Q.A.&C. Review: R. SABILKA 7-6-87 | Date | QAL ☐ | QAR ☐ | Safety and Health Review: LC Hardwood, 7-2-87

ORDER PLACED BY

Telephone ☐ Telegram ☐ Letter ☐ Verbally ☐

By Our _____ Wherein We Accepted

Your _____ Offer

Dated _____

Clause No.(s) _____

Gary Cox advised of del of 45 days according to GSA contract.

On _____

To Your _____

PURCHASING

54-5100-479

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A. Outside dimensions: 8' x 8' x 22'

B. Internal chemical resistant epoxy coating

C. Internal Spill Containment Capacity: 500 gallons

D. Three doors with safety locks

E. Pressure relief roof

F. Static grounding connection

G. Fire sprinkler system with three sprinkler heads

H. Fire department hookup (2 1/2 NHT fittings)

I. Explosion proof wiring system

J. One explosion proof ventilation system (1260 CFM)

K. One explosion proof light

L. One permanent emergency eye/facewash

M. One fiberglass floor grating (comp.) (gray)

N. Polypropylene insert (sump liner)

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Specifications for Chemical Storage Container Model SS-22

Safety Storage containers are designed to provide secondary spill containment, fire protection, and security for hazardous materials storage in accordance with federal, state, and local regulations. The material, design, and workmanship employed by Safety Storage are specified in the following outline.

I) Material

All materials are new, unused, and as specified herein. Materials not specified are free from defects which would adversely affect the performance of individual components or the overall assembly. Our Model 22 is fabricated from prime steel, commercial grades ASTM-A569 and ASTM-A36.

II) Design

A) Spill Containment Reservoir

An internal 570-gallon capacity spill containment reservoir is a major design feature of the Model 22. This spill holding capacity exceeds the secondary containment requirements mandated by local Hazardous Materials Storage Ordinances.

B) Subfloor

The subfloor of the Model 22 is constructed of 10-gauge steel and coated with chemical-resistant epoxy paint. It serves as the base of the spill containment reservoir and prevents the release of hazardous liquids and solids from the storage facility if they are discharged from a primary container. The subfloor is supported above the ground by four (4) inch structural channel which permits ready inspection of the container sump from the outside.

C) Floor

The standard flooring in the Model 22 is 1 1/8" thick epoxy-coated exterior grade plywood. A slip resistant grit is applied to the top surface of each panel during the second application of epoxy paint. The flooring is equipped with removable sections to permit visual inspections for leaks or spills. The floor support system is designed for loads up to 250 lbs. per square foot. Optional fiberglass floor grating is available.

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D) Exterior Walls

The front, back, and side walls of the Model 22 are constructed of 10-gauge steel coated with chemical-resistant epoxy paint on the inside. These walls are designed with ribs and structural steel designed to resist internal explosive force of 100 lbs. per square foot. Three pressure relief panels are provided in the rear wall and are designed to release at an internal pressure of approximately 20 lbs. per square foot.

E) Roof

The roof of the Model 22 is constructed of 12-gauge steel on 10 gauge supports. It is designed as part of the pressure resistant structure and is capable of handling a 40 PSF snow loading. In addition, the roof supports are utilized for supporting optional equipment such as lights and Dry Chem System. The inside is coated with two (2) coats of chemical-resistant epoxy paint.

F) Interior Walls

The Model 22 can be equipped with either one (1) or two (2) optional interior walls which will divide the storage facility into two (2) or three (3) rooms, respectively. This will enable you to safely store incompatible chemicals within the same structure. The two types of interior walls available are: (1) a steel chemical separation wall, and (2) a 2-hour fire-resistance rated chemical separation wall. The latter consists of four pieces of gypsum wallboard sandwiched between two sheets of 12-gauge steel. Both types of walls are joined to the subfloor with continuous welds.

G) Doors

The front of the Model 22 is equipped with three (3) large doors. The height and width of each door opening measures 7' X 4 1/2'. These openings will easily accomodate the movement of palletized material in and out of the unit. The perimeter of each door frame is equipped with weatherstripping to provide a positive seal when each door is closed. A door check (rod) is also provided to enable each door to be maintained in the open-locked position during loading and unloading operations.

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H) Security Locks

Each door of the Model 22 is equipped with a Hansen three-point locking mechanism. All three (3) locks are keyed the same. To prevent anyone from becoming trapped inside the storage container, each doorlock can be unlocked from the inside.

I) Polypropylene Liner

An optional polypropylene liner can be installed in the spill containment reservoir of each room (compartment) used to store corrosive materials. The liner acts as a tertiary containment structure and provides additional protection for the epoxy-coated steel subfloor.

J) Ventilation

The Model 22 can be equipped with an optional ventilation system consisting of a UL listed Class I, Division I, totally enclosed explosion-proof motor with a non-static cast aluminum fan blade and associated ductwork. The latter is constructed of epoxy coated steel and equipped with intake vents and exhaust vent. This system has been designed to perform in atmospheres containing flammable vapors and provides approximately one (1) air change per minute.

K) Fire Protection

A water sprinkler system with three (3) sprinkler heads is a standard feature of the Model 22. An optional UL listed dry chemical fire suppression system is also available.

L) Lighting

Up to three (3) explosion-proof lights can be installed inside the Model 22. The outside of the unit can be equipped with one (1) light. These incandescent fixtures are UL listed for hazardous locations and consist of a 150-watt bulb, heavy-duty glass globe, and a sealed heavy-duty aluminum housing with an epoxy finish.

M) Electrical Wiring

The Model 22 can be equipped with an explosion-proof wiring

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system for those optional items requiring electrical power. This system is installed in accordance with NEC (National Electrical Code) requirements and includes an exterior power service panel, a relay box, an explosion-proof seal, explosion-proof junction boxes, explosion-proof conduit, and heat sensors (with ventilation system only).

N) Temperature Control

A model 22 with temperature control is available for the storage of temperature-sensitive materials. The ceiling, walls, doors, and subfloor of this double-wall constructed building is fully insulated and can be equipped with: 1) a Class I, Division I, Group D, heating system; 2) a Class I, Division I, Group D, cooling system; 3) Class I, Division I, Group D heating and cooling systems; or 4) a Class I, Division II, Group D, heating and cooling system.

O) Shelving

Storage shelving constructed of epoxy-coated steel can be installed for the convenient placement of small chemical containers (bottles, boxes, carboys, etc.). Each shelf measures fifteen inches (15") deep with a one-inch (1") lip on the front edge and can be attached to the side and back walls of the Model 22.

P) Grounding

Each Model 22 is equipped with one (1) exterior static grounding connection and three (3) interior grounding/bonding lugs. In addition, a copper-clad steel grounding rod is provided with each unit.

Q) Holdown Bracing

The Model 22 can be equipped with four (4) L-brackets and provided with the required threaded rods, nuts, washers, and plates or anchor bolts, for seismic or hurricane bracing.

R) Emergency Eye/Face Wash

The Model 22 can be equipped with an exterior emergency eye/face wash fixture or a portable self-contained unit is available as options to meet OSHA's requirements.

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S) Loading Ramp

An optional access ramp manufactured from prime steel is available. Each ramp is painted safety yellow and measures 7 1/2' X 4' (L x W).

T) Liquid Level Detector

An optional explosion-proof liquid level sensor is available for continuous monitoring of the sump for spills. This detector can be hooked up to an external audible alarm or contacts provided for tie in to your security system.

III) Workmanship

A) Steel Fabrication

The steel Safety Storage uses to fabricate the Model 22 is free from kinks, sharp bends, and other conditions which would be deleterious to the finished product. Safety Storage's manufacturing processes do not reduce the strength of the steel to a value less than intended by the design. Each manufacturing process is done neatly and accurately, and all bends are made by controlled means to insure uniformity of size and shape.

B) Welding

Foreign matter which would be injurious to a weld are removed from all surfaces to be welded in the fabrication of the Model 22. The welding procedures employed by Safety Storage are in accordance with the filler metal specifications of the American Welding Society and in cooperation with the American Society for Testing Materials. All welds are MIG and are sufficient size and shape to develop the full design strength of the parts connected by the welds. These welds transmit the imposed stresses without permanent deformation or failure when subjected to proof or storage loads.

C) Cleaning

Safety Storage uses cleaners, power abrasive grinders, and sandblasting to prepare metal surfaces prior to painting to ensure

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that they are free from oil, grease, slag, weld spatter, mill scales, products of corrosion, dirt, or foreign substances. The procedure is performed in accordance with the Steel Structures Painting Council (SSPC) Specification SSPC-SP 1, 2, 3, and 7.

D) Painting

Safety Storage uses a red-oxide primer with zinc chromate on all exterior surfaces of the Model 22. The finish coat is a gloss white alkyd enamel on all exterior surfaces and the minimum total dry film thickness is 4 mil. Two coates of chemical-resistant epoxy paint are applied to all interior surfaces.

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APPENDIX 4A-11

SPECIFICATION FOR ELECTRICAL STORAGE MODULES 7 AND 8
(H-2-81296, SHEET 3 OF 3)

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CONSTRUCTION SPECIFICATION (DIVISION 16)

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 REFERENCE STANDARDS AND SPECIFICATIONS: THE FOLLOWING STANDARDS AND SPECIFICATIONS, INCLUDING DOCUMENTS REFERENCED THEREIN, FORM PART OF THIS SECTION TO EXTENT DESIGNATED HEREIN.

1.1.1.1 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C80.1-1983	AMERICAN NATIONAL STANDARD FOR RIGID STEEL CONDUIT--ZINC COATED

1a 1.1.1.2 AMERICAN WELDING SOCIETY (AWS)

AWS D9.1-1984	SPECIFICATION FOR WELDING SHEETMETAL

1a 1.1.1.3 FEDERAL SPECIFICATIONS (FS)

WW-C-0054DC INCLUDING INT AMD 1	CONDUIT, METAL, RIGID: AND COUPLING, ELBOW, AND NIPPLE, ELECTRICAL CONDUIT: ALUMINUM

1.1.1.4 NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

STANDARDS PUBLICATION/ NO. FB 1-1988	FITTINGS, CAST METAL BOXES, AND CONDUIT BODIES FOR CONDUIT AND CABLE ASSEMBLIES
STANDARDS PUBLICATION/ NO. FU1-1986	LOW VOLTAGE CARTRIDGE FUSES-600 VOLT OR LESS
STANDARDS PUBLICATION/ NO. ICS 2-1983 W/REV THROUGH JUNE 1985	STANDARDS FOR INDUSTRIAL CONTROL DEVICES, CONTROLLERS, AND ASSEMBLIES
STANDARDS PUBLICATION/ NO. ICS 6-1988	ENCLOSURES FOR INDUSTRIAL CONTROLS AND SYSTEMS
STANDARDS PUBLICATION/ NO. RN 1-1986	POLYVINYL-CHLORIDE EXTERNALLY COATED GALVANIZED RIGID STEEL CONDUIT AND ELECTRICAL METALLIC TUBING
STANDARDS PUBLICATION/ NO. WD 1-1983	GENERAL REQUIREMENTS FOR WIRING DEVICES

1.1.1.5 NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	NATIONAL ELECTRICAL CODE, 1990 EDITION

1.1.1.6 UNDERWRITERS LABORATORIES, INC (UL)

1989	ELECTRICAL APPLIANCE AND UTILIZATION EQUIPMENT DIRECTORY
1989	ELECTRICAL CONSTRUCTION MATERIALS DIRECTORY

1.2 QUALITY ASSURANCE

1.2.1 STANDARDS: PRODUCTS SHALL BE IDENTIFIED FOR INTENDED PURPOSE BY UNDERWRITERS LABORATORIES, INC (UL) IN THE ELECTRICAL APPLIANCE AND UTILIZATION EQUIPMENT DIRECTORY OR ELECTRICAL CONSTRUCTION MATERIALS DIRECTORY, AND BEAR LISTING MARK OF LABORATORY. LISTING AND MARKING BY UL IS NOT REQUIRED FOR PRODUCTS SPECIFIED TO MEET THE REQUIREMENTS OF A NATIONAL STANDARD, OR DESIGNATED BY MANUFACTURER'S PART NUMBER ON THE DRAWINGS.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 SOLDERLESS CONNECTORS AND TERMINAL LUGS: PRESSURE TYPE, RATED FOR USE WITH COPPER CONDUCTORS AND RATED FOR SYSTEM UTILIZATION VOLTAGE.

2.1.1.1 FOR CONDUCTORS #8 AWG AND SMALLER.

SIMILAR TO THOMAS AND BETTS COMPANY "STA-KON".

2.1.1.2 FOR CONDUCTORS #6 AWG AND LARGER.

SIMILAR TO BURNDY ENGINEERING COMPANY "SCREW PRESSURE CONNECTORS OR "HYDENT".

2.1.2 RACEWAYS, FITTINGS, AND BOXES

2.1.2.1 CONDUITS SHALL BE RIGID STEEL AND MEET THE REQUIREMENTS OF ANSI C80.1.

2.1.2.2 PVC COATING ON RIGID STEEL CONDUIT SHALL MEET THE REQUIREMENTS OF NEMA RN 1, TYPE A-40.

2.1.2.3 CONDUIT FITTINGS SHALL MEET THE REQUIREMENTS OF NEMA FB 1.

2.1.2.4 USE "MYERS" TYPE WATERTIGHT FITTINGS OR SEALING LOCKNUTS FOR CONDUIT ENTRIES INTO SIDES OR TOPS OF NEMA 4 ENCLOSURES.

2.1.2.5 EXTERIOR RECEPTACLE OUTLET BOXES: CAST METAL TYPE FD.

2.1.3 CONDUCTORS: #6 - STRANDED COPPER, TYPE USE
CONDUCTORS: #12 - SOLID COPPER, TYPE THWN/THHN OR XHHW.

2.1.4 EQUIPMENT NAMEPLATES: LAMINATED PLASTIC, 1/16 INCH THICK WITH WHITE SURFACE AND BLACK CORE. EDGES BEVELED AND SMOOTH. ENGRAVED NOMENCLATURE SHARP AND CLEAR.

2.1.5 PLASTIC INSULATING TAPE: SIMILAR TO SCOTCH NO. 33 MANUFACTURED BY 3M COMPANY.

2.2 EQUIPMENT

2.2.1 EQUIPMENT ENCLOSURES SHALL MEET THE REQUIREMENTS OF NEMA ICS 6 AND BE TYPE 4.

2.2.2 FUSEHOLDER: SINGLE PIECE PHENOLIC BASE, TIN PLATED COPPER ALLOY FUSE CLIP, 2 POLE, 60 AMP, 250 VOLT, SQUARE D FE222-1 WITH ADAPTER FOR 20 AMP FUSES. FUSES SHALL BE 250 VOLT RATED, SIMILAR TO BUSS, FUSETRON, CATALOG NO. FRN CONFORMING TO NEMA FU1.

2.2.3 RELAY, TIME-DELAY, OCTAL BASE PLUG-IN, 120 VAC COIL, 10A DPDT CONTACTS, 0.3 TO 30 SEC ADJUSTABLE TIME DELAY ON ENERGIZATION, POTTER AND BRUMFIELD CD SERIES, TYPE CDB38.7D006.

2.2.4 ALARM LIGHT, 120 VAC, PIKE MOUNTED WITH WHITE LENS. SIMILAR TO TESCOR TECHNOLOGY "SAFTI-STROBE" #2012D-D08.

1b 2.2.5 RECEPTACLES: DUPLEX, BROWN, SPECIFICATION GRADE, 20 AMPERES, 120 VOLT, 2 POLE, 3-WIRE, GFCI, MEETING THE REQUIREMENTS OF NEMA REFERENCE DESIGNATION 5-20R.

2.2.6 CONTROL STATION, HEAVY DUTY, NEMA 4, MOMENTARY "START-STOP" PUSHBUTTONS, NEMA A600 CONTACTS RATED 10 AMPS, 120V A.C. WITH APPROPRIATE NAMEPLATES-SQUARE D KYK21

2.2.7 SWITCH, SINGLE POLE, 15A 120-277 VAC, BROWN, RATED FOR 1/2 HP, 120-V MOTOR, IN WEATHERPROOF ENCLOSURE.

1b 2.2.8 CIRCUIT BREAKERS: REPLACE EXST 20A, 1P GFCI BREAKERS WITH SIMILAR MAKE AND MODEL WITHOUT GFCI TRIPPING CHARACTERISTICS. PROVIDE THERMAL MAGNETIC TRIPPING ONLY. PROVIDE BREAKERS WITH SAME FRAME TYPE AND MOUNTING METHOD AS ORIGINALLY SUPPLIED.

PART 3 - EXECUTION

3.1 PREPARATION

3.1.1 FIELD MEASUREMENTS: SCALE DIMENSIONS ON DRAWINGS SHOW DESIRED LOCATION OF EQUIPMENT. ACTUAL LOCATIONS, DISTANCES, AND LEVELS SHALL BE GOVERNED BY FIELD CONDITIONS.

3.2 INSTALLATION

3.2.1 GENERAL; PERFORM WORK IN ACCORDANCE WITH NEC.

3.2.2 IDENTIFY COMPONENTS BY NAMEPLATE ENGRAVED WITH DESIGNATION AND FUNCTION SHOWN. ATTACH NAMEPLATES, WITH CLEAR RTV SILICONE SEALANT.

3.2.3 CONDUIT

3.2.3.1 MAKE ELBOWS, OFFSETS, AND BENDS UNIFORM AND SYMMETRICAL. BEND CONDUIT WITH APPROVED BENDING DEVICES.

3.2.3.2 CUT SQUARE, REAM, AND REMOVE BURRS. CONDUIT SHALL BE CLEAN, DRY, AND FREE OF DEBRIS. IMMEDIATELY AFTER INSTALLATION, PLUG OR CAP EXPOSED ENDS WITH STANDARD ACCESSORIES UNTIL WIRES ARE INSTALLED.

3.2.3.3 THREADED HUBS OR SEALING TYPE LOCKNUTS SHALL BE USED OUTDOORS OR WHERE MOISTURE IS PRESENT. USE ERICKSON TYPE COUPLINGS WHERE REQUIRED.

3.2.3.4 USE 1 HOLE CLAMPS EQUIPPED WITH CLAMPBACKS TO SECURE CONDUITS.

3.2.3.5 SET UP JOINTS IN CONDUIT INSTALLED UNDERGROUND, OR EXPOSED TO WEATHER, WITH HIGH TEMPERATURE, ANTISEIZE, CONDUCTIVE THREAD LUBRICANT AND SEALANT.

3.2.3.6 INSTALL PVC COATED CONDUIT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. REPAIR COATING, DAMAGED DURING HANDLING OR INSTALLATION USING PVC PAINT RECOMMENDED BY CONDUIT MANUFACTURER.

3.2.4 INSTALL BOXES, ENCLOSURES, AND WIRING DEVICES FIRMLY IN POSITION AND PLUMB.

3.2.5 CONDUCTORS

3.2.5.1 DO NOT BEND CABLES INSTALLED IN WIREWAYS TO LESS THAN MANUFACTURER'S RECOMMENDED MINIMUM BENDING RADIUS; RECOMMENDED PULLING TENSION SHALL NOT BE EXCEEDED.

3.2.5.2 DO NOT INSTALL OR HANDLE WIRES WITH THERMOPLASTIC INSULATION OR JACKET WHEN AMBIENT TEMPERATURE IS 15° F OR BELOW

3.2.5.3 SPLICES SHALL BE MADE USING APPROVED INSULATED CRIMPING SLEEVES; WIRE SHALL BE TERMINATED USING CRIMP TYPE LUGS.

3.2.5.4 INSTALL AND MARK DIRECT BURIAL CABLE IN ACCORDANCE WITH THE DRAWINGS.

3.3 FIELD QUALITY CONTROL

3.3.1 TESTING, GENERAL

3.3.1.1 TEST EQUIPMENT AND WIRING FOR CONTINUITY AND UNINTENTIONAL GROUNDS, AND VERIFY PROPER VOLTAGE AT EQUIPMENT SERVED BEFORE ATTEMPT IS MADE TO OPERATE EQUIPMENT. NOTIFY KEH BEFORE START OF TESTS. CORRECT ITEMS FOUND, DURING TESTING OR EXAMINATION BY KEH TO BE AT VARIANCE WITH THE DRAWINGS.

3.3.1.2 IN ADDITION TO TESTING SPECIFIED TO BE PERFORMED BY CONTRACTOR, INSTALLATION WILL BE SUBJECT TO EXAMINATION BY KEH FOR CONFORMANCE WITH DESIGN AND APPLICABLE CODES. ASSIST THE KEH AS REQUESTED.

3.3.2 WIRING SYSTEMS

3.3.2.1 TEST WIRING OPERATING LESS THAN 150 VOLTS TO GROUND FOR CONTINUITY AND UNINTENTIONAL GROUNDS. RESISTANCE SHALL NOT EXCEED 1 OHM ON CONTINUITY CHECKS.

3.3.3 EXHAUST FAN OPERATION (TEST UNITS 7 AND 8)

3.3.3.1 TURN ON CIRCUIT BREAKER AND MOTOR DISCONNECT SWITCH.

3.3.3.1 PUSH "START" BUTTON AND HOLD LESS THAN 2 SECONDS: VERIFY FAN STARTS BUT DOES NOT CONTINUE TO RUN.

3.3.3.2 PUSH "START" BUTTON AND HOLD FOR 5 SECONDS: VERIFY FAN STARTS AND CONTINUES TO RUN, BEACON IS NOT ON AND SAMPLE PUMP RECEPTACLE IS ENERGIZED.

3.3.3.3 FORCE EXHAUST LOUVERS CLOSED MOMENTARILY: VERIFY UNINTERRUPTED FAN OPERATION. (IF FAN STOPS, INCREASE TIME DELAY RELAY SETTING AND REPEAT TEST)

3.3.3.4 FORCE EXHAUST LOUVERS CLOSED AND HOLD FOR 2 SECONDS (OR TIME SET IN STEP 3): VERIFY, EXHAUST FAN STOPS, BEACON IS ON AND SAMPLE PUMP RECEPTACLE IS DE-ENERGIZED.

3.3.3.5 RESTART EXHAUST FAN.

3.3.3.6 PUSH "STOP" BUTTON AND HOLD FOR 5 SECONDS: CONFIRM FAN STOPS, BEACON IS ON AND SAMPLE PUMP RECEPTACLE IS DE-ENERGIZED.

3.3.3.7 RESTART EXHAUST FAN.

3.3.4 WELDS INDICATING VISUAL TESTING (VT) IS REQUIRED SHALL BE EXAMINED AS REQUIRED BY AWS D9.1.

ATTEST SUCCESSFUL TEST RESULTS:

SHERNER ELECTRIC (DN.C.)	8/20/91		5/6/91
INSTALLATION CONTRACTOR	DATE	CONTRACTING OFFICER (KEH)	DATE
WHC PROJECT ENGINEER	DATE		

DOES NOT CONTAIN CLASSIFIED OR UNCLASSIFIED CONTROLLED NUCLEAR INFORMATION

R.J. HARMAN
Reviewing Official/ADC
Kaiser Engineers Hanford Company
8/27/90
Date

NUMBER	TITLE	REFERENCES
DRAWING TRACEABILITY LIST		

NUMBER	TITLE
NEXT USED ON	

REV NO.	DESCRIPTION	REV BY DATE	KEH APPROVALS	AND FOR INFO ONLY FOR DATE
1	AS-BUILT FOR PROJ. W-149 @ECN W149-2 Z D,E4-5 @ECN W149-1 Z C1-3:E6-8	KCA 6/4/91		

REVISIONS

CAD FILE B081296C CAD CODE 2J10VMAC02:10 0.NN

DRAWN	LS JONES	8/90
CHECKED	M. ALEXANDER	8/90
SUPERV	J. ARCHIBALD	8/90
DESIGN	DL FORT	8/90
DE	TC OTEN	8/90
DESIGN ENG APPR	R. HARMAN	8/90

APPROVED FOR IMPLEMENTATION
E.C. FUNKHOUSER
8/27/90

IMPACT LEVEL 3 ECN 125917

U.S. DEPARTMENT OF ENERGY
RICHLAND OPERATIONS OFFICE
KAISER ENGINEERS HANFORD COMPANY

ELECTRICAL
STORAGE MODULES 7 & 8
SPECIFICATIONS

PROJECT W-149 LOW FLASH-POINT MIXED WASTE TRU STOR

SIZE	ACCT NO	SYSTEM	DRAWING NO	REV NO
F	2000	7301	H-2-81296	1

SCALE NONE FLOOR NO E40948 SHEET 3 OF 3

KEHCAD

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APPENDIX 4A-12

SPECIFICATION FOR CIVIL ASPHALT STORAGE PAD (200-W AREA, H-2-90264)

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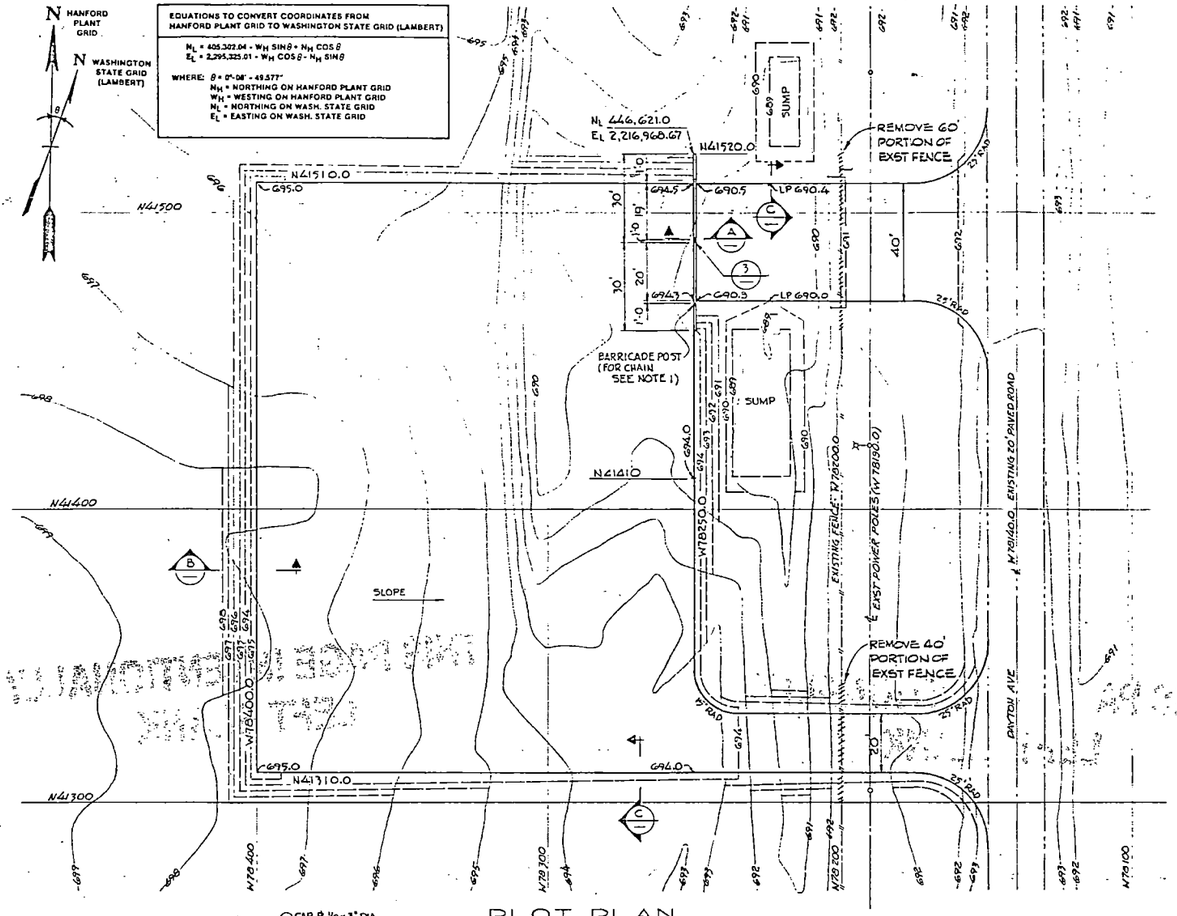
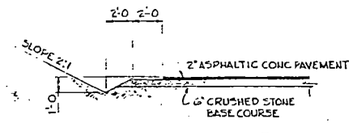


PLOT PLAN
SCALE: 1" = 20'



SECTION B
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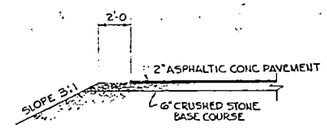

SECTION C
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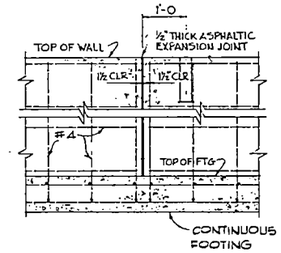
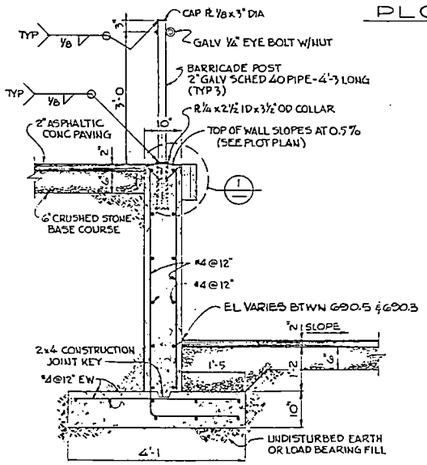


DETAIL 3
SCALE: ½" = 1'-0



SECTION A
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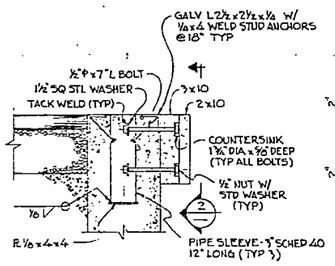

DETAIL 1
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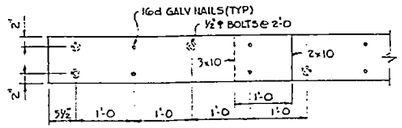


DETAIL 2
SCALE: 1" = 1'-0

SPECIFICATIONS

1- PAVED AREAS

1.1 ALL WORK SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS OF THE STATE OF WASHINGTON STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 1980 (M-41-10).

1.1.1 CLEARING, GRUBBING AND CLEAN-UP PER SECTIONS 2-01.1 THRU 2-01.3.

1.1.2 EXCAVATION AND EMBANKMENT PER SECTIONS 2-03.1 THRU 2-03.3. COMPACTION OF FILL PER SECTION 2-03.3(14) C METHOD B.

1.1.3 SUBGRADE PREPARATION PER SECTIONS 2-06.1 THRU 2-06.3.

1.1.4 WATERING PER SECTIONS 2-07.1 THRU 2-07.3.

1.1.5 TRIMMING AND CLEAN-UP PER SECTIONS 2-11.1 THRU 2-11.3.

1.1.6 BASE COURSE SHALL BE CRUSHED STONE CONFORMING TO SECTION 9-03.9(3) AND SHALL BE INSTALLED PER SECTIONS 4-04.1 THRU 4-04.3

1.1.7 ASPHALTIC CONCRETE WEARING COURSE SHALL BE CLASS B PER SECTIONS 5-04.1 THRU 5-04.3(4) AND 5-04.3(6) THRU 5-04.3(16)

2-CONCRETE

2.1 MINIMUM COMPRESSIVE STRESS AT 28 DAYS - f'_c = 3000 PSI.

2.2 AGGREGATE SHALL CONFORM TO ASTM C-33 WITH A MAXIMUM SIZE OF ¾".

2.3 CEMENT SHALL CONFORM TO ASTM C-150 TYPE II (LOW ALKALI).

2.4 CONCRETE MIX SHALL BE PER ASTM C-94 WITH PROPORTIONS PER ACI 301, SECTION 3.8 METHOD 2 OR 3.

2.5 MIX TO HAVE A MAXIMUM SLUMP OF 5".

2.6 AIR ENTRAIN MIX 3½% TO 6%

2.7 REINFORCING SHALL CONFORM TO ASTM A615 DEFORMED GRADE 60.

2.8 LAP REINFORCING BARS 15" MINIMUM.

2.9 EXPANSION JOINT MATERIAL SHALL BE PER ASTM D994.

2.10 CONCRETE WORK SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS (ACI 301-72 REV 75)

2.1.1 SUB-GRADE	SECTION	8.1
2.1.2 FORMWORK	SECTIONS	4.1, 4.2, 4.3, 4.4, 4.5, 4.7
2.1.3 REINFORCEMENT	SECTIONS	5.2.2, 5.5.1, 5.5.2, 5.5.3, 5.5.8
2.1.4 PLACING	SECTIONS	8.1, 8.2, 8.3, 8.4, 8.5
2.1.5 REPAIRING	SECTIONS	9.1, 9.2, 9.3, 9.4,
2.1.6 FINISHING	SECTIONS	10.2, 10.4, 10.5
2.1.7 CURING	SECTIONS	12.1, 12.2, 12.3, 12.4

2.1.8 TESTING - SLUMP TEST, AIR ENTRAINMENT TEST AND TEST CYLINDERS SHALL BE THE RESPONSIBILITY OF THE GOVERNMENT'S REPRESENTATIVE. DELIVERY TICKETS SHOWING ACTUAL MIX PROPORTIONS, WATER CEMENT RATIO AND ADDITIVES SHALL BE SUBMITTED TO THE GOVERNMENT'S REPRESENTATIVE PRIOR TO UNLOADING.

2.11 SUBMIT COMPLETED POUR SLIP PRIOR TO STARTING ANY POUR. POUR SLIP FORMS WILL BE FURNISHED BY THE GOVERNMENT'S REPRESENTATIVE.

3.- DOCK BUMPER

3.1 BOLTS SHALL CONFORM TO ASTM A-307

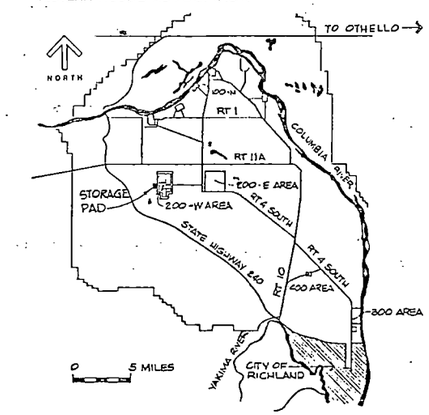
3.2 WOOD BUMPER SHALL BE DOUGLAS FIR #1 STRUCTURAL PLANK PER WESTERN WOODS ASSOCIATION.

NOTES

1- CHAIN BARRICADE SHALL BE #10 GALV STEEL SINGLE JACK CHAIN TYPE II CONFORMING TO FED SPEC RR-C-271B WITH A SPRING GALV SNAP OR GALV HOOK AT EACH END OF EACH SECTION.

2- PIPE FOR BARRICADE POST AND SLEEVE SHALL CONFORM TO EITHER ASTM A53 OR ASTM A120.

3- STRUCTURAL SHAPES AND PLATES SHALL CONFORM TO ASTM A36.



VICINITY MAP

RHO APPROVAL BY H. Shiew	DATE 9-21-82	U. S. DEPARTMENT OF ENERGY Richland Operations Office
PROJ ENGR Sven Kiderlen	7-29-82	KAISER ENGINEERS HANFORD COMPANY
DR J. L. Reed	7/14/82	CIVIL ASPHALT STORAGE PAD 200-W AREA
APPROVED BY R. H. Dennis	7-29-82	
RATES R. H. Dennis	7/14/82	
APPROVED BY D. LIEN	7/15/82	PROJECT TITLE ASPHALT STORAGE PAD
CHECKED BY L. A. GADDIS	7/15/82	
DRAWN BY J. GRICKSON	7/14/82	PROJ — WO CK 2237 JOB R44620
DESIGNED BY J. L. FORT	7/8/82	SCALE SHOWN BLDG 200-W INDEX 0110
CLASSIFICATION BY —		DRAWING NUMBER H-2-90264 SHEET — QC — REV 0
NOT REQUIRED		

NUMBER	DRAWING LIST / TITLE	REFERENCES
		NEXT USED ON END ITEM

BY-DATE	BY-DATE	REV BY DATE	DESCRIPTION	REV
APPROVAL	KEH APPROVAL			0

REVISIONS

COMMENT REVIEW

MICROFILMED

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APPENDIX 4A-13

CONSTRUCTION SPECIFICATION W-016H-C3, REV. 2, FOR RADIOACTIVE MIXED WASTE STORAGE FACILITIES

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W-016H-C3
Revision 2

CONSTRUCTION SPECIFICATION FOR

RADIOACTIVE MIXED WASTE STORAGE FACILITIES

Work Order CR9265

Revision 0: 09-12-90
Revision 1: 05-30-91

OFFICIAL RELEASE BY WHC (23)
DATE JUL 10 1991

Prepared By:

Kaiser Engineers Hanford Company
Richland, Washington

For the U.S. Department of Energy

Contract DE-AC06-87RL10900

Anne S. Langevin	7/8/91	M. A. Fisher	7/3/91
Principal Lead Engineer	Date	Technical Documents	Date
R. Lundgren	7-9-91	J. F. Mudge	7/3/91
Safety	Date	Environmental	Date
Larry Salberry	7-9-91	William R. Stott	7-9-91
Quality Engineering	Date	Project Manager	Date

Westinghouse Hanford Company

H. E. Walkey	7-10-91
Projects Department	Date

DOES NOT CONTAIN CLASSIFIED OR UNCLASSIFIED CONTROLLED NUCLEAR INFORMATION

J. F. Mudge
Reviewing Official/ADC
Kaiser Engineers Hanford Company
7/3/91
Date

W016HC3.SP2.2925

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Section 01019	Items Furnished for Construction	2
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Section 01040	Coordination	2
Section 01043	Job Site Administration	3
Section 01050	Survey and Field Engineering	2
Section 01065	Permits	2
Section 01100	Special Project Procedures	3
Section 01200	Project Meetings	2
Section 01300	Submittals	8
Section 01310	Progress Schedules	4
Appendix A	CPM Schedule	1
Section 01400	Quality Assurance	4
Section 01500	Construction Facilities and Temporary Controls	5
Section 01610	Delivery, Storage, and Handling	1
Section 01630	Product Options and Substitutions	4
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Section 08800	Glazing	2
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SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 INTRODUCTION

1.1.1 Project W-016H Radioactive Mixed Waste Storage Facility is located in the 200W Limited Access Area of the Hanford Site, approximately 25 road miles northwest of Richland, Washington.

1.2 STATEMENT OF WORK

1.2.1 Scope: The work consists of furnishing supervision, labor, equipment, materials, transportation, and services for procurement, receiving, handling, storage, protection, fabrication, installation inspection, and testing to provide (3) operational facilities ready for occupancy in accordance with these contract documents.

1.2.2 Work Included: Design fabrication and erection of 3 metal buildings. One of the buildings is 55,000 square feet, and other two are 34,000 square feet each. The work includes:

1.2.2.1 Survey, clear, and grub each building site.

1.2.2.2 Grade, gravel, and asphalt approaches to each building and access roadway between and around buildings.

1.2.2.3 Furnish and install underground water and electrical service to each building.

1.2.2.4 Furnish and install mechanical, electrical, fire alarm, fire protection, and air monitoring systems in each building.

1.2.2.5 Furnish and apply special protective coating to each building slab.

1.2.2.6 Furnish and install approximately 4,000 linear feet of underground 12 inch diameter sanitary water line.

1.3 DRAWINGS: The Drawings which show the work to be accomplished by these Contract Documents are listed on Drawing H-2-80894.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 01019

ITEMS FURNISHED FOR CONSTRUCTION

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 Code of Federal Regulations (CFR)

Title 30 Mineral Resources
Sub Chapter N - Metal and Nonmetal Mine Safety and Health

30 CFR 56	Safety and Health Standards - Surface Metal and Nonmetal Mines

1.2 SUBMITTALS: Not Used

1.3 GENERAL

1.3.1 Material and equipment furnished or made available to be incorporated into the Work are set forth in this Section. Other services and utilities provided are covered in other sections of this Specification.

1.3.2 Comply with provisions of Section 9 of the Contract General Conditions for all items furnished for construction.

1.3.3 Provide KEH access to the premises where items furnished for construction are stored before incorporation into the Work.

1.4 GRAVEL AND SAND

1.4.1 Gravel and sand from unmined natural deposits are available at no cost from sites designated by KEH within 4 miles of the project site. KEH makes no representation that unmined materials will meet physical properties required in this Specification.

1.4.2 If the Contractor elects to utilize the available gravel sites, Contractor shall furnish all equipment and labor required to excavate, process, load, transport, and place the gravel and sand.

1.4.3 Material from the gravel sites shall be used only for the work covered by this Specification and no gravel or sand, processed or nonprocessed, or concrete manufactured therefrom shall be transported off the Hanford Site.

1.4.4 Access to gravel sites and travel between gravel sites and construction sites shall be on roads designated by KEH and the use shall be in compliance with the requirements of Section 01500 of this Specification.

1.4.5 Operations at the gravel sites shall be in compliance with the following requirements.

1.4.5.1 Confine removal of overburden and top soil to areas designated by KEH. Stabilize blow sand areas after surface has been disturbed with ballast or other approved method to prevent wind erosion.

1.4.5.2 Make no excavation or bank cut within 100 feet of power lines, paved roads, railroads, security fences, or other permanent structures.

1.4.5.3 Excavation and processing shall be in accordance with 30 CFR 56, Safety and Health Standards. Correct operations identified by KEH to be hazardous to life or property.

1.4.5.4 Explosives are prohibited articles as described in Section 56 of the Contract General Conditions and shall not be brought to the Hanford Site or proposed for use without written KEH approval.

1.4.5.5 Temporary structures are permitted at the gravel site for offices, storage, or repair facilities necessary for the gravel removal and processing operations. No facility for habitation shall be permitted.

1.4.5.6 Use of gravel sites shall be nonexclusive. Others may also enter the gravel sites to excavate material required for other work.

1.4.5.7 Upon completion of operations the gravel site shall be cleared of debris, temporary structures, and equipment. The excavated area shall be graded, banks properly sloped, and stabilized to prevent wind erosion. Conditions identified by KEH as not meeting these requirements shall be corrected before final acceptance of the Work.

1.4.5.8 The right to use the gravel sites may be terminated by KEH for failure to comply with requirements set forth herein or for abandonment of operations under this contract. The right to use the gravel sites shall terminate without notice upon acceptance of Work under this Contract.

1.5 MATERIALS AND EQUIPMENT

1.5.1 Other materials and equipment shown or specified in the Specifications and the Drawings required to complete the Work shall be furnished by the Contractor.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01027

APPLICATION FOR PAYMENT

PART 1 - GENERAL

1.1 REFERENCES: Not Used

1.2 SUBMITTALS: Not Used

1.3 FORMAT

1.3.1 Complete Form KEH-1026.00, Progress Estimate Backup, sample appended. Contractor developed substitutes for form may be used only with prior approval of KEH.

1.3.2 Complete Form KEH-0959.00, Monthly Estimate of Work Completed, sample appended, or include following in letter requesting payments.

Subtotal Value of All Pay Items Completed to date (Include all modifications)		$X,XXX.XX
Allowance for Material Stored on Site		
Previous Net Allowance	$X,XXX.XX	
Minus Materials Placed	X,XXX.XX	
Plus Materials Stored	X,XXX.XX	
Net Allowance		X,XXX.XX
Subtotal Value Completed to Date		
Less Previous Payments	X,XXX.XX	
Less Other Charges from KEH	X,XXX.XX	
Subtotal Deductions		(X,XXX.XX)
Total Payment Requested		$X,XXX.XX
Less Retainage @ _____%		(X,XXX.XX)
Total Payment Allowed		$X,XXX.XX

1.4 APPLICATION PROCEDURE

1.4.1 Payments to Contractor set forth in Section 15 of Contract General Conditions are initiated by Contractor making application for payment as follows.

1.4.1.1 Begin application for payment by completing KEH furnished Form referenced in Paragraph 1.3.1. Include, as minimum, breakdown of contract price for each item listed in Section 01310 and percent complete for each item.

1.4.1.2 Review backup sheets with KEH and adjust data.

1.4.1.3 Finalize application for payment by either completing Form KEH-0959.00 or initiating letter containing elements of Paragraph 1.3.2.

1.5 PAYMENT PROCEDURE

1.5.1 Upon receipt of application for payment, KEH will audit data and check for compliance with requirements of Section 01720. When satisfied that contract requirements are up-to-date, Form KEH-0959.00 will be prepared and signed by KEH.

1.5.2 Copy of signed Form showing amount of payment to be made will be furnished Contractor.

1.5.3 KEH will mail check to Contractor's designated address.

1.6 ADDITIONAL DATA REQUIRED

1.6.1 When processing applications for payment and preparing payment documents, KEH may require data to substantiate and justify amounts requested. Processing of payment documents may be delayed if data is not forwarded expeditiously to KEH.

1.6.2 Requests for payment for equipment or material which Contractor has received, but has not installed, shall be accompanied by invoice or other data to provide evidence that title to equipment or material is held by Contractor.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

KAISER ENGINEERS
HANFORD

PROGRESS ESTIMATE BACKUP

Sheet ____ of ____

Contractor:	Contract No.:
Subject:	
Backup for Progress Estimate No.:	Dated:

Item	Description	Estimated Cost	Weighted Percent	Percent Complete to Date	W'T'D % Complete to Date	Total $ to Date

SAMPLE

KEH-1026.00 (03-87)

KAISER ENGINEERS HANFORD	MONTHLY ESTIMATE OF WORK COMPLETED	
Contract or P.O. No	Estimate No.	Date

Name of Contractor

Address

Nature of Work

Initial Amount of Contract	Total Amount of Modifications to Date	Total Adjusted Contract Amount
$	$	$

Description			Amount	
Estimated Work Completed to (Date)				
Less: Previous Payments	$			
Other Charges (Explain Below)	$			
Total Deductions			($	)
Adjusted Payment Requested			$	
Less Retainage @ _____%			$	
Total Payment Allowed			$	

SAMPLE

I certify that I have verified this periodical estimate dated _____ for $ _____ and that to the best of my knowledge and belief it is a true and correct statement of work performed and that the contractor's statement of his account and amount due him is correct and just, and the quantities included in this estimate have been performed in full accordance with the terms and conditions of the corresponding construction documents.

FOR THE CONTRACTOR

By _____

KAISER ENGINEERS HANFORD COMPANY

By _____
Project Manager

By _____
Field Contract Engineer

KEH-0959.00 (02/90)

END OF SECTION

SECTION 01040

COORDINATION

PART 1 - GENERAL

1.1 REFERENCES: Not Used

1.2 SUBMITTALS: Not Used

1.3 CONSTRUCTION ACTIVITIES

1.3.1 Coordinate construction activities to assure efficient and orderly sequence of work, with provisions for accommodating items to be installed later.

1.3.2 As noted in Section 29 of the Contract General Conditions, other contracts may be under construction concurrently with the work included in this Specification. The Contractor shall coordinate his activities with those of other contractors for the mutual benefit of all. Coordination meetings may be required in addition to progress meetings to keep all parties informed of scheduled activities at interface points.

1.4 WORK IN EXISTING FACILITIES

1.4.1 Buildings No. 2402 WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, and 2403WA are operating facilities and work must be planned and scheduled to minimize interference with plant operations and to sustain the safety of operating personnel.

1.4.2 Access to the work area shall be only as directed by KEH to minimize disruptions to work force.

1.4.3 Keep work area safe and orderly for construction personnel and operating personnel. Clean work area after each work period and stack tools and materials away from traffic areas.

1.5 CONNECTIONS TO EXISTING SYSTEMS

1.5.1 Forty-eight hour notice of work that will affect existing systems shall be given to KEH. Careful planning and scheduling of work activities is required to coordinate operations of existing systems to keep disruptions at a minimum.

1.5.2 As required in Subsection 50.7 of Contract General Conditions, the connection to the existing systems must be scheduled 2 weeks in advance for work to be done. KEH will coordinate the schedule with the Contractor and utility.

1.5.3 The connection must be accomplished within 24 hours.

1.6 ACCESS TO WORK AFTER POSSESSION

1.6.1 Access to warranty work as set forth in Section 24 of Contract General Conditions or access to work after possession as set forth in

Section 20 of Contract General Conditions will be coordinated by KEH with other contractors, and users of the facility. Notify KEH in advance of proposed work to minimize disruptions.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01043

JOB SITE ADMINISTRATION

PART 1 - GENERAL

1.1 REFERENCES: Not Used

1.2 SUBMITTALS: Not Used

1.3 WORKING HOURS

1.3.1 Work shall be performed during regular day shift which is 7:30 a.m. to 4:00 p.m., Monday through Friday, excluding holidays.

1.3.2 Work other than regular day shift requires KEH approval in advance as set forth in Section 51 of Contract General Conditions.

1.4 BADGE, DOSIMETER, AND ORIENTATION

1.4.1 The Work is within a Limited Access Area. Badging, basic dosimeter requirements, and orientation will be in accordance with Section 56 of Contract General Conditions.

1.5 EVACUATION DRILLS

1.5.1 Personnel working inside Limited Access Area are required to participate in emergency evacuation drills which are held approximately once every 3 months and last approximately 1 hour.

1.5.2 Maintain daily log or other suitable record of names of all personnel including subcontractors working inside the Limited Access Area.

1.6 SECURITY

1.6.1 Policy and Procedures: Contractor employees are required to comply with security policy and procedures set forth in Sections 56 and 87 of Contract General Conditions. Copies of Safeguards and Security Manual KEH-MA-6 will be provided to the Contractor upon request after award of Contract.

1.6.2 Security Escorts

1.6.2.1 Contractor personnel not having "5" or "3" security clearance, working within 200 West Limited Area require security escorts. Escorts are provided by KEH at no cost except as set forth in subparagraph 1.6.2.8.

1.6.2.2 Escorts will be assigned from the KEH trailer located outside the 200 East Limited Area near Access Gate 814.

1.6.2.3 The ratio of escorts to uncleared Contractor personnel for the purpose of daily transportation of men and materials to the worksite shall be 1 to 5, irrespective of the type of craft or lower tier companies the 5 personnel represent. For days when the Contractor's total work force is less than 5 people, a maximum of 1 escort will be provided.

1.6.2.4 The ratio of escorts to uncleared personnel at the worksite through the course of a workday shall be the same as set forth in subparagraph 1.6.2.3.

1.6.2.5 Contractor shall provide "pooled" transportation for his uncleared personnel and the KEH escorts into the limited/protected work areas. A maximum of 3 Contractor vehicles for uncleared personnel will be allowed into the limited/protected area at any time. No personal vehicles will be allowed into the limited area under this contract.

1.6.2.6 Parking for personnel and Contractor vehicles not used due to "pooling" of personnel to the worksite shall be available at the escort trailer near 200 East Area Gate 814.

1.6.2.7 Provide a list of Contractor personnel and vehicles to be used inside the limited/protected area and anticipated start and duration of the utilization. Provide the list 1 week before the start of work for escort requirement determination. Provide weekly work schedules of employees, not later than Thursday of the preceding week (minimum 24 hour notice required for changes).

1.6.2.8 The Contractor may be charged when escorts have been requested and the Contractor personnel do not show up at the time and place specified. Charges will be made at the rate of $18 per hour for each escort for time lost waiting for Contractor personnel.

1.6.3 Security Clearances

1.6.3.1 Security clearances for Contractor employees may be provided for this Work and reduce the requirements for security escorts during construction. Requests for "5" clearance will be considered under the following circumstances.

1.6.3.2 Contractor has a contract with KEH for work within a Limited Area and has a minimum of 60 calendar days of onsite work remaining when request for clearance is received.

1.6.3.3 Clearances requested are for full-time employees, including crafts, expected to be employed for duration of Contract.

1.6.3.4 A personnel security questionnaire (PSQ) shall be completed for each person requesting clearance immediately after Contract award or as soon as onsite personnel requirements are known. Personnel security questionnaire forms available upon request.

1.6.3.5 Employees that received security clearances are required to sign a Security Termination Form, furnished by KEH, and return the form with the security badge when their Work is completed or the Contract terminated.

1.7 WORK NEAR ELECTRICAL LINES

1.7.1 In addition to requirements of Subsection 50.2 of Contract General Conditions, when cranes or hoists are operated under or adjacent to existing overhead electrical lines, a standby lineman must be in attendance.

Notify KEH not less than 3 working days before standby lineman is required. The standby lineman will be furnished by KEH at no cost.

1.8 SAFETY REQUIREMENTS

1.8.1 Fire Safety

1.8.1.1 The Contractor is required to address fire safety as part of his construction safety plan as required by Section 55 of Contract General Conditions. The following fire safety requirements are to be incorporated into the construction safety plan.

a. Portable shields shall be utilized wherever the Contractor is welding, cutting, or grinding.

b. Maintain a fire watch a minimum of 1/2 hour after the cessation of welding, cutting, or grinding.

c. Fully charged fire extinguishers shall be available whenever welding, cutting, or grinding.

d. Method to control the ignition of brush fires.

e. Method to comply with requirements for off road driving and grass fire prevention given in Section 01500.

1.8.2 Safety Apparel

1.8.2.1 Personnel shall wear appropriate foot wear in a recognized construction area. Tennis shoes, canvas type shoes, or open toe shoes do not meet this requirement.

1.8.2.2 Personnel, including nonconstruction, shall wear approved eye protection and construction type hardhats when in construction area.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 01050

SURVEY AND FIELD ENGINEERING

PART 1 - GENERAL

1.1 REFERENCES: Not Used

1.2 SUBMITTALS: Not Used

1.3 QUALITY CONTROL

1.3.1 Establishing alignment, support location, and grades shall be the responsibility of a Land Surveyor registered in the State of Washington and acceptable to KEH.

1.3.2 Field notes, records, and documentation shall be available to KEH to review and verify the procedures used and the accuracy of work.

1.4 SURVEY DATA

1.4.1 Basic reference points with coordinate descriptions and bench mark with elevation identified will be located in the field by KEH Representative. Detail surveys shall be by Contractor.

1.4.2 Contractor shall be responsible for the preservation of bench marks and reference points, including stakes or other markers established until removal is authorized by KEH.

1.4.3 From information and dimensions indicated on the construction Drawings, Contractor shall perform survey/layout as required by the Work.

1.5 PROCEDURES

1.5.1 Before initial layout field verify horizontal and vertical data. Report discrepancies to KEH before proceeding.

1.5.2 Establish an adequate number of permanent reference points to be used during construction referenced to original control points. Record locations with horizontal and vertical data on Project Record Documents.

1.5.3 Protect and preserve control points and reference points until work is complete. Report to KEH the loss or destruction of any control point. Report the relocation or change in data affecting the reference points.

1.5.4 Periodically, verify data for each control point, reference point, and construction staking to maintain construction accuracy.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01065

PERMITS

PART 1 - GENERAL

1.1 REFERENCES: Not Used

1.2 SUBMITTALS: Not Used

1.3 FEDERAL, STATE, AND MUNICIPAL LAWS, CODES, AND REGULATIONS

1.3.1 Permits or licenses to do business as required by Federal, State, and Municipal laws, codes, and regulations are the sole responsibility of the Contractor as stated in Section 6 of Contract General Conditions.

1.4 HANFORD SITE PERMITS

1.4.1 General: Before certain types of work can be done at Hanford, the Contractor is required to have a permit. These permits are provided by KEH at no cost to the Contractor; however, the Contractor must furnish information required and must notify KEH in advance of work for which permit is required. The Contractor shall comply with requirements and restrictions set forth in each permit.

1.4.2 Excavation: As set forth in Subsection 50.9 of Contract General Conditions no excavation shall be done without an Excavation Permit. Permit will be issued before start of construction and is for duration of the Work. Post permit at site of Work. In addition to the requirements on the KEH excavation permit, the contractor is required to have GTE locate any buried telephone lines prior to excavation. Telephone 1-800-424-5555.

1.4.3 Backfill Permit: Permit required for each element of fill and backfill and good for 5 days or duration of work element provided Work does not stop for 5 consecutive days. Permit form furnished by KEH shall be completed by Contractor and returned to KEH for approval before starting work. Permit shall be kept at worksite.

1.4.4 Tie-in Permit: A separate permit is required for each utility tie-in and is valid until tie-in is completed. Permits furnished by KEH with 5 days notice. Permit shall be kept at site of Work being performed.

1.4.5 Welding and Cutting Permit: All welding and flame cutting requires welding and cutting permit. Provide welding process to be used 5 days before start of welding for KEH to furnish permit. Permit shall be kept at worksite.

1.4.6 Oversize Load Permit: In addition to Washington State Permit, a site permit is required for each movement of oversize load or vehicle on established roads at Hanford Site. Permit will be furnished by KEH with 48 hour notice of the width, height and length of the oversized load and the proposed route of travel. The Contractor will be requested to verify the

proposed route has been travelled and all limitations (especially, wire or signal height) have been identified. See Section 01500 for vehicles requiring Oversize Load Permit, restrictions on movement, and other requirements.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01100

SPECIAL PROJECT PROCEDURES

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Conference of Governmental Industrial Hygienists (ACGIH)

Latest Edition	Threshold Limit Values

1.1.1.2 Federal Standards (FED STD)

FED-STD-313C	Material Safety Data, Transportation Data, And Disposal Data For Hazardous Materials Furnished To Government Activities

1.1.1.3 Occupational Safety and Health Administration (OSHA)

Code of Federal Regulations (CFR)
Title 29, Labor
Chapter XVII, Occupational Safety and Health Administration, Department of Labor
Part 1910, Occupational Safety and Health Standards

Subpart Z	Toxic and Hazardous Substances

1.1.1.4 Washington Industrial Safety and Health Act (WISHA)

Washington Administrative Code (WAC)

Chapter 173-303 WAC, Dangerous Waste Regulations

173-303-330	Personnel Training

Chapter 296-62 WAC, Occupational Health Standards - Safety Standards for Carcinogens

296-62-07111	Respirable Air and Oxygen for Self-Contained Breathing Apparatus and Supplied Air Respirators

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Hazardous Materials

1.2.1.1 Provide a listing of all hazardous materials prior to using the material at the job site.

1.2.1.2 Provide a material safety data sheet (MSDS) for each material listed.

1.2.1.3 Provide method for storage of materials.

1.2.1.4 Provide method for interim storage of waste.

1.2.2 Fall Protection: Provide a written fall protection plan to be used during building erection, siding, and roof sheeting. The plan must reflect the most current changes in the WISHA fall protection standard. The plan must be site and task specific and include a minimum of the following:

1.2.2.1 Identification of the hazards.

1.2.2.2 Fall protection methods.

1.2.2.3 Procedures for assembly, maintenance, inspection, and disassembly of fall protection equipment.

1.2.2.4 Procedures for handling, storage, and securing of tools and work materials.

1.2.2.5 Methods of providing overhead protection for workers in the area below.

1.2.2.6 Methods of rescuing injured workers at high elevation.

1.2.2.7 Method for training workers and documenting training relative to this hazard.

1.3 HAZARDOUS MATERIAL REQUIREMENTS

1.3.1 Definitions

1.3.1.1 Hazardous material: A material or substance which is determined to be physically or chemically deleterious to the health or well being of an individual because of its toxic, reactive, flammable, or carcinogenic nature. For the most part, a list of these materials may be found in 29 CFR 1910, Subpart Z, and the latest edition of the ACGIH Threshold Limit Values booklet.

1.3.1.2 Hazardous material storage area: A place of accumulation of hazardous materials, in quantities greater than a 1 day supply.

1.3.2 Hazardous materials, whether specified, recommended, or voluntarily requisitioned by the Contractor, shall be governed by the requirements of FED-STD-313 and Section 111 of Contract General Conditions.

1.3.3 Hazardous Waste Handling

1.3.3.1 All hazardous waste materials generated by the Contractor at the job site shall be turned over to KEH for disposal.

1.3.3.2 Contractor personnel who handle, transfer, store or otherwise work with dangerous waste must be trained as required in WAC 173-303-330.

1.3.3.3 Hazardous waste spills must be reported to KEH immediately.

1.3.3.4 After identification of hazardous waste to be generated, a satellite accumulation area will be designated for the Contractor to deposit the waste.

1.3.3.5 Hazardous waste materials must be identified and packaged as approved or directed by KEH.

1.4 Breathing Air Requirements

1.4.1 Breathing air shall be of compressed G-7.1 Type 1 Grade E quality.

1.4.2 Supply systems, including compressors, shall be in accordance with WAC 296-62-07111.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.1 REFERENCES: Not Used

1.2 SUBMITTALS: Not Used

1.3 MEETING PROCEDURES

1.3.1 Representatives from KEH and the Contractor, including major subcontractors, shall participate in all project meetings. Representatives from Operating Contractor and DOE may attend as required by items to be discussed.

1.3.2 Meeting times and locations shall be mutually agreed to by Contractor and KEH and will be held at the Hanford Site in Richland, Washington, except informal design reviews. KEH will issue notices of meetings and prepare meeting minutes which will be distributed to project participants.

1.4 SITE LABOR CONFERENCE

1.4.1 Before starting construction onsite, Contractor and subcontractors shall attend an informational conference on Hanford Site labor requirements applicable to this project. Contractor shall schedule the conference with KEH and identify all crafts for this project. KEH will provide meeting notice to representatives from labor organizations whose members may be utilized in construction and will attend the conference. Contractor shall conduct the meeting and present the proposed work plan and craft utilization. Contract General Conditions relating to labor will be reviewed.

1.5 PRECONSTRUCTION MEETING

1.5.1 Meeting will be scheduled by KEH before start of onsite work. Authorized representatives of Contractor and major subcontractors shall attend and KEH will advise others having an interest in the Work. Meeting will be chaired by KEH.

1.5.2 Following items, as a minimum, will be incorporated into agenda for meeting.

1.5.2.1 Point of contact and key personnel representing Operating Contractor, Safety, QA/QC, Acceptance Inspectors, and Contract Administrators.

1.5.2.2 Schedule requirements and restraints, submittals and work limitations.

1.5.2.3 Safety, construction progress meetings and frequency, and certified payrolls.

1.5.2.4 Report requirements and frequency.

1.5.2.5 Quality requirements.

1.5.2.6 Major material and equipment lists.

1.5.2.7 Other pertinent items.

1.6 CONSTRUCTION PROGRESS MEETINGS

1.6.1 Meetings are held weekly at time and location determined at preconstruction meeting and will be approximately 1 hour long.

1.6.2 KEH will chair the meeting and request attendance of key personnel as required. Authorized representative of Contractor and pertinent subcontractors shall attend.

1.6.3 Purpose of meetings is to monitor status and provide forum for exchange of pertinent information related to the Work. Major topics may include, but not be limited to, the following.

1.6.3.1 Schedule, cost, and construction status.

1.6.3.2 Design and scope changes.

1.6.3.3 Submittal status, key material and equipment delivery status.

1.6.3.4 Potential problem areas.

1.6.3.5 Inspection and testing status.

1.6.3.6 Action item status, goals for next meeting.

1.6.3.7 Other appropriate items.

1.6.4 Meeting minutes will be issued by KEH as promptly as possible following the meeting. Action items will be identified with assigned follow-up. Issues resolved will be reported in the minutes, as well as closed action items.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.1 DESCRIPTION

1.1.1 This Section summarizes submittals required in Part 1 of each section of this Specification. It explains type of submittals required, and describes procedures for submittals and review.

1.1.2 Submittals required in Part 1 of each section are summarized in Article 1.3. Each submittal is identified by Submittal Number, Reference Section, and Title. Submittals are required for either "Review and Approval" or "Review for Record".

1.1.2.1 Submittals requiring review and approval are to receive approval before procurement, fabrication, or construction is started.

1.1.2.2 Submittals requiring review for record are those on which procurement, fabrication, construction or acceptance testing may proceed, but acceptance is contingent upon compliance with Drawings and Specifications.

1.1.3 Supplemental Submittals are initiated by Contractor in accordance with Section 01630 for consideration of substitute products or corrective procedures and require review and approval.

1.2 SUBMITTAL PROCEDURES

1.2.1 Transmit submittals to KEH by Data Transmittal form.

1.2.2 Identify each submittal by Submittal Number, Reference Section, and Title noted in Article 1.3. Number of copies required for retention by KEH are shown in Schedule and include 2 copies to be returned to Contractor. Additional copies required for Contractor uses shall be added.

1.2.3 Review each submittal for completeness, compliance with Contract Documents, and for proper identification before sending to KEH. Submittal data shall either be stamped showing review process has taken place or Data Transmittal form may be signed with statement of "Reviewed for Compliance." Submittals not stamped or signed to show review will be returned without consideration.

1.2.4 Submittals requiring review and approval will be stamped by KEH and marked "Approved", "Approved with Exception" or "Not Approved, Revise and Resubmit." Approval of submittals does not relieve Contractor of responsibility for errors contained therein.

1.2.4.1 Approved submittals are identified by submittal stamp with "Approved" or "Approved with Exception" box checked. "Approved" signifies general concurrence to achieve conformance with design concept of Project and compliance with requirements of Contract Documents. "Approved with Exception" signifies general concurrence with noteworthy comments or

clarifications. Approval of specific item shall not be construed as approval of system or assembly of which item is a component.

1.2.4.2 A submittal which is not approved is identified as "Not Approved, Revise and Resubmit." Submittal is considered by KEH to be technically deficient or incomplete and therefore, unacceptable. Resubmittal is required, hence fabrication, procurement, or performance of procedures shall not proceed.

1.2.4.3 Upon receipt of deficient submittal data, make corrections noted on transmittal and resubmit data to KEH within 10 calendar days.

1.2.5 Materials and equipment fabricated or installed without required approved submittals, or which differ from approved Drawings or vendor data are subject to rejection and replacement at Contractor's expense.

1.2.6 Delays arising from failure to submit, in timely manner, required Drawings, and other related data described in Contract Documents, shall not constitute excusable delays for extensions, unless excusable under other provisions of Contract. Allow 15 calendar days for KEH review and disposition of submittals, including shop drawings and vendor information, required to be furnished. Time period will be measured from date of receipt of submittal in KEH's office to date of return mailing.

1.2.7 Contractor is responsible for dimensions to be confirmed and correlated at Project site.

1.2.8 Submittals for review and record will be reviewed and filed. Incomplete or inaccurate data will be returned marked "Resubmit" with appropriate comments, and items procured or work performed shall be corrected. Payment for equipment will not be made unless required Vendor Information has been furnished.

1.2.9 Supplemental submittals shall contain sufficient data required in Section 01630 to show substantial compliance with Drawings and Specifications. Substitute product submittals shall contain as minimum, outline dimensions, operating clearances, and engineering data. Identify each submittal by Specification Section number and Paragraph number or referenced Drawing number and detail. Improperly identified or incomplete submittals will be returned without consideration.

1.2.10 Procedures for performing certain items of work are required to be submitted for review and approval before work is commenced. Those work procedures which have been approved by KEH for work similar to that to be accomplished on Project may not need to be reapproved. Forward 1 copy of previously approved procedure to KEH by Data Transmittal form and identify by Submittal Number, Reference Section, Title, and either procedure number or project number for which procedure was approved. Submittal will be reviewed by KEH and if acceptable retained for record. If previously approved procedure is not acceptable submittal will be returned with requirements for resubmittal.

1.3 SCHEDULE OF SUBMITTALS

Submittal Number	Submittal Title	Quantity	Review and Approval	Review For Record
CONTRACT GENERAL CONDITIONS				
55.2	Safety Program and Job Safety Analysis	5	5 days before start of work	
55.3	Industrial Injury/ Illness Experience	5		5 days before start of work and each month
55.5.1	OSHA Form No. 200 Report	5		5th working day, each month
55.6	Equipment Certi-fication	5		2 days before bringing equipment onsite
SPECIAL PROJECT PROCEDURES				
01100/1.2.1.1	Hazardous Materials List	5		Prior to delivery
01100/1.2.1.2	MSDS	5		Prior to delivery
01100/1.2.1.3	Method of Storage	5		Prior to delivery
01100/1.2.1.4	Method of Waste Storage	5		Prior to delivery
PROGRESS SCHEDULES				
01310/1.3.1.1	Progress Schedule for First 60 Days	5	10 days after notice of award	
01310/1.3.1.1	Progress Schedule for Duration of Contract	5	30 days after notice of award	

Submittal Number	Submittal Title	Quantity	Review and Approval	Review For Record
PROGRESS SCHEDULES (Continued)				
01310/1.4	CPM Project Schedule	5	30 days after notice of award	
01310/1.5.1	Initial Bi-Weekly Work Schedule	2	10 days after notice of award	
01310/1.5.1	Subsequent Bi-Weekly Work Schedules	2	By noon each Friday	
EARTHWORK				
02200/1.2.1	Method to Prevent Damage During Excavation	5	Before excavation	
HOT-LAID ASPHALTIC CONCRETE PAVING				
02512/1.2.1	Laboratory Reports	5	Before delivery	
PIPED UTILITIES				
02650/1.2.1	Approval Data	5	Before delivery	
02650/1.2.2	Leak/Pressure Test Procedures	5	Before testing	
02650/1.2.3	NFPA Test Certificate	5	Within 10 days after completion	
FIRE WATER SYSTEMS				
02668/1.2.1	Approval Data	5	Before delivery	
02668/1.2.2	Vendor Information	12		Before installation
02668/1.2.3	NFPA Test Certificate	5	Within 10 days after completion	

Submittal Number	Submittal Title	Quantity	Review and Approval	Review For Record
CAST-IN-PLACE CONCRETE				
03300/1.2.1	Certification of Ready Mixed Concrete Production Facilities	5	Before mixing	
03300/1.2.2	Reinforcing Steel Fabricator Drawings	5	Before delivery	
03300/1.2.3	Block Diagram	5	Before installation of forms	
03300/1.2.4	Concrete Materials, Mix Design and Mix Proportions	5	Before mixing	
03300/1.2.5	Cold Weather Concreting	5	Before placing concrete	
03300/1.2.6	Curing Procedure	5	Before mixing	
METAL FABRICATIONS				
05500/1.2.1	Fabricator Drawings for Gratings	5	Before fabrication	
PREFORMED ROOFING AND CLADDING/SIDING				
07400/1.2.1	Fabricator Drawings	5	Before fabrication	
07400/1.2.2	Color Samples	3	Before fabrication	
FLASHING AND SHEET METAL				
07600/1.2.1	Fabricator Drawings	5	Before fabrication	
SEALANTS AND CALKING				
07920/1.2.1	Manufacturer's Installation Instructions	5	Before application	
METAL DOORS AND FRAMES				
08100/1.2.1	Fabricator Drawings	5	Before delivery	

Submittal Number	Submittal Title	Quantity	Review and Approval	Review For Record
OVERHEAD COILING DOORS				
08332/1.2.1	Fabricator Drawings	5	Before delivery	
FINISH HARDWARE				
08710/1.2.1	Hardware List	5	Concurrent with doors and frames	
SPECIAL PROTECTIVE COATING				
09805/1.2.1	Vendor Information	12		Before installation
09805/1.2.2	List of Materials	5	Before delivery	
09805/1.2.3	Certificate of Compatibility	5	Before delivery	
09805/1.2.4	Crew Certification	5	Before application	
09805/1.2.5	Application Instructions	5		Before application
PAINTING				
09900/1.2.1	List of Materials	5	Before delivery	
09900/1.2.2	Color Samples	3	Before delivery	
INTERIOR SIGNS				
10440/1.2.1	Manufacturer's Data	5	Before delivery	
PRE-ENGINEERED STRUCTURES				
13120/1.2.1	Erection Instructions and Diagrams	5	Before delivery	
13120/1.2.2	Certificates of Conformance or Compliance	5	Before delivery	
13120/1.2.3	Color Samples	1	Before delivery	

Submittal Number	Submittal Title	Quantity	Review and Approval	Review For Record
FIRE PROTECTION				
15300/1.2.1	Approval Data	5	Before delivery	
15300/1.2.2	Vendor Information	12		Before instal-lation
15300/1.2.3	Design/Fabricator Drawings	5	Before fabrication	
15300/1.2.4	Seismic Calculations	5	Before fabrication	
15300/1.2.5	Record Drawings	5		Within 10 days after completion
15300/1.2.6	NFPA Test Certificate	5		Within 10 days after completion
HEATING, VENTILATING, AND AIR CONDITIONING				
15500/1.2.1	Approval Data	5	Before delivery	
15500/1.2.2	Vendor Information	12		Before instal-lation
15500/1.2.3	Test Data	5		Within 10 days after test completion
SERVICE AND DISTRIBUTION				
16400/1.2.1	Approval Data	5	Before delivery	
ALARM AND DETECTION SYSTEMS				
16720/1.2.1	Approval Data	5	Before Delivery	
16720/1.2.2	Vendor Information	12		Before instal-lation

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01310

PROGRESS SCHEDULES

PART 1 - GENERAL

1.1 REFERENCES: Not Used

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Rate of Progress Schedule: Submit schedule as required in this Section.

1.2.2 CPM Project Schedule: Submit schedule as required in this Section.

1.3 RATE OF PROGRESS SCHEDULES

1.3.1 Progress schedules as identified in Section 5 of Contract General Conditions shall be submitted for approval, by phase, in accordance with the following.

1.3.1.1 Schedules shall be submitted after receipt of notice to proceed, for a contract phase, as follows:

a. A schedule covering the first 60 calendar days of Contract phase activities, within 10 calendar days.

b. A schedule covering all Contract activities for the duration of the phase, within 30 calendar days. Based on CPM Schedule required in Article 1.4.

1.3.1.2 The progress schedule shall show the order in which the Contractor proposes to carry on the work, the dates on which it will start the several salient features of the work including procurement of materials and equipment and contemplated dates for completion. Each schedule shall be in the form of a horizontal bar chart of suitable scale to indicate the percentage of work scheduled for completion at any time with a separate bar for each activity. At the end of each week or at the end of such other periods of time specified in the Contract, the Contractor shall prepare and submit 1 copy of such chart showing the actual progress at the end of such period.

1.3.2 Organize the schedule to show activities relative to each major subcontractor and supplier. Provide sub-schedule to define critical portions of the entire schedule.

1.3.3 The progress schedule shall include design activities and milestones, delivery date of design documents. Construction activities, progress milestones, and include but not be limited to the following activities.

1.3.3.1 Schedule of activities:

a. Mobilization and bond.

b. Clear and grub site.

c. Install underground water service.

d. Install underground electrical service.

e. Perform building excavation.

f. Form and pour foundation.

g. Pour slab.

h. Erect building.

i. Install roll-up door.

j. Install exhaust fans and louvers.

k. Install sprinkler piping inside the building.

l. Construct riser rooms.

m. Install electrical ground grid.

n. Install building electrical and fire alarm equipment.

o. Perform electrical and fire alarm systems testing.

p. Install CAM units.

q. Test CAM units.

r. Apply special protective coating.

s. Stabilize around building.

t. Gravel and pave roadways.

u. Punchlist and demobilize.

1.3.4 The schedule shall show, as a minimum, the accumulated percentage of completion of each activity and total percentage of work completed as of the last work day of each month.

1.3.4.1 An "S" curve shall be developed from percentage of total work figures and superimposed on the Progress Schedule.

1.3.4.2 A dollar value or percent of total shall be shown next to each activity shown on the schedule. These figures will be the basis for determining the progress payments described in Section 01027.

1.4 CPM PROJECT SCHEDULE

1.4.1 Prepare and submit for approval within 30 calendar days a CPM Project Schedule identifying critical path activities which includes the logical sequence and relationship of activities for engineering, design, submittals, procurement, fabrication, delivery, erection, installation and testing of work covered by each Contract phase.

1.4.2 Activity durations shall be in working days. Activities exceeding 20 working days shall be reduced by identifying logical subactivities. Activity titles shall be self-explanatory with abbreviations shown in a legend on the document. Indicate early start, early finish, late start, late finish, (restraining activities) and total float for activities. Highlight critical path activities to identify the project's critical path.

1.4.3 The CPM Project Schedule shall include but not be limited to the following activities. Reference CPM Schedule: Appended is a reference CPM schedule. This schedule is included to aid the Contractor in developing the CPM required by Paragraph 1.4.

a. All significant engineering functions performed prior to fabrication, such as specific procedures, and shop and field drawings, submitted for approval and approved.

b. Major material acquisitions and delivery.

c. Offsite fabrication and delivery schedules.

d. All lower tier contractor activities.

e. All field installation and nondestructive examination activities.

f. Indications that work for each activity is to be performed on a single, double or triple shift, and that work is to be done on a 5, 6, or 7 day work week basis.

g. Identification of inspection (hold) points.

h. Manpower loading and leveling.

i. Milestones indicating interface requirements with construction activities performed by others.

1.5 BI-WEEKLY WORK SCHEDULE (Two Week Look Ahead)

1.5.1 The Contractor shall prepare and submit 2 copies of a detailed schedule of the next 2 week's work no later than noon of each Friday. The first work schedule shall be submitted within 10 working days after receipt of the written notice of Contract award for review and approval. The schedule shall include the following as a minimum.

a. Work description.

b. Location of work.

c. Work involving outages, overtime, weekends, etc.

d. Inspection requirements.

1.6 REVISIONS TO SCHEDULES

1.6.1 Whenever KEH determines that there is a significant variance between actual and scheduled progress, endangering completion within the Contract completion time, KEH may require that Contractor prepare and submit a revised CPM and progress schedule.

1.6.2 Indicate progress of each activity to date of submittal and projected completion date of each activity. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

1.6.3 Provide narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken, or proposed, and its effect, including the effect of changes on schedules of separate contractors.

1.6.4 Distribute copies of revised schedules to jobsite file, subcontractors, suppliers, and other concerned entities. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in revised schedules.

1.6.5 If the Contractor fails to submit the progress schedule specified in Paragraph 1.3.1 within the time prescribed, or the updated progress schedule specified in Paragraph 1.6.1, within the requested time, KEH may withhold approval of progress payments until such time as the Contractor submits the required progress schedules.

PART 2 - PRODUCTS

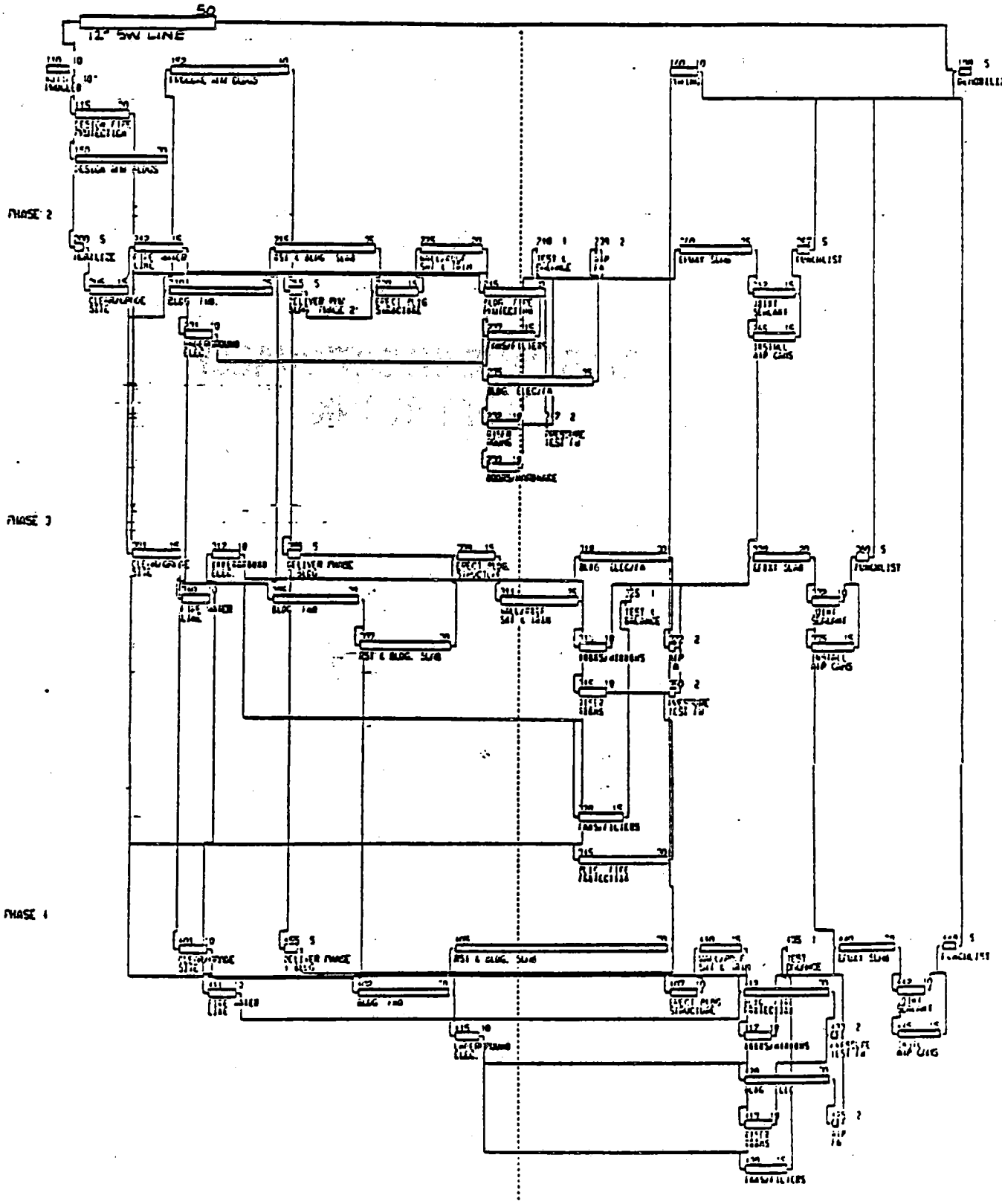
Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

APPENDIX A



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SECTION 01400

QUALITY ASSURANCE

PART 1 - GENERAL

1.1 REFERENCES: Not Used.

1.2 SUBMITTALS: Not Used.

1.3 INSPECTING AND TESTING

1.3.1 In accordance with Section 19 of Contract General Conditions, perform following.

1.3.1.1 Section 02668, Leak Testing.

1.3.1.2 Section 05500, Visual Weld Examination.

1.3.1.3 Section 09805, Concrete Surface Inspection.

1.3.1.4 Section 09900, Surface Inspection.

1.3.1.5 Section 13120, inspect final installation of pre-engineered structures.

1.3.1.6 Section 15300, Leak Testing.

1.3.1.7 Section 15500, HVAC Testing.

1.3.1.8 Section 16400, Electrical Testing.

1.3.1.9 Section 16720, Electrical Testing.

1.3.1.10 Section 16720, Acceptance Test Procedure (ATP).

1.3.2 In accordance with Section 19 of Contract General Conditions, KEH will perform following.

1.3.2.1 Testing to determine moisture density relations and field in-place density of soils.

1.3.2.2 Sampling and testing of asphalt concrete pavement.

1.3.2.3 Preparation, collecting, and testing of concrete specimens.

1.3.2.4 Testing of special protective coating.

1.3.2.5 Dc testing of new cable at receipt.

1.3.2.6 Cable and transformer testing after installation.

1.3.2.7 Witness specific inspection and witness points.

1.3.2.8 Perform final acceptance inspection.

1.3.3 Specific Inspection and Witness Points

1.3.3.1 Adhere to inspection points required. Ensure personnel have completed inspections of and approved portions of work in accordance with Contract requirements before notifying KEH.

a. Specific inspection and witness points are defined as follows.

1) Construction inspection (H): Required for witnessing of specific construction features, before further construction is allowed to proceed.

2) Receiving (R): Special items of fabrication, equipment, or material scheduled to be delivered to Project site or other designated location which require inspection upon arrival. Notify KEH within 4 hours after arrival of item.

3) Witness (W): Selected for inspection at option of KEH. Work may proceed upon verbal release by KEH or upon expiration of 1 hour beyond scheduled time of witness.

b. H, R, and W points apply to onsite work. Except where longer period is specified, notify KEH at least 4 working hours before each point for onsite work.

1.3.3.2 H, R, and W points are for following items and stages of work.

SITEWORK

<u>Earthwork</u>

H - All compaction procedure demonstration
H - All backfilling operations

<u>Road Subgrade And Granular Base</u>

H - All compaction procedure demonstration
H - All backfilling operations

<u>Hot-Laid Asphaltic Concrete</u>

H - All compaction procedure demonstration
H - All compaction testing of hot-laid asphaltic concrete pavement

<u>Fire Water Systems</u>

H - Initial flushing
H - All hydrostatic testing

CONCRETE

Cast-In-Place Concrete

H - All concrete placement
H - Initial grout placement

METALS

Metal Fabrications

H - Initial welding

THERMAL AND MOISTURE PROTECTION

Sealants And Calking

H - Initial application of sealants and calking on concrete floor

FINISHES

Special Protective Coating

H - Prior to initial application

SPECIAL CONSTRUCTION

Pre-Engineered Structures

H - Initial erection of pre-engineered structures

MECHANICAL

Fire Protection System

H - All flushing of piping
H - All pressure testing of piping

Heating, Ventilating, And Air Conditioning

R - Arrival of wall exhauster
H - All testing of HVAC system

ELECTRICAL

Service And Distribution (600-Volts And Below)

H - Initial cable pull
H - Initial exothermic welding

H - All meggering of conductors rated 600 volts and used for services, feeders or branch circuits over 150 volts to ground, phase-to-phase, and phase-to-ground
W - All remainder electrical testing
H - Final closure of all electrical enclosures

Alarm And Detection Systems

W - All continuity testing of fire alarm circuits
H - All acceptance test procedures

1.4 OPEN ITEM DEFICIENCY AND NONCONFORMANCE REPORTING

1.4.1 KEH utilizes open item deficiencies and nonconformance reports to document deviations from Contract requirements.

1.4.1.1 Open item deficiency: Documented on open item lists available from KEH on request. Can be corrected by Contractor without additional direction. Correction shall bring item into compliance with Contract requirements, using approved rework procedures or standards without violating application specifications, codes, or standards.

1.4.1.2 Nonconformance report: Documented on nonconformance report (NCR). NCRs document deviations from Contract requirements when characteristic, documentation, or procedure renders quality of item or activity unacceptable or indeterminate. NCRs are identified by red construction hold tags or blue NCR tags. A hold tag prohibits movement, installation, processing or further fabrication of nonconforming items pending approval of NCR disposition. An NCR tag identifies nonconformance but allows work to proceed based on an approved NCR disposition. No action shall be taken to correct or alter actual condition before receipt of approved disposition. Tags are not to be removed by anyone other than agency who applied tag.

1.4.2 Contractor shall ensure its organization is represented by individuals with sufficient authority to commit Contractor to corrective action requirements identified by KEH.

1.4.3 Open item deficiencies and nonconformances reported during performance of Contract require resolution before completion and final payment.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 National Fire Protection Association (NFPA)

NFPA 701	Standard Methods of Fire Tests for Flame-Resistant Textiles and Films, 1989 Edition

1.1.2 Washington State Department of Transportation (WSDOT)

M41-10-88	Standard Specifications for Road, Bridge, and Municipal Construction

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.3 CONSTRUCTION FACILITIES

1.3.1 First Aid: Facilities are available at Building 2719WA in the 200 West Area to provide first line medical attention.

1.3.2 Operation and Storage Areas: The onsite operations of the Contractor including storage of materials shall be confined to area adjacent to the worksite as designated in the field by KEH.

1.3.3 Disposal Site for Waste: Disposal of excess excavation, broken asphalt, and broken concrete shall be at a site approximately 12 road miles from the project location. The disposal site is open only during regular working hours as stated in these Contract Documents.

1.4 TEMPORARY UTILITIES

1.4.1 Water

1.4.1.1 Construction water

a. Water for construction purposes will be made available from a hydrant adjacent to the worksite. Hauling, dispensing, and temporary piping shall be at the Contractor's expense. Fittings furnished by the Contractor for connection to the water source must be approved by KEH before installation. The Contractor shall remove all temporary piping, hoses, fittings, and valves before final acceptance of the work.

b. Water will be made available from an existing hydrant in the vicinity of each worksite. A 4-1/2 inch, National Standard Thread, 1/4 turn ball valve with a female swivel to a 4-inch sexless "Snap-Tite/Storz" quick connect coupling shall be connected to the 4-1/2 inch port for Fire Department use only. A reduced pressure backflow preventer, BEECO-AERGAP

Model 6CM or approved, and a slow-opening 2-1/2 inch gate valve shall be installed on each hydrant port intended for construction use. A slow-opening valve will prevent water hammer. The hydrant wrench, backflow preventers and all valves shall be furnished by the Contractor. The wrench shall remain on the hydrant at all times. When used, the hydrant shall be turned "Full-on" or "Full-off". Partial opening causes damage to the hydrant. The hydrant shall be turned off at the end of each work day. The Contractor shall provide freeze protection for the hydrant and temporary piping or hoses. All temporary pipe or hose extensions shall be furnished by the Contractor. Fittings provided by the Contractor for connection to water source shall be approved by KEH prior to installation. Before final acceptance of the contract work, the Contractor shall remove all temporary piping, hoses and valves installed by him.

NOTE: Contractor is required to notify KEH prior to each opening of hydrant.

1.4.1.2 Drinking water: Water for drinking purposes will be made available within the 200 West Area. The Contractor is responsible for furnishing adequate drinking water to his employees that conforms to health and safety requirements.

1.4.2 Electrical Power: Temporary power 240-120V ac will be made available at a power pole near the site assigned for the field office. All power lines or cable extensions, including transformers, protective equipment, switches, and fixtures beyond the point of supply shall be furnished by the Contractor. All temporary installations made by the Contractor shall be removed upon completion of construction under this contract.

1.4.3 Telephone

1.4.3.1 The telephone system within the Administratively Controlled Area at the Hanford Site is operated by General Telephone Company of the Northwest, Inc. Upon request of the Contractor, KEH will arrange for telephone service at the construction offices of the Contractor and its subcontractors, if facilities for such services are available. KEH will charge the Contractor for installation and services in accordance with the charge assessed by General Telephone Company. Those charges will be determined on the basis of published tariffs. Information of tariffs may be obtained from DOE's Site Services Contractor, office of the Manager of the Plant Telephone and Radio, Telephone 376-6322.

1.4.3.2 All of the above charges will be deducted from payments due the Contractor. The Contractor and its subcontractors may use provided telephones for long distance calls necessary to the performance of the work. All such calls must be made by use of a valid credit card and the cost of such calls shall not be charged to the Site Services Contractor or KEH.

1.4.4 Sanitary Facilities: The Contractor shall furnish and service chemical or other approved sanitary toilets for use of his employees. The facilities shall conform to requirements of KEH which are available upon request.

1.5 ACCESS ROADS AND PARKING AREAS

1.5.1 Access to 200 East Area shall be through Access Gate No. 814. Access to 200 West Area shall be through the main gate.

1.5.2 Parking for Contractor's company vehicles will be made available in the vicinity of the work outside the limited area. "No Parking" signs are posted to indicate fire and emergency lanes. No on-street parking will be allowed.

1.5.3 Grass Fire Prevention: To reduce the potential for grass fires, all off-road driving shall be kept to a minimum. Each vehicle driving off-road or to remote locations, shall carry a portable fire extinguisher (10 pound ABC dry chemical, minimum), communications equipment consisting of a two-way radio or mobil phone (CB type radios are not acceptable) and a shovel. All fires shall be reported immediately to the nearest Hanford Patrol and the Hanford Fire Department.

1.6 TEMPORARY CONTROLS

1.6.1 Dust Control: The Contractor shall maintain all work areas to prevent a hazard or nuisance to others. Dust control shall be accomplished by sprinkling or other methods as approved by KEH. Sprinkling shall be repeated at such intervals to keep all parts of the disturbed area at least damp at all times, and the Contractor must have sufficient equipment on the job to accomplish this. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs. No separate or direct payment will be made for dust control and the cost thereof shall be considered incidental to and included in the Contract price.

1.6.2 Temporary Enclosures: Plastic sheeting materials used to form enclosures shall have minimum thickness of 14 mils and have fire retardant capabilities meeting the requirements of NFPA 701. Acceptable manufacturers are Winman Corporation (Plastic Division), St. Cloud, Minnesota; Lancs Industries, 1270 N.E. 124th Street, Kirkland, Washington 98034; and Protective Plastics, Inc. 230 Silver Creek Road, Greer, South Carolina 29651. Other manufacturers may be submitted to KEH for approval.

1.6.3 Traffic Control: Temporary traffic control and barricades shall be in accordance with WSDOT M41-10, Section 1-07.23(3).

1.6.3.1 Movement of vehicles and equipment: Slow moving vehicles and equipment shall not travel on Hanford Site roads during heavy traffic periods between 6:30 A.M. and 8:00 A.M., and 3:30 P.M. and 5:30 P.M. Vehicles and equipment shall not block existing roads or park on roadway shoulders.

1.6.3.2 Oversize load or vehicle: Travel of oversized load or vehicle is restricted to the hours between 9:00 A.M. and 2:30 P.M. Site permit

specified in Section 01065 is required when the load or vehicle exceeds the following dimensions:

- Width 8 feet 6 inches
- Height 14 feet
- Length 40 feet (Single unit)
  48 feet (Single trailing unit)

a. Oversized Load Identification: All vehicles or loads exceeding 8 feet 6 inches in width shall have an oversized load sign displayed on the front of the towing vehicle and on the rear of the trailing unit. Red flags shall be attached to each corner of the oversized load or vehicle.

b. Escort Vehicle(s): Escort vehicles shall be equipped with oversized load signs and amber lights. On two-lane highways, escort vehicles are required in the front and rear of a load or vehicle over 10 feet wide. For multiple-lane highways, an escort vehicle is required in the rear of a load or vehicle over 14 feet wide and on the front and rear of a load or vehicle over 20 feet wide.

c. Electrical Escort: A qualified electrical escort (journeyman lineman) is required when the load or vehicle reaches a height of 14 feet or higher from the road surface, or when a clearance of at least 6 feet cannot be maintained from overhead electrical or signal lines.

1.7 FIELD OFFICE

1.7.1 A field office equipped and staffed to conduct efficiently the work under this Contract shall be established by the Contractor. A copy of all Drawings, Specifications and other information pertinent to the proper and efficient prosecution of the Contract work shall be kept by the Contractor at this office, and the authorized representative of KEH shall have access thereto at all times. Telephone service will be made available at the Contractor's field office as set forth in Paragraph 1.4.3 providing such service is available. The Contractor may utilize existing telephones at buildings to be designated in the field by KEH for local calls.

1.7.2 All portable or relocatable structures, including trailers utilized by Contractor for field offices or storage shall be anchored or tied down to prevent overturning and lateral movement in winds up to 70 mph. The underfloor area shall be enclosed or skirted with material that will not burn or support combustion. The purpose of this requirement is for prevention of wind-blown debris accumulation and the use of underfloor space for material storage. Anchoring and enclosure shall be in accordance with anchoring and enclosure methods submitted and shall be completed within 14 days of arrival on site.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

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SECTION 01610

DELIVERY, STORAGE, AND HANDLING

PART 1 - GENERAL

1.1 REFERENCES: Not Used

1.2 SUBMITTALS: Not Used

1.3 RAILROAD AVAILABLE

1.3.1 Railroad shipments are possible into the boundaries of the Hanford Site. If the Contractor elects to utilize rail transportation the shipments shall be accomplished in accordance with this Section.

1.3.2 Carload shipments may be made to Richland, Washington, over Washington Central Railroad from Burlington Northern or Union Pacific Railroads. KEH will arrange for movement of rail cars from Richland to any available spurs or sidings on the Government owned railroad system within the Hanford Site. KEH is not liable for demurrage charges, or for loss or damage to the car or lading, unless loss or damage is due to the fault or negligence of KEH.

1.3.3 The Contractor shall make his own investigation as to availability of rail spurs or sidings in the vicinity of the worksite. Use of spurs will
be coordinated with other users at the Site. The Contractor shall notify KEH not less than two working days before the scheduled arrival of carload shipments.

1.3.4 Equipment and labor required for unloading, transporting, and handling shall be furnished by the Contractor. Each carload must be unloaded within three working days after arrival, unless time extension is granted by KEH.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 01630

PRODUCT OPTION AND SUBSTITUTION

PART 1 - GENERAL

1.1 REFERENCES: Not Used

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.3 GENERAL

1.3.1 Products include material, equipment and systems and shall meet the requirements of the Specifications and referenced standards.

1.3.2 Material and workmanship shall meet requirements of Section 13 of the Contract General Conditions.

1.3.3 Components required to be supplied in quantity within Specification sections shall be the same and be interchangeable.

1.3.4 Do not use materials and equipment removed from existing structure, except as specifically required, or allowed, by Contract Documents.

1.4 PROCEDURES

1.4.1 Submittal of Substitution Approval Request Form 1151.00, sample appended, is not required when product is specified by reference standards, or by description, and proposed product meets the standards or complies with the description.

1.4.2 Submittal of Form 1151.00 is required when product is specified by naming models of one or more manufacturers, and product is not named, and not similar to those named.

1.4.3 Limitations on Substitutions

1.4.3.1 Substitutions will not be considered when indicated or implied on fabricator drawings or product data submittals without separate formal request, when requested directly by subcontractor or supplier, or when acceptance will require substantial revision of Contract Documents.

1.4.3.2 Substitute products shall not be ordered or installed without written acceptance.

1.4.3.3 Only one request for substitution for each product will be considered. When substitution is not accepted, provide specified product.

1.4.3.4 KEH will determine acceptability of substitutions based on technical requirements and cost related to substitution incurred by KEH.

1.4.4 Requests for Substitutions

1.4.4.1 Submit separate request for each substitution using Form KEH 1151.00. Document request with complete data substantiating compliance of proposed substitution with requirements of Contract Documents.

1.4.4.2 Identify product by Specification Section and Article or Paragraph numbers. Provide manufacturer's name and address, trade name of product, and model or catalog number. List fabricators and suppliers as appropriate.

1.4.4.3 Attach as minimum product data specified in Section 13 of the Contract General Conditions.

1.4.4.4 Give itemized comparison of proposed substitution with specified product, listing variations, and reference to Specification Section and Article or Paragraph numbers.

1.4.4.5 Give quality and performance comparison between proposed substitution and specified product.

1.4.4.6 List availability of maintenance services and replacement materials.

1.4.4.7 State effect of substitution on construction schedule, and changes required in other work or products. If substituted product requires or necessitates revisions to structures, foundations, footings, services, systems, piping, electrical, etc, cost of engineering and construction shall be borne by Contractor. Contractor shall submit for approval drawings, calculations, and vendor data which clearly show revisions to accommodate substitution.

1.4.5 Contractor Representation

1.4.5.1 Request for substitution constitutes representation that Contractor has investigated proposed product and has determined it is equal to or superior to specified product.

1.4.5.2 Contractor shall provide same warranty for substitution as for specified product.

1.4.5.3 Contractor shall coordinate installation of accepted substitute, making changes required for work to be completed.

1.4.5.4 Contractor waives claims for additional costs related to substitution which may later become apparent.

1.4.5.5 Contractor waives claim for additional performance time resulting from product substitution.

1.4.6 Submittal

1.4.6.1 Submit 13 copies of request for substitution.

1.4.6.2 KEH will review Contractor's request for substitutions with reasonable promptness.

1.4.6.3 For accepted products, submit fabricator drawings, product data, and samples required in Section 01300.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

KAISER ENGINEERS HANFORD	SUBSTITUTION APPROVAL REQUEST

From (Contractor) _____ Contract No. _____

Project _____

Description of Proposed Substitution _____

_____

We hereby submit for consideration the following product instead of specified item for above project:

Specification No. _____ Section _____

Drawing No. _____ Section or Zone _____

Specified Item _____

Proposed Substitution _____

Attach complete technical data, including laboratory tests and samples, as applicable.

Provide detailed comparison of the significant qualities (system performance, interface requirements, size weight, durability, performance and similar characteristics, and including visual effect where applicable) for the proposed substitution of comparison with the original requirements.

Describe other changes to drawings and specifications required by proposal as outlined below and attach additional information as necessary.

Complete Each Item

A. Changes to drawing dimensions _____

_____

B. Effect of substitution on other systems _____

_____

C. Outline differences between proposed substitution and specified item _____

_____

_____

D. Manufacturer's guarantees of proposed and specified items are:

_____ Same _____ Different (explain on attachment)

Undersigned attests function, and quality equality equivalent or superior to specified item and has reviewed General Conditions paragraph GC-13 for assignment of responsibility if the substitution is approved.

Submitted By	Signature	
Address		Date
		Phone

KEH-1151.00 (10/87)

SAMPLE

END OF SECTION

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 REFERENCES: Not Used

1.2 SUBMITTALS: Not Used

1.3 RECORD REQUIREMENTS

1.3.1 The nature of the work at the Hanford Site requires that certain documents, as defined herein, be held to record the construction process and the administration of the Contract. KEH is responsible for assembling all pertinent data for final disposition. The Contractor is responsible for preparing, preserving, and delivering those Project Record Documents to KEH required by this Contract. These documents are in addition to those submittals required in Section 01300.

1.3.2 Project Record Documents shall be marked by the Contractor to identify those copies for record and to prevent their use for construction. Record copies of construction documents shall be kept in the Contractor's Field Office and shall be available to KEH during the progress of the work.

1.3.3 Some data required for Project Records are delivered to KEH during the course of construction and contract administration, while other required records are assembled after completion of construction for delivery to KEH. In all situations the Contractor is required to document the delivery by retaining a copy of reports delivered during course of work until construction completion, retaining a copy of letter of transmittal itemizing delivered items, or other means acceptable to KEH.

1.4 PROJECT RECORD DOCUMENTS

1.4.1 General: The documents required for Project Record are itemized herein. Each document shall be identified by Title or Number and shall be complete. All notes or markings added by hand shall be legible utilizing a permanent non-smearing marking media, such as ink or felt tip markers, in contrasting color.

1.4.2 Storage and Marking: One set of Drawings and the Contract Documents, including Addenda and Modifications to the Contract, shall be stored in the Field Office apart from documents used in construction and shall be maintained in a clean, dry, and legible condition. Legibly mark each item to record actual construction, including changes to dimensions and details, manufacturer's name, catalog number, and substitute products.

1.4.3 Certified Payrolls: Each week certified payrolls, as required by Section 108 of the Contract General Conditions, shall be filed with KEH and copies kept in Field Office until Contract completion. No progress payments will be processed unless all certified payrolls for the work period have been received by KEH.

1.4.4 Daily Force and Equipment Report: Before noon each day, the Contractor shall furnish to KEH one copy of a detailed Daily Force Report covering all labor and supervision of the Contractor and each of his lower tier contractors for the previous day. The report shall include a general description of the work performed and list major items of equipment on-site.

1.4.5 Weekly Manpower Report: A weekly manpower report completed daily and submitted weekly (before 10:00 a.m. on Monday for the previous week) is required during the performance period of subject Contract. Forms for Contractor's use in documenting the foregoing will be furnished by KEH.

1.4.6 Backfill Permits: Retain all backfill permits approved for the work as required in Section 02200.

1.4.7 Soil Compaction Procedure: Retain all Forms KEH-382 completed for the work as required in Section 02200 and Section 02235.

1.4.8 Soil and Asphalt Tests: If the Contractor elects to test any soil or asphalt or to have independent test performed, copies of such tests shall be given to KEH.

1.4.9 Pour Slips: After obtaining KEH approval of concrete pour slip required in Section 03300, give copy to KEH and retain Contractor copy until Contract closeout and then forward to KEH.

1.4.10 Trip Tickets: Deliver to KEH with each truck load of concrete as required in Section 03300 and retain Contractor copy until Contract closeout and then forward to KEH.

1.4.11 Concrete Tests: If the Contractor elects to test concrete or to have independent tests performed, copies of such tests shall be given to KEH.

1.4.12 Visual Weld Inspection Documentation: Provide documentation of inspections.

1.4.13 Surface Inspection: Provide documentation that surfaces to be coated are satisfactory.

1.4.14 Pre-engineered Structures: Final inspection documentation.

1.4.15 Electrical Test Reports: Provide reports of all tests as required in Sections 16300, 16400, and 16720.

1.4.16 Product Samples and Manufacturer's Instructions: In addition to submittals required in Section 01300 and requirements of this Section, any information received by the Contractor from suppliers that can document products used and how products were installed shall be forwarded to KEH for Project Records.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

D 653-88	Standard Terminology Relating to Soil, Rock, and Contained Fluids

1.1.1.2 Washington Industrial Safety and Health Act (WISHA)

Washington Administrative Code (WAC)

Title 296, Labor and Industries
Chapter 296-155 WAC, Safety Standards for Construction Work

Part N	Excavation, Trenching, and Shoring

1.1.1.3 Washington State Department of Transportation (WSDOT)

M41-10-88	Standard Specifications for Road, Bridge, and Municipal Construction

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Method to Prevent Damage During Excavation: Submit procedures proposed to prevent overstressing existing structures or interrupting service to existing facilities.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 General: Obtain select soils from excavation or other designated locations. Obtain on-site approval for soils.

2.1.2 Fill or Backfill

2.1.2.1 Structural: Well graded soil mixtures which may contain cobbles up to 3 inches in greatest dimension if uniformly distributed and not constituting more than 20 percent of volume of fill.

2.1.2.2 Common: Well graded soil mixtures containing cobbles up to 8 inches in greatest dimension if uniformly distributed and not constituting more than 40 percent of volume of fill.

2.1.3 Bedding for Underground Pipe and Conduit: Sand, defined in ASTM D 653 or excavated sandy material having less than 20 percent by volume gravel particles and maximum dimension of 1/2 inch.

2.1.4 Stabilization: Gravel, in accordance with WSDOT M41-10, Section 9-03.9(3), Top Course.

2.1.5 Plastic Sheet Marker: 6 inch wide detectable tape similar to "Terra Tape D" manufactured by Griffolyn Co, Inc. Tape shall be imprinted with warning such as "Caution Buried Installation Below" at intervals of not more than 4 feet.

PART 3 - EXECUTION

3.1 EXCAVATION

3.1.1 Before performing excavation, obtain excavation permit. Excavation permits will be furnished as set forth in Section 01065.

3.1.2 Locate and expose underground utilities by hand tools. Use of heavy equipment and machinery is subject to approval of KEH.

3.1.3 Slope sides of excavations or trenches more than 4 feet deep in accordance with WISHA Chapter 296-155 WAC, Part N, Table N-1.

3.1.4 Shore excavations more than 4 feet deep and with sides sloped steeper than 1-1/2 horizontal to 1 vertical. Install shoring as excavation progresses and remove as backfilling is accomplished.

3.1.5 Do not store excavated or other material closer than 2 feet from edge of excavation unless barrier is erected to retain excavated materials. Store and maintain materials in manner that they are prevented from falling or sliding into excavation.

3.1.6 Wherever slopes of excavations will intersect existing underground lines or structures such as building foundations, underground piping, electrical ducts or direct buried electrical lines, install shoring or other means of support to prevent overstressing existing structure or underground lines or to prevent interrupting service to existing buildings.

3.1.7 Footings and Foundations

3.1.7.1 Make excavations for footings to depth shown on the Drawings or to further depth as necessary to provide undisturbed surface to receive footing. Make excavations to proper width with allowances made for forms and bracing. Make bottom of excavations compact, level, true, and free of loose material.

3.1.7.2 If over-excavation occurs where footings are designed to be placed on undisturbed earth, correct at time of placing concrete by

extending concrete down to undisturbed earth, or by placement of backfill, compacted in accordance with subparagraph 3.2.1.2b, Method C.

3.1.8 Trenches for Underground Piping and Conduit

3.1.8.1 Make excavations to line and grade shown on the Drawings and wide enough to make connections. Excavate with near vertical sides from bottom of trench up to 1 foot above utility lines. Excavate trench deep enough to permit placement of compacted sand bedding, 4 inches minimum thickness, beneath lines except where excavation is in undisturbed sand which will serve as bedding or where lines are to be encased in concrete. Pare holes in trench bottoms for pipe couplings so pipe will bear full length of barrel or section.

3.1.8.2 Install shoring to hold materials and surcharge pressure for full depth of trench.

3.1.8.3 Keep trenches free of standing water when laying is in progress.

3.1.8.4 If over-excavation occurs, correct by placement of structural backfill.

3.1.9 Where stabilization is required, finish subgrade 3 inches below elevations shown on the Drawings.

3.2 INSTALLATION

3.2.1 Fill and Backfill

3.2.1.1 General

a. Backfill Permit: Do not start fill or backfill without approved permit as set forth in Section 01065.

b. Remove debris and organic matter from area to be filled or backfilled.

c. Use only select materials for fill or backfill. Keep materials free of frozen particles, lumps, organic matter and trash.

d. Do not place fill or backfill on frozen ground.

e. Filling or backfilling by sluicing or flooding with water will not be permitted.

f. Bring fill or backfill up evenly on sides of walls, structures and utility lines to avoid unbalanced loading.

g. Do not place fill or backfill against concrete structure or foundation wall less than 14 days after completion of structure or wall unless written permission from KEH is obtained. Provide wall support, where noted on the Drawings, before filling or backfilling.

3.2.1.2 Structural

a. Before placement of fill or backfill, demonstrate, to KEH by physical test at site, that procedure proposed for installation and compaction of soils will provide degree of compaction specified. Prepare "Soil Compaction Procedure" Form KEH-382, sample appended, in accordance with printed instructions. Forms will be furnished by KEH.

b. Place backfill in accordance with WSDOT M41-10, Section 2-03.3(14)C and approved procedure as follows.

1) Use Method C under foundations, slabs and pipelines.

2) Use Method B under pavements and roads, and within 5 feet of buildings, fences, other structures, or poles supporting electric lines or pipe.

c. Compaction control tests will be in accordance with WSDOT M41-10, Section 2-03.3(14)D.

3.2.1.3 Common

a. Place fill or backfill in layers not more than 12 inches thick, loose measurement.

b. Compact each layer, full width, by at least 1 pass of vibratory or rammer type compactor, pneumatic-tired roller, loaded scraper wheel, grader wheel or power roller.

c. Mound over top layer of backfill to depth of 1 inch for each 12 inches of trench depth to maximum mound height of 6 inches.

3.2.1.4 Underground piping and conduit trenches

a. Bedding placed beneath utility lines in trenches shall be material meeting the requirements of Paragraph 2.1.3.

b. Place and compact bedding in trench prepared according to subparagraph 3.1.7.1 before laying utility lines. Compact bedding as specified for structural backfill.

c. Place backfill over joints in underground pipes only after pressure testing of line has been completed.

d. Backfill under conduit and haunches of pipe, around sides, and up to one foot above top of pipe or conduit with bedding material. Place and compact material same as specified for structural backfill. Compact with care, to avoid misalignment of pipe and provide uniform bearing along barrel of pipe.

e. Backfill utility trenches from elevation 1 foot above top as follows.

1) For locations specified in subparagraph 3.2.1.2, use structural backfill.

2) Use common backfill in accordance with subparagraph 3.2.1.3 for other locations.

f. Do not allow heavy construction equipment to pass over buried lines until at least 2 feet of backfill has been placed over line or until bridging has been placed across trenching and approved by KEH.

3.2.2 Plastic Sheet Marker: Place continuous over buried utility lines. Place marker tape directly over line and 1 foot below finish grade. Place marker over each outside pipe of multiple lines. Place intermediate markers at maximum of 4 feet apart.

3.2.3 Finish Grading and Stabilization

3.2.3.1 Rake area disturbed by work, remove surface stones larger than 6 inches and dispose of excess material and debris at area designated by KEH.

3.2.3.2 Stabilize area disturbed by work and as indicated on the Drawings with 3 inch course of gravel meeting the requirements of Paragraph 2.1.4. Finish stabilization course to elevations shown on the Drawings.

3.3 FIELD QUALITY CONTROL

3.3.1 Soil Compaction Tests: Sampling and testing of compacted fill and backfill will be performed by KEH.

SOIL COMPACTION PROCEDURE

A

Project Number	Project Title	Date

Contract Number	Procedure Number	Location of Demonstration

REQUIREMENTS	EQUIPMENT DEMONSTRATED
Applicable Spec./Dwg.	Type
Compaction Required %	Manufacturer
Maximum Lift Size	Model

B

LABORATORY SOIL TEST RESULTS

☐ Non-granular Materials (WSDOT Test Method No. 609)
Maximum Density _____ Moisture % _____

☐ Granular Materials (WSDOT Test Method No. 606-A)
☐ Density Chart Attached

☐ In-Situ
Density _____

C

COMPACTION DEMONSTRATION TEST RESULTS

Formula for Percent Compaction: $\frac{\text{dry density}}{\text{max density}} \times 100 = \text{Percent Compaction}$

No. of Passes	Depth of Lift	Percent Moisture	Lbs/ft³ Dry	Maximum Density	Percent Compaction	Accept	Reject

Observations or Comments

SAMPLE

TEST METHOD USED FOR DEMONSTRATION

☐ Nuclear Gage (ASTM D2922 & D3017)

☐ Other _____

D

Contractor Representative		Date
Engineer/Constructor Inspector		Date

KEH-0382.00 (03/89)

INSTRUCTIONS

This Soil Compaction Procedure form, when approved by the Engineer/Constructor Inspector, documents witnessing and verifying the compaction procedure.

Section A is the responsibility of the Construction Contractor. It is to be completed at the time of backfill compaction demonstration and presented to the Engineer/Constructor Inspector.

Section B is completed by the Engineer/Constructor Inspector. Data entered is obtained from the agency or individual that performed testing.

Section C is completed by the Engineer/Constructor Inspector as the demonstration is performed. Using the applicable formula, the percent compaction achieved is determined and entered. Acceptance is based on the results as compared with the compaction percent required in Section A.

Section D is signed and dated by the Construction Contractor Representative acknowledging responsibility for this procedure and compliance thereto for applicable backfill operations. Section D is signed and dated by the Engineer/Constructor Inspector to signify witnessing and verification.

KEH-0382.00R (03/89)

END OF SECTION

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SECTION 02235

ROAD SUBGRADE AND GRANULAR BASE

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 Washington State Department of Transportation (WSDOT)

M41-10-88	Standard Specifications for Road, Bridge, and Municipal Construction

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Subgrade Fill and Backfill

2.1.1.1 General: Obtain select soils from excavation or other designated locations. Obtain on-site approval for soils.

2.1.1.2 Fill or backfill: Well graded soil mixtures which may contain cobbles up to 3 inches in greatest dimension if uniformly distributed and not constituting more than 20 percent of volume of fill.

2.1.2 Granular Base

2.1.2.1 Base course: Meeting the requirements of WSDOT M41-10, Section 9-03.9(3), Base Course Classification.

2.1.2.2 Leveling course: Meeting the requirements of WSDOT M41-10, Section 9-03.9(3), Top Course Classification.

2.1.2.3 Crushed gravel shoulder: Same as leveling course.

PART 3 - EXECUTION

3.1 EXCAVATION

3.1.1 Before performing excavation, obtain excavation permit. Excavation permits will be furnished as set forth in Section 01065.

3.1.2 If over-excavation occurs, correct by placement of backfill as specified in subparagraph 3.2.2.2.

3.2 INSTALLATION

3.2.1 Subgrade Filling and Backfilling

3.2.1.1 Remove debris and organic matter from area to be filled or backfilled.

3.2.1.2 Use only select materials for fill or backfill. Keep materials free of frozen particles, lumps, organic matter and trash.

3.2.1.3 Do not place fill or backfill on frozen ground.

3.2.1.4 Filling or backfilling by sluicing or flooding with water will not be permitted.

3.2.2 Fill or Backfill

3.2.2.1 Before placement of fill or backfill, demonstrate, to KEH by physical test at site, that procedure proposed for installation and compaction of soils will provide degree of compaction specified. Prepare "Soil Compaction Procedure" Form KEH-382, sample appended, in accordance with printed instructions. Forms will be furnished by KEH.

3.2.2.2 Place backfill under roads in accordance with WSDOT M41-10, Section 2-03.3(14)C, Method B.

3.2.3 Granular Base

3.2.3.1 Before placement of granular base, demonstrate, to KEH by physical test at site, that procedure proposed for installation and compaction of base will provide degree of compaction specified. Prepare "Soil Compaction Procedure" Form KEH-382, sample appended, in accordance with printed instructions. Forms will be furnished by KEH.

3.2.3.2 Construction Requirements: Construction shall be in accordance with following sections of WSDOT M41-10.

a. Subgrade: Section 2-06.3.

b. Equipment: Section 4-04.3(1).

c. Mixing: Section 4-04.3(3).

d. Placing and spreading: Section 4-04.3(4).

e. Miscellaneous requirements: Section 4-04.3(7).

f. Weather limitations: Section 4-04.3(8).

g. Hauling: Section 4-04.3(9).

3.2.3.3 Shaping and Compacting

a. Final shaping before compacting shall be accomplished using approved equipment and shall be in accordance with WSDOT M41-10, Section 4-04.3(5).

b. Compaction control tests will be in accordance with WSDOT M41-10, Section 2-03.3(14)D.

3.2.3.4 Shoulders: Construct shoulders, of width shown on the Drawings, after placement of asphaltic wearing course.

3.2.4 Finish Grading and Stabilization: Rake area disturbed by work, remove surface stones larger than 6 inches and dispose of excess material and debris at area designated by KEH.

3.3 FIELD QUALITY CONTROL

3.3.1 Sampling and testing of compacted fill and backfill will be performed by KEH.

SOIL COMPACTION PROCEDURE

A

Project Number	Project Title	Date

Contract Number	Procedure Number	Location of Demonstration

REQUIREMENTS	EQUIPMENT DEMONSTRATED
Applicable Spec./Dwg.	Type
Compaction Required %	Manufacturer
Maximum Lift Size	Model

B

LABORATORY SOIL TEST RESULTS

☐ Non-granular Materials (WSDOT Test Method No. 609)
Maximum Density _____ Moisture % _____

☐ Granular Materials (WSDOT Test Method No. 606-A)
☐ Density Chart Attached

☐ In-Situ
Density _____

C

COMPACTION DEMONSTRATION TEST RESULTS

Formula for Percent Compaction: $\frac{\text{dry density}}{\text{max density}} \times 100 = \text{Percent Compaction}$

No. of Passes	Depth of Lift	Percent Moisture	Lb/ft³ Dry	Maximum Density	Percent Compaction	Accept	Reject

Observations or Comments

SAMPLE

TEST METHOD USED FOR DEMONSTRATION

☐ Nuclear Gage (ASTM D2922 & D3017)

☐ Other _____

D

Contractor Representative		Date
Engineer/Constructor Inspector		Date

KEH-0382.00 (03/89)

INSTRUCTIONS

This Soil Compaction Procedure form, when approved by the Engineer/Constructor Inspector, documents witnessing and verifying the compaction procedure.

Section A is the responsibility of the Construction Contractor. It is to be completed at the time of backfill compaction demonstration and presented to the Engineer/Constructor Inspector.

Section B is completed by the Engineer/Constructor Inspector. Data entered is obtained from the agency or individual that performed testing.

Section C is completed by the Engineer/Constructor Inspector as the demonstration is performed. Using the applicable formula, the percent compaction achieved is determined and entered. Acceptance is based on the results as compared with the compaction percent required in Section A.

Section D is signed and dated by the Construction Contractor Representative acknowledging responsibility for this procedure and compliance thereto for applicable backfill operations. Section D is signed and dated by the Engineer/Constructor Inspector to signify witnessing and verification.

KEH-0382.00R (03/89)

END OF SECTION

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SECTION 02512

HOT-LAID ASPHALTIC CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

ANSI D6.1-1978, w/Rev through Dec 1983	American National Standard Manual on Uniform Traffic Control Devices for Streets and Highways

1.1.1.2 Washington State Department of Transportation (WSDOT)

M41-10-88	Standard Specifications for Road, Bridge, and Municipal Construction

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Laboratory Reports: Submit laboratory reports for following.

1.2.1.1 Asphalt: Showing that asphalt used in mix meets the requirements of AR-4000W in accordance with WSDOT M41-10, Section 9-02.1(4).

1.2.1.2 Asphalt concrete mix: Showing compliance with WSDOT M41-10, Sections 9-03.8(2) and 9-03.8(6). Include Rice density as established by WSDOT Method 705.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Asphalt: Meeting the requirements of WSDOT M41-10, Sections 9-02.1(2) and 9-02.1(4). Grade of paving asphalt for use in asphaltic concrete mixture shall be AR-4000W.

2.1.2 Aggregate: Class "B" meeting the requirements of WSDOT M41-10, Section 9-03.8(1),(2), (3)B.

2.1.3 Blending Sand: Meeting the requirements of WSDOT M41-10, Section 9-03.8(4).

2.1.4 Mineral Filler: Meeting the requirements of WSDOT M41-10, Section 9-03.8(5).

2.2 MIXES

2.2.1 Proportioning of Asphalt Concrete Materials: Meeting the requirements of WSDOT M41-10, Section 9-03.8(6) Class "B" asphalt concrete.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Construction: In accordance with following sections of WSDOT M41-10.

3.1.1.1 Asphalt mixing plants: Section 5-04.3(1).

3.1.1.2 Hauling equipment: Section 5-04.3(2).

3.1.1.3 Asphalt pavers: Section 5-04.3(3).

3.1.1.4 Rollers: Section 5-04.3(4).

3.1.1.5 Existing surface conditioning: Section 5-04.3(5). No prime coat required.

3.1.1.6 Asphalt material heating: Section 5-04.3(6).

3.1.1.7 Aggregate preparation: Section 5-04.3(7).

3.1.1.8 Mixing: Section 5-04.3(8).

3.1.1.9 Spreading and finishing: Section 5-04.3(9).

3.1.1.10 Compaction: Section 5-04.3(10). Control may be performed by the Virginia Breakover Method.

3.1.1.11 Joints: Section 5-04.3(11).

3.1.1.12 Samples: Section 5-04.3(12).

3.1.1.13 Surface smoothness: Section 5-04.3(13).

3.1.1.14 Heating-planing bituminous pavement: Section 5-04.3(14).

3.1.1.15 Weather limitations: Section 5-04.3(16).

3.1.1.16 Asphalt change in grade: Section 5-04.3(18).

3.1.1.17 Driving surface sealing: Section 5-04.3(19).

3.1.2 Pavement Striping: In accordance with ANSI D6.1, Section III and WSDOT M41-10, Section 8-22.

3.2 FIELD QUALITY CONTROL

3.2.1 Sampling and testing of asphalt concrete pavement will be performed by KEH.

END OF SECTION

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SECTION 02650

PIPED UTILITIES

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

ANSI Z53.1-1979	American National Standard Safety Color Code for Marking Physical Hazards

1.1.1.2 American Society for Testing and Materials (ASTM)

A 307-88a	Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
A 563-88a	Standard Specification for Carbon and Alloy Steel Nuts
D 2321-83a	Standard Practice for Underground Installation of Flexible Thermo-plastic Sewer Pipe

1.1.1.3 American Water Works Association (AWWA)

C104-85	American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
C110-87	American National Standard for Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in., for Water and Other Liquids
C111-85	American National Standard for Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
C600-87	AWWA Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances

C651-86	AWWA Standard for Disinfecting Water Mains
C900-81	AWWA Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. Through 12 in., for Water
M23-80	AWWA Manual for PVC Pipe--Design and Installation

1.1.1.4 International Association of Plumbing and Mechanical Officials (IAPMO)

1988 Edition	Uniform Plumbing Code (UPC)

1.1.1.5 National Fire Protection Association (NFPA)

NFPA 24	Standard for the Installation of Private Fire Service Mains and Their Appurtenances, 1987 Edition

1.1.1.6 Washington State Department of Transportation (WSDOT)

M41-10-88	Standard Specifications for Road, Bridge, and Municipal Construction

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Approval Data: Submit information listed in Column 5 of Approval Data List in this Section.

1.2.2 Leak/Pressure Test Procedures: Submit procedures outlining proposed methods of testing joints in piping systems.

1.2.3 NFPA Test Certificate: Submit completed Contractor's Material and Test Certificate in accordance with NFPA 24, Section 8-9.3.4.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 General

2.1.1.1 Components of new underground piping system, if not designated in this Section and the Drawings by manufacturer's name and model or figure number, shall be current products of manufacturer.

2.1.2 Pipe and Fittings: Meet the requirements of pipe codes in this Section and details on the Drawings.

2.1.3 Valves: Specified in pipe codes and provided with adjustable cast iron valve boxes.

2.1.4 Indicator Posts: See Section 02668.

2.1.5 Bitumastic: Koppers No. 550 or Superservice Black.

2.1.6 Painting: See Section 09900.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 General

3.1.1.1 Install piping and piping accessories in accordance with the Uniform Plumbing Code (UPC), NFPA 24, the Pipe Codes, the Drawings, and this Section.

3.1.1.2 Keep piping systems clean during work. Once fabrication has started on length of pipe, plug or cap open ends when installation is not in progress to prevent entry of dirt and other foreign material.

3.1.1.3 Where piping is laid in trench, trench shall be free of frost or frozen earth and standing water.

3.1.2 Polyvinyl Chloride (PVC) Pipe

3.1.2.1 Protect from impact shocks and dropping. Before laying, inspect and discard damaged sections. PVC piping shall not be installed in the vertical position.

3.1.2.2 Start laying in finished trenches at lowest point of run and progress upgrade. Support pipe full length of barrel.

3.1.2.3 Handle pipe and accessory materials in accordance with AWWA M23, Chapter 6.

3.1.2.4 Install with alignment and grade in accordance with ASTM D 2321, Section 02200, and the Drawings.

3.1.2.5 Support valve and cast-iron fitting weight on concrete cradle, or concrete blocks with anchors.

3.1.2.6 Install restraints on pipe and piping components in accordance with NFPA 24, Article 8-6 and A-8-6.2. Restraining mechanical joints as listed in UL Fire Protection Equipment Directory may be substituted for conventional anchoring. Where thrust blocks are used, make bearing area equal to area shown in Table 8-6.2.9 multiplied by a factor of 1.33 and as shown on the Drawings.

3.1.3 Coat carbon steel accessories, which will be buried, such as tie-rods and clamps, with bitumastic. Allow time for bitumastic to dry before backfilling.

3.1.4 Install post barricades around fire hydrants and post indicator valves in accordance with the Drawings and this Section.

3.1.5 Excavation, backfill, and grading work shall meet the requirements of Section 02200 as it applies.

3.1.6 Repair asphaltic concrete pavement removed for installation of piping in accordance with Section 02512.

3.1.7 Painting and Marking

3.1.7.1 Surface preparation, materials, and coating application of primer and paint shall be in accordance with Section 09900, Paragraphs 3.2.1 and 3.5.1.

3.1.7.2 Colors: Defined in ANSI Z53.1.

a. Upper barrel of indicator posts red.

b. Barricade posts red.

3.1.8 Flushing

3.1.8.1 Obtain written method for disposal of flushing water from KEH.

3.1.8.2 After installation, before pressure testing completed system, flush piping with water until effluent is clean and contains no visible particulate matter but in no case for less than one minute.

3.1.8.3 Use sanitary water for flushing sanitary water lines.

3.1.8.4 Flush new sanitary water piping in accordance with NFPA 24, Article 8-8.

3.2 FIELD QUALITY CONTROL

3.2.1 Hydrostatic Testing

3.2.1.1 Furnish instruments, facilities and labor required to conduct tests.

3.2.1.2 Document leak/pressure testing of sanitary waterlines on the NFPA Test Certificate.

3.2.1.3 Perform leak tests in presence of KEH unless otherwise instructed in writing.

3.2.1.4 Perform tests after lines have been flushed and before backfilling.

3.2.1.5 Before applying test pressure to piping, install necessary restraining devices to prevent distortion or displacement of piping.

3.2.1.6 Install 1 temporary relief valve during pressure testing of systems. Relief valve shall have discharge capacity of at least 125 percent

capacity of pressurizing device and be set to operate at not more than 110 percent of test pressure. Demonstrate proper operation of relief valve at following times.

a. Before each series of leak tests before relief valve is attached to system.

b. Whenever KEH has cause to question operating accuracy of relief valve.

3.2.1.7 Verify air has been expelled from piping before applying hydrostatic pressure.

3.2.1.8 Test new Pipe Code A in accordance with NFPA 24 Article 8-9. Leakage at joints shall not exceed limits specified in NFPA 24, Article 8-9. Repair unsatisfactory joints and retest.

3.2.1.9 If lines are subject to freezing, remove water upon completion of hydrostatic test.

3.3 DISINFECTION

3.3.1 Disinfect sanitary water lines in accordance with AWWA C651.

3.3.2 Arrange for bacteriological testing of water samples with KEH before performing disinfection procedures. Bacterial analysis is 4 days in length from time samples are received in laboratory. Analysis provides "presumptive" results in 2 days with "confirmation" at end of test.

PIPE CODE A

Service:	Maximum Operating Pressure:	Test Pressure:	Maximum Operating Temperature:
Sanitary Water (SW)	120 psig	180 psi	100 F

Sizes	12 inch and larger.
Pipe	PVC in accordance with AWWA C900.
Joints	Elastomeric-gasket couplings in accordance with AWWA C900.
Wall Thickness	Class 200, DR 14.
Fittings	Cast iron or ductile iron in accordance with AWWA C110 with cement lining in accordance with AWWA C104 and mechanical or push-on joints in accordance with AWWA C111.
Tapping Valve	Flanged by MJ ends, Kennedy Fig. 950XP or Mueller #H-667.
Gate Valves	3 inch, flanged, Stockham Fig. G-612. 8 inch, mechanical or push-on joints, Kennedy Fig. 70X or 71X. 12 inch, mechanical or push-on joints, Kennedy Fig. 70X or 71X.
Flexible Couplings	Compression type slip-on steel, Dresser type 38 or 138.
Combination Air Valves	3 inch, APCO #147C.3.
Bolting	Carbon steel heavy hex series bolts, ASTM A 307, Grade B, and heavy hex nuts, ASTM A 563, Grade A.
Gaskets	Use full face gaskets with flat face flanges. Compressed synthetic fiber, 1/16 inch thick, Anchor Packing #443.

Project No	W-016H-C3
Project Title	RMW Storage Facility
Specification Section	02650

APPROVAL DATA LIST
("X" Indicates Required Data)

1 EPN IDENTIFICATION	2 DESCRIPTION	3 REFERENCE DRAWING	4 SPECIFICATION PARAGRAPH	5 DATA: Dimensional Drawings	Equipment Weights	Specifications	Material Description	Performance Data	Circuit or Control Diagrams	Data Sheets	Illustrative Cuts	Installation Instructions	6 REMARKS
	12 inch PVC pipe						X				X		
	Pipe fittings						X				X		
	Valves						X				X		

END OF SECTION

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SECTION 02668

FIRE WATER SYSTEMS

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

ANSI Z53.1-1979	American National Standard Safety Color Code for Marking Physical Hazards

1.1.1.2 American Water Works Association (AWWA)

C104-85	American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
C110-87	American National Standard for Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in., for Water and Other Liquids
C111-85	American National Standard for Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
C151-86	American National Standard for Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
C600-87	AWWA Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances
C651-86	AWWA Standard for Disinfecting Water Mains

1.1.1.3 Factory Mutual System (FM)

1991 Edition	Approval Guide

1.1.1.4 National Fire Protection Association (NFPA)

NFPA 24	Standard for the Installation of Private Fire Service Mains and Their Appurtenances, 1987 Edition

1.1.1.5 Underwriters Laboratories, Inc (UL)

1991	Fire Protection Equipment Directory

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Approval Data: Submit information listed in Column 5 of Approval Data List in this Section.

1.2.2 Vendor Information: Submit information listed in Column 5 of Vendor Information List in this Section.

1.2.3 NFPA Test Certificate: Submit completed Contractor's Material and Test Certificate in accordance with NFPA 24, Section 8-9.3.4.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 General: System is designed for a maximum operating pressure of 125 psig.

2.1.2 Piping

2.1.2.1 Pipe, pipe joints and fittings shall meet the requirements of NFPA 24, the Drawings and this Section.

2.1.2.2 Pipe: Cement lined meeting the requirements of AWWA C104 and ductile iron, Class 50 minimum, meeting the requirements of AWWA C151. Pipe shall have rubber gasketed mechanical joints meeting the requirements of AWWA C111.

2.1.2.3 Fittings: Cement lined meeting the requirements of AWWA C104, with joints and pressure class ratings compatible with pipe used and shall meet the requirements of AWWA C110.

2.1.3 Painting: See Section 09900.

2.2 EQUIPMENT

2.2.1 Components of new underground fire protection system, including pipe and fittings, if not designated in this Section and the Drawings by manufacturer's name and model or figure number, shall be current products of the manufacturer, and be listed or approved for intended use by UL or FM. Components designated by manufacturer or trade name shall be supplied. No substitutions will be accepted.

2.2.2 Post Indicator Valve (PIV)

2.2.2.1 Gate valve: Kennedy nonrising stem valve with indicator post flange. Valve shall open in counterclockwise direction.

2.2.2.2 Indicator post: Adjustable, telescoping barrel type with locking handle and clearly visible, position indicator sign plates, protected by nonbreakable plastic windows. Post shall be matched for assembly to gate valve.

2.2.3 Switches: Valve Position Supervisory Limit Switches for Installation on Post Indicator Valves: Potter Model PIVSV-A. Shall be tamperproof and designed for use intended. Switch shall be operated during first 2 revolutions of handle in closing direction.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Install piping and piping accessories in accordance with NFPA 24, AWWA C600, the Drawings, and this Section.

3.1.2 Protect pipe and fittings from impact shocks and dropping. Before laying, inspect pipe and discard damaged components. Remove damaged components from job site.

3.1.3 Keep piping systems clean during work. Once fabrication has started on length of pipe, plug or cap open ends of piping when installation is not in progress to prevent entry of dirt and other foreign material. Inner surfaces of pipe, valves, and fittings shall be smooth, clean, and free of sand, debris and dirt when installed.

3.1.4 Where piping is laid in trench, trench shall be free of frost or frozen earth and standing water.

3.1.5 Install new fire mains minimum depth of 3'-6" from grade to top of pipe.

3.1.6 Install restraints on pipe and piping components in accordance with NFPA 24, Article 8-6 and A-8-6.2. Restraining mechanical joints as listed in UL Fire Protection Equipment Directory may be substituted for conventional anchoring. Where thrust blocks are used, make bearing area equal to area shown in Table 8-6.2.9 multiplied by a factor of 1.33 and as shown on the Drawings.

3.1.7 Coat carbon steel accessories which will be buried, such as tie-rods and clamps, with bitumastic. Allow time for bitumastic to dry before backfilling.

3.1.8 Install post barricades around post indicator valves in accordance with the Drawings and this Section.

3.1.9 Excavation, backfill and grading work shall meet the requirements of Section 02200 as it applies.

3.1.10 Repair asphaltic concrete pavement, removed for installation of fire water main, in accordance with Section 02512.

3.1.11 Painting and Marking

3.1.11.1 Surface preparation, materials and coating application of primer and paint shall be in accordance with Section 09900.

3.1.11.2 Colors: Defined in ANSI Z53.1.

a. Upper barrel of indicator post red.

b. Barricade posts red.

3.2 FIELD QUALITY CONTROL

3.2.1 General

3.2.1.1 Furnish equipment and instruments required to perform flushing and testing.

3.2.1.2 Perform flushing and testing while witnessed by KEH.

3.2.1.3 Remove and replace or repair apparatus, material, or work which fails in flushing or testing operations and repeat operation.

3.2.1.4 Repair damage resulting from flushing or testing.

3.2.2 Flushing

3.2.2.1 Obtain written procedure for disposal of flushing water from KEH.

3.2.2.2 Flush new piping in accordance with NFPA 24, Article 8-8.

3.2.3 Hydrostatic Testing

3.2.3.1 Perform testing in accordance with NFPA 24, Article 8-9.

3.2.3.2 Perform testing after piping has been flushed and before backfill is placed over pipe joints.

3.2.3.3 Verify that air has been expelled from piping before applying hydrostatic pressure.

3.2.3.4 Examine piping joints, fittings, and other potential leak sources during test. Leaks in piping system are not acceptable. Repair leaks and retest.

3.2.3.5 If piping system is subject to freezing, remove water from lines upon completion of tests.

3.3 DISINFECTING

3.3.1 Disinfect fire water lines in accordance with AWWA C651.

3.3.2 Arrange for bacteriological testing of water samples with KEH before performing disinfection procedures. Bacterial analysis is 4 days in length from time samples are received in laboratory. Analysis provides "presumptive" results in 2 days with "confirmation" at end of test.

Project No W-016H-C3

Project Title RMW Storage Facility

Specification Section 02668

APPROVAL DATA LIST

("X" Indicates Required Data)

1 EPN IDENTIFICATION	2 DESCRIPTION	3 REFERENCE DRAWING	4 SPECIFICATION PARAGRAPH	5 DATA: Dimensional Drawings	Equipment Weights	Specifications	Material Description	Performance Data	Circuit or Control Diagrams	Data Sheets	Illustrative Cuts	Installation Instructions	6 REMARKS
1	Pipe		2.1.2				X				X		
2	Fittings		2.1.2.3				X				X		
3	Post Indicator Valve (PIV)		2.2.2								X		
4	Supervisory Switches		2.2.3								X	X	

9 2 1 2 3 5 6 1 8 7 4

Project No. W-016H-C3

Project Title RMW Storage Facility

Specification Section 02668

VENDOR INFORMATION LIST

("X" Indicates Required Data)

1 EPN IDENTIFICATION	2 DESCRIPTION	3 REFERENCE DRAWING	4 SPECIFICATION PARAGRAPH	5 VENDOR INFORMATION (VI) Dimensional Drawings	Equipment Weights	Specifications	Certified Test Data	Circuit or Control Diagram	Instructions: Installation	Instructions: Operation	Instructions: Maintenance	Spare Parts List	Data Sheets	Illustrative Cuts	
1	Pipe		2.1.2			X								X	
2	Fittings		2.1.2.3			X								X	
3	Post Indicator Valve (PIV)		2.2.2											X	
4	Supervisory Switches		2.2.3						X					X	

END OF SECTION

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SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Concrete Institute (ACI)

ACI 301-84 (Revised 1988)	Specifications for Structural Concrete for Buildings
ACI 306.1-87	Standard Specification for Cold Weather Concreting

1.1.1.2 American Society for Testing and Materials (ASTM)

A 615-87a	Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
C 33-86	Standard Specification for Concrete Aggregates
C 94-89b	Standard Specification for Ready-Mixed Concrete
C 150-86	Standard Specification for Portland Cement
C 260-86	Standard Specification for Air-Entraining Admixtures for Concrete
C 494-86	Standard Specification for Chemical Admixtures for Concrete
C 1017-85	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete

1.1.1.3 National Ready Mixed Concrete Association (NRMCA)

January 1, 1976 (Third Revision)	Certification of Ready Mixed Concrete Production Facilities

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Certification of Ready Mixed Concrete Production Facilities: Submit current legible copy of "Certificate of Conformance for Concrete Production Facilities" issued by and bearing the seal of the National Ready Mixed Concrete Association. Certificate shall contain signature and seal of registered Civil Engineer.

1.2.2 Reinforcing Steel Fabricator Drawings: Submit complete reinforcing fabrication and placing drawings based on block diagram in accordance with ACI 301, Section 5.1, including splices not shown on the Drawings.

1.2.3 Block Diagram: Submit block diagram of scheduled concrete pours. Identify pours.

1.2.4 Concrete Materials, Mix Design and Mix Proportions: Submit in accordance with ACI 301, Sections 3.8 and 16.7.3. Define each material to be used in concrete and state amount, by weight, to be utilized per cubic yard of plastic mix.

1.2.5 Cold Weather Concreting: Submit detailed procedure in accordance with ACI 306.1, Section 1.5.1.

1.2.6 Curing Procedure: Submit description of materials and methods of curing in accordance with ACI 301, Section 12.2.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Concrete

2.1.1.1 Cement: ASTM C 150, Type II (Low Alkali).

2.1.1.2 Aggregates: ASTM C 33, maximum size 3/4 inch.

2.1.1.3 Air-entraining admixture: Meeting the requirements of ASTM C 260; Sika Chemical Company "SIKA AER"; Chem-Masters Corp "Adz-Air"; or Protex Industries "Protex".

2.1.1.4 Properties (except as noted otherwise on Drawings)

a. Minimum allowable compressive strength: 4500 psi at 28 days. (3000 psi at 28 days for thrust blocks, duct banks, post.)

b. Slump: 4 inch maximum in accordance with ACI 301, Section 3.5.

c. Air content: 5 percent ± 1.5 percent.

d. Water-cement ratio: 0.50 maximum.

e. Cement: 540 lb/cy minimum.

f. Proportions: In accordance with ACI 301, Sections 3.8 and 3.9.

2.1.1.5 Mixing: In accordance with ASTM C 94.

2.1.1.6 Delivery: In accordance with ASTM C 94.

2.1.1.7 Superplasticizer: In accordance with ASTM C 494, Type F and ASTM C 1017, Types 1 and 2.

2.1.2 Reinforcing Steel

2.1.2.1 Steel bars: ASTM A 615, deformed, Grade 60.

2.1.2.2 Tie wire: Black annealed steel, 16 gage minimum.

2.1.3 Joint Materials

2.1.3.1 Expansion joint filler: See Section 07920.

2.1.3.2 Sealant: See Type II, Section 07920.

2.1.3.3 Waterstop: Polyvinyl chloride (PVC), dumbbell or serrated type, with center bulb, 6 inches wide.

2.1.3.4 Dowel bars: ASTM A 36, carbon steel.

2.1.4 Nonshrink Grout: Nonmetallic type, "Five Star Grout" by US Grout Corp; "Por-Rok" Anchoring Cement by Hallemite; or "Masterflow 713" by Master Builders.

2.1.5 Forms: Wood, steel, plywood, or Masonite Corporation "Concrete Form Presdwood", as required for various specified finishes.

PART 3 - EXECUTION

3.1 PREPARATION

3.1.1 Form Construction

3.1.1.1 Install formwork in accordance with ACI 301, Section 4.2. Interior shape and rigidity shall be such that finished concrete will meet the requirements of the Drawings within tolerances specified in ACI 301, Table 4.3.1.

3.1.1.2 Prepare form surfaces in accordance with ACI 301, Section 4.4.

3.1.1.3 Forms for surfaces which will be permanently concealed from view may be saturated with water before placing concrete instead of other treatment, except in freezing weather forms shall be treated with oil or stearate.

3.1.1.4 Clean forms of foreign material before placing concrete.

3.2 INSTALLATION

3.2.1 Reinforcing Steel

3.2.1.1 Fabricate bars accurately to dimensions shown on Drawings, within tolerances shown in ACI 301, Section 5.6.

3.2.1.2 Tag in accordance with bar list.

3.2.1.3 Place as shown on approved submittals within tolerances specified in ACI 301, Sections 5.6 and 5.7.

3.2.1.4 Tie to prevent displacement during placement of concrete.

3.2.1.5 Do not force into concrete after initial set has started.

3.2.1.6 Place with dimension of concrete protection equal to minimum given in ACI 301, Section 5.7, except where shown otherwise on the Drawings.

3.2.1.7 Place welded wire fabric on chairs and lap two mesh at splices. Tie splices with wire.

3.2.1.8 At construction joints, grease one end of each dowel bar to prevent bonding. At any given joint, all dowel bars shall be greased on the same side.

3.2.2 Concrete

3.2.2.1 Before ordering, obtain approval of required submittals.

3.2.2.2 Before batching, obtain approval of formwork and reinforcement by KEH.

3.2.2.3 Before placing:

a. Obtain approval of "Pour Slip" by KEH. "Pour Slip" shall include appropriate reference to specific portion of structure to be placed, maximum size of coarse aggregate, design strength, admixture, and slump. "Pour Slip" forms can be obtained from KEH.

b. For each truck load, deliver "Trip Ticket" to KEH. "Trip Ticket" shall contain information listed in ASTM C 94, subparagraphs 16.1.1 through 16.1.10, and include water/cement ratio.

3.2.2.4 Place in accordance with ACI 301, Sections 8.1, 8.2, and 8.3. Do not drop (free fall) more than 5 feet. Insert vibrator, vertically if possible, into concrete and reach small distance into concrete in next lower layer. Do not insert vibrators into lower courses that have reached initial set. Take care to avoid allowing head of vibrator to come in contact with forms or embedded items.

3.2.2.5 Temper only as permitted in ACI 301, Section 7.5.

3.2.2.6 Place nonshrink grout where shown on the Drawings and in accordance with manufacturer's recommendations.

3.2.2.7 Weather conditions: Protect concrete during placement in accordance with ACI 301, Section 8.4. Cold weather concreting shall be in accordance with approved procedure.

3.2.2.8 Construction joints: Make in accordance with ACI 301, Section 6.1, and as detailed on the Drawings. Sawcut in accordance with ACI 301, Section 11.5 or use embed in accordance with ACI 301, Sections 6.4 and 6.5.

3.2.2.9 Embedded items: Install in accordance with ACI 301, Sections 6.4 and 6.5.

3.2.2.10 Expansion joints: Locate as shown on the Drawings and construct with premolded filler and sealant.

3.2.2.11 Contraction joints: Locate as shown on the drawings. Sawcut in accordance with ACI 301, Section 11.5 or use embed in accordance with ACI 301, Sections 6.4 and 6.5.

3.2.2.12 Placing concrete against earth: Place on or against firm, damp surfaces free of frost, ice and free water. Do not place until required com-paction has been obtained. Dampen earth surfaces to receive fresh concrete.

3.2.2.13 Consolidation: Consolidate concrete slabs in accordance with ACI 301, Section 11.6.

3.2.3 Concrete Repair and Form Removal

3.2.3.1 Remove forms in accordance with ACI 301, Section 4.5.

3.2.3.2 Cut back form ties and examine concrete surfaces for defects. Repair only after permission for patching is given by KEH.

3.2.3.3 Place concrete repair mortar within 1 hour after mixing. Do not retemper mortar.

3.2.3.4 Surface defect repair: Repair in accordance with ACI 301, Sections 9.1, 9.2 and 9.3. Cure concrete repairs same as new concrete.

3.2.3.5 Repair of defects in concrete surfaces to be covered with special protective coating (SPC) shall be in accordance with SPC manufacturer's recommendations.

3.2.4 Concrete Finishes and Tolerances

3.2.4.1 Formed surfaces: Start finishing following concrete repair and complete within 96 hours after forms have been removed. Finish in accordance with sections of ACI 301 noted below.

a.	Surfaces exposed to earth backfill	Section 10.2.1
b.	Interior surfaces	Section 10.2.2

c.	Exterior surfaces exposed to weather	Section 10.2.2
d.	Related unformed surfaces	Section 10.5
e.	Surfaces to receive special protective coating	Section 10.3.2

3.2.4.2 Unformed surfaces: Finish in accordance with sections of ACI 301 noted below:

a.	Interior floors	Section 11.7.3
b.	Exterior equipment slabs	Section 11.7.3
c.	Exterior slabs subject to foot traffic	Section 11.7.4
d.	Surfaces to receive special protective coating	Section 11.7.3

3.3 FIELD QUALITY CONTROL

3.3.1 Concrete Testing: Sampling and testing of concrete will be the responsibility of KEH. Concrete will be tested to ACI 301, Sections 16.3.4, 16.3.5, 16.3.6 and 16.3.8.

3.4 CURING AND PROTECTION

3.4.1 Curing

3.4.1.1 Cure concrete in accordance with ACI 301, Section 12.2. Clear curing compounds shall be tinted or applied surfaces marked to delineate extent of spraying.

3.4.1.2 Do not use curing compound on concrete surfaces to receive special protective coating. Cure in accordance with ACI 301, Section 12.2.1.2 or 12.2.1.5.

3.4.2 Protection

3.4.2.1 Protect concrete during extreme weather conditions in accordance with ACI 301, Section 12.3.

3.4.2.2 Protect concrete from mechanical injury in accordance with ACI 301, Section 12.4.

END OF SECTION

SECTION 05400

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Iron and Steel Institute (AISI)

1986 Edition	Specification for the Design of Cold-Formed Steel Structural Members

1.1.1.2 American Society for Testing and Materials (ASTM)

A 446-87	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality
C 955-88	Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Track), and Bracing or Bridging, for Screw Application of Gypsum Board and Metal Plaster Bases

1.1.1.3 Industrial Fasteners Institute (IFI)

IFI-113	Steel Self-Drilling Tapping Screws

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Structural Studs and Runners: Meet the requirements of ASTM C 955. Structural properties computed in accordance with AISI Specification.

2.1.1.1 Studs: C-shaped, formed from 0.0635 inch galvanized steel sheet meeting the requirements of ASTM A 446, Grade D, with minimum G 60 coating weight.

2.1.1.2 Runners: U-shaped, formed from 0.0635 inch galvanized steel sheet meeting the requirements of ASTM A 446, Grade A, with G 60 coating weight.

2.1.2 Joists and Stringers: Structural properties computed in accordance with AISI Specification.

2.1.2.1 Joists: C-shaped, formed from 0.0635 inch galvanized steel sheet meeting the requirements of ASTM A 446, Grade D, with minimum G60 coating weight.

2.1.2.2 Stringers: Channel shaped, formed from 0.0635 inch galvanized steel sheet meeting the requirements of ASTM A 446, Grade A, with minimum G60 coating weight.

2.1.3 Screws: Meeting the requirements of IFI-113.

2.1.4 Fasteners and Accessories: Metal framing manufacturer's standard.

2.2 FABRICATION

2.2.1 Form members to manufacturer's standard shapes and meet the requirements of AISI Specification.

PART 3 - EXECUTION

3.1 ERECTION

3.1.1 Erect cold-formed metal framing in accordance with manufacturer's instructions.

3.1.2 Align runners accurately and anchor to floor, as shown on the Drawings. Install studs plumb, square and true to line and hold firmly in position with sufficient temporary bracing until permanently fastened in place. Do not splice studs.

3.1.3 Cut right angle connections of framing components to fit squarely against abutting members.

3.1.4 Connect members together and provide bracings in accordance with AISI Specification.

END OF SECTION

SECTION 05500

METAL FABRICATIONS

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society of Mechanical Engineers (ASME)

1986 Edition, w/Addenda through Dec 1988	ASME Boiler and Pressure Vessel Code
Section IX	Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators

1.1.1.2 American Society for Testing and Materials (ASTM)

A 36-88c	Standard Specification for Structural Steel
A 53-88a	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless

1.1.1.3 American Welding Society (AWS)

AWS D1.1-90	Structural Welding Code - Steel

1.1.1.4 Federal Specifications (FS)

RR-G-661E, Including AMD 1	Grating, Metal, Bar Type (Floor, Except For Naval Vessels)

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Fabricator Drawings for Gratings

1.2.1.1 Submit drawings showing overall dimensions, details, and direction of bearing bars in accordance with the Drawings. Include cutouts and banding of grating around obstructions.

1.2.1.2 Submit load/deflection tables to verify conformity with design values shown on the Drawings.

1.3 QUALITY ASSURANCE

1.3.1 Qualification of Welding Personnel and Procedures

1.3.1.1 Personnel and procedures for welding structural steel shall have been qualified in accordance with AWS D1.1 before welding. Qualification in accordance with ASME Section IX may be substituted for this requirement.

1.3.1.2 Maintain file of welding procedure specifications, procedure qualification records and welder performance qualification test results at site for review.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Deliver metal fabrications to project at time convenient for installation. If exposed to inclement weather, protect fabrications with paper, plastic or other weatherproof covering and store off ground.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Rolled Steel Shapes, Plates and Bars: ASTM A 36.

2.1.2 Steel Pipe: ASTM A 53 (black), standard weight, Schedule 40.

2.1.3 Fasteners

2.1.3.1 Expansion anchors: Kwik-Bolt II manufactured by Hilti Fastening Systems.

2.1.3.2 Weld studs: Nelson Stud Welding Company Type H4L.

2.1.4 Metal Grating: Meeting the requirements of FS RR-G-661, Type I, Class 1, Material S, hot-dip galvanized. Grating shall be plain surface type with end banding bars, size shown on the Drawings. Provide manufacturer's standard clips for attachment to framing.

2.1.5 Nonshrink Grout: See Section 03300.

2.2 FABRICATION

2.2.1 General

2.2.1.1 Verify measurements and take field measurements necessary before fabrication. Provide miscellaneous bolts and anchors, supports, braces and connections necessary for completion of metal fabrications. Cut, reinforce, drill and tap metal fabrications shown to receive finish hardware and similar items. Weld or bolt connections as shown on the Drawings.

2.2.1.2 Workmanship: Form metal fabrications to shape and size, with sharp lines, angles, and true curves. Drilling and punching shall produce clean, true lines and surfaces. Execute and finish work in accordance with fabrication drawings.

2.2.1.3 Jointing and intersections: Accurately made, tightly fitted and in true planes with adequate fastenings.

2.2.1.4 Perform welding of steel connections in accordance with AWS D1.1, using E70XX electrodes. Perform visual weld examination in accordance with AWS D1.1, Paragraph 6.5.5, and document results. The Contractor shall examine the work to make certain the requirements of AWS D1.1, Section 3 and Paragraph 8.15 are met.

2.2.2 Miscellaneous Steel Items: Supply required clips, frames, equipment supports, and other fabrications shown on the Drawings. Fabricate parts from standard structural sections or shapes, to sizes required. Wherever miscellaneous parts are exposed, grind edges, corners, and rough cuts smooth and free of snags. Shop paint parts except those to be embedded in concrete or masonry, or those which require other specific finishes.

2.2.3 Finishes

2.2.3.1 Prime ferrous metal in accordance with Section 09900. Do not coat members to be embedded in concrete or masonry, surfaces and edges to be field welded, or items to be galvanized.

2.2.3.2 Zinc-rich coating: Galvicon MZP metallic zinc paint or ZRC zinc rich coating.

PART 3 - EXECUTION

3.1 INSPECTION

3.1.1 Examine areas where metal fabrications are to be installed and notify KEH in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner compatible with requirements for installation. Furnish setting drawings, diagrams, templates, instructions and directions for installation of anchorages, such as concrete inserts, anchor bolts and miscellaneous items having integral anchors, to be embedded in concrete or masonry construction. Coordinate with KEH for delivery of items to site.

3.2 INSTALLATION

3.2.1 Install metal fabrications plumb, level or as shown on the Drawings.

3.2.2 Make field connections as neatly as possible with joints flush and smooth. Grind smooth exposed field welds and polish before field painting. Repair welds in galvanized work with 2 coats of zinc-rich coating.

3.2.3 After installation has been approved, clean and paint connections with primer. Touch-up shop prime coat wherever damaged. Repair breaks in galvanized coatings with zinc-rich coating.

END OF SECTION

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SECTION 07200

INSULATION

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

C 665-86	Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing

1.1.1.2 Underwriters Laboratories, Inc (UL)

1989	Building Materials Directory

1.2 SUBMITTALS: Not Used

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Deliver materials to site in original sealed containers or packages bearing manufacturer's name and brand designation. Where materials are covered by referenced specification, containers or packages shall bear specification number, type, and class as applicable.

1.3.2 Store and handle materials in manner to protect from damage during entire construction period.

1.3.3 Store insulation off ground and under cover to protect against weather, moisture, and physical damage.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Blanket Insulation: Mineral fiber insulation meeting the requirements of ASTM C 665. Insulation containing asbestos will not be acceptable. Insulation shall be UL listed and have "flame spread" and "fuel contributed" of 25, and "smoke developed" of 50 or less.

2.1.1.1 Wall insulation: Type III mineral fiber blankets with minimum thermal resistance of R-11 and faced with aluminum foil vapor barrier covering on one side. Insulation shall be capable of fitting into available space without compressing more than 10 percent in thickness.

2.1.1.2 Roof insulation: Type III mineral fiber blankets with minimum thermal resistance of R-19 and faced with aluminum foil vapor barrier covering on 1 side.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Blanket Insulation

3.1.1.1 Fire riser room: Completely insulate space between framing members or furring strips. Fit snugly into framing spaces leaving no voids. At exterior walls and in roof spaces install with vapor barrier toward interior side of construction. Fasten flanges to metal studs with mechanical fasteners or adhesive recommended by insulation manufacturer. Support insulation installed horizontally with No. 9 wire spaced at 2 feet maximum.

3.1.1.2 Install continuous behind electrical outlets. Fit around electrical conduits, pipes and other protruding objects. When water pipes occur in exterior wall or ceiling construction, apply insulation between pipe and cold side of wall or ceiling.

3.1.1.3 Cut to fit angles, corners, or irregular spaces, forming flange of vapor barrier for fastening to framing. Seal joints or breaks in vapor barrier.

END OF SECTION

SECTION 07400

PREFORMED ROOFING AND CLADDING/SIDING

PART 1 - GENERAL

1.1 REFERENCED STANDARDS AND SPECIFICATIONS: The following standards and specifications, including documents referenced therein, form a part of this specification to the extent designated herein.

1.1.1 American Society for Testing and Materials (ASTM)

A 446-87	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality
A 525-87	Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process

1.2 SUBMITTALS: Refer to section 01300 for submittal procedures.

1.2.1 Fabricator Drawings: Submit fabricator erection drawings. Include a description of the sheet materials, fastening devices and sealants to be supplied, the quantity of each type of material, and the layout of each area to be covered with the siding. Details shall show panel capability of meeting exact overall building dimensions and assembly from exterior inward, from inside the building, to avoid assembly interference with nearby buildings, elevated steam lines, and the stack.

1.2.2 Color Samples: Submit manufacturer's standard colors for roof, walls, liners, and trim. Colors used on project will be selected by KEH.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Apply plastic protection film to preformed surfaces before delivery.

1.3.2 Store materials at site in dry place away from excess moisture, uncured concrete, cement, lime or strong chemicals.

PART 2 - PRODUCTS

2.1 METAL ROOFING AND CLADDING/SIDING PANELS

2.1.1 Prefinished Steel

2.1.1.1 Sheet steel stock: ASTM A 446, zinc-coated (galvanized) to ASTM A 525, G90. Factory color finished.

2.1.1.2 Minimum thickness: 0.0217 inch (80,000 psi yield).

2.1.1.3 Roof and walls: Panels shall be 3 foot wide with 4 major corrugations 1-1/2 inches high, 12 inches on center with 2 minor corrugations between each of the major corrugations the entire length of the panel; Butlerib II panels.

2.1.2 See Section 13120 for design loads and criteria.

2.2 METAL LINER PANELS

2.2.1 Prefinished Steel

2.2.1.1 Panels: ASTM A 446, zinc-coated (galvanized) to ASTM A 525, G60. Factory color finished.

2.2.1.2 Minimum thickness: 0.0187 inch.

2.2.1.3 Walls and ceiling: Nestable corrugated metal liner, 36 inches wide by 9/16 inch deep. Panels shall extend from floor to ceiling and serve as finished ceiling. See Drawings for locations.

a. Provide matching metal trim at interior and exterior corners, and around wall and ceiling openings.

2.2.1.4 Metal wall framing: See Section 05400.

2.3 INSULATION: See Section 07200.

2.4 METAL TRIM AND ACCESSORIES

2.4.1 Metal closure strips, top, base, head, sill and jamb or corner trims shall be the same material, gage, and finish as the siding.

2.4.2 Eave flashing, trim, ridge caps, ridge channel and similar metal accessories shall be same material, gage and finish as adjacent wall or roof covering.

2.4.3 Gable Trim: 0.0217 inch galvanized steel with factory applied color coating. Design and size shall be similar to Contour Gable Trim by Butler Manufacturing Company.

2.4.4 Gutter and Downspout Fabrication

2.4.4.1 Fabricate of same material and finish as wall metal.

2.4.4.2 Form gutters and downspout to collect and remove water flow from roof resulting from rain falling at rate of 3 inches per hour for 5 minute duration.

2.5 CLOSURES AND SEALANTS

2.5.1 Closure Strips: Manufacturer's standard, formed compressed rubber, synthetic rubber, bituminous impregnated materials, or metal of same

type as roof and wall panels. Closure strips shall be formed to match corrugations of roofing or siding.

2.5.2 Sealant: Nonstaining type, elastomeric, manufacturer's standard.

2.6 FASTENERS

2.6.1 Roofing and Siding Panels: Manufacturer's standard type, finished to match adjacent surface when exterior exposed.

2.6.2 Metal Wall Liner and Ceiling Liner: Self-drilling screws, cadmium plated stainless steel, furnished with color coated heads.

2.7 FINISH

2.7.1 Precoated enamel on steel with color selected from manufacturer's standards by KEH.

2.7.2 Coating materials containing lead will not be acceptable.

PART 3 - EXECUTION

3.1 METAL ROOFING, SIDING, AND LINER PANELS

3.1.1 Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.

3.1.2 Fasten cladding system to structural supports, aligned, level and plumb.

3.1.3 Install sealant and gasket to prevent weather penetration.

3.1.4 System: Free of rattles, noise due to thermal movement, and wind whistles.

3.2 METAL TRIM AND CLOSURES

3.2.1 Utilize trim and closures with metal siding installations as shown on fabricator's drawings.

3.2.2 Protect trim with prefinished surfaces from damage in the same manner siding is protected.

3.2.3 Attach gutters and downspouts to building. Install gutters to provide drainage.

3.3 CONNECTORS

3.3.1 Space sheet fasteners in accordance with manufacturer's recommendations.

3.3.2 Install self-tapping hex-head or slotted pan-head screws with power tools.

3.4 INSULATION: Except as otherwise shown on the Drawings or approved, install insulation against covering and between supporting members to present neat appearance. Blanket insulation shall have facing at joints lapped and fastened to provide tight joints.

3.5 WALL LINER: Fasten wall liner into place to present neat appearance.

3.6 FIELD PAINTING: Upon detection, abraded or corroded spots on shop-painted surfaces shall be wire brushed and touched up with same material used for shop coat. Shop-primed ferrous surfaces exposed on outside of building and shop-primed surfaces of doors shall be painted with 2 coats of approved exterior enamel. Factory color finished surfaces shall be touched up as necessary with manufacturer's recommended touch-up paint.

END OF SECTION

SECTION 07600

FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

A 527-85	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock-Forming Quality
B 32-89	Standard Specification for Solder Metal

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Fabricator Drawings: Submit fabrication and erection drawings of sheet metal work. Include half size or full size details of sections.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Store sheet metal off ground and protected from damage.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Sheet Metal: Galvanized sheet steel, coating class G90, meeting the requirements of ASTM A 527, 0.0276 inch minimum.

2.1.2 Solder: 50 percent tin, 50 percent lead meeting the requirements of ASTM B 32.

PART 3 - EXECUTION

3.1 FABRICATION

3.1.1 General

3.1.1.1 Form sheet metal accurately to profiles shown on the Drawings, free of buckles and waves.

3.1.1.2 Hem exposed edges 1/2 inch.

3.1.1.3 Make provision in fabrication for expansion and contraction.

3.1.1.4 Clean and flux metals before soldering. Sweat solder completely through seam width.

3.1.1.5 Neutralize excess flux, as work progresses, with 5 to 10 percent washing soda solution, and rinse thoroughly.

3.1.1.6 Back paint sheet metal with primer in accordance with Section 09900.

3.2 INSTALLATION

3.2.1 Verify surfaces to receive sheet metal are clean and smooth and blocking has been installed.

3.2.2 Install sheet metal watertight, without waves, warps, buckles, fastening stresses or distortion.

END OF SECTION

SECTION 07920

SEALANTS AND CALKING

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

D 994-71 (1982)	Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)
ASTM C 920 (1987)	Standard Specification for Elastomeric Joint Sealants

1.1.1.2 Federal Specifications (FS)

TT-S-00227E, Including AMD 3	Sealing Compound: Elastomeric Type, Multicomponent (For Caulking, Sealing, And Glazing In Buildings And Other Structures)
TT-S-00230C, Including AMD 2	Sealing Compound: Elastomeric Type, Single Component (For Caulking, Sealing, And Glazing In Buildings And Other Structures)

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Manufacturer's Installation Instructions: Include manufacturer's instructions for cleaning, priming, and application of sealants for each material condition of application along with products supplied.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Deliver materials to jobsite in manufacturer's original containers, unopened and labels intact.

1.3.2 Store and handle materials to prevent inclusion of foreign materials or exposure to temperatures exceeding 90 F.

1.3.3 Do not bring materials onto site with shelf lives that will expire before scheduled use.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 General: Container labels shall show name of material, date of manufacture, mixing instructions, shelf life, and curing time.

2.1.2 Sealants

2.1.2.1 Exterior building sealant: One component polyurethane: Nonsag type meeting the requirements of FS TT-S-00230, Type II.

2.1.2.2 Interior building and sheet metal sealant: One component polysulfide sealant: Nonsag type meeting requirements of FS TT-S-00230, Type II.

2.1.2.3 Interior concrete joints: Sealant shall meet the requirements of ASTM C 920, Type M, Grade P, Class 25, USE T. Sealant shall be protective coating compatible, and be recommended by the Special Protective Coating manufacturer. See Section 09805.

2.1.3 Primer: Nonstaining type, as recommended by manufacturer of sealant compound for intended service.

2.1.4 Expansion Joint Filler: Similar to Watson Bowman & Acme Corporation "W" Series, or bituminous type meeting the requirements of ASTM D 994.

2.1.5 Backer Rod: Closed-cell polyethylene foam rod.

2.1.6 Bond Breaker Tape: Polyethylene tape with pressure sensitive adhesive.

PART 3 - EXECUTION

3.1 PREPARATION

3.1.1 Clean joints to be sealed of dirt, dust, oil, grease, mortar, and other foreign materials.

3.1.2 Follow recommendations of manufacturer of sealing materials for each condition of application.

3.1.3 Remove loose particles with wire brush. Blow out joints with oil-free and moisture-free compressed air. Remove wax or oil with methyl ethyl ketone or xylol.

3.2 INSTALLATION

3.2.1 Primer

3.2.1.1 Prime joints when and as recommended by sealant manufacturer for each condition of application.

3.2.1.2 Do not apply primer to concrete until concrete has cured at least 28 days.

3.2.2 Back-Up

3.2.2.1 Install backer rod in joints where polysulfide and polyurethane sealant is to be applied. Install with proper tool, in accordance with manufacturer's instructions and to correct depth for sealant shape specified. Where depth of joint is not sufficient for installation of backer rod, use bond-breaker tape to prevent 3 point adhesion.

3.2.2.2 Install bond-breaker tape over expansion joint filler, in joints where polyurethane sealant is to be applied.

3.2.3 Joint Dimensions: As shown on Drawing or as recommended by sealant manufacturer. Otherwise make depth of sealant joints 1/2 of joint width, except that minimum joint size shall be 1/4 inch by 1/4 inch.

3.2.4 Sealant

3.2.4.1 Perform sealing work using specified materials and proper tools in accordance with manufacturer's recommendations for conditions of each application.

3.2.4.2 Use polyurethane sealant in joints of concrete floors and walkways. For other sealant applications, use 1 component polysulfide.

3.2.4.3 Apply polysulfide sealant to sheet metal joints.

3.2.4.4 Apply sealant to clean and dry joints only.

3.2.4.5 Do not apply sealants when ambient temperature is below 40 F or above 100 F.

3.2.4.6 Apply sealing materials with guns having proper size nozzles and using sufficient pressure to fill spaces and voids solid. Where use of gun is impractical, proper hand tools, as approved, may be used.

3.2.4.7 Tool sealant after installation as required to properly fill joint and produce smooth surface.

3.2.4.8 Take necessary precautions to prevent contact of sealants with adjacent surfaces. If necessary, apply masking tape in continuous strips in alignment with edge of joint. Remove masking tape after joints have been tooled.

END OF SECTION

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SECTION 08100

METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

A 115 (1982)	Steel Door Preparation Standards
A 156.16-1989	American National Standard for Auxiliary Hardware

1.1.1.2 American Society for Testing and Materials (ASTM)

A 366-85	Standard Specification for Steel, Sheet, Carbon, Cold-Rolled Commercial Quality
A 569-85	Standard Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip, Commercial Quality

1.1.1.3 Steel Door Institute Specification (SDI)

100	Standard Steel Doors and Frames Selection and Usage
108	Guide for Standard Steel Doors

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Fabricator Drawings: Submit Drawings showing size, elevations and location of each door and frame. Include location and details of hardware reinforcement, and frame anchors.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Deliver to site in undamaged condition.

1.3.2 Store above ground and under cover.

1.3.3 Clean abraded or rusty areas and touch up with same primer used for shop finish.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Hollow Metal Doors: Full-flush type doors, 1-3/4 inch thick, with no seams or joints on face, and meet the requirements of SDI 100 and SDI 108.

2.1.1.1 See Drawings for types and sizes.

2.1.1.2 Fabricate from 18 gage minimum annealed and leveled ASTM A 366 or ASTM A 569 steel.

2.1.1.3 Doors reinforced with 1 of following.

a. Steel members welded in place with spaces filled with insulation. See Drawings for insulated door locations.

b. Water resistant honeycomb core bonded to both faces.

2.1.1.4 Fabricate with 1/8 inch maximum clearance from frames.

2.1.1.5 Doors prepared for the installation of lockset, bolts, closers, latch sets, strikes, and mortised for template hinges shall comply with the ANSI A 115 series where applicable.

2.1.1.6 Reinforce for hinges with 10 gage minimum steel, for closers with 12 gage minimum steel, and for locks with 14 gage minimum steel. Reinforcement drilled and tapped as required for attachment of hardware.

2.1.1.7 Surface welds ground smooth.

2.1.1.8 Glazing stop on exterior side of doors shall be nonremovable.

2.1.2 Pressed Metal Frames

2.1.2.1 See Drawings for profiles and dimensions.

2.1.2.2 Fabricate from 16 gage annealed and leveled ASTM A 366 or ASTM A 569 steel.

2.1.2.3 Corners mitered, welded and ground smooth.

2.1.2.4 Three 18 gage wall anchors and 1 floor anchor for each jamb.

2.1.2.5 Temporary spreader attached to bottom of each frame.

2.1.2.6 Reinforce for hinges with 10 gage minimum steel, and for strikes and closers with 12 gage minimum steel. Reinforcement drilled and tapped as required for attachment of hardware.

2.1.2.7 Door Silencers: Furnish 3 rubber door silencers for door frames, L03011 in accordance with ANSI A 156.16.

2.1.3 Shop Finish: Doors and frames bonderized and painted with 1 coat of manufacturer's standard, baked-on, rust inhibitive primer. Primer containing lead will not be acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Leave temporary spreaders in place until frames are attached to wall framing.

3.1.2 Install frames with jambs plumb and head level.

3.1.3 Install frames for glazed openings where scheduled.

3.1.4 Attach frames to wall framing. Align anchors with hinges and door strike.

3.1.5 Install doors in conjunction with application of hardware, and with uniform clearance at head and jambs. Leave in smooth operating condition.

END OF SECTION

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SECTION 08332

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Referenced Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

A 526-85	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Fabricator Drawings: Submit drawings showing each type and location of doors. Describe features of construction and show installation details.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Deliver to site in undamaged condition.

1.3.2 Store above ground and under cover.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Overhead Coiling Doors: Similar to SFN1 manufactured by Overhead Door Corporation.

2.1.1.1 Doors electric power operated (208V, 3 phase, 60 Hz) with auxiliary chain-gear operation. Interlock shall prevent motor operation when chain hoist is engaged.

2.1.1.2 Size doors, including components, to resist wind load of 20 psf. Minimum size of components given in manufacturer's published specifications.

2.1.1.3 Form curtain of interlocking steel flat-faced slats. Form slats from copper bearing steel sheets, galvanize in accordance with ASTM A 526, 1.25 ounce zinc per square foot, and phosphatize. Slats shall be Type F-265 flat crown, pitch 2-5/8 inches, with a crown depth of 5/8 inch (minimum 0.0336 inch).

2.1.1.4 Bottom of curtain shall consist of 2 rolled steel angles fastened, back to back, to slats. Equip bottom with safety edge of

continuous rubber seal, providing automatic emergency reversing of travel if object in doorway is contacted by safety edge.

2.1.1.5 Door curtain shall coil onto 4 inch minimum steel pipe designed for not more than 0.03 inch deflection per foot of door width. Support pipe on ball bearings and equip with adjustable, counterbalancing, helical springs.

2.1.1.6 Equip guides with double weatherstripping.

2.1.1.7 Cover coiled door with hood formed from 0.0276 inch minimum steel sheet, galvanized in accordance with ASTM A 526. Hood shall be supplied with internal, neoprene baffle and lintel weatherseal to retard air infiltration.

2.1.1.8 Give metal surfaces 1 coat minimum of manufacturer's standard, rust-inhibiting primer.

2.1.1.9 Equip doors with locking devices, suitable for padlocking.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Install in accordance with the Drawings and approved submittals.

3.1.2 Attach door securely to structure.

3.1.3 At completion, adjust as required for door to operate freely.

END OF SECTION

SECTION 08710

FINISH HARDWARE

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

ANSI A156.1-1981	American National Standard for Butts and Hinges
ANSI A156.2-1983	American National Standard for Bored and Preassembled Locks and Latches
ANSI A156.4-1980	American National Standard for Door Controls--Closers
ANSI A156.16-1989	American National Standard for Auxiliary Hardware
ANSI A156.18-1984	American National Standard for Materials and Finishes

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Hardware List: Submit complete hardware list. List hardware for each door separately under door number and hardware requirement.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Packing and Marking: Pack each item of hardware separately, with necessary fasteners and instructions. Mark each item with hardware number shown in hardware list.

1.3.2 Protect hardware from damage before, during, and after installation.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Specific Requirements: See hardware schedule at end of this Section.

2.1.2 Manufacturers' Catalog Numbers: Catalog numbers in hardware schedule refer to following manufacturers.

2.1.2.1 Door hinges: ANSI A156.1, types and sizes shown in schedule, with nonremovable pins on exterior doors. Similar to Stanley.

2.1.2.2 Locksets and latchsets: ANSI A156.2, Series 4000, Grade 1, Type shown in schedule. Similar to Schlage heavy duty.

2.1.2.3 Door closers: ANSI A156.4, type and size shown in schedule. Similar to Corbin.

2.1.2.4 Auxiliary hardware: ANSI A156.16, type shown in schedule. Similar to Builders Brass Works Corp.

2.1.2.5 Weatherstripping, door bottoms and thresholds: Similar to Pemko.

2.1.3 Fasteners: Furnish necessary screws, bolts, and other fasteners of suitable size and type to anchor hardware in position. Match hardware finish. Furnish with expansion shields, toggle bolts, and other appropriate anchors.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Verify installation and be responsible for fit of hardware in locations specified.

3.2 ADJUSTING AND CLEANING

3.2.1 Remove protective coverings and clean hardware before completion of project. Leave hardware in smooth operating condition. Deliver keys to KEH.

3.3 HARDWARE SCHEDULE

Hardware Group No.	Hardware	Quantity	Hardware Type	ANSI A156.18 Finish
Group #1	Hinges	1-1/2 Pr	Butts, FBB 168 4-1/2 x 4-1/2	652
	Lockset	1	D-53PD 70 PLY (without core)	626
	Closer	1	K120	SBL
	Threshold	1	172 A 36"	---
	Automatic Door Bottom	1	430 CR 36"	---
	Weatherstripping	1 Set	319 CN	---
	Door Stop	1	F-121 X	626

Group #2	Hinges	1-1/2 Pr	Butts, FBB 168, 4-1/2 x 4-1/2	652
	Closer	1	K120	SBL
	Lockset	1	D-53 PD 70 PLY (without core)	626
	Threshold	1	172A 36"	---
	Weatherstripping	1 set	319 CN	---
	Door Stop	1	F-121 X	626
	Automatic Door Bottom	1	430 CR 36"	---

3.4 FIELD QUALITY CONTROL: Notify KEH in accordance with Section 01400.

END OF SECTION

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SECTION 08800

GLAZING

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

C 1048-88	Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass

1.1.1.2 Consumer Product Safety Commission (CPSC)

Code of Federal Regulations
Title 16, Commercial Practices
Chapter II, Consumer Products Safety Commission

Part 1201	Safety Standards for Architectural Glazing Materials

1.1.1.3 Federal Specifications (FS)

TT-S-00230C, Including AMD 2	Sealing Compound: Elastomeric Type, Single Component (For Calking, Sealing, And Glazing In Buildings And Other Structures)

1.1.1.4 International Conference of Building Officials (ICBO)

1988 Edition	Uniform Building Code (UBC)

1.2 SUBMITTALS: Not Used

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Glass

2.1.1.1 Tempered: Label to show compliance with CPSC Part 1201, Category I or Category II.

a. Clear tempered: Float meeting the requirements of ASTM C 1048, Kind FT, Condition A, Type I, Class 1.

2.1.2 Glazing

2.1.2.1 Setting blocks: 80 durometer neoprene equal to thickness of glass and long enough to limit load on each block to 15 psi. Minimum length of setting blocks, 3 inches.

2.1.2.2 Gasket: Preformed elastomeric material molded or extruded in form of strips, channels or other shapes designed to provide 4 to 10 pounds per linear inch of sealing pressure and possessing following properties.

Tensile strength	2000 psi, min
Elongation at rupture	175%, min
Tear resistance	120 lb/lin in.,min
Hardness, Durometer (Shore A scale)	75 ± 5
Compression set	35%, max 22 hrs at 212 F
Brittleness temperature	-40 F, min

a. Use 40 pound density closed-cell neoprene sponge gasket in combination with full-density wedge gasket meeting the requirements of above material for dry set glazing on metal channel frames.

2.1.2.3 Sealant: One part silicone construction sealant meeting the requirements of FS TT-S-00230.

2.1.2.4 Tape: Preformed sealant, usually butyl-polyisobutylene, with or without shims or spacers, designed for use in compression glazing in conjunction with bulk sealant and gaskets and possessing properties of sealant.

2.1.2.5 Color of tape and sealant shall match color of frame.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Install glass in accordance with the Drawings, approved submittals, and CPSC Part 1201, Chapter II.

3.1.2 Install tempered glass with tong marks at bottom of lite.

3.2 ADJUSTING AND CLEANING

3.2.1 At completion of work, remove glazing compound from window assembly, remove labels and paint from glass, then clean and polish glass.

END OF SECTION

SECTION 09805

SPECIAL PROTECTIVE COATING

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

D 4259-88	Standard Practice for Abrading Concrete
D 4260-88	Standard Practice for Acid Etching Concrete

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Vendor Information: Submit information listed in column 5 of the Vendor Information List in this Section.

1.2.2 List of Materials: Submit complete list of materials, colors and location to be used, to substantiate compliance with the Drawings and this Section. List shall enumerate percentage of volatile and nonvolatile materials and percentage of component parts of each type of material.

1.2.3 Certificate of Compatibility: Submit letter stating that, for the intended use (including joint designs), coatings are compatible with the sealants listed in Section 07920.

1.2.4 Crew Certification: Submit documentation attesting that the application crew has been certified by the manufacturer to apply the selected coating system.

1.2.5 Application Instructions: Submit manufacturer's detailed application instructions, including application equipment required, coating thickness, and standard joint procedures.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Deliver materials to site in manufacturer's unopened containers with labels intact. Do not open containers or remove labels until after inspection and acceptance by KEH.

1.3.2 Store materials in accordance with manufacturer's recommendations and in well ventilated area not exposed to excessive heat, sparks, flame or direct rays of sun.

1.4 PROJECT CONDITIONS

1.4.1 Environment for Coating: Coat exterior surfaces only when ambient and surface temperatures are within the manufacturer's recommended range, and temperature is 5 F above dewpoint. Apply coatings only when substrate temperatures are falling, unless prior written approval has been obtained from KEH.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Surface Conditioner: 100 percent solids, trowelable epoxy mastic such as Wall-NV Trowelable by Steelcote or approved substitute.

2.1.2 Primer: Two-component epoxy sealer such as Epo-Lux 121 by Steelcote or approved substitute.

2.1.3 Finish coat: 100 percent solids epoxy such as Colortop by Steelcote or approved substitute.

2.1.4 Joint Sealers: Manufacturers standard products compatible with the coating system and meeting the requirements of Section 07920.

2.1.5 Surface conditioner, primer and finish coating materials shall be products of the same manufacturer.

PART 3 - EXECUTION

3.1 INSPECTION

3.1.1 Examine surfaces scheduled to receive coating for conditions that will adversely affect execution, permanence or quality of work and which cannot be put into acceptable condition through preparatory work included in Article 3.2.

3.1.2 Report in writing to KEH conditions that may potentially affect proper application of finish. Do not commence surface preparation or coating application until defects have been corrected and conditions are made suitable.

3.2 PREPARATION

3.2.1 General: Before application, sweep and dust space or area to receive coating.

3.2.2 Pre-Priming: Clean concrete surfaces of laitance, oil, stains, dust, and other foreign material.

3.2.2.1 Clean concrete with uniform application of 1 of following.

a. Abrasive blast in accordance with ASTM D 4259.

b. Acid etch in accordance with ASTM D 4260.

3.2.2.2 If acid etch is used, rinse thoroughly with clean water when solution ceases to foam and scrub with stiff bristle brush. Allow treated area to thoroughly dry. Scratches, cracks, holes, and abrasions shall be cut back to proper key and filled with surface conditioner.

3.2.2.3 Allow concrete to cure 28 days before coating is applied.

3.2.3 Post Priming

3.2.3.1 Feather abrasions, chips, skips and holidays occurring in prime coat by sanding and recoat with material and color to minimum dry film thickness specified.

3.2.3.2 Previously coated surfaces shall be recoated only after existing film is completely dry.

3.2.3.3 Protect coating from rain until dry to touch.

3.2.4 Protection

3.2.4.1 Provide and install drop cloths, shields and other protective devices required to protect surfaces adjacent to areas being coated. Keep spatter, smears, droppings and over-run of coating materials to minimum and remove as coating work progresses.

3.2.4.2 Remove and store electrical fixtures, outlets and switch plates, mechanical diffusers, escutcheons, surface hardware, fittings and fastenings before starting work. Clean and reinstall upon completion of work in each area. Use no solvent or abrasives to clean hardware that will remove lacquer finish normally used on some items.

3.3 APPLICATION

3.3.1 Apply coating materials in accordance with manufacturer's recommendations.

3.3.2 Apply with equipment recommended by manufacturer.

3.3.3 Joints: Prepare and treat joints in accordance with manufacturer's standard procedures, Section 07920, and the Drawings.

3.4 FIELD QUALITY CONTROL

3.4.1 Inspection: KEH will perform tests to ascertain that coating materials have been applied in accordance with this Section.

3.5 CLEANING

3.5.1 Furnish and maintain at site, closed metal containers for disposal of waste materials. Place materials spotted or soaked with paint, oil or solvents in containers.

3.5.2 Brushes, rollers, spatulas and spray equipment shall be thoroughly cleaned after each use and shall contain no oils, thinners or other residue after such cleaning.

3.5.3 Remove empty cans from site at end of each shift.

3.5.4 At completion of coating work, remove materials, containers, rags, cloths, brushes, and other equipment from site. Clean up spills.

3.6 COATING SCHEDULE

	Minimum Wet Film Thickness	Minimum Dry Film Thickness
3.6.1 Concrete (Interior of Buildings 2403WB, WC, and WD)		
Prime Coats:		
Epo-Lux 121	NA	NA
Hi-Build (78 Series)	7 mils	5 mils
Amerlock 400 wc	6.4 mils	5 mils
Finish Coats:		
Colortop	10 mils	10 mils
Hi-Build (78 Series)	7 mils	5 mils
Amershield	7 mils	5 mils

3.6.2 Where coating thickness can not be verified, a visual inspection of the surface shall be performed to verify complete coverage.

Project No W-016H-C3

Project Title RMW Storage Facility

Specification Section 09805

VENDOR INFORMATION LIST

("X" Indicates Required Data)

1 EPN IDENTIFICATION	2 DESCRIPTION	3 REFERENCE DRAWING	4 SPECIFICATION PARAGRAPH	5 VENDOR INFORMATION (VI) Dimensional Drawings	Equipment Weights	Specifications	Certified Test Data	Circuit or Control Diagram	Instructions: Installation	Operation	Maintenance	Spare Parts List	Data Sheets	Illustrative Cuts	
1	Surface Conditioner		2.1.1			X			X						
2	Primer		2.1.2			X			X						
3	Finish Coat		2.1.3			X			X						
4	Joint Sealers		2.1.4			X			X						

END OF SECTION

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SECTION 09900

PAINTING

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

D 16-84	Standard Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products

1.1.1.2 Federal Specifications (FS)

SS-S-1996	Sealer, Water And Weather Resistant, For Asphalt, Concrete, And Masonry Surfaces
TT-E-489H	Enamel, Alkyd, Gloss, Low VOC Content
TT-E-509C	Enamel, Odorless, Alkyd, Interior, Semigloss, White And Tints
TT-P-641G, Including AMD 1	Primer Coating; Zinc Dust-Zinc Oxide (For Galvanized Surfaces)
TT-P-645A	Primer, Paint, Zinc Chromate, Alkyd Type

1.1.1.3 Federal Standard (FED STD)

FED-STD-595A, Including CHGS NOT 1, 2, 3, 4, 5, 6, 7, 8 And 9	Colors

1.1.1.4 Military Specification (MS)

DOD-P-15328D, Including AMD 1	Primer (Wash), Pretreatment (Formula No. 117 For Metals)

1.1.1.5 Steel Structures Painting Council (SSPC)

Surface Preparation Specifications

SSPC-SP 1-82	No. 1 Solvent Cleaning

SSPC-SP 2-82	No. 2 Hand Tool Cleaning
SSPC-SP 3-82	No. 3 Power Tool Cleaning
SSPC-Paint 27-82	Basic Zinc Chromate-Vinyl Butyral Wash Primer

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 List of Materials: Submit list including manufacturer's names, specifications and other data necessary to show compliance with requirements.

1.2.2 Color Samples: Colors will be selected by KEH. Submit samples in form of 3 inch by 5 inch color chips. Describe coating material and color identification on reverse face of each chip. Retain approved samples for use as quality standard of final finishes.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Deliver materials to jobsite in sealed, original, labeled containers each bearing manufacturer's name, type of paint, brand name, color designation, and instructions for mixing and reducing.

1.3.2 Store materials at minimum ambient temperature of 45 F in well ventilated and heated area or areas.

1.3.3 Take precautions to prevent fire hazards and spontaneous combustion.

1.4 PROJECT CONDITIONS

1.4.1 Environmental Requirements

1.4.1.1 Temperature

a. Unless otherwise recommended by paint manufacturer, apply coatings when ambient and surface temperatures are between 45 F and 95 F except water-thinned paints and other special coatings. Apply water-thinned paints when ambient and surface temperature is between 50 F and 90 F.

b. Should temporary heat be required, provide until specified surface and air temperatures exist for required time period. Maintain temporary heat for 24 hours after paint and finish application.

1.4.1.2 Weather

a. Do no exterior work on unprotected surfaces if it is raining or moisture from other source is present or expected before applied paints can dry or attain proper cure without damage.

b. Allow wet surfaces to dry and attain required temperatures and conditions specified before proceeding with work or continuation of previously started work.

c. Do not apply finish in areas where dust is being generated.

1.4.1.3 Ventilation: Provide adequate continuous ventilation required for drying various materials as recommended by paint manufacturer.

1.4.1.4 Illumination: Do not proceed with work unless minimum lighting level of 15 footcandles is provided on surfaces to be painted or finished. Provide temporary lighting to attain lighting level specified.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Terms used are defined in ASTM D 16.

2.1.2 Sealers

2.1.2.1 Concrete floor, interior, Building 2403WB, WC, and WD: Refer to Section 09805.

2.1.2.2 Exterior concrete ramps and fire riser room floor, clear: FS SS-S-1996.

2.1.3 Pretreatment Wash for Metals: MS DOD-P-15328.

2.1.4 Primers

2.1.4.1 Zinc chromate: FS TT-P-645, (alkyd type). Tint with lamp black to produce color other than yellow.

2.1.4.2 Zinc dust-zinc oxide: FS TT-P-641, Type II.

2.1.5 Paints

2.1.5.1 Gloss enamel, exterior and interior: FS TT-E-489, Class A.

2.1.5.2 Semigloss enamel, interior: FS TT-E-509.

2.1.6 Other Materials: Materials not specifically described but required to achieve specified finishes shall be of high quality and of manufacture approved by KEH.

2.1.7 Hazardous Material Restrictions

2.1.7.1 Lead: Do not use paint that contains more than 0.06 percent lead by weight in total nonvolatile content of paint.

2.1.7.2 Mercury: Do not use mercurial fungicides in exterior oil paints.

2.1.8 Colors and Tints: Paint manufacturer's standard colors and tints.

PART 3 - EXECUTION

3.1 INSPECTION

3.1.1 Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence, or quality of work and which cannot be put into acceptable condition through preparatory work included in Article 3.2.1.

3.1.2 Report in writing to KEH conditions that may potentially affect proper application of finish. Do not commence surface preparation or coating application until defects have been corrected and conditions are made suitable.

3.2 PREPARATION

3.2.I New Surfaces

3.2.1.1 Surfaces to be coated shall be in proper condition to accept and assure proper adhesion of coating system.

3.2.1.2 Ferrous metals

a. For shop primed surfaces, apply phosphoric acid etch solution at field welded or abraded spots and let set for time recommended by acid etch manufacturer, rinse with potable water, and when dry, apply prime coat. Wash primed surfaces free of dirt, oil, and grease.

b. Prepare ferrous metals in accordance with SSPC-SP 2 Hand Tool Cleaning and/or SSPC-SP 3 Power Tool Cleaning. Mill scale may be present on cleaned surface providing it is fully anchored, gives metallic appearance and does not cover more than 30 percent of surface. Prime ferrous metals within four hours after preparation.

3.2.1.3 Galvanized and nonferrous metals: Solvent clean in accordance with SSPC-SP 1 and treat with vinyl type wash coat meeting the requirements of SSPC-Paint 27.

3.2.1.4 Concrete Floors

a. Allow at least 14 days after forms are removed before starting work unless otherwise approved by KEH. Remove dirt, scale, powder, laitance, oil and grease, by washing with trisodium phosphate solution, rinse with potable water and let dry.

b. Verify exact type and manufacture of form oil or release agents used and remove in accordance with written recommendation of manufacturer. Where pH alkalinity reading is above 8-1/2, use zinc sulphate.

c. Remove contamination, dirt, dust, and foreign matter on concrete floors. Apply acid etch solution, rinse with clear water, then let dry. After surface treatment, keep traffic off surface until painted.

3.2.2 Mixing and Thinning

3.2.2.1 General: Packaged paint may be thinned before application where necessary to suit conditions of surface, temperature, weather, and method of application. Follow manufacturer's written instructions for thinning packaged paint. Use of thinner shall not relieve Contractor from obtaining complete hiding. Do not mix paints of different manufacturers.

3.2.2.2 Pretreatment wash: Mix by adding one volume of acid component to four volumes of resin component. Add acid component slowly to resin component with constant stirring. Use within eight hours. Material may be reduced with normal butyl alcohol or 99 percent isopropyl alcohol if thinning is required to maintain wet spray.

3.2.3 Protection

3.2.3.1 Cover or otherwise protect finished work of other trades, surfaces not to be painted, or surfaces not concurrently being painted.

3.2.3.2 Provide sufficient drop cloths, shields, and protective equipment to prevent spray or drippings from fouling surfaces not being painted, including surfaces in paint storage and preparation areas.

3.2.3.3 Place cotton waste, cloths, and materials which may constitute fire hazard in closed metal containers and remove daily from jobsite.

3.2.3.4 Where toxic materials, and both toxic and explosive solvents are used, take appropriate precautions in accordance with manufacturer's written instructions and applicable safety regulatory agencies. In applying acid etch coating or solutions to metals, concrete, plaster, and toxic materials to copper, provide ventilation and take protective measures to meet requirements of safety regulatory agencies.

3.3 APPLICATION

3.3.1 Surfaces to be Painted and Finished: Paint surfaces scheduled or shown. Finish factory-primed materials in accordance with this Section.

3.3.2 General: Paint may be applied by brush, roller, or spray unless otherwise specified. At time of application, paint shall show no signs of deterioration. Maintain uniform suspension of pigments during application.

3.3.2.1 Apply paint so finished surfaces are free of runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. Hiding shall be complete. Apply each coat as film of uniform thickness. Use rollers of type designed for coating to be applied and surface to be coated. Ensure that surfaces including edges, corners, crevices, welds, and rivets receive film thickness equivalent to adjacent painted surfaces.

3.3.2.2 Touch up suction spots or make overall application of primer or sealer on first coat on gypsum wallboard and other surfaces to produce uniform color and gloss.

3.3.2.3 Touch up concrete sealer coats to eliminate dull spots. Wipe off excess sealer after each application.

3.3.3 Coating Progress: Allow time between successive coats to permit proper drying. Modify drying times to suit abnormal environmental conditions. Oil base or oleoresinous solvent type paints are ready for recoating when paint feels firm, does not deform or feel sticky under moderate pressure of thumb, and application of another coat of paint does not cause lifting or loss of adhesion of undercoat.

3.3.4 Time Between Surface Preparation and Painting: Apply first coat on surfaces that have been cleaned, pretreated, and otherwise prepared for painting as soon as practicable after such pretreatment has been completed, but before deterioration of prepared surface.

3.3.5 Pretreatment Wash Coat: Apply vinyl type wash coat by brush or spray. Maintain wet spray at all times.

3.4 CLEANING

3.4.1 At completion of each day, remove painting materials, empty containers, rags, cloths, brushes, or other equipment. Store or dispose of as appropriate.

3.4.2 As work proceeds and upon completion, promptly remove paint where spilled, splashed, or spattered.

3.4.3 At conclusion of work, leave premises neat and clean to satisfaction of KEH.

3.5 PAINTING AND FINISH SCHEDULE

		Minimum Dry Film
3.5.1	Exterior and Interior	
3.5.1.1	Ferrous Metal, Enamel, Gloss	
	Pretreatment: MS DOD-P-15328	0.5 mil
	Prime Coat: FS TT-P-645	1.5 mils
	2nd Coat: FS TT-E-489, Class A	1.5 mils
	Finish: FS TT-E-489, Class A	1.5 mils
3.5.1.2	Galvanized Metal, Enamel, Gloss	
	Pretreatment: MS DOD-P-15328	0.5 mil
	Prime Coat: FS TT-P-641, Type II	1.5 mils
	2nd Coat: FS TT-E-489, Class A	1.5 mils
	Finish: FS TT-E-489, Class A	1.5 mils
3.5.1.3	Overhead Coiling and Metal Doors	
	See Paragraph 3.5.2.2 (Interior)	
3.5.2	Interior	
3.5.2.1	Ferrous Metal, Enamel, Semigloss	
	Pretreatment: MS DOD-P-15328	0.5 mil
	Prime Coat: FS TT-P-645	1.5 mils

2nd Coat: FS TT-E-509 1.5 mils
Finish: FS TT-E-509 1.5 mils

NOTE: Preprimed pre-engineered building steel bents shall be touched up only - no finish coats shall be required.

3.5.2.2 Metal Doors and Frames and Overhead Coiling Doors, Enamel, Semigloss
Prime Coat: By Door Manufacturer 1.5 mils
2nd Coat: FS TT-E-509 1.5 mils
Finish: FS TT-E-509 1.5 mils
(Interior and Exterior)

3.5.3 Use products of same manufacturer within coating system.

3.6 COLOR SCHEDULE: Colors shall be as follows:

3.6.1 Miscellaneous Steel Framing: Match prime coat to existing primed components of metal building.

3.6.2 Hollow Metal Doors and Frames: Products of PPG.

3.6.2.1 Doors: Specify door color to match building color. Submit color for KEH approval.

3.6.2.2 Frames: Product of PPG. Blue; submit color to KEH for approval.

3.6.3 Overhead Coiling Doors: Specify door color to match building color, submit color for KEH approval.

3.6.4 Interior Perimeter Steel Base Plate: Prime to match existing primed components of metal building.

3.6.5 Sprinkler System: Red, No. 21105 in accordance with FED-STD-595.

3.6.6 Where paint is scheduled, but color is not specifically called out in the above Schedule, the surface shall match surround areas.

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SECTION 10440

INTERIOR SIGNS

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: Not applicable

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Manufacturer's Data: Submit a complete manufacturer's catalog cut of exit signs. Show details of installations.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Deliver materials to the site in original sealed containers or packages bearing the manufacturer's name and brand designation.

1.3.2 Store and handle materials in a manner to protect them from damage during the entire construction period.

PART 2 - PRODUCTS

2.1 EXIT SIGN: Self-powered wall-mounting unit with 6 inch high, 3/4 inch stroke, green letters on white background. Sign shall be illuminated by sealed tritium gas tubes coated internally with phosphor. Unit shall be capable of 12 years maintenance-free continuous operation. Similar to Self-Powered Lighting, Inc No. 710A-1-WG-S.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Exit signs shall be installed at locations shown on the Drawings. Signs shall be installed plumb and true, at the indicated mounting heights.

3.2 ANCHORAGE

3.2.1 Anchorage shall be in accordance with the manufacturer's recommendation.

END OF SECTION

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SECTION 13120

PRE-ENGINEERED STRUCTURES

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Institute of Steel Construction, Inc (AISC)

AISC M011-1980	Manual of Steel Construction, 8th Edition

1.1.1.2 American Iron and Steel Institute (AISI)

1986 Edition	Specification for the Design of Cold-Formed Steel Structural Members

1.1.1.3 American National Standards Institute (ANSI)

ANSI A58.1-1982	American National Standard Minimum Design Loads for Buildings and Other Structures

1.1.1.4 American Society for Testing and Materials (ASTM)

A 446-87	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality
A 525-87	Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process

1.1.1.5 American Welding Society (AWS)

AWS D1.1-90	Structural Welding Code - Steel

1.1.1.6 International Conference of Building Officials (ICBO)

1988 Edition	Uniform Building Code (UBC)

1.1.1.7 Metal Building Manufacturers Association (MBMA)

1986 Edition	Low Rise Building Systems Manual

1.1.1.8 Lawrence Livermore National Laboratory (LLNL)

UCRL-15910 June 1990	Design and Evaluation Guidelines for Department of Energy Facilities Subjected to Natural Phenomena Hazards

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Erection Instructions and Diagrams: Submit documents necessary to erect buildings and install components, including the following.

1.2.1.1 Anchor bolt layouts, sizes, and other design details.

1.2.1.2 Structural connections.

1.2.1.3 Roofing and siding connections.

1.2.1.4 Joint sealing and calking.

1.2.1.5 Door frame installation.

1.2.1.6 Flashings.

1.2.1.7 Accessory installation.

1.2.1.8 Details and instructions necessary for assembly.

1.2.1.9 Fabrication drawings necessary to supplement instructions and diagrams.

1.2.2 Certificates of Conformance or Compliance: Fabrication drawings, including anchor bolt layouts and sizes, shall be accompanied by stress values, design calculations, and certificate signed by registered professional structural engineer, stating design criteria and procedures used and attesting to adequacy and accuracy of design.

1.2.3 Color Samples: Colors used on Project will be selected by KEH. Submit samples from manufacturer's standard.

1.3 SYSTEM DESCRIPTION

1.3.1 Metal Building: Multiple-span structure, rigid frame beam and column type.

1.3.1.1 Primary framing: Rigid frame of rafter beams and columns, intermediate columns, braced end frames, end wall columns, and wind bracing or roof and wall panels braced and tied.
1.3.1.2 Secondary framing: Purlins, girts, eave struts, flange bracing, sill supports, clips and other items required for complete installation.

1.3.1.3 Wall and roof system: Preformed metal panels of vertical profile, and accessory components.

1.3.2 Design Criteria: Design building and components in accordance with applicable sections of AISC M011, MBMA "Metal Building Systems Manual", AISI "Specification for the Design of Cold-Formed Steel Structural Members", and UBC.

1.3.2.1 Basic design shall include live, dead, snow, wind, and seismic loads. Other design loads, either static or dynamic, shall be considered auxiliary loads.

1.3.2.2 Vertical live and snow loads: Design roof for dead load plus 20 psf uniformly distributed live and dead loads.

1.3.2.3 Wind loads: Design in accordance with ANSI A58.1, Section 6, using following criteria.

a. Basic wind speed: 70 mph.

b. Importance factor: 1.07

c. Exposure category: C.

1.3.2.4 Seismic loads: Design in accordance with UCRL-15910, Section 4.2.2.

1.3.2.5 Auxiliary loads

a. Design roof framing for additional load of 10 psf to accommodate loads imposed on building from piping, lighting fixtures, and equipment, including automatic fire sprinkler system. Provide method for fastening equipment to roof.

b. Magnitude, quantity, and location of auxiliary loads shown on the Drawings or described in this Section.

1.3.2.6 Maximum deflection in roofing or roof panels shall not exceed 1/180th of spans, and maximum deflection in siding or wall panels shall not exceed 1/90th of spans.

1.3.2.7 Provide drainage to exterior for water entering or condensation occurring within cladding system.

1.3.2.8 Install building completely weathertight, free of abrasions, loose fasteners, and deformations.

1.3.2.9 Weld steel in accordance with AWS D1.1, Section 1 through 8.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Deliver, store, handle, and erect prefabricated components, panels, and other manufactured items in manner that will not damage or deform.

1.4.2 Examine sheets and panels upon arrival at site and, if found to be wet, remove moisture, restack, and protect until used. Replace damaged or defaced components unless they can be repaired to satisfaction of KEH.

1.4.3 Stack materials stored at site before erection on platforms or pallets and cover with tarpaulins or other suitable weathertight covering.

1.4.4 Store metal sheets or panels so water which may have accumulated during transit or storage will drain off.

1.4.5 Do not store sheets or panels in contact with materials that may cause staining.

1.5 WARRANTY

1.5.1 Building shall be warranted against water leaks arising out of or caused by ordinary wear and tear by elements for period of 5 years. Warranty shall start upon final acceptance of Work or date Operating Contractor takes possession, whichever is earlier.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Wall and Roof Systems

a. Sheet steel stock: ASTM A 446 zinc-coated (galvanized) to ASTM A 525, G90. Factory color finished.

b. Wall system: 0.0217 inch (26 gage), exposed fastening panels.

c. Roof system: 0.0276 inch (24 gage), exposed fastening panels.

d. Sealant: Manufacturer's standard elastomeric, nonstaining type.

e. Fasteners: Manufacturer's standard type, finished to match adjacent surface when exterior exposed.

2.1.2 Accessories

a. Flashing, trim, caps, and similar metal accessories shall be of same thickness, material and finish used for adjacent wall or roof coverings.

b. Gutter and downspout fabrication:

1) Fabricate of same material and finish as wall metal.

2) Form gutters and downspout to collect and remove water flow from roof resulting from rain falling at rate of 3 inches per hour for 5 minute duration.

c. Closure strips: Formed of compressed rubber, synthetic rubber, bituminous impregnated materials, or metal of same respective type as roof and wall panels, and standard with manufacturer. Molded closure strips shall be free of open voids and shall not absorb or retain water. Closure strips shall be formed to match corrugations or configurations of

roofing or siding being used, and provided where shown and necessary for weathertight construction.

d. Louver and vents: See Section 15500.

e. Non-shrink grout: See Section 03300.

2.1.3 Finish: Precoated enamel on steel with color selected from manufacturer's standards by KEH.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Erect in accordance with manufacturer's approved erection instructions and diagrams.

3.1.2 Set structural elements on nonshrink grout specified in Section 03300.

3.1.3 Insulate dissimilar materials, not compatible when in contact, from each other by gaskets or insulating compounds.

3.1.4 Wall and Roof Systems

3.1.4.1 Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.

3.1.4.2 Fasten cladding system to structural supports, aligned level and plumb.

3.1.4.3 Use exposed fasteners for roof system and exposed or concealed fasteners for wall system.

3.1.4.4 Install sealant and gasket to prevent weather penetration.

3.1.4.5 System: Free of rattles, noise due to thermal movement, and wind whistles.

3.1.5 Attach gutters and downspouts to building. Install gutters to provide drainage.

3.1.6 Attach louvers and ventilators to supporting construction to assure rain-tight installation.

3.1.7 Field Painting: Upon detection, abraded or corroded spots on shop-painted surfaces shall be wire brushed and touched up with same material used for shop coat. Shop-primed ferrous surfaces exposed on outside of building and shop-primed surfaces of doors shall be painted with 2 coats of approved exterior enamel. Factory color finished surfaces shall be touched up as necessary with manufacturer's recommended touch-up paint.

3.2 FIELD QUALITY CONTROL

3.2.1 Inspect final installation for compliance with this Section and approved submittals. Inspection shall include verification of materials and configuration in accordance with approved submittals. Ensure that fasteners are installed and tightened in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 15300

FIRE PROTECTION

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

ANSI B31.1-1989 Edition	American National Standard Code for Pressure Piping - Power Piping

1.1.1.2 American Welding Society (AWS)

AWS D1.1-90	Structural Welding Code - Steel

1.1.1.3 Factory Mutual System (FM)

1990 Edition	Approval Guide

1.1.1.4 Federal Standards (FED STD)

FED-STD-595A, Including CHGS NOT 1, 2, 3, 4, 5, 6, 7, 8, And 9	Colors

1.1.1.5 International Conference of Building Officials (ICBO)

1988 Edition	Uniform Building Code (UBC)

1.1.1.6 National Fire Protection Association (NFPA)

NFPA 13	Standard for the Installation of Sprinkler Systems, 1989 Edition

1.1.1.7 Underwriters Laboratories, Inc (UL)

1990	Fire Protection Equipment Directory

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Approval Data: Submit information listed in Column 5 of Approval Data List in this Section.

1.2.2 Vendor Information: Submit information listed in Column 5 of Vendor Information List in this Section.

1.2.3 Design/Fabricator Drawings: Submit design, fabrication and installation drawings of automatic dry pipe sprinkler systems. Design in accordance with NFPA 13 for ordinary hazard occupancy classification. Size system in accordance with pipe Schedule in NFPA 13, Section 8-3. Include applicable requirements of NFPA 13, Article 1-9 and this Section.

1.2.3.1 Identify proposed deviations from specified materials or design requirements in writing.

1.2.3.2 Design shall be reviewed and approved by a Washington State licensed professional fire protection engineer to verify that the design complies with the requirements of NFPA 13 and the construction specifications. The submitted design drawings shall bear the engineers professional stamp.

1.2.3.3 Identify location of hangers, supports, and sway braces on design drawing. Provide details of hanger, support, and sway brace assemblies, to identify the assembly components used, including material type, sizes, and manufacturer's name, model, or figure number, as applicable. Include on the design drawing sufficient detail of attachment of assembly to building structure, showing fastener type, size, material, and embedment depth where applicable.

1.2.4 Seismic Calculations: Submit detailed mathematical analysis verifying that design of attachments of hangers, supports, and sway braces to building structure meet the requirements of UBC, Zone 2B.

1.2.5 Record Drawings: Submit "as-installed" drawings of dry pipe sprinkler systems.

1.2.6 NFPA Test Certificate: Submit completed Contractor's Material and Test Certificate, in accordance with NFPA 13, Section 1-10.

1.3 SYSTEM DESCRIPTION

1.3.1 Design of the sprinkler system shall comply with the earthquake requirements of NFPA 13, Section 3-5.3 and associated NFPA 13, Appendix A references.

1.3.2 Each sprinkler system shall include a 6-inch dry pipe valve supplied with standard trim including automatic air maintenance compressor, fire department connection, flow alarm pressure switch, low air pressure supervisory switch, system main drain valve, water motor alarm gong, and valve house low temperature supervisory switch. The systems shall include all other appurtenances required by NFPA 13 and specified herein.

1.3.3 Components of sprinkler system, if not designated in this Section and the Drawings by manufacturer's name and model/figure number, shall be current products of manufacturer and UL listed or FM approved for use intended.

1.4 QUALITY ASSURANCE

1.4.1 Welding Documentation: Fabricator shall ensure that welders in his employ are qualified in accordance with AWS or ANSI requirements before

performing shop or field welding on structural steel components which are part of this Section. Welder qualification test results shall be made available upon request. Proposed AWS or ANSI welding procedures shall be subject to review.

1.4.2 Fabricator shall have a welding procedure and a quality assurance procedure prior to welding as required in NFPA 13, Paragraph 3-7.2.11.1 and 3-7.2.11.2.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Piping

2.1.1.1 Pipe and fittings: Meet the requirements of NFPA 13. Piping shall be steel with threaded or grooved type (rubber gasketed) fittings. Rubber gasketed fittings for use with plain end pipe shall not be used.

2.1.1.2 Rigid and flexible rubber gasketed couplings: Bolted sleeve type for use with grooved-end pipe, with rubber rings for sealing. Couplings and rubber rings shall be approved for use on dry pipe sprinkler systems.

2.1.2 Sealant: See Section 07920.

2.1.3 Paint: See Section 09900.

2.2 EQUIPMENT

2.2.1 Water Motor Alarm Gong: Weatherproof mechanical gong with hood, complete with drain and interconnecting piping.

2.2.2 The following equipment, designated by manufacturer or trade name, shall be supplied. No substitutions will be accepted.

2.2.3 Switches

2.2.3.1 Flow alarm pressure switch: Potter, Model PS10. Switches shall have pressure-actuated, normally-open contacts.

2.2.3.2 Low air pressure supervisory switch: Potter, Model PS40. An adjustable low air pressure supervisory switch with normally-closed contacts shall be installed on dry pipe sprinkler systems to annunciate a failure to maintain a proper air supply in the system.

2.2.3.3 Low temperature supervisory switch: Potter, Model RTS-G. A low temperature supervisory switch with normally-closed contacts shall be installed in sprinkler system valve houses to annunciate temperature drops within valve houses below 40 F.

2.2.4 Automatic Sprinklers: Nominal 1/2 inch diameter orifices, rated for high (286 F) temperature classification.

2.2.5 Air Compressor: Provide an air compressor for each of the dry pipe sprinkler systems. A 110 volt, single phase local power supply shall be provided to each valve house as shown on the Drawing.

2.2.6 Sprinkler Cabinet: Provide with required number of sprinkler heads of ratings and types installed, a sprinkler wrench, and locate adjacent to each system riser.

2.2.7 Fire Department Connection: Brass or bronze body and furnished with self-closing double clappers, plugs and chains, automatic balldrip valve, and escutcheon plate. Connection shall be 4 inch IP by 2-1/2 inch HT by 2-1/2 inch HT. Hose threads shall be National Standard Fire Hose threads, 7-1/2 TPI.

2.2.8 Dry Pipe Valve: Reliable, with standard trim package.

PART 3 - EXECUTION

3.1 DESIGN REQUIREMENTS

3.1.1 Design 2 dry pipe sprinkler systems to provide complete sprinkler protection throughout the building in accordance with NFPA 13 for ordinary hazard occupancy classification. Locations of system risers are shown on the Drawing. Size of system risers shall be as specified herein.

3.1.2 The temperature classification for sprinklers located under the roof shall be rated high (286 F).

3.2 INSTALLATION

3.2.1 Install dry pipe sprinkler systems in accordance with NFPA 13 and as specified herein.

3.2.2 Coordinate requirements for interruption of existing services and Fire Department stand-by with KEH.

3.2.3 Protect new piping from damage by earthquake, by proper clearance around penetration holes, flexible couplings, and sway bracing, in accordance with NFPA 13, Sections 3-5.3 and associated portions of Appendix A.

3.2.4 Pack pipe penetrations through insulated walls with fiberglass or mineral wool packing and seal both sides with polysulfide sealant. Seal penetrations through uninsulated walls with polysulfide sealant.

3.2.5 Pipe Escutcheons: Install on sides of wall penetrations exposed to view.

3.2.6 Repair damaged surfaces. Refinish repaired or defaced surfaces to match adjacent undisturbed areas.

3.2.7 Terminate exterior discharge, inspectors test, and auxiliary drain lines with 45 degree elbows, turned down.

3.2.8 Provide suitable splash-pads, at exterior discharge locations, on other than paved surfaces.

3.2.9 Paint new system piping exposed to weather conditions on outside of building in accordance with Section 09900. Finish color shall be red (No. 21105) shown in FED STD 595.

3.2.10 Welding

3.2.10.1 Limit onsite welding to fabrication of supports or braces, if necessary. No other on site welding will be permitted.

3.2.10.2 Perform shop welding of piping and attachments to pressure retaining components in accordance with ANSI B31.1 and NFPA 13.

3.2.10.3 Perform welding of steel structural elements in accordance with AWS D1.1, Sections 1 through 8.

3.2.10.4 Do not perform welding or flame cutting on or within building without written approval of KEH.

3.2.10.5 Perform visual weld examination in accordance with AWS D1.1 paragraphs 6.5.5 and 8.15, or ANSI B31.1 paragraph 136.4.2 as applicable.

3.2.10.6 Perform dye penetrant weld examination on cover pass of tie-in welds, not to be hydrostatically tested, in accordance with ANSI B31.1 paragraph 136.4.4.

3.2.11 Hangers and Supports

3.2.11.1 Hang, support and brace sprinkler system piping from building structural steel members, or to metal supports attached to building structure in accordance with NFPA 13.

3.2.11.2 Use clamping devices when attaching hangers to structural steel. When clamping is impracticable, obtain written authority to weld, punch, drill or cut structural steel members to provide attachment. C-type clamps shall not be used to attach sway braces to building structure (See NFPA 13, Paragraph 3-5.3.5.10).

3.2.11.3 When required, deliver to KEH detailed mathematical analysis, by registered professional engineer, of structural integrity where questionable alterations of building structural components are proposed such as punching or drilling. Analysis may also be required where obvious deformations of structural members are caused by hanging sprinkler piping.

3.2.12 Signs: Permanent type identification signs shall be installed at control, drain, test, and alarm valves. Legend shall include warning of Fire Department response to operation of valve.

3.3 FIELD QUALITY CONTROL

3.3.1 Flushing and Testing

3.3.1.1 General

a. Furnish equipment and instruments required to perform flushing and testing operations described below.

b. Conduct flushing and testing operations while witnessed by KEH.

c. Remove and replace pieces of apparatus, material, or work which fails in flushing or testing operations and retest.

d. Repair damage resulting from flushing or testing to satisfaction of KEH.

3.3.1.2 Flushing: Flush new sprinkler system piping as described below.

a. Flush sprinkler piping by feeding water into system through alarm valve to provide velocity of at least 7 feet per second in piping being flushed.

b. Discharge flushing water from end of cross mains.

c. Discharge flushing water to point designated by KEH. Flushing shall continue until effluent runs clear and free of foreign matter.

d. Provide documented evidence that flushing has been accomplished in accordance with this Section. Deliver to KEH before testing.

3.3.1.3 Hydrostatic test

a. Hydrostatically test new sprinkler system in accordance with NFPA 13, Section 1-11.2.

b. Use hydrostatic test pressure of 200 psi.

c. Leaks in piping will not be acceptable.

3.3.1.4 Dry pipe system tests: Test in accordance with NFPA 13, Section 1-11.3.

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Project Title RMW Storage Facility

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APPROVAL DATA LIST

("X" Indicates Required Data)

1 EPN IDENTIFICATION	2 DESCRIPTION	3 REFERENCE DRAWING	4 SPECIFICATION PARAGRAPH	5 DATA: Dimensional Drawings	Equipment Weights	Specifications	Material Description	Performance Data	Circuit or Control Diagrams	Data Sheets	Illustrative Cuts	Installation Instructions	6 REMARKS
1	Dry Pipe Valves		2.2.8								X		Including all trim
2	Water Motor Alarm Gongs		2.2.1								X		
3	Fire Department Connections (FDC)		2.2.7								X		
4	Check Valve for FDC		1.3.1								X		
5	Flow Alarm Pressure Switches		2.2.3.1								X		
6	Low Air Pressure Supervisory Switches		2.2.3.2								X		
7	Low Temperature Supervisory Switches		2.2.3.3								X		
8	Sprinkler Heads		2.2.4								X		
9	Rubber Gasketed Rigid and Flexible Couplings		2.1.1.1								X		
10	Air Compressor		2.2.5										

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Project Title RMW Storage Facility

Specification Section 15300

VENDOR INFORMATION LIST

("X" Indicates Required Data)

1 EPN IDENTIFICATION	2 DESCRIPTION	3 REFERENCE DRAWING	4 SPECIFICATION PARAGRAPH	5 VENDOR INFORMATION (VI) Dimensional Drawings	Equipment Weights	Specifications	Certified Test Data	Circuit or Control Diagram	Instructions: Installation	Instructions: Operation	Instructions: Maintenance	Spare Parts List	Data Sheets	Illustrative Cuts	
1	Dry Pipe Valves		2.2.8	X							X	X		X *	
2	Water Motor Alarm Gongs		2.2.1											X	
3	Fire Department Connections	(FDC)	2.2.7											X	
4	Check Valve for FDC		1.3.1											X	
5	Flow Alarm Pressure Switches		2.2.3.1											X	
6	Low Air Pressure Supervisory Switches		2 2.3.2											X	
7	Low Temperature Supervisory Switches		2.2.3.3											X	
8	Sprinkler Heads		2.2.4											X	
9	Rubber Gasketed Rigid and Flexible Couplings		2.1.1.1											X	
	Air Compressor		2.2												

END OF SECTION

SECTION 15500

HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 Air Movement and Control Association, Inc (AMCA)

AMCA Standard 210-85	Laboratory Methods of Testing Fans for Rating Purposes

1.1.1.2 American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)

52-76	ASHRAE Standard Method of Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter

1.1.1.3 American Society for Testing and Materials (ASTM)

A 307-88a	Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
A 563-88a	Standard Specification for Carbon and Alloy Steel Nuts

1.1.1.4 Sheet Metal and Air Conditioning Contractors National Association, Inc (SMACNA)

1983, 1st Edition	HVAC Systems--Testing, Adjusting and Balancing

1.1.1.5 Underwriters Laboratories, Inc (UL)

1989	Building Materials Directory

1.2 SUBMITTALS: Refer to section 01300 for submittal procedures.

1.2.1 Approval Data: Submit information listed in Column 5 of Approval Data List in this Section.

1.2.2 Vendor Information: Submit information listed in Column 5 of Vendor Information List in this Section.

1.2.3 Test Data: Submit documentation of test data, dated and signed by contractor executing test.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Fasteners: ASTM A 307, Grade A or B bolts, with heavy hex nuts meeting the requirements of ASTM A 563, UNC threads, bolt head marking not required. Finish to be cadmium plating or electro-galvanizing.

2.2 EQUIPMENT

2.2.1 Wall Exhausters: Units shall be 5 horsepower, 21,680 cfm for Building 2403 WD, and 3 horsepower, 13,340 cfm for Buildings 2403 WC and 2403 WB at .40 inches static pressure, equipped with OSHA approved drive and inlet guard, and gravity damper. Units shall be belt-driven type, minimum of 2 belts. The motor pulley shall be adjustable for final system balancing. A disconnect switch shall be factory installed and wired from the fan motor to the disconnect junction box. Motors shall be equipped with over-current protection box. Units shall bear the AMCA 210 certified performance seal for air performance. Unit wiring shall be 480 volt, 3 phase, 60 hertz. Similar to ACME Propmaster Model K48N for Building WD, and K36M for Buildings WC and WB.

2.2.2 Louvers: Units shall be flanged for flush surface application. Jambs shall be constructed with integral downspouts for carrying water from the blades to the louver sill. Screens shall be provided on the interior surface of the louvers and shall be 1/2 inch mesh. Louvers shall be constructed of extruded aluminum with anodized finish with 1 coat of lacquer. Louvers shall be 48 inches by 72 inches, passing 8672 cfm for Building WB, and 6670 cfm for Buildings WC and WD with less than 0.15 inch wg static pressure drop. Similar to American Warming and Ventilating, Inc, Model LE-33.

2.2.3 Baseboard Heater: Units shall be suitable for 120 volts, single-phase, 60 hertz. Heater output shall be 1000 watts. Baseboard length shall be 48 inches. Similar to Chromalox, Model BBF-41. Provide Integral thermostat, similar to Model BBFK-7. Unit shall be UL listed.

2.2.4 Dampers: Units shall be automatic closing gravity type, rear flanged, sized to fit wall exhauster support steel. Screens shall be provided on the interior surface of the dampers and shall be 1/2 inch galvanized mesh.

2.2.5 40 Percent ASHRAE-Rated Filters: Initial average filtering efficiency of 40 to 45 percent, when tested in accordance with ASHRAE 52, having UL Class II listing. Size, 24- by 24- by 12-inch. Filters to be complete with steel holding frames and retainers.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Equipment

3.1.1.1 Install where shown on the Drawings in accordance with manufacturer's instructions.

3.1.1.2 Install filters after construction has been completed and debris removed.

3.2 FIELD QUALITY CONTROL

3.2.1 Testing HVAC Systems

3.2.1.1 After system is installed, place exhaust fans in operation in accordance with manufacturer's instructions. After fans have been in operation for at least 4 hours, test the HVAC systems in accordance with SMACNA Testing, Adjusting and Balancing publication, and under surveillance of KEH.

3.2.1.2 Furnish instruments, materials and labor required to perform testing of systems. Instruments shall have been calibrated by approved testing laboratory with date of calibration marked on them.

3.2.1.3 Do not use instruments which are part of system for testing. Check instruments of system against test instruments.

3.2.1.4 Data to be recorded

a. Record vibration of fan shaft along with testing data for each system specified, except unit heaters, by SMACNA.

b. After test has been performed, submit Test Data report in accordance with Paragraph 1.2.3. Test data shall be tabulated and submitted with flow sheet indicating points of measurement. Include characteristics of systems that were observed during tests. Include failure of system and control components to meet operational functions required by the Drawings and this Section.

3.2.1.5 Testing sequence: Perform in accordance with sequence given by SMACNA.

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Specification Section	15500

APPROVAL DATA LIST

("X" Indicates Required Data)

1 EPN IDENTIFICATION	2 DESCRIPTION	3 REFERENCE DRAWING	4 SPECIFICATION PARAGRAPH	5 DATA: Dimensional Drawings	Equipment Weights	Specifications	Material Description	Performance Data	Circuit or Control Diagrams	Data Sheets	Illustrative Cuts	Installation Instructions	6 REMARKS
	Wall Exhausters			X		X		X					
	Gravity Dampers			X		X		X					
	Louvers		—	X		X		X					
	Filters					X		X					

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Project Title RMW Storage Facilities

Specification Section 15500

VENDOR INFORMATION LIST

("X" Indicates Required Data)

1 EPN IDENTIFICATION	2 DESCRIPTION	3 REFERENCE DRAWING	4 SPECIFICATION PARAGRAPH	5 VENDOR INFORMATION (VI) Dimensional Drawings	Equipment Weights	Specifications	Certified Test Data	Circuit or Control Diagram	Instructions: Installation	Operation	Maintenance	Spare Parts List	Data Sheets	Illustrative Cuts	
	Wall Exhausters			X	X	X					X	X			
	Gravity Dampers			X	X	X					X	X			
	Louvers			X	X	X					X	X			
	Filters										X				

END OF SECTION

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SECTION 16400

SERVICE AND DISTRIBUTION

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

ANSI C80.1-1983	American National Standard for Rigid Steel Conduit--Zinc Coated
ANSI C82.1-1985	American National Standard Specifications for Fluorescent Lamp Ballasts

1.1.1.2 American Society for Testing and Materials (ASTM)

A 475-78 (1984)	Standard Specification for Zinc-Coated Steel Wire Strand

1.1.1.3 Federal Specifications (FS)

W-C-375B, Including Notice 1	Circuit Breakers, Molded Case; Branch Circuit And Service
W-F-406D	Fittings For Cable, Power, Electrical And Conduit, Metal, Flexible
W-C-1094A	Conduit and Conduit Fittings Plastic Rigid
W-P-115B	Panel, Power Distribution
W-S-896E, Including AMD 2 and Notice 1	Switches, Toggle (Toggle And Locks), Flush Mounted (General Specification)
WW-C-566C	Conduit, Metal, Flexible

1.1.1.4 National Electrical Manufacturers Association (NEMA)

Standards Publication/ No. FB 1-1988	Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies

Standards Publication/ No. ICS 2-1988	Standards for Industrial Control Devices, Controllers, and Assemblies
Standards Publication/ No. ICS 6-1988	Enclosures for Industrial Controls and Systems
Standards Publication/ No. PB 1-1984	Panelboards
Standards Publication/ No. ST 20-1986	Dry-Type Transformers for General Applications
Standards Publication/ No. WD 1-1989	General Requirements for Wiring Devices

1.1.1.5 National Fire Protection Association (NFPA)

NFPA 70	National Electrical Code, 1990 Edition

1.1.1.6 Underwriters Laboratories, Inc (UL)

1989	Electrical Appliance and Utilization Equipment Directory
1989	Electrical Construction Materials Directory
UL 797-1977	Standard for Electrical Metallic Tubing

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Approval Data: Submit information listed in Column 5 of Approval Data List in this Section.

1.3 QUALITY ASSURANCE

1.3.1 Standards: Products shall be identified for intended purpose by Underwriters Laboratories, Inc (UL) in the Electrical Appliance and Utilization Equipment Directory or Electrical Construction Materials Directory, and bear listing mark of laboratory. In absence of mark, submit documentation of applicable listing. Listing and marking by UL is not required for products specified to meet the requirements of a national standard, or designated by manufacturer's part number on the Drawings or in this Section.

PART 2 - <u>PRODUCTS</u>

2.1 MATERIALS

2.1.1 Solderless Connectors and Terminal Lugs: Pressure type, rated for use with copper or aluminum conductors with insulating caps or covers rated for system utilization voltage. Connectors shall be types specified below.

2.1.1.1 For conductors #8 AWG and smaller.

a. Ideal Industries, Inc "Wire-Nuts."

b. Thomas and Betts Company "Sta-Kon."

c. 3M Company "Scotchlok."

2.1.1.2 For conductors #6 AWG and larger.

a. Burndy Engineering Company "Screw Pressure Connectors" or "Hydent."

b. Thomas and Betts Company "Lock-tite."

2.1.2 Raceways, Fittings and Boxes

2.1.2.1 Conduit shall meet the requirements of appropriate standard as follows.

a.	Rigid steel	ANSI C80.1
b.	Electrical metallic tubing (EMT)	UL 797
c.	Flexible metal	FS WW-C-566
d.	PVC	FS W-C-1094A

2.1.2.2 Conduit fittings for rigid steel and electrical metallic tubing shall meet the requirements of NEMA FB 1. Only compression type threadless fittings shall be used with EMT.

2.1.2.3 Fittings used with flexible metal conduit shall meet the requirements of FS W-F-406 and be squeeze type only. Flexible metal conduit shall have integral ground conductor.

2.1.2.4 Interior lighting fixture outlet boxes: 4 inch octagonal pressed steel.

2.1.2.5 Exterior lighting fixture outlet boxes: Cast with threaded hubs.

2.1.2.6 Interior receptacle outlet boxes: 4 inch square by 2-1/8 inches deep, pressed steel with 4 inch square cover.

2.1.2.7 Exterior receptacle outlet boxes: Cast metal Type FD.

2.1.2.8 Telephone outlet boxes: 4 inch square by 2-1/8 inch deep pressed steel with cover plate for single device.

2.1.3 Conductors: Copper, AWG size specified on the Drawings.

2.1.3.1 Conductor insulation: Type THHN, 90 C.

2.1.3.2 Conductor No. 10 and smaller shall be solid; No. 8 and larger shall be stranded.

2.1.3.3 Conductor identification: Voltage levels, grounded conductors, equipment grounding conductors, and ungrounded phase conductors shall be identified. Existing field center wire color-code systems shall be used. If no present field center wire color code exists, the following color-coding system shall be used:

a. Color coding for 240/120-volt, single-phase systems:

1) Grounded neutral white.

2) Grounding conductor green or bare.

3) Ungrounded conductor black.

4) Ungrounded conductor red.

b. Color coding for 208Y/120 volt, 3-phase systems:

1) Grounded neutral white.

2) Grounding conductor green or bare.

3) Phase A (ungrounded) conductor black.

4) Phase B (ungrounded) conductor red.

5) Phase C (ungrounded) conductor blue.

c. Color coding for 480Y/277 volt, 3-phase systems:

1) Grounding neutral gray.

2) Grounding conductor green or bare.

3) Phase A (ungrounded) conductor brown.

4) Phase B (ungrounded) conductor orange.

5) Phase C (ungrounded) conductor yellow.

2.1.4 Wiremarkers: Imprinted tubular plastic.

2.1.5 Nameplates: Laminated plastic stock, 1/16 inch thick, white surface with black core with beveled edges. Engraving shall be 1/4 inch minimum block style. The following is a list of nameplates required for each of the 3 buildings. (2403WB, WC, WD). (CAM ALARM TEST) (CAM ALARM PNL) (CAM 1) (CAM 2) (CAM 3) (CAM 4) (EXH FAN 1) (EXH FAN 2) (EXH FAN 3) (EXH FAN 4) (EXH FAN DISC 1) (EXH FAN DISC 2) (EXH FAN DISC 3) (EXH FAN DISC 4) (XFMR A) (SPEAKERS - PAGING SYS) (POWER PNLBD A) (LIGHT CONTACTOR).

2.1.6 Concrete and Masonry Anchors: Kwik-Bolt manufactured by Hilti Fastening Systems or Red Head Wedge Anchor manufactured by

Phillips Drill Company. Anchors to be minimum 3/8 inch diameter with a minimum 2-1/2 inch embedment depth.

2.1.7 Wire Pulling Compound: "Y-er Eas" manufactured by Electro Compound Company or Polywater manufactured by American Polywater Corporation.

2.1.8 Tape

2.1.8.1 Plastic insulating tape: Similar to Scotch No. 33+ manufactured by 3M Company.

2.1.8.2 Conduit protection tape: Similar to Scotchrap No. 50 manufactured by 3M Company.

2.1.9 Insulating Putty: "Scotchfil" manufactured by 3M Company, GE No. 8389 manufactured by General Electric Co, or "Airseal" manufactured by Kearney Company.

2.1.10 Duct Sealing Compound: "Sealex" manufactured by Porcelain Products Co or "Kerite" manufactured by Kerite Co.

2.1.11 Hangers for Individual Conduits: Factory made springable wrought steel clamps or malleable iron, split and hinged rings. For suspended conduit, clamps or rings shall be bolted to, or interlocked with threaded suspension rod.

2.1.12 Sealant: See Section 07920.

2.1.13 Grounding Systems

2.1.13.1 Conductors: Buried ground cable shall be 5/8 inch diameter, 7 strand, special low carbon grade steel with Class B zinc coating in accordance with ASTM A 475. Exposed bonding conductor shall be No. 6 bare solid copper minimum.

2.1.13.2 Ground rods: 5/8 inch diameter by 8'-0" long galvanized steel.

2.1.13.3 Ground connections shall be exothermally welded using appropriate molds and cartridges. Similar to Erico. Building column to ground grid may be with a Cadwld-type GL lug bolted to column with 1/2 inch diameter galvanized bolt.

2.1.13.4 Ground plates: 2-1/2 inch square with 4 tapped holes, 3/8-16 threads, 1/2 inch deep. Similar to Erico Products No. S-330.

2.1.13.5 Equipment grounding conductors shall be included in all raceways containing feeders, branch circuits, or control circuits of 120 volts or greater.

2.2 EQUIPMENT

2.2.1 Equipment enclosures shall meet the requirements of NEMA ICS 6-110 and be Type 1, 3, or 3R.

2.2.2 Panelboards: Rating shown on panelboard schedule, UL labeled, and meeting the requirements of NFPA 70 (NEC), NEMA PB 1 and FS W-P-115. Flush or surface mounting as shown on panelboard schedule.

2.2.2.1 Provide with main circuit breaker.

2.2.2.2 Provide doors with flush-type combination catch and locks, keyed alike and furnished with 2 keys for each panelboard. Provide each panelboard with directory card holder and card for branch circuit load identification.

2.2.2.3 Furnish with nameplate engraved with designation shown on panelboard schedule. Attach nameplate to front of panelboard above door.

2.2.2.4 Branch circuit breakers: Molded case bolt-on type with thermal magnetic trips, meeting the requirements of FS W-C-375. Number, rating and arrangement are shown on panelboard schedule or one-line diagram. Permanently number branch circuits. Number tabs shall not be attached to, or be part of, circuit breaker.

a. Branch circuit breaker positions marked "space": Bussed for future circuit breakers. Provide removable single pole filler plates for spaces shown on panelboard schedule.

b. Branch circuit breakers marked "S" shall be UL listed for switching duty.

c. Branch circuit breakers marked "G" shall include ground fault circuit interrupter.

2.2.3 General Purpose Transformers: Dry type, 60 hertz, of kVA rating shown on the Drawings with minimum two 2-1/2 percent taps above and two 2-1/2 percent taps below normal rated primary voltage. Insulation system rated 70 C with 115 C winding temperature rise above ambient. Transformers shall be floor-mounting and meet the requirements of NEMA ST 20.

2.2.4 Combination Motor Controllers: Horsepower rated, with 2 NO and 2 NC auxiliary contacts. Bimetallic type overload elements are acceptable. Overload relay reset and momentary contact start-stop pushbutton in cover. Circuit breakers shall meet the requirements of FS W-C-375 and be instantaneous motor circuit protector type. Controllers shall meet the requirements of NEMA ICS 2-321.

2.2.5 Magnetic Contactors: NEMA Size 1, having 8 normally open contacts, and operating coil rated at 277V ac, with NEMA 1 enclosure. Contactors shall meet the requirements of NEMA ICS 2-211.

2.2.6 Terminal Blocks

2.2.6.1 For #10 AWG conductors and smaller: Either 1-piece or factory assembled sectional double terminal, barrier type, with binder screw terminals. Terminal ampacities shall be equal to or greater than conductor ampacities. Marathon or Buchanan.

2.2.6.2 Furnish covers to cover live parts of terminations for circuits of more than 150 volts to ground. Provide with means for ready inspection and full width marking areas.

2.2.7 Lighting Fixtures: Furnish with parts and fittings necessary to install in accordance with manufacturer's instructions.

2.2.7.1 Fixtures of each type described shall be of 1 manufacturer and identical finish and appearance.

2.2.7.2 Fluorescent fixture ballasts: High power factor type, rated for voltage shown on the Drawings or in this Section, suited for fixture temperature environment, and provided with automatic resetting thermal protector. Ballasts shall meet the requirements of ANSI C82.1.

2.2.7.3 Catalog numbers, when called out in subparagraph 2.2.7.4, are for individual units.

2.2.7.4 Lighting fixtures shall be as follows:

a. Fixture A: Industrial fluorescent, 8 feet, 2-F96TR Slimline lamps, 277 volt, 10 percent up-light component, with wire guard. Ballast shall be CBM/ETL unit with operating temperature range to 0 F. Metalux catalog No. IA-296A-277-V.

b. Fixture B: Industrial fluorescent, same as Fixture A except to include an emergency power-pak in fixture wireway.

c. Fixture D: Outlet box lamp holder, porcelain, medium base, keyless, 660 watts, 250 volt, with 2 screw terminals and 100 watts incandescent lamp.

d. Fixture F: Exterior low-pressure sodium wall pack, 135 watts, 120 volt, aluminum body with polycarbonate lens and up-light shield, and internally-mounted photocell. Voigt catalog No. 0-38-120-PI.

2.2.7.5 Photoelectric cell controls: Diecast aluminum weatherproof housing with hermetically sealed light sensitive element, having manually adjustable light level slide with turn-on range of 2 foot-candles.

2.2.8 Receptacles: Duplex, brown, specification grade, rated 15 ampere, 120 volt, 3 wire, grounding type, meeting the requirements of NEMA WD 1 Designation 5-15R with screw terminals arranged for side wiring. Self-grounding receptacles may be used instead of ground requirements specified.

2.2.9 Toggle Switches: Brown, specification grade, 3 way, rated 20 amperes, 277 volts, with conventional handles, screw terminals arranged for side wiring, and meeting the requirements of FS W-S-896.

2.2.10 Plates

2.2.10.1 Receptacle: Finish pressed steel.

2.2.10.2 Toggle switch: Finish pressed steel.

2.2.11 Paging System

2.2.11.1 Amplifier: 35 watts of output power, 100 hertz-10 kHZ frequency response, with 2 MIC and 1 AUX inputs, balanced low-impedence microphone inputs, and individual bass and trebel controls. Bogen Model C35C.

2.2.11.2 Microphone: Desk type dynamic, omni direcitonal, push-to-talk operation with locking feature, dual impedance, die cast base, and 7'-0" cord. Bogen Model MBS-1000.

2.2.11.3 Speakers, Indoor: 7.5 watt (adjusted for 5 watt operation) variable impedence, with 6 inch diameter projector. Bogen Model SPT-5A.

2.2.11.4 Speaker, Outdoor: 15 watt, variable impedance, weatherproof, with all-purpose mounting bracket. Bogen Model SPT-15A.

2.2.12 Beacon: Flashing, 120V ac, with red acrylic dome, and polished stainless steel parabolic reflectors. Unit shall be weatherproof and designed for mounting on 1/2 inch NPT threaded conduit. Edwards Adaptabeacon Catalog No. 50R.

2.2.13 Bell: Vibrating, weatherproof, 120V ac, 6 inch with back box. Edwards Adaptabel Catalog No. 340-6N5.

2.2.14 Pushbutton Station: Oiltight in cast enclosure, single NO-NC contact block, standard pushbutton without legend plate. Provide nameplate as specified in Paragraph 2.1.5. Cutler-Hammer No. 10250T4342.

2.2.15 Pull Box (PB): Type SG, 12 inch x 12 inch x 6 inch, screwed cover, 14 gage material.

2.2.16 Junction Box (JB): Type SC, 6 inch x 6 inch x 4 inch, screwed cover, 14 gage material.

2.2.17 Air monitor, continuous, Beta-Gamma. Similar to Eberline Model AMS-3.

2.2.18 Air pump, regulated, 1/4 hp, 115 Vac, 6 amp, 26" hg vacuum. Similar to Eberline Model RAP-1.

2.2.19 Air monitor, continuous, alpha. Similar to Eberline Model Alpha-6.

PART 3 - <u>EXECUTION</u>

3.1 PREPARATION

3.1.1 Field Measurements: Scale dimensions on Drawings show desired and approximate location of equipment; actual locations, distances, and levels shall be governed by field conditions.

3.2 INSTALLATION

3.2.1 General

3.2.1.1 Perform work in accordance with the NEC.

3.2.1.2 Fasten equipment to structural members of building or metal supports attached to structure, or to concrete surfaces.

a. Use clamping devices for attaching to structural steel, or, when clamping is impracticable, obtain written authority from KEH to weld to, drill or cut structural members to provide attachment.

b. Fasten equipment to concrete or masonry with expansion anchors.

c. Attach to drywall by screws into studs, and to metal wall panels by weld studs, bolts or self-tapping metal screws.

d. Locate equipment, boxes and conduit approximately where shown in relation to equipment served.

e. Do not install conduit raceways and boxes in positions that interfere with work of other trades.

f. Identify components by nameplate engraved with designation and function shown on the Drawings.

g. Attach nameplates on or near equipment with clear RTV silicone sealant.

3.2.1.3 Use appropriate special tools when installing devices for which special installation tools are recommended by manufacturer.

3.2.2 Grounding Systems

3.2.2.1 All welded connections shall be wire brushed and all buried welds and welds exposed to weather shall be coated with asphaltic paint a minimum of 6 inches in each direction from the weld.

3.2.2.2 Grounding cables shall be protected against mechanical damage before and during backfill. Backfill material within 1 foot of cables shall not contain rocks larger than 2 inches in diameter.

3.2.2.3 Connections between galvanized steel and copper conductors shall be above grade and in a dry location.

3.2.2.4 Ground steel columns to grounding grid.

3.2.2.5 Location of perimeter ground grids shall meet the following:

a. Be 3 feet, plus or minus 6 inches, from building foundations.

b. Be separated by 1 to 2 feet.

c. Be buried a minimum of 1 foot below floor slabs and 2 feet 6 inches below grade.

All grid intersections shall be exothermally welded.

3.2.2.6 Ground rods shall be 3 to 4 feet outside of perimeter grids.

3.2.2.7 Ground neutral conductors of 3-wire, single-phase, and 4-wire, 3-phase, wye connected distribution systems.

3.2.2.8 Ground equipment in accordance with NFPA 70.

3.2.3 Conduit

3.2.3.1 Use rigid steel or intermediate metal where conduit is subject to mechanical damage, installed in concrete floors and walls, or exposed to weather. Electrical metallic tubing may be used elsewhere except 2 inch buried conduit shall be PVC Schedule 80.

3.2.3.2 Install #14 gage galvanized steel pull wire or 1/8 inch polyethylene rope in spare conduits.

3.2.3.3 Install concealed conduits as directly as possible and with bend radii as long as possible. Install exposed conduit parallel with or at right angles to building lines. Where conditions permit, maintain continuous exposed horizontal runs along walls at minimum height of 9 feet above floor level or grade.

3.2.3.4 Make elbows, offsets and bends uniform and symmetrical. Bend conduit with approved bending devices.

3.2.3.5 Cut square, ream and remove burrs. Conduit shall be clean, dry, and free of debris. Immediately after installation, plug or cap exposed ends with standard accessories until wires are installed.

3.2.3.6 Use galvanized steel locknuts and insulated bushings for attachment to enclosures except threaded hubs or sealing type locknuts shall be used outdoors or where moisture is present. Threadless fittings will not be permitted for rigid conduit. Use Erickson type couplings where required. Do not use running threads.

3.2.3.7 Use 1 hole clamps equipped with clampbacks or Unistrut with clamps to secure conduits.

3.2.3.8 Flexible conduit

a. Use to make connections to motors and other equipment subject to vibration. Use liquidtight flexible metal conduit where conduit and fittings are installed outdoors or exposed to moisture or chemical fumes indoors.

b. Use in lengths not exceeding 4 feet for other equipment, with approval of KEH.

3.2.3.9 Set up joints in conduit installed in concrete, underground, or exposed to weather, with high temperature, antiseize, conductive thread lubricant and sealant.

3.2.3.10 Install exposed conduit stubbing up through floor slab straight and plumb, lined up, and uniformly spaced. Install at sufficient depth below slab to eliminate part of bend above top of slab. Cap or plug stub-up before placing concrete. Verify stub-up locations with final equipment arrangements.

3.2.3.11 Wrap conduit passing from concrete to air with conduit protection tape from 3 inches in concrete to at least 12 inches in earth, or 3 inches in air.

3.2.3.12 Seal opening around conduit at exterior wall penetrations and penetrations of walls which form boundaries between adjoining ventilation zones, using specified sealant. Make seal waterproof and finish sealant flush with surrounding wall surface.

3.2.3.13 Use hangers with 3/8 inch rods for 2 inch conduit and smaller. If conduit is suspended on rods more than 2 feet long, rigidly brace to prevent horizontal motion or swaying.

3.2.3.14 Apply duct sealing compound after installation of conductors, at boxes, in conduits that penetrate walls or floors.

3.2.4 Boxes, Enclosures and Wiring Devices

3.2.4.1 Install boxes firmly in position and plumb.

3.2.4.2 Install dust covers on junction, pull, and outlet boxes, and other types of wiring outlets at initial installation. Do not remove dust covers until wires are installed and permanent cover or device is placed on box or outlet.

3.2.5 Conductors

3.2.5.1 Maximum pulling tension on conductors: Recommended by manufacturer.

3.2.5.2 Identify each conductor designator by wire number on the Drawings with wire marker. Attach wire marker at each termination point within 2 inches of wire termination. Marker nomenclature shall be visible without moving wire or marker.

3.2.5.3 Paint or pressure-sensitive colored tape may be used for coding conductors instead of colored insulation on #8 AWG and larger wire only.

3.2.5.4 Use lubricant recommended by cable manufacturer, or wire pulling compound specified, to decrease friction when pulling wire and cable through conduit.

3.2.5.5 Do not install or handle wires with thermoplastic insulation or jacket when ambient temperature is 15 F or below.

3.2.6 Splices, Taps and Cable Terminations

3.2.6.1 Make splices and taps in building wire with solderless connectors described in Paragraph 2.1.1. Use connectors in accordance with manufacturer's instructions.

3.2.6.2 Use plastic insulating tape for uninsulated splices and taps. Apply tape to thickness at least equal to conductor insulation. Where bolted splice or connection presents irregular surface, apply insulating putty to joints before taping.

3.2.6.3 Use crimp-on type ring or spade lugs with turned up legs for wire terminations of stranded conductors to binder screw or stud type terminals. Lugs shall have insulated sleeves.

3.2.7 Lighting Fixtures: Mount suspended lighting fixtures as shown on the Drawings. Use fixture stud if lighting fixture is suspended from outlet box. Only keyless fittings may use box cover fastening screws for support.

3.2.8 Paging System: The amplifier and microphone shall be shelf-mounted near the east door as shown on the Drawing. Conduit containing speaker wires shall terminate in an insulated bushing at the amplifier. Speakers shall be mounted 17'-0" above floor or grade, and shall be connected to an outlet box via portable cord.

3.3 FIELD QUALITY CONTROL

3.3.1 Testing, General

3.3.1.1 Test equipment and wiring for continuity and unintentional grounds, and verify proper phase sequence and voltage at equipment served before attempt is made to operate equipment. Document results of tests performed. Notify KEH before start of tests. Correct items found, during testing or examination by KEH, to be at variance with the Drawings and this Section.

3.3.1.2 Furnish instruments, labor and equipment required to conduct testing.

3.3.1.3 Use test instruments which bear valid calibration stamp showing date of calibration and expiration date of stamp. Calibration and accuracy of test instruments shall be certified by independent testing laboratory having standards traceable to the National Bureau of Standards.

3.3.1.4 In addition to testing specified to be performed by Contractor, installation will be subject to examination by KEH for conformance with design and applicable codes. Assist KEH as requested.

3.3.2 Motors

3.3.2.1 Check for correct rotation.

3.3.2.2 Measure and record voltage and current, and verify value agrees with data on nameplate.

9 2 1 2 3 6 1 9 5 0

3.3.3 Wiring Systems

3.3.3.1 Megger conductors rated 600 volts and used for services, feeders or branch circuits over 150 volts to ground, phase-to-phase, and phase-to-ground. Minimum acceptable value of insulation resistance is 200 megohms. Megger manufacturer's instruction pamphlet, furnished with megger, shall provide instructions for conducting tests. Disconnect devices not capable of withstanding voltage or current of megger test, such as indicating instruments, relays and lamps, before test is made. Voltage output of megger shall be 1000V dc, nominal.

3.3.3.2 Test wiring operating less than 150 volts to ground for continuity and unintentional grounds. Resistance shall not exceed 1 ohm on continuity checks.

3.3.3.3 Contractor may elect to group and connect together conductors within raceway while performing megger test. Record all readings. Repeat megger test after replacement of defective wiring.

3.3.3.4 Reconnect devices disconnected during testing.

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APPROVAL DATA LIST

("X" Indicates Required Data)

1 EPN IDENTIFICATION	2 DESCRIPTION	3 REFERENCE DRAWING	4 SPECIFICATION PARAGRAPH	5 DATA: Dimensional Drawings	Equipment Weights	Specifications	Material Description	Performance Data	Circuit or Control Diagrams	Data Sheets	Illustrative Cuts	Installation Instructions	6 REMARKS
	Panelboards		2.2.2	X		X					X		
	Transformers		2.2.3		X	X					X		
	Lighting fixtures		2.2.7	X		X				X	X		
	Air monitor		2.2.17	X		X					X		
	Air pump		2.2.18	X		X					X		
	Air monitor		2.2.19	X		X					X		

END OF SECTION

SECTION 16720

ALARM AND DETECTION SYSTEMS

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American National Standards Institute (ANSI)

ANSI C80.1-1983	American National Standard for Rigid Steel Conduit--Zinc Coated

1.1.1.2 Factory Mutual System (FM)

1991 Edition	Approval Guide

1.1.1.3 National Electrical Manufacturers Association (NEMA)

Standards Publication/ No. FB 1-1988	Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies
Standards Publication/ No. ICS 6-1988	Enclosures for Industrial Controls and Systems

1.1.1.4 National Fire Protection Association (NFPA)

NFPA 70	National Electrical Code, 1990 Edition
NFPA 72	Standard for the Installation, Maintenance and Use of Protective Signaling Systems, 1990 Edition
NFPA 72E	Standard on Automatic Fire Detectors, 1987 Edition
NFPA 1221	Standard for the Installation, Maintenance and Use of Public Fire Service Communication Systems, 1988 Edition

1.1.1.5 Underwriters Laboratories, Inc (UL)

1991	Electrical Appliance and Utilization Equipment Directory

1991	Electrical Construction Materials Directory
1991	Fire Protection Equipment Directory
UL 38-1981 w/Rev through Sep 1981	Standard for Manually Actuated Signaling Boxes for Use With Fire-Protective Signaling Systems
UL 797-1977	Standard for Electrical Metallic Tubing
UL 1242-1985	Standard for Intermediate Metal Conduit

1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Approval Data: Submit information listed in Column 5 of Approval Data List in this Section.

1.2.2 Vendor Information: Submit information listed in Column 5 of Vendor Information List in this Section.

1.3 QUALITY ASSURANCE

1.3.1 Standards: Products shall be identified for intended purpose by UL in the Electrical Appliance and Utilization Equipment Directory or Electrical Construction Materials Directory, and bear listing mark of laboratory.

1.3.1.1 Use fire alarm equipment listed in UL Fire Protection Equipment Directory or FM Approval Guide bearing mark of listing organization.

1.3.1.2 Fire alarm system design, components, and installation shall meet the requirements of NFPA 70, 72, 72E, and 1221.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Solderless Connectors: Pressure type, rated for use with copper or aluminum conductors, and used in installations not exceeding 600 volts between conductors. Connectors with insulating caps or covers shall berated for system utilization voltage. Connectors shall be types specified below.

2.1.1.1 Ideal Industries, Inc "Crimp Connector."

2.1.1.2 Thomas and Betts Company "Sta-Kon."

2.1.1.3 Coaxial cable connectors type PL259 crimp-on.

2.1.2 Raceways, Fittings, and Boxes

2.1.2.1 Conduit shall meet the requirements of appropriate standard as follows.

a.	Rigid steel	ANSI C80.1
b.	Intermediate metal	UL 1242
c.	Electrical metallic tubing (EMT)	UL 797

2.1.2.2 Conduit fittings for rigid steel and electrical metallic tubing shall meet the requirements of NEMA FB 1. Only compression type threadless fittings shall be used with EMT.

2.1.2.3 Conduit entries into sides or tops of NEMA Type 3 or NEMA Type 3R enclosures shall be made with "Myers" type watertight fittings, or sealing locknuts similar to those manufactured by Midwest Electric Manufacturing Corp.

2.1.2.4 Exterior lighting fixture outlet boxes shall be cast with threaded hubs.

2.1.3 Conductors: Stranded copper, Type THWN/THHN.

2.1.4 Wire Pulling Compound: Not permitted.

2.1.5 Plastic Insulating Tape: Similar to Scotch No. 33+ manufactured by 3M Company.

2.1.6 Wire Markers: Thermal printed, heat shrink tube type similar to those manufactured by Brady.

2.1.7 Hangers for Individual Conduits: Factory made springable wrought steel clamps or malleable iron, split and hinged rings. For suspended conduit, clamps or rings shall be bolted to, or interlocked with threaded suspension rod.

2.1.8 Decals: Red with 1/2 inch white letters "FIRE ALARM SYSTEM" with adhesive back, similar to those manufactured by Action Industrial Systems.

2.1.9 Fire-Rated Sealant: 3M-CP-25, or Biotherm, one part sealant, UL listed fire barrier sealant manufactured by Bio-Fire Protection Ltd. Prime as recommended by sealant manufacturer.

2.2 EQUIPMENT

2.2.1 Fire alarm equipment enclosures shall meet the requirements of NEMA ICS 6-110 and be Type 1.

2.2.2 In the following paragraphs, equipment designated by manufacturer or trade name shall be supplied. No substitutions will be accepted.

2.2.3 Fire Alarm Control Panel: Pyrotronics CP-400.

2.2.3.1 Enclosure shall be designed for surface mounting: Panel door shall have a cylinder lock with key matched to Corbin Catalog No. 60.

2.2.3.2 Provide one fire detection zone, minimum, with end-of-line supervision to detect open circuit or unintentional grounds, in accordance with NFPA 72A.

2.2.3.3 Indicating lights shall be labelled with their function.

2.2.3.4 Supply following panel mounted indicating lights and features:

a. AC power ON (green).

b. Low battery (amber).

c. System fire alarm (red).

d. System trouble (amber).

e. Zone alarm (red).

f. Zone trouble (amber).

g. Signalling circuit trouble (amber).

h. Alarm gong silence-normal-test switch, with indicating light for silence position (red). Test and silence positions shall not transmit signal to fire station. Ring-back shall occur if panel is reset with gong switch in silence position.

i. Trouble silence-normal switch, with indicating light for silence position (amber), with ring-back when panel is reset to normal with switch in silence position.

j. Reset-normal-test switch.

k. Trouble alarm buzzer.

l. Two alarm signalling circuits.

m. Fire alarm activating device and circuits.

n. Supervisory activating device and circuits.

o. Automatic power transfer switch.

p. End-of-line supervisory devices.

q. Terminal blocks for wiring.

r. Remote trouble relay with form C contacts.

s. Battery charger.

2.2.3.5 Alarm signals shall latch and require manual reset.

2.2.3.6 Control panel operation.

a. On incoming fire alarm signal, fire alarm activating device shall:

1) Trip existing radio master alarm box by zone.

2) Light fire alarm indicating lamp.

3) Light incoming signal zone indicating light.

4) Operate building alarm gongs.

5) Shut down exhaust fans.

b. On incoming trouble signal, supervisory activating device shall:

1) Light trouble indicating lamp.

2) Light zone indicating lamp.

3) Transmit a trouble signal via the radio master alarm box.

4) Sound audible trouble signal at panel.

c. Fire alarm signal shall be initiated by:

1) Operating manual pull station in system.

2) Operation of sprinkler head.

d. Trouble signal shall be initiated by:

1) Disconnecting device or wire in system.

2) Loss of ac circuit.

3) Closing of post indicator valve (PIV) or main sprinkler valve.

4) Open circuit.

5) Ground short not part of system design.

6) Removal of modules in fire alarm control panel.

7) Low battery voltage.

e. Alarm gong circuit

1) Ringing circuit shall pulse 24V dc single stroke alarm gongs at rate of 2 strokes per second.

2) Circuit components may be in separate enclosure if there is no room in manufacturer's standard enclosure.

2.2.4 Manual Fire Alarm Stations: Pyrotronics Model No. MS-501. Noncoded, nonself-restoring double action type with single pole, normally open positive action contacts. Station shall have a hinged cover. Stations shall meet the requirements of UL 38, be for indoor surface mounting, and finished "Signal Red".

2.2.5 Alarm Bells: Pyrotronics 24 V dc supervised BDS Series. Bells shall be UL listed with single-stroke operation with optional shell sizes in 6 inch and 10 inch diameters. Bells shall also provide for semiflush mounting to standard 4 inch square backboxes, or surface mounting to Pyrotronics indoor IBH-2 backboxes. Current draw shall be 0.38 amp maximum.

2.2.6 Auxiliary Disconnect Box: Fabricate auxiliary function control in accordance with Drawings. Components shall be UL listed. Housing shall be hinged, weathertight construction. The key lock switch shall be Corbin, Catalog No. 60.

2.2.7 Power Supply

2.2.7.1 The primary power for the Radio Fire Alarm Master Box shall be obtained from the power panelboard as shown on the Drawings. The circuit breaker shall be red, fitted with a suitable guard (requiring the removal of a screw to open) and used only for fire alarm equipment. Label circuits used in the power panelboard.

2.2.7.2 Provide secondary battery operated power supply, with automatic cut-over and return, to operate fire alarm system and trouble signals in event of failure of facility power supply. Transfering from facility power supply to secondary power supply shall cause a trouble signal to be initiated. No false alarms shall occur due to loss or restoration of primary power.

2.2.7.3 Provide rechargeable batteries, Model BP-61, in accordance with NFPA 72B of heavy duty, sealed lead acid gelled electrolyte type battery assembly designed for fire alarm usage. Battery assembly shall be sized to operate system for minimum of 60 hours and sound gongs for a minimum of 5 minutes after loss of charging current.

2.2.7.4 Battery charger: Compatible automatic, solid state, constant voltage device with ac voltage compensation, dc voltage regulation and current limiting.

2.2.8 Radio Fire Alarm Master Box: The radio fire alarm master box and antenna will be furnished by others for installation hereunder.

2.2.9 Fire Alarm Locator Lighting Fixture: Locator light No. 332-8N5 outdoor lighting fixture, incandescent, Type N, Crouse-Hinds Vaportight Catalog No. VG175 with VN75 red glass globe, V911 guard, VXF10 outlet box, and 100 watt lamp.

2.2.10 End-Of-Line Resistor or Diode: Sized and provided by fire alarm equipment supplier.

PART 3 - EXECUTION

3.1 PREPARATION

3.1.1 Field Measurements: The Drawings show general layout of complete system including arrangement of equipment. Verify scale dimensions since actual locations, distances, and levels shall be governed by field conditions.

3.2 INSTALLATION

3.2.1 General

3.2.1.1 Perform work in accordance with NFPA 70 (NEC), 72A, 72B, 72G, and 1221.

3.2.1.2 Fasten equipment to structural members of building or metal supports attached to structure.

a. Attach to existing partitions by screws.

b. Locate equipment, boxes, and conduit approximately where shown in relation to equipment served.

c. Do not install conduit raceways and boxes in positions that interfere with work of other trades.

3.2.2 Conduit

3.2.2.1 Use rigid steel, intermediate metal, or electrical metallic tubing for work described by this project.

3.2.2.2 Install concealed conduits as directly as possible and with bend radii as long as possible. Install exposed conduit parallel with or at right angles to building lines.

3.2.2.3 Make elbows, offsets and bends uniform and symmetrical. Bend conduit with approved bending devices.

3.2.2.4 Use galvanized steel locknuts and bushings for attachment to enclosures except threaded hubs may be used where permitted by the NEC. Threadless fittings will not be permitted for rigid conduit. Use Erickson-type couplings where required. Do not use running threads.

3.2.2.5 Use one-hole clamps equipped with clampbacks to secure conduits.

3.2.2.6 Use "Myers" type watertight fittings for conduit entry to radio fire alarm box.

3.2.2.7 Set up joints in conduit installed in concrete, underground, or exposed to weather, with high temperature, antiseize, conductive thread lubricant and sealant.

3.2.2.8 Seal opening around conduit at exterior wall penetrations and penetrations of walls which form boundaries between adjoining ventilation zones, using specified sealant. Make seal waterproof and finish sealant flush with surrounding wall surface.

3.2.3 Boxes, Enclosures, and Wiring Devices

3.2.3.1 Install boxes firmly in position and plumb.

3.2.3.2 Install extension ring with blank cover on flush-mounted junction boxes where box serves permanently installed equipment.

3.2.3.3 Place "FIRE ALARM SYSTEM" decals on all junction boxes.

3.2.4 Conductors

3.2.4.1 Do not bend cables installed in wireways to less than manufacturer's recommended minimum bending radius. Bind single conductors installed in wireways with nylon cable ties to form cable assemblies. Lay cables in wireways in straight parallel lines, and avoid crossing.

3.2.4.2 Use following color code for fire alarm system conductors:

Circuit	Color	Min. AWG
From fire alarm control panel to the radio master alarm box	Orange	14
Alarm initiating devices--detectors, manual stations, etc	One Lt Blue and one DK Blue	14
Supervisory devices--limit switches, pressure supervisory switches, etc	One Yellow and one Tan	14
Alarm Bells	One Red and One Black	14
Other wiring	Blue or different from preceding colors	Varies
AC power	Black, White, and Green	12
Battery Wiring	Brown	Varies

3.2.5 Devices

3.2.5.1 Connect wiring to components within the fire alarm control panel in accordance with the Drawing and vendor information prints.

3.2.5.2 Mount manual pull stations at 4'-6" above floor.

3.2.6 Cable Terminations: Use crimp-on type spade lugs for wire terminations of stranded conductors to binder screw or stud type terminals. Spade lugs shall have upset legs and insulation sleeves sized for conductors.

3.3 FIELD QUALITY CONTROL

3.3.1 Testing, General

3.3.1.1 Test equipment and wiring installed before attempt is made to operate equipment. Resistance, current, and voltage measurements may be made as work progresses. Notify KEH before start of required tests. Correct items found, during testing or examination by KEH to be at variance with the Drawings and Specifications. Deliver test reports to KEH weekly as completed.

3.3.1.2 Initial operation and testing of radio fire alarm box will be performed by Westinghouse Hanford Company (WHC) telecommunications. Do not energize radio fire alarm box until directed to by the WHC telecommunications personnel.

3.3.1.3 Furnish instruments, labor and equipment required to conduct testing.

3.3.1.4 Use test instruments which bear valid calibration stamp showing date of calibration and expiration date of stamp. Calibration and accuracy of test instruments shall be certified by independent testing laboratory having standards traceable to the National Bureau of Standards.

3.3.1.5 In addition to testing specified to be performed by Contractor, installation will be subject to examination by KEH for conformance with design and applicable codes. Assist KEH as requested.

3.3.2 Wiring Systems: Test fire alarm circuits for continuity.

3.3.3 Acceptance Testing: Operability of fire alarm modifications shall be verified by Acceptance Test Procedures (ATP) No. 4783 for Building WD, No. 4784 for Building WC, and No. 4785 for Building WB, which are parts of the design packages.

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Project Title	RMW Storage Facilities
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APPROVAL DATA LIST
("X" Indicates Required Data)

1 EPN IDENTIFICATION	2 DESCRIPTION	3 REFERENCE DRAWING	4 SPECIFICATION PARAGRAPH	5 DATA: Dimensional Drawings	Equipment Weights	Specifications	Material Description	Performance Data	Circuit or Control Diagrams	Data Sheets	Illustrative Cuts	Installation Instructions	6 REMARKS
1	Fire Alarm Control Panel including all modules		2.2.3	X		X			X		X		
2	Manual Pull Station		2.2.4							X			
3	Fire Alarm Gong		2.2.5							X			

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Project Title RMW Storage Facilities

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VENDOR INFORMATION LIST

("X" Indicates Required Data)

1 EPN IDENTIFICATION	2 DESCRIPTION	3 REFERENCE DRAWING	4 SPECIFICATION PARAGRAPH	5 VENDOR INFORMATION (VI) Dimensional Drawings	Equipment Weights	Specifications	Certified Test Data	Circuit or Control Diagram	Instructions: Installation	Instructions: Operation	Instructions: Maintenance	Spare Parts List	Data Sheets	Illustrative Cuts	
1	Fire Alarm Control Panel		2.2.3			X		X	X	X					
	including all modules														

END OF SECTION

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APPENDIX A

SAMPLE BATTERY CALCULATION

ALARM MANUFACTURER: Fireco

ALARM PANEL TYPE: Model FACP-7

REFERENCE DRAWINGS: M123 Control Panel Wiring Diagram

M374 Zone Alarm Module
M339 Alarm Trouble Module, etc.

CURRENT DEMAND

SYSTEM COMPONENTS:	NORMAL SUPERVISORY	ALARM CONDITION
Zone Alarm Module	0.005A	0.065A
Trouble Module	0.003A	0.020A or 0.0
Fire Alarm Module	0.005A	0.050A
Ionization Detectors	0.003A	0.035A
Ultraviolet Detectors	0.005A	0.045A
Indicator Lam	-	0.030A
Auxiliary Relay Coil	-	0.025A
Masterbox Coil	-	0.045A

SYSTEM COMPONENTS	NORMAL SYSTEM DEMAND
(6) Zone Alarm Modules	0.030
(1) Trouble Module	0.003
(1) Fire Alarm Module	0.005
(3) Ionization Detectors	0.009
(1) Ultraviolet Detector	0.005
	0.052A @ 60 hr =

3.120AH

SYSTEM COMPONENTS	FIRE ALARM DEMAND
(5) Zone Module (Supervisory)	0.025
(1) Zone Module (Alarm)	0.065
Fire Alarm Module	0.050
(2) Ionization Detectors	0.070
Indicator Lamp	0.030
Aux Relay Coil	0.025
Masterbox Coil	0.045
	0.310A @ 1 hr =

0.310AH

CONTINGENCY - 20% of normal Supr Demand 3.12 AH
0.624AH

TOTAL TIME ADJUSTED CURRENT DRAW:
4.054AH

END OF APPENDIX A

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