

2. AMENDMENT/MODIFICATION NO. 003	3. EFFECTIVE DATE September 08, 1998	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
6. ISSUED BY Bureau of Reclamation Lower Colorado Region P.O. Box 61470 Boulder City NV 89006-1470	CODE http://www.lc.usbr.gov/~g3100/	7. ADMINISTERED BY (If other than Item 6) CODE	

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State, and ZIP code)	(✓)	9A. AMENDMENT OF SOLICITATION NO. 98-SI-30-12400
	✓	9B. DATED (SEE ITEM 11) August 18, 1998
		10A. MODIFICATION OF CONTRACT/ORDER NO.
		10B. DATED (SEE ITEM 13)
CODE	FACILITY CODE	

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers [] is extended, [X] is not extended.

Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:
 (a) By completing Items 8 and 15, and returning 1 copy of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. **FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER.** If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (if required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(✓)	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT/ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

E. **IMPORTANT:** Contractor [] is not [] is required to sign and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible)

Project Title: Pre-Engineered Carpentry/Sandblast Shop, Boulder Canyon Project, Hoover Dam, Arizona - Nevada

Purpose of Amendment: The purpose of this amendment is to (1) make revisions to the estimated quantities in the Schedule; (2) make revisions and/or corrections to the Specifications; (3) make revisions to three drawings; and (4) incorporate WBR Clause No. 1452.236-80.

Receipt of Bids: The date and time for receipt of bids remains September 17, 1998 at 2 p.m., local time. The place for receipt of bids remains the Bureau of Reclamation, Lower Colorado Regional Office, Annex Building, Room AA-123, Nevada Hwy and Park Street, Boulder City, Nevada.

Acknowledgment: See block 11 above regarding how to acknowledge this amendment. The acknowledgment must be received at the place designated for receipt of offers (see block 8 of the "Solicitation, Offer, and Award," Standard Form 1442).

Bid Modification: See block 11 above if you have submitted your bid and now desire to modify it or withdraw it.

(Continued on following pages)

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)		
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
_____ (Signature of person authorized to sign)		BY _____ (Signature of Contracting Officer)	

Description of Changes:

1. The estimated quantity in Item 3. of paragraph B.2 is revised to 90 cubic yards, from 45 cubic yards.

Instructions: In Section B, remove pages B-1 and B-2 and replace with the attached revised pages B-1 and B-2.

2. Reclamation clause WBR 1452.236-80 Restriction on Submission and Use of Equal Products--Bureau of Reclamation (APR 1992) is hereby incorporated.

Instructions: In Section H, remove page H-13 and replace with the attached revised pages H-13 and H-14. In ToC, remove pages i and ii and replace with the attached revised pages i and ii.

3. Revisions and/or corrections are made to the specifications on the pages listed below, and Section 2.4 - Excavation and Backfill of Trenches is added.

Filing Instructions:

Remove Pages

ToC pages i thru iv
1-7 and 1-8
1-21 thru 1-24
2-5 and 2-6
4-5 and 4-6
5-1 thru 5-6
5-17 thru 5-20a
5-23 thru 5-27
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8-3 and 8-4

Insert Pages

ToC pages i thru iv
1-7 and 1-8
1-23 thru 1-24
2-5 thru 2-8
4-5 thru 4-6a
5-1 thru 5-6
5-17 thru 5-20a
5-23 thru 5-28
6-7 thru 6-13
8-3 and 8-4

4. Drawings Nos. 2 (45-301-6574) , 6 (45-301-6578), and 7 (45-301-6579) are revised.

Instructions: In Attachment No. 5, Drawings, remove Drawings Nos. 2, 6, and 7 and replace with the attached revised drawings.

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B.1 WBR 1452.214-908 THE REQUIREMENTS--BUREAU OF RECLAMATION--LOWER COLORADO REGION (NOV 1996)

(a) The Contractor shall furnish the items identified in this Section, in accordance with the terms, conditions, and specifications contained in the contract.

(b) Bidders are cautioned to carefully review the bid submission requirements contained in Section L. Failure to comply with these requirements may result in a bid being declared nonresponsive.

(c) Bids will be considered for award on the total of the schedule in paragraph B.2, but no bid will be considered for award for only a part of the schedule. Bids for only a part of the schedule will be considered nonresponsive and will be rejected.

(d) The Section H clause entitled "Payment for Mobilization and Preparatory Work" applies to schedule item(s) for Mobilization and Preparatory Work.

(e) Bidders are advised to carefully read paragraph (d) of the FAR clause 52.214-19, entitled "Contract Award–Sealed Bidding–Construction," regarding materially unbalancing of bids.

B.2 THE SCHEDULE

SCHEDULE

Item	Work or Material	Quantity	Unit	Unit Price	Amount
1.	Mobilization and preparatory work.	1	LS	\$	\$
2.	Excavation.	120	CY	\$	\$
3.	Placing and compacting aggregate base.	45 90	CY	\$	\$
4.	Furnishing and placing reinforced concrete.	90	CY	\$	\$
5.	Furnishing and erecting pre-engineered metal building, including accessories, and installing Government-furnished lock cylinders.	1	LS	\$	\$
6.	Furnishing and installing electrical system.	1	LS	\$	\$
7.	Furnishing and installing air compressor.	1	LS	\$	\$
8.	Furnishing and installing power cable and transformers.	1	LS	\$	\$
9.	Assembling, installing, painting, and testing Government-furnished pulse filter system.	1	LS	\$	\$
10.	Furnishing, installing, and testing grounding system.	1	LS	\$	\$
TOTAL FOR SCHEDULE					\$

B.3 WBR 1452.214-906 BIDDING SCHEDULE COMPLETION INSTRUCTIONS--BUREAU
OF RECLAMATION--LOWER COLORADO REGION (NOV 1996)

NOTE OF CAUTION TO BIDDERS: When completing the bid schedule, the price entered in the "Amount" column shall be the mathematical product of the quantity multiplied by the unit price. Rounding up or down is not permitted. If a price entered in the "Amount" column has been rounded, the Contracting Officer will correct such amount, pursuant to the bid preparation provision(s) in Section L for the purposes of determining the apparent low bidder, and any such corrections will appear on the contract award document.

REFERENCED SPECIFICATION OR STANDARD	TITLE	EDITION OR REVISION EFFECTIVE DATE
NDOT	Standard Specifications for Road and Bridge Construction	1986
NEMA MG1	Motors and Generators	1993 (Rev 1 & 2(X))
NFPA 101	Safety to Life from Fire in Buildings and Structures	1997
SSPC-SP6	Commercial Blast Cleaning	1991 (Revised 1994)
UL Standard No. 467	Grounding and Bonding Equipment	2993 (Rev thru Aug 1996)
UL Standard No. 559	Heat Pumps	1985
USBR 7205	Earth Manual, Part 2	Third Edition
Water and Power Resources Service	(Curing Compound)	October 1, 1980

H.6 WBR 1452.236-904 AVAILABILITY AND USE OF UTILITY SERVICES--BUREAU OF RECLAMATION--LOWER COLORADO REGION (NOV 1996)

In accordance with FAR 52.236-14, Availability and Use of Utility Services, incorporated by reference in Section I, the following utility services will be made available under the contract:

a. Water from existing hydrants will be available to the Contractor for construction purposes. Such water may be used for construction purposes at no cost to the Contractor (see paragraph 1.3.5 Water for Construction Purposes). Facilities are provided on an as-is, where-found basis.

H.7 WBR 1452.236-80 RESTRICTION ON SUBMISSION AND USE OF EQUAL PRODUCTS--BUREAU OF RECLAMATION (APR 1992)

Notwithstanding the "Material and Workmanship" clause of this contract, or any other contractual provision, "or equal" products will not be considered for the following "brand name" product:

NO. 1	BRAND NAME SPECIFIED	Mfr: McKinney Products Make/Model/Catalog #: Door Hardware for Sargent Maximum Security System Paragraph: 4.1.6.b.
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RSN	Item	Reference paragraph or clause	Responsible code	Submittals required	No. of sets to be mailed to:*		Due date or delivery time
					CO	CE	
E8	Distribution panelboards	5.1.4	CE	Catalog cut-sheets and manufacturer's data	0	3	Not less than 20 days prior to purchase
E9	Lighting panelboard	5.1.5	CE	Catalog cut-sheets and manufacturer's data	0	3	Not less than 20 days prior to purchase
E10	Insulated conductors	5.1.2	CE	Manufacturer's data	0	3	Not less than 20 days prior to purchase
E11	Insulated conductors	5.1.2	CE	Megger test reports	0	3	Not less than 15 days after completion of testing
E12	Lighting systems	5.1.3	CE	Manufacturer's data	0	3	Not less than 20 days prior to purchase
E13	Power Cable	5.4	CE	Manufacturer's data and meggar test reports	0	2	Within 15 days after tests are completed
P1	Paint	8.1.1	CE	Color samples	0	2	Not less than 20 days prior to application

*CO indicates Contracting Officer, and CE indicates Construction Engineer. For mailing addresses, see subparagraph entitled "Addresses" of paragraph entitled "Submittal Requirements."

SECTION 1.2 - MATERIALS

1.2.1. MATERIALS TO BE FURNISHED BY THE CONTRACTOR

a. General.--The Contractor shall furnish all materials required for completion of the work.

The words "material" or "materials" as used in these specifications to denote items furnished by the Contractor shall be construed to mean equipment, machinery, product, component, or any other item required to be incorporated in the work.

When a separate item which includes the furnishing of any material is provided in the schedule, the cost of furnishing, hauling, storing, and handling shall be included in the price offered for that item. When a separate item is not provided in the schedule for furnishing any material required to be furnished by the Contractor, the cost of furnishing, hauling, storing, and handling shall be included in the price offered for the work for which the material is required.

Materials furnished by the Contractor shall be of the type and quality described in these specifications. The Contractor shall make diligent effort to procure the specified materials from any and all sources, but where because of Government priorities or other causes, materials required by these specifications become unavailable, substitute materials may be used: Provided, That no substitute materials shall be used without prior written approval of the Contracting Officer, said written approval to state the amount of the adjustment, if any, to be made in favor of the Government. The Contracting Officer's determination as to whether substitution shall be permitted and as to what substitute materials may be used shall be final and conclusive. If the substitute materials approved are of less value to the Government or involve less cost to the Contractor than the materials specified, an adjustment shall be made in

c. Disposal of hazardous waste and materials.--Hazardous waste, as defined by 40 CFR 261.3; and hazardous materials, as defined by Federal Standard No. 313, as amended; or other Federal, State, or local laws or regulations, used by the Contractor or discovered in work or storage areas, shall be disposed of in accordance with these specifications and applicable Federal, State, and local laws and regulations. Waste materials that may be hazardous shall be tested, and the test results shall be submitted to the Contracting Officer for review.

Waste materials known or found to be hazardous shall be disposed of in approved treatment or disposal facilities. Hazardous wastes shall be recycled whenever possible. A copy of the hazardous waste manifest shall be sent to the Contracting Officer.

Waste materials discovered at the construction site shall immediately be reported to the Contracting Officer. If the waste may be hazardous, the Contracting Officer may order delays in the time of performance or changes in the work, or both. If such delays or changes are ordered, an equitable adjustment will be made in the contract in accordance with the applicable clauses of the contract.

d. Disposal of other waste materials.--

(1) General.--Waste materials including, but not restricted to, refuse, garbage, sanitary wastes, industrial wastes, and oil and other petroleum products, shall be disposed of by the Contractor.

(2) Disposal by removal.--Waste materials to be disposed of by removal from the construction area shall be removed prior to completion of the work under these specifications. All materials removed shall become the property of the Contractor.

Where waste materials are to be dumped, they shall be dumped only at an approved dump. The Contractor shall make any necessary arrangements with private parties and county officials pertinent to locations and regulations of such dumping, and shall pay any fees or charges required for such dumping.

e. Cost.--Except as provided above, the cost of cleanup and disposal of waste materials in accordance with this paragraph shall be included in the prices offered in the schedule for other items of work.

SECTION 1.6 - SITEWORK

1.6.1 REMOVING EXISTING BITUMINOUS SURFACING

a. General.--The Contractor shall remove existing bituminous surfacing where required for construction of the pre-engineered metal building, drive slabs, stoops, equipment foundations, and trenches. Existing bituminous surfacing shall be saw-cut to form a vertical joint between new and existing bituminous surfacing. Where existing bituminous surfacing has been removed and is to be replaced, the ground surfaces shall be prepared in accordance with the provisions of Paragraph 2.3.1 (Preparation of Subgrade).

b. Disposal.--The Contractor shall dispose of waste materials by removing materials from the construction area. All materials removed shall be disposed of in accordance with the provisions of Paragraph 1.5.6.(Cleanup and Disposal of Waste Materials).

c. Cost.--The cost for removing existing bituminous surfacing shall be included in the lump sum price offered in the schedule for furnishing and erecting the pre-engineered metal building **and furnishing and installing electrical system.**

1.6.2 PLANT-MIX BITUMINOUS SURFACING

a. General.--The Contractor shall furnish and place bituminous pavement for resurfacing around the pre-engineered metal building and over the water line and conduit excavations and any other areas where the existing bituminous surfacing has been disturbed. The completed plantmix bituminous pavement course shall be acceptable to the Contracting Officer in both composition and construction quality.

A tack coat of emulsified asphalt shall be furnished and applied to faces of concrete or existing pavement against which new bituminous pavement is to be placed.

A prime coat of liquid asphalt shall be furnished and applied to the surface of the aggregate base course prior to placing bituminous pavement on the base layer.

All reference to NDOT standard specifications in this section shall mean the Nevada Department of Transportation "Standard Specifications for Road and Bridge Construction," 1986 edition and any later supplements thereto.

All reference to AASHTO standard specifications in this section shall mean American Association of State Highway and Transportation Officials, " Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 18 Edition," Year Published 1997 and any later supplements thereto.

b. Mix design.-- Hot plant-mix bituminous pavement mixtures conforming to Nevada Department of Transportation mix design criteria and material requirements may be obtained from commercial suppliers as approved by the Contracting Officer. Unless otherwise specified in this paragraph or otherwise approved by the Contracting Officer, the bituminous pavement construction shall conform to conventional construction practices as commonly specified in the applicable provisions of section 401 of the Nevada standard specifications.

c. Materials --

(1) Mineral aggregate.--Mineral aggregate for plant-mix bituminous pavement course shall conform to the required grading limits and test requirements set forth for type 4 material for surface course in section 705 of the Nevada standard specifications.

(2) Mineral filler.--Commercial mineral filler shall conform to the requirements of AASHTO designation: M 17.

(3) Asphalt cement.--Asphalt cement, grade AR-8000 for the surface course, conforming to the requirements of subsection 703.03.02 of the Nevada standard specifications shall be used in the mix unless otherwise approved by the Contracting Officer.

(4) Emulsified asphalt.--Emulsified asphalt, grade SS-1, conforming to the requirements of subsection 703.03.04 of the Nevada standard specifications shall be used where a tack coat is required to be applied.

(5) Liquid asphalt.--Liquid asphalt, grade MC-250, conforming to the requirements of subsection 703.03.03 of the Nevada standard specifications shall be used where a prime coat is required to be applied.

d. Construction.--Quality control shall be the responsibility of the Contractor. The construction requirements for plant operation, mixing, placing, finishing, compacting, and smoothing, including longitudinal joint construction and surface tolerances, for placement of the bituminous surface course shall be as specified in the applicable construction paragraphs of sections 303, 401, and 402 of the Nevada standard specifications.

Surfaces required to be given a tack coat shall be thoroughly cleaned prior to application of tack coat material. The emulsified asphalt tack coat shall be applied at a rate of approximately 0.08 gallon of diluted material per square yard and at a temperature between 75 and 130 °F. The emulsion shall be properly diluted with water and applied as specified in section 405 of the Nevada standard specifications.

The liquid asphalt prime coat shall be applied to the full width of the area of aggregate base course to be surfaced at a rate of approximately 0.25 gallon per square yard and at a temperature between 165 and 220 °F. The prime coat shall be allowed to dry prior to placing bituminous surfacing. The prime coat shall not be applied during rainy weather or when the atmospheric temperature is less than 50 °F.

e. Cost.--The cost for furnishing and placing bituminous surfacing shall be included in the lump sum price offered in the schedule for furnishing and erecting the pre-engineered metal building **and furnishing and installing electrical system.**

1.6.3 LIGHT POLE RELOCATION

a. General.--The contractor shall furnish all equipment and materials necessary to relocate the existing light pole as shown on drawing No. 2 (45-301-6574). The relocated light pole shall include a new concrete foundation as shown on drawing No. 24(45-300-201), and all required conduit and wiring. The relocated light pole shall be fully functional after being relocated.

b. Materials. -

(1) Concrete.--Division 3

(2) Electrical.--Division 5

% c. Cost.--Cost of relocating the light pole, **new concrete foundation and conduit and**
% **wiring** shall be included in the lump sum price offered in the schedule for furnishing, and
erecting the pre-engineered metal building.

and shall be of such quality that it will compact thoroughly when watered and rolled to form a firm well-bonded base. When tests indicate the material is deficient in binder, additional soil binder shall be added to the material but only in such amounts as will insure the total material conforming to the following requirements. Soil binder shall be pulverized before mixing with rock, gravel, or stone aggregate.

(1) Grading.--The aggregate when tested by means of standard screens (designation 4) shall conform to the following limits of gradation:

100 percent passing a screen with 1-inch-square openings;

90 to 100 percent passing a screen with 3/4-inch-square openings;

35 to 65 percent passing a No. 4-mesh screen;

15 to 40 percent passing a No. 16-mesh screen; and

2 to 10 percent passing a No. 200-mesh screen.

(2) Quality.--When subjected to the Los Angeles abrasion test (designation 21), the aggregate shall have a loss, using grading A, not to exceed 50 percent, by weight, at 500 revolutions. The designations in parentheses refer to methods of test described in the Eighth Edition of the Bureau of Reclamation Concrete Manual. The Government will test the aggregate, and the Contractor shall provide such facilities as may be necessary for procuring representative test samples (designation 1).

Commercially available aggregate base course material conforming to the requirements set forth in section 704 of the Nevada standard specifications for type II, class B aggregate base shall be acceptable for use as required by this paragraph.

c. Placing. -- Preparation of the subgrade for aggregate base shall conform to Paragraph 2.3.1. (Preparation of Subgrade). The aggregate base, when thoroughly compacted, shall conform to the grades and dimensions shown on the drawings or otherwise established. Depositing and spreading the materials shall be accomplished by any practical means which obtains the specified results. Before the material has been spread, it shall be mixed thoroughly, until the material shows a uniform mixture of all sizes of particles. Wetting may be necessary to obtain proper mixing.

d. Compacting.--The material shall be rolled or tamped until it is compacted thoroughly and is true to grade and cross section. Sufficient water to obtain compaction shall be applied during the compaction operations. The aggregate base shall be compacted to a relative density of not less than 95 percent as determined by tests as described in paragraph 2.1.1. (Compacting Earth Materials).

2.3.3. MEASUREMENT AND PAYMENT

Measurement, for payment, for furnishing and placing aggregate base course will be made on the basis of the dimensions shown on the drawings or where dimensions are not shown on the drawings the basis shall be as prescribed by the Contracting Officer.

Payment for furnishing and placing aggregate base course will be made at the unit price per cubic yard offered therefore in the schedule. The price offered in the schedule shall include the cost of all materials and labor required for the aggregate base course including furnishing, placing, and compacting the material.

% **SECTION 2.4 - EXCAVATION AND BACKFILL OF TRENCHES**

%

% **2.4.1. EXCAVATION FOR CONDUIT AND PIPE TRENCHES**

%

% **a. General.--The Contractor shall excavate conduit and pipe trenches for installation**
% **of underground conduit lines and PVC water line. The trenches shall be excavated to the**
% **depths as specified in Paragraph 5.1.1. (Electrical Conduit Systems) and Section 6.6**
% **(PVC Piping), or as directed by the Contracting Officer.**

%

% **b. Foundation.--When the foundation material below the bottom of the conduits and**
% **PVC pipe is unsuitable, as determined by the Contracting Officer, the Contractor shall**
% **overexcavate and replace the overexcavation with compacted backfill. The backfill shall**
% **be placed and compacted as specified in Paragraph 2.4.2. (Compacting Earth Materials).**
% **If at any point in excavation, the foundation material is excavated beyond the required**
% **depths to receive the conduits and pipe, the overexcavation shall be filled with suitable**
% **material and compacted in accordance with Paragraph 2.4.2 (Compacting Earth**
% **Materials).**

%

% **c. Cost.--The cost of excavation for conduit and pipe trenches shall be included in the**
% **applicable prices offered in the schedule for which the excavation was performed.**

%

% **2.4.2. BACKFILL IN CONDUIT AND PIPE TRENCHES**

%

% **a. General.--The Contractor shall place backfill material in conduit and pipe trenches**
% **were excavated in accordance with Paragraph 2.4.1 (Excavation for Conduit and Pipe**
% **Trenches).**

%

% **Reference in this paragraph to backfill in conduit and pipe trenches includes aggregate**
% **base material, sand bedding and select material obtained from excavation and select**
% **material obtained from commercial sources.**

%

% **Backfill in conduit and pipe trenches shall be placed as specified in this paragraph or as**
% **directed by the Contracting Officer. Backfill required to be compacted shall be placed as**
% **specified in Paragraph 2.1.1. (Compacting Earth Materials). The type of material used for**
% **backfill, the amount thereof, and the manner of depositing the material shall be subject to**
% **the approval of the Contracting Officer.**

%

% **Gradation limits for select material for backfill shall be evenly distributed with the range**
% **of 100 percent passing the 3/4-inch size screen and not more than 5 percent passing the**
% **No. 200 screen.**

%

% **Gradation limits for aggregate base material for backfill shall meet the requirements**
% **specified in Paragraph 2.3.2. (Aggregate Base).**

%

% **All buried electrical conduit shall have 2 inches of sand or fine earth placed around each**
% **conduit.**

%

% **All backfill shall be carefully placed and spread in uniform layers so that all voids will be**
% **filled. Aggregate base material above the compacted select material may be placed as**
% **soon as compacting of the select fill material has been completed. The Contracting**
% **Officer may choose to delay further placement of aggregate base materials to procure**
% **samples for compaction testing. Should compaction test indicate insufficient density of**
% **the compacted select material about the conduit or pipe, the Contractor will be required**
% **to continue compacting the backfill materials until the proper densities are obtained.**

%

% **No direct payment will be made to the Contractor for backfill in conduit or pipe trenches,**
% **and the cost of backfill in conduit and pipe trenches shall be included in the applicable**
% **prices offered in the schedule for which the backfill was performed.**

%

% **2.4.3. COMPACTING BACKFILL IN CONDUIT AND PIPE TRENCHES**

%

% **a. General.--Backfill in conduit and pipe trenches shall be compacted as specified in**
% **this paragraph or as directed.**

%

% **b. Location of compacted backfill.--Sand bedding, select backfill material, and**
% **aggregate base material in the conduit trenches shall be compacted to the densities**
% **specified in Paragraph 2.1.1. (Compacting earth Materials). Backfill in the trenches will**
% **be compacted to the final grade for placement of bituminous surfacing material and**
% **placement of concrete slabs.**

%

% **c. Compacting backfill.--Backfill in conduit trenches shall be compacted in layers**
% **having about the same top elevation on both sides of the conduits or pipe to prevent**
% **unequal loading and displacement of the conduit or pipe. All compacted backfill in the**
% **conduit trenches shall be free form voids or loose material. Select material shall be**

% **compacted by saturation and internal vibration. Temporary bulkheads shall be used to**
% **control the water where required to facilitate compaction of select materials.**
%
% **No direct payment will be made for compacting backfill in the conduit and pipe trenches,**
% **and all cost thereof shall be included in the applicable prices offered in the schedule for**
% **which the compaction of backfill is performed.**

mastic with the upper and lower panels. At roof end laps, one or two beads, 1/4" each, permanently pliable mastic shall be applied.

Fasteners for roof panels shall be installed in the flat of the panel at a spacing of 1 foot on center except at end laps and terminal ends, where the spacing shall be a nominal 6 inches on center. Fasteners for wall panels shall be installed in the flat of the panel at a spacing of 1 foot on center.

Damaged or defective areas of paint or galvanizing shall be cleaned and repaired in accordance with recommendations of the building manufacturer.

Care shall be taken to ensure that all parts are installed in correct position and alignment. The building anchor bolts shall be located accurately and shall be held in correct position and alignment during placing and setting of the concrete.

Baseplates shall be leveled or aligned carefully, adjusted to correct alignment and grade with steel shims as necessary and rigidly secured in place. Spaces under the baseplates shall be filled completely with grouting mortar according to Paragraph 3.4.2. (Grouting Mortar).

The ridge, eaves, corners, and panel joints shall be closed and sealed watertight.

4.1.6. HINGED DOORS

a. General.--The Contractor shall furnish and install standard hinged doors at the locations shown on the specification drawings or approved submittal drawings. The doors shall be 3'-0" x 7'-0" x 1-3/4", single swing, flush panel metal doors.

b. Door and Frame.--The 3-foot 0-inch by 7-foot 0-inch hollow core steel doors shall meet the requirements of SDI-100 published by the Steel Door Institute. The door shall be grade III, model 3, galvanized steel, with flush end closure treatment at top and internal construction of polyurethane core, polystyrene core, or steel vertical stiffeners and fiberglass insulation. The frame shall be a hollow steel frame constructed of 14-gauge, minimum, galvanized steel. The doors and frames shall be bonderized and furnished with one finish coat of oven baked rust inhibiting alkyd white enamel paint meeting the manufacturer's specifications. The doors shall have a paint finish coat matching the building trim color.

The Government's existing security system is the Sargent Maximum Security System as
% manufactured by Sargent and Company. The Contractor shall provide all necessary **door**
% hardware for Sargent Maximum Security System, **manufactured by McKinney Products**,
except the lock cylinders and keying. The Contractor shall install the Government-furnished
lock cylinders. Hinges shall be full mortise.

Each door shall be provided with an aluminum threshold and a prepainted white drip. The junction of the door frame and wall panels shall be made weathertight by the use of a trim and sealant. The cross section of the trim shall be subject to approval of the Contracting Officer.

% **c. Submittals.--At least 20 days prior to purchasing the door hardware the Contractor**
% **shall submit manufacturers catalog sheets and data showing that the door hardware**
% **chosen meets all of the requirements of these specifications.**

% **d. Cost.--The cost for furnishing and installing hinged doors, door hardware and installing**
% **the Government-furnished lock cylinders, including all labor and materials, shall be included**
in the lump sum price offered in the schedule for furnishing and erecting the pre-engineered metal building.

4.1.7. INSULATED STEEL ROLLING DOORS

a. General. -- The Contractor shall provide manually-operated insulated steel rolling doors with weatherstripping for the shop building as shown on the drawing. The insulated steel rolling doors shall be complete with hood, barrel, door curtain, guides, counterbalance assembly, manual operator assembly, weather seals, and all accessory material required for complete installation.

The steel rolling doors shall be a product of a manufacturer regularly engaged in the manufacture of insulated steel rolling doors of the type specified. The door curtain shall be inside mounted between jambs with outside face flat in appearance.

The insulated steel rolling doors shall be designed to minimize the infiltration of wind, water, sand and dust and shall be designed for a wind pressure of not less than 25 pounds per square foot. The door shall be mounted on the interior face of the wall.

b. Submittals. -- Submittals shall be in accordance with this paragraph and paragraph 1.4.3. (Submittal Requirements).

(1) Shop drawings. -- At least 30 days before shipment to the jobsite, submit shop drawings and data covering details of the insulated steel rolling doors and hardware. Show size and location of door framing and reinforcement; gages of steel, thickness and type of insulation, "R" factor of door curtain, details and location of manual operator and door hardware, details of guides and brackets, details of weatherstripping, and other details covering fabrication and installation of the doors and frames.

(2) Product data. -- Include manufacturer's catalog sheets, specifications, color charts, and information showing that material and equipment are in accordance with these specifications.

(3) Installation data. -- Submit manufacturer's installation data.

(4) Maintenance data. -- Submit manufacturer's maintenance data.

c. Materials. -- The insulated steel rolling doors shall be the 625 Series "Stormtite" insulated rolling door manufactured by Overhead Door Company, P.O. Box 809046, Dallas TX 75380-9046; or the "Thermal-Door" insulated rolling door manufactured by Atlas Door Corporation, 116 Truman Drive, Edison NJ 08818; or equal, having the following salient characteristics:

- (1) Structural steel. -- ASTM A 36.
- (2) Sheet steel. -- ASTM A653 with not less than G-90 zinc coating. General requirements shall be in accordance with ASTM A924.

DIVISION 5--ELECTRICAL

SECTION 5.1 - ELECTRICAL

5.1.1. ELECTRICAL CONDUIT SYSTEMS

a. General.--The Contractor shall furnish and install electrical conduit, accessories, and materials required to complete the embedded and exposed conduit systems. All materials used in the conduit system shall be UL listed and rated for their intended purposes or shall be labeled by a nationally recognized testing laboratory (NRTL) accredited by the Federal Occupational Safety and Health Administration (OSHA) when applicable. Conduit accessories for conduit shall include:

- (1) Fittings such as caps, connectors, couplings, nipples, reducers, elbows, pipe plugs, locknuts, bondnuts, bushings, seals, and any other fittings required to complete the electrical conduit systems.
- (2) Threaded joint compound; protective sealant; materials for sealing ends of conduits terminating at outdoor boxes, panelboards, or cabinets; supports and clamps, complete with bolts, washers, and nuts; and other devices required to complete the electrical conduit systems and to fasten, clamp, attach, and support each conduit in place.

b. Materials.--The materials for the electrical conduit installation shall conform to the following requirements:

- (1) Rigid steel conduit, zinc coated.
- (2) Metal conduit fittings.
- (3) Plastic-coated rigid-steel conduit.--The conduit shall be zinc coated, with a factory-applied, bonded, plastic compound protective coat at least 0.04 inch thick uniformly around conduit. All elbows, fittings, couplings, hangers, and other accessories shall have an equal bonded coating. The fittings and couplings shall be sleeved to provide a watertight joint. The solvent that will be used to make the fittings and couplings watertight shall be as recommended by the manufacturer.
- (4) Conduit sealing bushings.--The bushings shall seal against liquid, gas, and vapor seepage; and shall be non-toxic, non-shrinking, and fire retardant.
- (5) Protective sealant.--The sealant shall be water repellent and shall be resistant to peeling and cracking.
- (6) Exposed outlet bodies and boxes.--The bodies and boxes shall be cast iron, malleable iron, or cast aluminum for exposed conduit systems.

(7) Malleable metal outlet boxes.--The boxes shall be in accordance with the following:

(a) Single gang. -- Single-gang device boxes and junction boxes shall be rectangular, single-gang, deep-wiring device outlet boxes with threaded hub connections for rigid steel conduit. Each box shall have four 1-inch threaded hubs, and shall be furnished complete with a 1-inch-deep cast or malleable metal extension ring. Boxes and extension rings shall be iron alloy with corrosion-resistant finish. Boxes shall be provided with 1-inch bushed elbows where indicated on the drawings, plugs for unused openings, and reducers as required.

(B) Type GRF.--The luminaire outlet boxes shall be 4-inch-round type outlet boxes approximately 3-1/8 inches deep, with threaded-hub connections for rigid steel conduit. Each box shall have four 1-inch threaded hubs, shall have plugs for all unused openings, shall have reducers as required, and shall be tapped for a 3/8-inch fixture stud. The boxes shall be an iron alloy with a corrosion-resistant finish.

(8) Fabricated sheet steel boxes.--Boxes shall consist of large junction, pull, or conduit boxes, excluding outlet boxes to contain wiring devices or to accommodate lighting fixtures, and shall be fabricated from sheet steel not less than No. 14 Manufacturer's Standard gauge. The cover for each box shall be attached with a heavy gauge continuous hinge. Stainless steel clamps shall be provided on the remaining three sides of the cover to ensure a watertight seal. Boxes exposed to weather shall be weather-resistant and watertight NEMA Type 4. Covers shall be provided with oil-resistant gaskets.

% **(9) PVC conduit.-- U.L. listed Schedule 40 meeting NEMA requirements. Couplings**
% **and connectors shall be of the same manufacturer as the conduit and shall be**
% **joined with recommended cement. Provide 400 pound test pull rope.**

c. Installation.--The conduit systems shall be installed as shown on the specification drawings and in accordance with the applicable requirements of the NEC, 1996, and the NFPA-101, 1997. The Contractor shall be responsible for determining the exact locations of embedded conduit stub-ups based on the equipment being furnished. The Contractor shall determine the routing of exposed conduit when it is not shown on the drawings.

The conduit shall be installed with all necessary fittings and supports, and the bends shall be gradual and smooth to permit pulling insulated conductors without undue stress or damage to these conductors or conduit. Conduit runs and bends shall be free from kinks, indentations, or flattened surfaces. Metal conduit bends made in the field shall be bent cold to prevent damage to protective coating. Burrs and sharp corners at the ends of metal conduit shall be removed.

Male threads of rigid metal conduit joints shall be coated with a suitable graphite or zinc sealing material before making joints, and shall be tightened securely to ensure electrical continuity and to prevent the entrance of moisture or foreign material.

Bushings or chase-type nipples shall be installed on the ends of conduit to protect the insulation of the insulated conductors from abrasion. Locknuts and bondnuts shall be installed to provide tight ground connections between conduit and boxes, panelboards, and cabinets.

The ends of conduits terminating at all boxes and panelboards shall be sealed with a sealing material or with sealing bushings to prevent air circulation and entrance of rodents through the conduits into the boxes or panelboards.

Conduit terminated at horizontal and vertical surfaces shall be stubbed two inches above the finished floor level or wall surface and shall be terminated with a coupling and a plug. The two-inch stubout and approximately 1 foot of the embedded conduit shall be wrapped with corrosion tape. The plug shall be replaced with a bushing or a Chase-type nipple before installing cable.

Unless shown otherwise, conduit to be embedded in concrete shall be rigid steel conduit. Conduit and conduit fittings to be embedded in concrete shall be held securely in position while the concrete is being placed. The ends of conduit shall be protected to prevent the entrance of concrete, sand, or other foreign material. The ends of embedded conduit shall be terminated with couplings and pipe plugs or with insulating bushings and caps.

Within 24 hours after removal of forms, conduit runs shall be swabbed with clean dry rags until thoroughly cleaned and dried. The threads of the removed plugs shall be greased, and the plugs shall be replaced and shall be left in place to prevent entrance of water or foreign material until the insulated conductors are installed. Conduit boxes shall be sealed with a rubber gasketed blank cover.

Wall penetration seals shall be furnished and installed for conduits entering the structure below grade. The seals shall be installed in accordance with the manufacturer's instructions.

Exposed conduit runs shall be straight and shall be parallel with each other and with the centerline of the room or structure. Exposed conduit shall be rigidly supported from the wall or ceiling within 3 feet of each outlet box, junction box, cabinet, or fitting and at intervals of not more than 5 feet. Installation of exposed conduit shall include, where required, drilling holes in the bottom, side, or top enclosures or plates of other electrical equipment. Exposed conduit shall be tightened securely and shall be supported rigidly in place, and connections to outdoor boxes shall be watertight. Metal conduit shall not be welded to structural steel or conduit supports.

Metal conduit buried directly in earth shall be plastic-coated conduit. Joints shall be watertight and shall be coated or covered in accordance with manufacturer's instructions. Plastic-coated conduit shall be securely tightened with a plumbers-type strap wrench. Damaged portions of the protective coat shall be repaired or covered in accordance with the manufacturer's instructions. Where buried conduit is to connect to embedded conduit or is to extend above ground, the bonded covering shall extend at least 3 inches into concrete or above the ground surface. Solvent shall be used when installing fittings and couplings to permanently bond the sleeves to the plastic coating of the conduit.

Bending of plastic-coated conduit shall be in accordance with the manufacturer's recommendations. If the manufacturer warns of possible damage to the conduit or the plastic coating when bending larger sizes, factory bends shall be used.

Buried electrical conduit shall be buried at a depth of 24 inches. All buried electrical conduit shall have 2 inches of sand or fine earth placed around each conduit. The remaining portions
% of the trenches shall be backfilled and compacted ~~as required to protect the conduit in~~
% **accordance with Paragraphs 2.4.2. (Backfill in Conduit and Pipe Trenches) and**
% **2.4.3. (Compacting Backfill in Conduit and Pipe Trenches).**

d. Cost.--Cost for furnishing and installing the various types and sizes of electrical conduit shall be included in the lump sum price offered in the schedule for furnishing and installing the
% electrical system, **which shall include all costs of trench excavation, compaction, backfill,**
% **and bituminous surfacing.**

5.1.2. INSULATED CONDUCTORS, 600 VOLTS OR LESS

a. General.--The Contractor shall furnish and install insulated conductors, 600 volts or less, in accordance with this paragraph and as shown on the drawings.

(1) Exceptions.--The insulated conductors, 600 volts or less, paragraph does not include the material requirements for the following cable and wire, which are provided for elsewhere in these specifications as indicated; however, the wire and cable listed below shall be installed in accordance with the applicable requirements of this paragraph.

(a) Luminaire wire.--Paragraph 5.1.3.c.(6).

(2) Definitions.--For the purposes of this paragraph, the following definitions shall apply:

(a) Cable.--Cable, cables, wire, or wires of one or more insulated conductors.

(b) Power cable.--Cable that is used for power loads including receptacle outlets; motors; alternating- and direct-current distribution circuits; heating, ventilating, air-conditioning and lighting circuits; and cable that is used for controlling heating, ventilating, air-conditioning, and lighting equipment.

(c) Indoor cable.--Cable with its entire length indoors.

b. Submittals.--Submittals shall be in accordance with this subparagraph, and paragraph 1.1.4. (Submittal Requirements).

The Contractor shall submit the data listed below.

(1) Manufacturer's data.

(2) Meggar test reports. Refer to Section 5.4.f.

c. Materials.--

(1) Cable, general.--All cable shall:

- (a) Be manufactured no more than 24 months prior to award date.
- (b) Be round, except for 2-conductor cable with parallel conductors.
- (c) Have ASTM class B or C copper conductor.
- (d) Have kcmil, AWG, or MCM designation.
- (e) Have coverings or insulation suitable for installation in the vertical position without injury to the covering or deformation of the insulation when supported in accordance with NEC article 300-19.

%

- (f) Have stranded conductors **and be type XHHW.**

(2) Color code for indoor lighting cable.--All No. 10 AWG and smaller single-conductor cable used in branch circuits shall have colored or identified insulation as follows:

- Phase A - black or orange*
- Phase B - red or yellow*
- Phase C - blue or brown*
- Neutral - white or gray*

* To be used when more than one multiwire branch circuit is contained in a single conduit.

(3) Outdoor power cable. -- This cable shall:

- (a) Be UL listed and shall bear the UL-type label on the outer surface in accordance with NEC.

(4) Determination of conductor sizes.--The Contractor shall determine all conductor sizes, except where shown on the drawings or specified, in accordance with NEC, 1996 and the following requirements (in the event of conflict between NEC, 1996 and the following, the more stringent requirement shall apply):

- (a) Minimum conductor size shall be No. 12 AWG except for the following:
 - (aa) Lighting circuits.--No. 12 AWG or larger.
 - (bb) Power.--No. 12 AWG or larger.

(b) Conductor sizes for power and lighting circuits shall be determined in accordance with NEC based on 60° C conductor temperature for sizes No. 1 AWG and smaller and 75° C conductor temperature for sizes No. 1/0 AWG and larger.

d. Installation.--The Contractor shall install the cables in accordance with the drawings, the requirements of these specifications, and the requirements of NEC, 1996 and NESC, 1997, where applicable.

Sufficient length shall be left at the cable ends to make connections conveniently to equipment, fixtures, and devices. Spare single conductors at each end of a multiconductor cable shall be retained in a length equal to the longest single conductor of the multiconductor cable. Conductors in current transformer cable shall be retained in sufficient length to reach the farthest terminal used to select current transformer ratios.

At the termination point of multiconductor cable, conductors shall be formed into neat packs and shall be laced or tied with self-locking cable ties.

The cable shall not be pulled into conduits until the conduit runs have been cleaned and are free from obstructions and sharp corners. A clean, dry, tight-fitting rag shall be drawn through conduit immediately before installing cable. The cable shall be installed so as to prevent cuts or abrasions in insulation or protective covering, or kinks in cable.

Gradual and uniform pulling stresses only will be permitted on cable. Where a lubricant is needed as an aid to the pulling, only soapstone or other suitable material not injurious to cable sheath shall be used. The Contractor shall install cable without exceeding allowable pulling tensions and sidewall pressures recommended by the cable manufacturer. Cable damaged during installation shall be removed and replaced by and at the expense of the Contractor.

No splices will be allowed in any single or multiconductor control cables. Splices will only be allowed in junction boxes at devices where wiring pigtails are provided from the manufacturer. Splices shall only be made where approved by the Contracting Officer's technical representative and shall meet the applicable requirements of NEC, 1996.

All conductors, whether single-conductor cables or individual conductors of multiconductor control, telemetering, instrumentation, and power cables shall be marked at each end with the conductor designation on the first line followed by the conductor destination device and terminal number on the second line. The spare conductors of multiconductor cables shall be machine lettered with the cable designation and the word "SPARE". The markers shall have designations that have been machine lettered. The markers shall be white in color and shall be of the self-laminating-vinyl type or of the heat-shrink type.

The contractor shall make all electrical connections to each piece of equipment or device.

e. Cost.--Cost for furnishing and installing the various types and sizes of insulated conductors shall be included in the lump sum price offered in the schedule for furnishing and installing the electrical system.

Equipment and/or miscellaneous metalwork that is required to be grounded, but is not shown on the drawings, shall be connected to the grounding system with a No. 4 AWG ground cable.

e. Connections. -- The Contractor shall make all ground connections between the equipment and the miscellaneous metalwork, and the ground plates of the grounding system whether or not such grounding connections are shown on the drawings. The number of grounding connections for equipment shall be one. Paint, enamel, scale, oil, grease, or other foreign nonconductive material shall be removed from the point of contact on metal surfaces before ground connections are made. After the connections are made, paint or galvanizing on the metal finishes that is damaged or removed as a result of the connections, shall be repaired in accordance with Division 8 (Painting).

Connections of ground cable risers to above-ground equipment shall be fastened above the base plates. The ground cable risers shall be secured to the structures as shown on the drawings.

Ground connections that will be buried underground or embedded in concrete shall be made utilizing an exothermic process. All connections shall be performed in accordance with manufacturer's instructions.

f. Damaged ground cable. - Existing ground cables, shown on drawing No. 2 (45-301-6574) are shown only in approximate location, and caution should be used in excavating near existing ground cables. The Contractor shall repair all ground cable damaged during construction to the satisfaction of the Contracting Officer at no additional cost to the Government.

g. Testing. - The resistance of the interconnected carpentry/sandblast shop, transformer T5, transformer T6 and the existing warehouse area ground mat to ground shall be measured no sooner than 30 days after completion of the substructure concrete pouring. The resistance shall be measured by the Contractor using the fall of potential method described in section 8.2.1.5 of IEEE standard No. 81, dated May 1983, using a Megger Ground Tester of the heavy-duty, low-resistance type with direct-reading, direct-current ohmmeter as described in bulletin No. 25 and any one of bulletins Nos. 25J, 25J-2, and 25T, all by James G. Bidle Co.; or equal.

When performing the test, the initial distance between the remote current electrode and the ground mat under test shall be a distance of at least six times the longest diagonal dimension of the ground mat being measured, and the distance between the potential electrode and the mat shall be a distance of at least four times the longest diagonal dimension of the mat. These distances should provide a starting point outside the area of influence of the ground mat to begin taking test measurements. The potential electrode shall be located as nearly as possible in an opposite direction from the current electrode during testing. The exact locations of the electrodes for subsequent measurements shall be determined by the Contractor in order to obtain results that reflect the actual resistance of the ground mat. The Contractor shall notify the Contracting Officer at least 24 hours in advance of the time the test is to be performed in order that the test may be witnessed by a representative of the Contracting Officer.

- High-voltage rating.....2400 volt delta connected
- % Low-voltage rating.....**480** ~~277~~ volts grounded wye
- Basic impulse insulation level.....30 kilovolts (high side)
1.2 Kv (low side)
- Taps, rated kilovolt ampere capacity.. $\pm 2 \frac{1}{2} \%$, $\pm 5\%$, $-7 \frac{1}{2}\%$, -10%
- Impedance.....6.5 percent
- Temperature rise..... 150°C

The transformers shall be capable of operating at specified loading and temperature rises when installed in the following ambient temperatures:

Average ambient temperature for 24 hours185°C insulation class

(2) Transformer T4 shall have the following ratings and features:

- Type.....1 phase, 60 hertz
outdoor, dry-type
- Capacity.....100 kVA
- High-voltage rating.....480 volt
- Low-voltage rating.....120/240
- Basic impulse insulation level.....1.2 kilovolts (high side)
- Taps, rated kilovolt ampere capacity.. $\pm 2 \frac{1}{2} \%$, $\pm 5\%$, $-7 \frac{1}{2}\%$, -10%
- Impedance.....5.2 percent
- Temperature rise.....150°C

The transformer shall be capable of operating at specified loading and temperature rises when installed in the following ambient temperatures:

Average ambient temperature for 24 hours 185 °C insulation class

(3) The transformers shall be provided with those accessories specified in ANSI C57.12.01 and C57.12.50.

(4) Transformer T5 shall consist of high and low-voltage cable terminating compartments. There shall be no exposed screws, bolts, or other fastening devices which are externally removable, nor shall there be openings through which foreign objects such as sticks, rods, or wires might contact live parts. Compartment doors shall be provided with means of padlocking. Construction shall limit entry of water (other than floodwater) into compartment to prevent impairment of operation of transformer. The enclosure shall be dry-type, NEMA dR outdoor, general purpose, pad-mounted.

(5) Transformer T5 shall have Incoming and outgoing terminal compartments with hinged doors with provisions for latching in open position and shall be located side by side separated by steel barrier with incoming compartment on the left. High-voltage (incoming) compartment shall be accessible only after door to low-voltage (outgoing) compartment has been opened. To facilitate making connections and permit cable pulling, doors and compartment hood shall be removable. Removable doorsill on compartments shall be provided to permit rolling or skidding of unit into place over conduit studs in foundation.

(6) Transformer T5 primary load-break fused disconnect switch assembly. -- Paragraph 5.3.2.

(7) Transformer T5 secondary manually operated load-break disconnect switch. -- Paragraph 5.3.3.

(8) Grounding. - Grounding shall be in accordance with Section 5.2 (Grounding), and as shown on the drawings. There shall be provisions for grounding in both high- and low-voltage compartments in transformer T5 as well as in transformers T4 and T6. The contractor shall provide solderless, clamp-type lugs or terminals for connecting to ground cables.

(9) Special tools and accessories required for installation, normal operation, and maintenance of equipment shall be furnished by the Contractor.

(10) Nameplates. - A nameplate shall be mounted on the front of each transformer. The nameplate material, type B, and engraving shall be in accordance with drawing No. 18 (40-D-6234).

(11) Transformer T6 shall have the following ratings and features:

Type.....	1 phase, 60 hertz outdoor, dry-type
Capacity.....	50 kVA
High-voltage rating.....	480 volt

Low-voltage rating.....120/240
Basic impulse insulation level.....1.2 kilovolts (high side)
Taps, rated kilovolt ampere capacity.. $\pm 2 \frac{1}{2} \%$, $\pm 5\%$, $-7 \frac{1}{2}\%$, -10%
Impedance.....5.2 percent
Temperature rise..... 150°C

The transformer shall be capable of operating at specified loading and temperature rises when installed in the following ambient temperatures:

Average ambient temperature for 24 hours 185 °C insulation class

- d. Installation. - The transformers shall be installed in the locations shown on the drawings.
- e. Testing. - The transformers shall receive factory tests described in ANSI C57.12.90, except no-load-loss and exciting-current tests will not be required.
- f. Painting. - The transformers shall be painted in accordance with Section 8.1 (Painting).
- % g. Cost. - Cost for furnishing and installing ~~two~~ **three** dry-type pad-mounted transformers shall be included in the lump-sum price offered therefor in the schedule for furnishing and installing power cable and transformers.

current curves (if applicable), fault current rating, interrupting rating, and installation and operation details. Where several items are listed on the same data sheet, the data pertinent to the equipment which are being submitted for approval shall be clearly marked. The data shall fully demonstrate that the material or equipment proposed meet the requirement of these specifications. Manufacturer's catalog data shall be furnished in a looseleaf binder or folder.

(1) Wiring devices. -- Approval data on wiring devices shall include data on cover plates.

(2) After receipt of the fuse unit time-current curves (if applicable) Reclamation shall provide the exact rating from the load-break fused disconnect switch assemblies.

~~(3) After receipt of the submittal, Reclamation shall provide the exact momentary current of the manually operated load-break disconnect switches.~~

%

(g) Fused disconnect enclosure and ~~load-break~~ **manually operated** disconnect enclosure data shall include type of enclosure, required mounting materials, layout illustrating the enclosure as separate from or included with transformer T5 enclosure, and verification that the enclosure(s) are rated for outdoors; NEMA 3R or 4.

(2) Operation and maintenance manuals, descriptive data, and bill of materials. Each set of this data shall be assembled into one enclosing cover.

The instruction book shall include:

(a) An index sheet at the front of each book which provides page or index tab number information for each item.

(b) Manufacture's instructions, operation, and catalog data sheets for each device and component.

(c) A list of recommended spare parts and components.

(d) Circuit breaker and fuse time-current curves.

(e) Complete parts lists for all replacement parts.

(f) Schematic diagrams.

(g) Wiring diagrams.

% h. Cost. -- Cost for furnishing, and installing ~~two manually group-operated~~ **and testing** load
% break ~~metal-enclosed~~ **fused** disconnect switch assemblies shall be included in the lump-sum

price offered in the schedule for furnishing and installing power cable and transformers, which price shall include the cost of furnishing and installing all materials for the disconnect switch assemblies.

5.3.3. MANUALLY OPERATED ~~LOAD-BREAK~~ DISCONNECT SWITCH

% a. General. - The Contractor shall furnish, ~~and~~ install, **and test** three sets of disconnect switch assemblies for transformer T5 ~~for future use~~. The switch assemblies shall be located in one enclosure or be a part of the secondary side of transformer T5. Each disconnect shall be manually operated. The three disconnect switch configuration shall be in accordance with the drawings.

b. Materials. --

(1) Disconnect switch. -- The disconnect switches shall meet the requirements of ANSI C37.32 and shall have the following ratings and features:

Type.....3-pole, single throw outdoor type,
gang-operated.

System nominal voltage.....480 volts

Basic impulse level (BIL).....15 kilovolts

Continuous current.....600 amperes

Momentary current.....6,000 amperes

d. Painting. - The disconnect switch assembly shall be painted in accordance with Division 8 (painting).

e. Drawings. - The Contractor shall furnish drawings and data in accordance with paragraph 1.1.4 (Submittals).

f. Installation. - The disconnect switch assemblies shall be installed in the locations shown on the drawings.

g. Submittals. -- Paragraph 5.3.2g.

% h. Cost. -- Cost for furnishing and installing ~~metal-enclosed, 480 volt, 3-pole, three~~ manually ~~group-~~ operated disconnect switch assemblies shall be included in the lump-sum price offered in the schedule for furnishing and installing power cable and transformers, which price shall include the cost of furnishing and installing all materials for the disconnect switch assemblies.

SECTION 5.4 - FURNISHING AND INSTALLING POWER CABLE

5.4.1. FURNISHING AND INSTALLING POWER CABLE

a. General. -- The Contractor shall furnish all materials and equipment necessary for installing power cable between the new carpentry/sandblast shop, existing long-term storage building and the switchyard relay house in accordance with these paragraphs and as shown on the drawings.

This work includes:

- % (1) Furnishing and installing power cable, ~~in 4" conduit,~~ from 480v panelboard L4 to transformer T5 and from 480v panelboard L6 to transformer T5. The measured distance is ~~900~~ **825** linear feet from 480v panelboard L6 to transformer T5.
- (2) Modifying the existing conduit in the warehouse yard as shown on drawing No. 2 (45-301-6574).
- % (3) Furnishing and installing power cable in the existing conduit between transformer T5 and the switchyard relay house. The measured distance is ~~6800~~ **6100** linear feet.
- (4) Core drilling one hole in the wall of the existing relay house.
- (5) Making final connections of the power cable and corresponding conduit to the 480V panelboard L4, transformer T4, 120/240V panelboard L5, 480V panelboard L6, transformer T6, existing 120/240V panelboard and transformer, shown on drawing No. 2 (45-301-6574) and drawing No. 3 (45-301-6575), to the bus bar in the existing switchyard relay house, shown on drawing No. 12 (45-D-8494) and to the 480-volt distribution panel.

b. Materials. -- The materials for installing power cable shall conform to the following requirements:

- (1) Power cable. -- Transformer T4 to 120/240 volt distribution panel L5, 480 volt distribution panel L4 to Transformer T5 and 480 volt distribution panel L6 to Transformer T5:
 - % (a) ~~Single~~ **Three-conductor, nonshielded type, interlocked, armored power cable, 600 volt, cross-linked, type MC, polyethylene insulation (XHHW-2), multi-conductor.** Minimum conductor size shall be 350 MCM copper.
 - (b) UL listed and shall bear the UL-type label on the outer surface in accordance with NEC, 1996.
 - % (c) **Power cable shall be rated for direct burial.**

- (2) Power cable. -- 480 volt distribution panel L4 to Transformer T4:
 - (a) Single-conductor, nonshielded type, minimum conductor size shall be 2/0 AWG copper.
 - (b) UL listed and shall bear the UL-type label on the outer surface in accordance with NEC, 1996.

- (3) Power cable. -- Transformer T5 to relay house

%
%
%
%

- (a) Single-conductor **(5 kv), underground distribution power cable, insulation level to match fused disconnect, PVC jacket, cross-linked polyethylene insulation**, non shielded type, minimum conductor size shall be 3/0 AWG copper with **15kv concentric neutral (100% grounded insulation level)** ground, ~~15 kv insulated~~.
- (b) UL listed and shall bear the UL-type label on the outer surface per NEC, 1996.
- (c) Power cable shall be rated for direct burial.

- (4) Conduit. -- Paragraph 5.1.1.

- (5) Dry-type transformers. -- Paragraph 5.3.1.

- (6) Power cable. -- 480 volt distribution panel L6 to Transformer T6:
 - (a) Single-conductor, nonshielded type, minimum conductor size shall be 3 AWG copper.
 - (b) UL listed and shall bear the UL-type label on the outer surface in accordance with NEC, 1996.

- (7) Power cable. -- Existing 120/240 volt distribution panel to Transformer T6:
 - (a) Single-conductor, nonshielded type, minimum conductor size shall be 2/0 AWG copper.
 - (b) UL listed and shall bear the UL-type label on the outer surface in accordance with NEC, 1996.

%
%

- (8) Pull box.--Pre-cast concrete with metal cover. Pull box shall be weatherproof and suitable for the required installation.**

c. Installation. -- The power cable shall be installed as shown on the drawings and in accordance with the applicable requirements of the NEC, 1996 and NFPA-101, 1997. **Power**

% **cable shall be buried 24" deep or 18" deep below a 2" concrete cap (NEC Table 300-5).**
% **Warning tape shall be placed in the trench directly above the power cable.**

% **The 3/0 power cable from transformer T5 to the relay house will be placed in an existing**
% **spare 4" PVC conduit directly parallel to an existing 4" conduit containing fiber optic**
% **cable. Both existing 4" conduit share common pull boxes (9 total). When pulling the**
% **new power cable, care must be taken to protect the existing fiber optic cable which has**
% **been looped in each pull box.**

Making electrical connections shall include furnishing all materials to make the connections and shall be made in accordance with the following:

(1) Clean the contact surfaces immediately prior to making the connection to remove dirt deposits and any old joint compound.

(a) Prepare tinned contact surfaces by rubbing with fine steel wool.

(b) Prepare untinned contact surfaces by cleaning to bright metal with emery cloth. Remove nicks and ridges by filing. Wipe off all copper particles.

(2) Coat the contact surfaces with a "nongrit" joint compound such as NO-OX-ID "A-Special."

(3) Do not abrade the copper contact surfaces through the joint compound.

(4) Bolt the bus connection in accordance with the following:

(a) Lubricate bolts with a nongrit joint compound such as NO-OX-ID or Alcoa No. 2 EJC.

(b) Torque all bolts in accordance with manufacturer's instruction.

(c) Remove excess joint compound expect a small bead around the joint to prevent entrance of moisture and dirt.

d. Core Drilling.-- The contractor shall core drill one hole in the existing reinforced concrete wall of the relay house as indicated on specification drawing No. 11 (45-D-8494). The core hole shall be 6 inches in diameter. Core drilling shall be the only acceptable method for cutting through the wall for installation of conduit. Upon completion of the hole, the Contractor shall thoroughly clean up all cuttings or other waste materials resulting from the core drilling operations in accordance Paragraph 1.5.6 (Cleanup and Disposal of Waste Materials). If drilling water is used, surfaces of concrete to remain exposed shall be cleaned immediately so as to prevent discoloration of the concrete by the drilling water and cuttings. The Contractor shall take all necessary precautions required to contain drilling fluids and prevent them from leaking to lower floors or otherwise becoming a nuisance or hazard.

- e. Fire Retardant Sealant.-- Where the conduit is installed through the existing concrete wall, the Contractor shall seal the annular space between the conduit and the perimeter of the core hole with fire retardant sealant. The sealant shall be placed in accordance with manufacturer's instructions.
- f. Testing. -- The Contractor shall perform megger tests on each power cable conductor per Section 5.4.b, insulated conductors in section 5.1.2 and specification drawing number No. 6 (45-301-6578).
- g. Submittals. -- Submittals shall be in accordance with this subparagraph, and paragraph 1.1.4. (Submittal Requirements).

The Contractor shall submit the data listed below.

- (1) Manufacturer's data for each type/size power cable and fire retardant sealant.
- (2) Meggar test reports.

h. Cost. -- The cost for furnishing all materials, installing cable, core drilling, installing sealant, and making all power connections for the power cable will be made at the applicable lump sum price for furnishing and installing power cable and transformers.

5.4.2. PAYMENT

Payment for furnishing and installing power cable and transformers shall be included in the lump sum price offered therefor in the schedule, which price shall include the cost of all labor, materials, equipment and incidentals, required for complete installation of the power cable and transformers, as shown on the drawings and herein specified.

The Contractor shall also furnish and install all conduit, and power and control wiring necessary to make the evaporative cooling unit ready for operation.

The evaporative cooler shall be designed for outdoor installation on a concrete slab as shown on drawing No. 3 (45-301-6575).

The evaporative cooling unit shall be capable of cooling 4,200 cubic feet per minute of outdoor air entering at 108°F dry bulb / 66 °F wet bulb to a leaving air temperature of 75 °F dry bulb. The unit shall be capable of delivering the specified airflow, free airflow, plus the static pressure required for all components internal to the evaporative cooling unit. The unit shall have a minimum saturation effectiveness of 80 percent at 500 feet per minute airflow velocity % through the evaporative media. **The external static pressure will be 0.5 inches w.g.**

b. Submittals. -- Submittals shall be in accordance with this paragraph and paragraph 1.1.4 (Submittal Requirements). The following shall be submitted:

(1) Approval drawings and data. -- Commercial products data including manufacturer's performance tables or curves showing rated capacities; saturation effectiveness; correction factors for altitude, temperature and voltage; dimensions, weights, application, construction materials, accessories, required clearances; electrical requirements, wiring diagrams and bill of materials.

(2) Final material. -- Service manuals including installation, operation and maintenance instructions, and copies of all previously approved data.

c. Materials. -

(1) Casing. -- Design for draw-through air-flow with (horizontal, vertical) discharge fan as shown on the drawings. Provide removable type access doors with gasket seals and quick release fasteners with hinges. Construct casing from double wall No. 18 U.S. Standard gauge hot-dipped galvanized steel panels and interior components from hot-dipped galvanized or noncorrosive materials. Panels shall be insulated with 1-1/2 lb density neoprene coated fiberglass. Fabricate metal parts from stainless steel when in direct contact with wetted media or covered with water. Coat with weather-resistant, baked-enamel. Provide a 3/4-inch drain.

(2) Base pan. -- Entire bottom of cooler casing shall be a watertight base pan with integral inlet water supply and drain connections. Construct base pan from No. 16 U.S. Standard gauge stainless steel. The base pan seams, joints, and fittings shall be welded to be leaktight.

(3) Fan and drive. -- The fan shall be the centrifugal type with forward curve fan blades. The fan outlet velocity shall not exceed 1,600 feet per minute. The centrifugal fan shall be furnished with grease-lubricated ball bearings and lubricating fittings. Equip with a V-belt drive adequately sized to drive the fan with an overload factor of 1.6. Provide fan

and motor with cast iron or steel sheaves with accurately turned grooves keyed to shafts. Motor sheaves shall be adjustable. Provide a fan guard.

Provide a flow switch to de-energize fan motor if belts break.

Provide a rigidly braced steel housing constructed from gauges recommended by AMCA and a supporting frame common to fan and motor. Mount on vibration isolators.

(4) Motor. -- NEMA MG1, across-the-line, full-voltage-starting, induction type, suitable for continuous operation, and with a nameplate horsepower rating a minimum of 115 percent of brake horsepower required at specified performance requirements. Maximum motor speed: 1,800 revolutions per minute.

Provide internal thermal protection.

(5) Internal water distribution system. -- Piping shall be ASTM B88 Type K copper tubing. Fittings shall be wrought or cast copper or brass, solder-joint pressure fittings. Piping shall be arranged to assure equal water distribution to humidifying elements.

(6) Float valve. -- Brass, bronze, or stainless steel valve with copper or PVC pipe float.

(7) Humidifying elements. -- Media shall be CELdek by Munters Evaporative Cooling Division, 108 Sixth Street Southeast, Fort Meyers FL 33907: or equal, having the following salient characteristics:

(a) Rigid, cross-fluted fiberglass media chemically treated to prevent rotting.

(b) Eight inches thick and shall provide a minimum saturation effectiveness of 80 per cent at an air velocity of 500 feet per minute.

Provide stainless steel frame suitable for servicing and for fastening element securely in place.

(8) Air filter. -- Air filters shall be medium efficiency disposable type.

(9) External water supply piping. -- Piping shall be ASTM B88 Type K copper tubing. Fittings shall be wrought or cast copper or brass, solder-joint pressure fittings.

(10) Electrical requirements. -- Evaporative cooling units shall be prewired for 120 volt, single-phase, 60-hertz service. Electrical panels shall include NEMA motor starters, pump relays, fuses and fuse blocks, terminal blocks and controls for single point electrical and control connections. All wiring shall terminate in one electrical panel for each factory assembled evaporative cooling unit.

Provide disconnect switch and exterior mounted 120-volt control transformer.

(11) Shut-off valve. -- 3/4" Commercial gate valve, bronze body, wedge, and screw-in bonnet. Non-rising stem.

d. Installation. -- Install in accordance with Uniform Building Code, Uniform Mechanical Code, National Electric Code, state, local code requirements, and the equipment manufacturer's recommendations. Provide flexible connector between the fan discharge and ductwork or building connection as applicable. Align, level, and securely anchor in place. Identify with plastic nameplate. Close off and seal joints and spaces between evaporative cooler support frames and structure to prevent air leakage.

e. Testing. -- Upon complete installation the evaporative cooling unit shall be tested with the propeller fans and the bag house filters for a minimum of 8 hours to insure proper operation.

f. Cost. -- The cost of furnishing and installing the evaporative cooling unit shall be included in the lump-sum price offered in the schedule for furnishing and erecting the pre-engineered metal building

SECTION 6.4 - PROPELLER FANS

a. General. -- The Contractor shall furnish and install propeller-type exhaust fans complete with back-draft dampers, fan blades, motor with V-belt drive, wall mounted fan housing and motor guard, motor support bracket, weather hood, adapter plates as required, and all accessories required for installation and operation. The fan in sandblast shop will be connected to operate with the evaporative cooler. The fan in the carpentry shop will controlled by a separate switch.

b. Submittals. -- Submittals shall be in accordance with this paragraph and paragraph 1.4.1(Submittal Requirements). The following shall be submitted:

(1) Approval drawings and data. -- Commercial products data including manufacturer's performance tables or curves showing rated capacities, correction factors, dimensions, weights, application, construction materials, accessories, required clearances, and electrical requirements.

(2) Final material. -- Service manuals including installation, operation and maintenance instructions, and copies of all previously approved data.

c. Materials. -

(1) The exhaust fans shall be suitable for mounting as shown on the drawings and shall be rated to deliver 4,200 cubic-feet-per-minute airflow **at 0.25 inches w.g. external static pressure.**

(2) Fan and drive. -- The propeller fan shall be the heavy-duty type with back-draft damper, fabricated steel propeller-type blade, and shall be equipped with a V-belt drive. The V-belt shall be adequately sized to drive the fan with an overload factor of 1.6 and

shall have adjustable motor sheaves. The fans shall be provided with fan guard and wall mounted housing.

(3) Motors. -- The fan motor shall be the across-the-line, full-voltage-starting, constant-speed, induction type suitable for continuous operation and shall conform to the applicable standards of IEEE, NEMA, and ANSI. Fan motor speeds shall be full speed and half speed.

The horsepower nameplate rating for the fan motor shall be not less than 115 percent of the brake horsepower required at the specified performance. The fan motor shall be rated at 120 volts, single phase, 60 hertz. Based on an ambient temperature of 25 °C, the temperature rise rating for the type motor enclosure and insulation class shall not exceed the temperature rise listed in the latest NEMA Standards for Tests and Performance of Motors.

(4) Wall mount fan housing. -- Factory assembled heavy gauge galvanized steel with prepunched holes.

(5) Exhaust fan switch.-- Exhaust fan switch, designated S7, on drawing No. 5 (45-301-6577):

(a) Manufacturer.--The switch shall be as manufactured by Pass & Seymour, Syracuse NY 13221; Hubbell Inc., Bridgeport CT 06605; Challenger Circle F, Inc., P.O. Box 591, Trenton NJ 08604; or equal, having the following salient characteristics:

(aa) Description.--The switch shall be NEMA WD 1, heavy-duty, AC only, general use snap switch, ivory type with an impact resistant plastic toggle handle.

(bb) Wiring terminals.--Screw type terminals only shall be provided for wiring. A screw terminal shall be provided for grounding.

(cc) Voltage rating.--The voltage rating shall be 120/277 volts, alternating current.

(dd) Current rating.--The current rating shall be 20 amperes.

(5) Weatherhood. -- Weatherhood shall be heavy gauge galvanized steel with prepunched holes and 2 by 2 by 0.063 galvanized mesh bird screen.

d. Installation. -- The propeller fans shall be installed as shown on the drawings and in accordance with Uniform Building Code, Uniform Mechanical Code, National Electric Code, state, local code requirements, and as recommended by the manufacturer. The propeller fan installation shall be sufficiently rigid to prevent vibration and noise.

e. Testing. -- Upon complete installation the fan shall be tested with the evaporative cooling units for a minimum of 8 hours to insure proper operation.

f. Cost. -- The cost of furnishing and installing the propeller fans shall be included in the lump-sum price offered in the schedule for furnishing and erecting the pre-engineered metal building.

SECTION 6.5 - PACKAGED AIR-CONDITIONING UNIT

a. General. - The air-conditioning shall be a factory assembled, packaged, air-to-air type complete with housing, direct-expansion evaporator coil, compressor, air-cooled condenser, automatic defrost system, economizer, drain pan, filters, drive motor, controls, and all accessories required for installation and operation. The air-conditioning unit shall be factory charged with HCFC 22 refrigerant. The air-conditioning unit shall be suitable for slab or platform mounting.

b. Submittals. - Submittals shall be in accordance with this paragraph and 1.1.4 (Submittal Requirements). The following shall be submitted:

(1) Approval drawings and data. - Manufacturer's published commercial products data including; application data; performance tables or curves showing: sensible and total cooling capacities, electric resistance heating capacity, airflow, and static pressure; applicable performance correction factors for temperature, altitude and voltage; construction materials; and electrical characteristics. Calculations showing expected cooling performance corrected for design temperatures. conditions.

(2) Final Material. - Service manuals including installation, operation and maintenance instructions, and copies of all previously approved data.

c. Materials. -

(1) Rating. - The air-conditioning shall be designed in accordance with UL Standard 559 and ANSI/ASHRAE 15 shall be rated in accordance with ARI 210/240, and ARI 270. The air-conditioning shall have an minimum rated a sensible cooling capacity of 32,000 Btu/h while supplying 1330 ft³/min. air flow, free discharge, with air entering the evaporator at 78 °Fdb/58 °Fwb, and outside air entering the condenser at 108 °F. **The external static pressure will be 0.25 inches w.g.**

(2) Housings. - Components of the air-conditioning shall be contained and supported within a baked enamel finish metal housing. The housing shall be constructed of galvanized steel and shall be insulated in the inside. All components on the inside shall be easily accessible through side access panels. Housing shall be suitable for horizontal air discharge and return.

(3) Compressor. - The compressor shall be the fully hermetic type with crankcase heater. The compressor shall be mounted on suitable vibration isolators.

(4) Filter. - The filters shall be 2-inch fiberglass disposable type. Face velocity shall not exceed 300 ft/min at the rated air flow. If disposable filters are used, two spare filters shall be provided with the unit.

(5) Coils. - The evaporator and condenser coils shall consist of aluminum fins metallicly and/or mechanically bonded to copper tubing. Each coil shall include properly selected distributing heads. Each coil shall be rated for not less than 250 lbs./in.² working pressure and sized for not more than 500 ft./min. air velocity.

(6) Drain pans. - Drain pans shall be constructed from corrosion-resistant materials and shall include drain connections for attachment to the condensate drains.

(7) Economizer. - Economizer shall be the modulating type furnished with low leakage control dampers, and damper operators.

(8) Fans and drives. - Evaporator and condenser fans shall be the forward curved, centrifugal, belt or direct-drive type.

(10) Motors. - Each motor shall be the across-the-line, full-voltage-starting, constant-speed-induction type suitable for continuous operation. The motors shall be suitable for operating on 460 volt, 3 phase, 60 hertz power supply.

The horsepower nameplate rating shall be not less than 115 percent of the brake horsepower required at the tabulated performance.

Based on an ambient temperature of 40°C, the temperature rise rating for the type of motor enclosure and insulation class shall not exceed the temperature rise listed in the latest NEMA Standards for Test and Performance of Motors.

(11) Refrigerant accessories. - Each refrigerant circuit shall be furnished with filter dryer, service valves, sight glass, gauge ports, reversing valve, solenoid valve, and expansion valve.

(12) Controls. - The air-conditioning controls shall include room mounted electronic programmable thermostat, automatic short cycling protection, high pressure switch and low pressure switch, a compressor lock to prevent restart until reset at the thermostat, and solid state enthalpy based economizer controls.

d. Installation. - The air-conditioning and connecting ductwork shall be assembled, aligned, leveled, and fastened in place as shown on the drawings. Installation shall be in accordance with the equipment manufacturer's instructions, Uniform Mechanical Code (UMC), National Electric Code (NEC), and local codes and standards.

e. Cost. -- The cost of furnishing and installing the packaged air-conditioning unit shall be included in the lump-sum price offered in the schedule for furnishing and erecting the pre-engineered metal building.

SECTION 6.6 - PVC PIPING

a. General. - The contractor shall furnish and install a 3/4" PVC water line from the existing 2-1/2" water line to the evaporative cooler as shown on drawing No. 2 (45-301-6574) and drawing No 4 (45-301-6576).

b. Materials. -

- (1) Pipe. - Schedule 80 PVC
- (2) Fittings. - Schedule 40 PVC, solvent weld, socket type
- (3) Shut-off valve. - Paragraph 6.3.c (11)

c. Installation. - The contractor shall locate the existing 2-1/2" water line which is buried approximately 3-feet deep. The new 3/4" water line shall be attached to the existing water line using a "T" type fitting, riser, and required reducers and shall be buried a minimum of 18" deep to the top of pipe. The new water line shall ~~bedded in 2" of sand or fine earth~~ **have 2 inches of sand or fine material placed around the water line.** The remaining portions of the trench shall be backfilled and compacted ~~as required to protect the pipe~~ **in accordance with Paragraph 2.4.2. (Backfill in Conduit and Pipe Trenches) and 2.4.3. (Compacting Backfill in Conduit and Pipe Trenches).** Warning tape shall be placed in the trench 12" above the pipe.

d. Testing. - Following installation, and prior to back filling the trench, the water line shall be tested at service pressure. Any leaks shall be immediately repaired.

e. Cost. - Cost of furnishing and installing the water line shall be included in the lump sum price offered in the schedule for furnishing, and erecting the pre-engineered metal building, **which shall include all costs of excavation, compaction, backfill, and bituminous surfacing.**

d. Application.--

(1) General.--Materials shall be thoroughly mixed at the time of application. Surfaces shall be clean and, unless otherwise specified, free from moisture at the time of application.

Care shall be exercised during spray application to hold the nozzle sufficiently close to the surface being painted to produce a continuous wet coat, and to avoid excessive evaporation of the volatile constituents and loss of material into the air, or bridging over crevices and corners. Effective means shall be provided for removing free oil and moisture from the air-supply lines of all spraying equipment. Spray equipment shall be equipped with mechanical agitators, pressure gages, and pressure regulators. Nozzle pressure consistent with acceptable finish results shall be employed when spray painting.

Each coat shall be applied in such a manner as to produce an even film of uniform thickness which will completely cover irregularities, fill crevices, and be tightly bonded to the substrate or previous coat. Each coat shall be free from runs, pinholes, sags, laps, brush marks, voids, and other defects.

Each coat shall be allowed to dry or to harden before the succeeding coat is applied.

Thinning of paints to facilitate satisfactory application shall be kept to a minimum but in no event shall it exceed 1 pint per gallon of paint, except as otherwise specified; only thinner approved for the type of paint shall be used.

All Contractor-applied coatings exposed to public view shall present a uniform texture and color-matched appearance.

Methods of preparing and applying paints and coatings not included in these specifications shall be in accordance with the manufacturer's instructions and the general requirements of these specifications.

(2) Application of specific materials shall be as follows:

(a) Priming paints.--Lead- and chromate-free anticorrosive primer shall be applied at a maximum coverage of 450-square-feet per-gallon per coat, but the dry-film thickness shall not be less than 1.0 mil for the first coat. Following the first coat of priming paint, an additional "edge" coat shall be applied over all rivets, welds, bolts, seams, sharp corners, and edges before subsequent painting. The first coat shall be applied by brush or roller and subsequent coats shall be applied by either brush, roller, or spray.

(b) Enamels.--For ferrous surfaces, enamels shall be spray applied to produce a minimum dry-film thickness of 1.5 mils per coat, and the total minimum dry-film thickness of the coating system shall be 4.0 mils.

For nonferrous surfaces, spray apply at a maximum coverage rate of 500-square-foot-per-gallon per coat.

(c) Acrylic Emulsion.--Apply in accordance with manufacturer's instructions at a maximum coverage rate of 400-square-foot-gallon per coat to produce a minimum dry-film thickness of 1.5 mils per coat.

f. Submittals.--Submittals shall be in accordance with this paragraph and paragraph 1.4.3. (Submittal Requirements).

(1) Color samples.--The contractor shall submit to the Government, for selection of paint color, two sets of color samples.

g. Cost.--The cost of furnishing, preparing, and applying all materials for the cleaning, paint repairing, and painting or coating operations shall be included in the applicable prices offered % in the schedule for installing the pulse filter system **the items of work for which the painting is required.** %

8.1.2. PAINTING TABULATION

a. Painting tabulation.--

No.	Item	Surface preparation method	Paint or coating material	Number of coats
1	Bag house	B	Prime coat: Alkyd, corrosion-inhibiting, lead- and chromate-free Finish coat: Silicon alkyd enamel	1 2 1.4-mil DFT, min./coat 4-mil DFT, min./coat
2	Bollards	B	Prime coat: Alkyd, corrosion-inhibiting, lead- and chromate-free Finish coat: Silicon alkyd enamel	1 2 1.4-mil DFT, min./coat 4-mil DFT, min./coat