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These Specifications Issued By:
Regional Director, Lower Colorado Region
Bureau of Reclamation
P. O. Box 427
Boulder City, Nevada 89005

Phone Inquiries
regarding these specifications
should be made to

DIVISION OF DESIGN AND CONSTRUCTION

Area Code: 702 Phone 293-8620

FTS 598-7161

EAST MESA TEST SITE



MASTER

ERDA TEST FACILITIES
EAST MESA TEST SITE
GEOTHERMAL RESOURCE INVESTIGATIONS
IMPERIAL VALLEY, CALIFORNIA

FOREWORD

The work is situated approximately 10 miles east of Holtville, California, in Imperial County. Work to be performed includes construction of ERDA Test Facilities at the test site.

The principal features of the work to be performed include:

1. Furnishing and erecting a 700-gpm cooling tower.
2. Furnishing and placing reinforced concrete foundation and sump for the cooling tower.
3. Furnishing and placing reinforced concrete equipment base and a 80' x 175' reinforced concrete test base.
4. Furnishing and erecting a steel support rack for a pipe manifold system.
5. Furnishing a pipe manifold system of 4-, 6-, and 8-inch schedule 40 pipe insulated with 2-inch thickness of aluminum-jacketed calcium-silicate insulation.
6. Furnishing and installing insulated steel pipelines from Wells Mesa 6-1, 6-2, 8-1, to the existing injection pipeline, and associated structures.
7. Electrical and grounding systems for power transformer, outdoor lighting, air compressor-dryer, and cooling tower equipment.
8. All earthwork, including trenches, required for completion of ERDA Test Facilities.

PROSPECTIVE BIDDERS DESIRING TO VISIT THE SITE OF THE WORK SHOULD communicate with the Construction Engineer, Bureau of Reclamation, Yuma Projects Office, 3800 Avenue 3 East, Yuma, Arizona, phone (602)726-2545.

SET ASIDE FOR SMALL BUSINESS

MASTER

BIDS WILL BE RECEIVED AT THE BUREAU OF RECLAMATION, YUMA PROJECTS OFFICE, 3800 Avenue 3 East, YUMA, ARIZONA, until 10 A.M. (LOCAL TIME AT PLACE OF BID OPENING), APRIL 14, 1976. BIDS SUBMITTED BY MAIL SHOULD BE ADDRESSED TO THE CONSTRUCTION ENGINEER, YUMA PROJECTS OFFICE, P. O. BIN 5569, YUMA, ARIZONA 85364.

Price (\$4.00)

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED
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STANDARD FORM 21
DECEMBER 1965 EDITION
GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41 CFR) 1-16.401
BUREAU OF RECLAMATION (2-73)

BID FORM
(CONSTRUCTION CONTRACT)

REFERENCE

SPECIFICATIONS NO. * 300C-388

*Read the Instructions to Bidders (Standard Form 22)
This form to be submitted in SINGLE*

DATE OF INVITATION

** February 26, 1976

NAME AND LOCATION OF PROJECT

NAME OF BIDDER (Type or print)

** ERDA TEST FACILITIES, EAST MESA
TEST SITE, GEOTHERMAL RESOURCE
INVESTIGATIONS, IMPERIAL VALLEY,
CALIFORNIA

*

*

(Date)

TO: U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

In compliance with the invitation for bids, the undersigned hereby proposes to perform all work for

SPECIFICATIONS NO. * 300C-388

in strict accordance with the General Provisions (Standard Form 23-A), Labor Standards Provisions Applicable to Contracts in Excess of \$2,000 (Standard Form 19-A), specifications, schedules, drawings, and conditions, for the amount(s) stated in the accompanying Bidding Schedule(s).

(Over)

* To be filled in by bidder.

** Not necessary for bidder to fill in.

The undersigned agrees that, upon receipt of written notice that a preliminary examination of the bids indicates that he will be the successful bidder, or upon written notice of the acceptance of this bid, he will within 10 calendar days (unless a longer period is allowed) after receipt of the prescribed forms, execute Standard Form 23, Construction Contract, and give performance bond and payment bond on Government standard forms, with good and sufficient surety or sureties: Provided, that contract and bond forms executed by the bidder prior to award of the contract will become effective only if his bid actually is accepted within 60 calendar days after the date of opening of the bids (or within such shorter period as may be specified in the bid by the bidder).

The undersigned agrees, if awarded the contract, to commence the work within the specified number of calendar days after the date of receipt of notice to proceed, and to complete the work within the number of calendar days after the date of receipt of notice to proceed as stated in the specifications.

RECEIPT OF AMENDMENTS: The undersigned acknowledges receipt of the following amendments (Supplemental Notices) of the invitation for bids, drawings, and/or specifications, etc. (Give number and date of each):

*

The representations and certifications on the accompanying STANDARD FORM 19-B are made a part of this bid.

ENCLOSED IS BID GUARANTEE, CONSISTING OF		IN THE AMOUNT OF
*		*
NAME OF BIDDER (Type or print)	FULL NAME OF ALL PARTNERS (Type or print)	
* BUSINESS ADDRESS (Type or print) (Include "ZIP Code")		
BY (Signature in ink. Type or print name under signature)		
TITLE (Type or print)		

DIRECTIONS FOR SUBMITTING BIDS: Envelopes containing bids, guarantee, etc., must be sealed, marked, and addressed as follows:

Address to the BUREAU OF RECLAMATION office indicated in the specifications as the office for receiving bids.

The following properly filled out bid identification must be placed on the left side of the envelope containing the bid:

BID for (SPECIFICATIONS NO. _____)
 To be opened (Time and date of opening)
 BID of (Name of bidder)

CAUTION—Bids should not be qualified by exceptions to the bidding conditions.

REPRESENTATIONS
AND CERTIFICATIONS
(Construction Contract)
(For use with SF 19 and 21)

REFERENCE (Enter same No.(s) as on SF 19/21)

NAME AND ADDRESS OF BIDDER (No., Street, City, State, and ZIP Code)

DATE OF BID

In negotiated procurements, "bid" and "bidder" shall be construed to mean "offer" and "offeror."

The bidder makes the following representations and certifications as a part of the bid identified above. (Check appropriate boxes.)

1. SMALL BUSINESS

He is, is not, a small business concern. (For this purpose, a small business concern is a business concern, including its affiliates, which (a) is independently owned and operated, (b) is not dominant in the field of operation in which it is bidding on Government contracts, and (c) had average annual receipts for the preceding 3 fiscal years not exceeding \$7,500,000. For additional information see governing regulations of the Small Business Administration.)

2. CONTINGENT FEE

(a) He has, has not, employed or retained any company or person (other than a full-time bona fide employee working solely for the bidder) to solicit or secure this contract, and (b) he has, has not, paid or agreed to pay any company or person (other than a full-time bona fide employee working solely for the bidder) any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this contract; and agrees to furnish information relating to (a) and (b) above as requested by the Contracting Officer. (For interpretation of the representation, including the term "bona fide employee," see Code of Federal Regulations, Title 41, Subpart 1-1.5.)

3. TYPE OF ORGANIZATION

He operates as an individual, partnership, joint venture, corporation, incorporated in State of

4. INDEPENDENT PRICE DETERMINATION

(a) By submission of this bid, each bidder certifies, and in the case of a joint bid each party thereto certifies as to his own organization, that in connection with this procurement:

(1) The prices in this bid have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, in the case of a bid, or prior to award, in the case of a proposal, directly or indirectly to any other bidder or to any competitor; and

(3) No attempt has been made or will be made by the bidder to induce any other person or firm to submit or not to submit a bid for the purpose of restricting competition.

(b) Each person signing this bid certifies that:

(1) He is the person in the bidder's organization responsible within that organization for the decision as to the prices being bid herein and that he has not participated, and will not participate, in any action contrary to (a)(1) through (a)(3) above; or

(2) (i) He is not the person in the bidder's organization responsible within that organization for the decision as to the prices being bid herein but that he has been authorized in writing to act as agent for the persons responsible for such decision in certifying that such persons have not participated, and will not participate, in any action contrary to (a)(1) through (a)(3) above, and as their agent does hereby so certify; and (ii) he has not participated, and will not participate, in any action contrary to (a)(1) through (a)(3) above.

(c) This certification is not applicable to a foreign bidder submitting a bid for a contract which requires performance or delivery outside the United States, its possessions, and Puerto Rico.

(d) A bid will not be considered for award where (a)(1), (a)(3), or (b) above, has been deleted or modified. Where (a)(2) above, has been deleted or modified, the bid will not be considered for award unless the bidder furnishes with the bid a signed statement which sets forth in detail the circumstances of the disclosure and the head of the agency, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

THE FOLLOWING NEED BE CHECKED ONLY IF BID EXCEEDS \$10,000 IN AMOUNT.

5. EQUAL OPPORTUNITY

He has, has not, participated in a previous contract or subcontract subject to the Equal Opportunity Clause herein, the clause originally contained in Section 301 of Executive Order No. 10925, or the clause contained in Section 201 of Executive Order No. 11114; he has, has not, filed all required compliance reports; and representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained prior to subcontract awards. (The above representation need not be submitted in connection with contracts or subcontracts which are exempt from the clause.)

NOTE.—Bids must set forth full, accurate, and complete information as required by this invitation for bids (including attachments). The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

6. PARENT COMPANY AND EMPLOYER IDENTIFICATION NUMBER

Each bidder shall furnish the following information by filling in the appropriate blocks:

(a) Is the bidder owned or controlled by a parent company as described below? Yes No. (For the purpose of this bid, a parent company is defined as one which either owns or controls the activities and basic business policies of the bidder. To own another company means the parent company must own at least a majority (more than 50 percent) of the voting rights in that company. To control another company, such ownership is not required; if another company is able to formulate, determine, or veto basic business policy decisions of the bidder, such other company is considered the parent company of the bidder. This control may be exercised through the use of dominant minority voting rights, use of proxy voting, contractual arrangements, or otherwise.)

(b) If the answer to (a) above is "Yes," bidder shall insert in the space below the name and main office address of the parent company.

NAME OF PARENT COMPANY	MAIN OFFICE ADDRESS (No., Street, City, State, and ZIP Code)
------------------------	--

(c) Bidder shall insert in the applicable space below, if he has no parent company, his own Employer's Identification Number (E.I. No.) (Federal Social Security Number used on Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941), or, if he has a parent company, the E.I. No. of his parent company.

EMPLOYER IDENTIFICATION NUMBER OF	➔	PARENT COMPANY	BIDDER
--------------------------------------	---	----------------	--------

7. CERTIFICATION OF NONSEGREGATED FACILITIES

(Applicable to (1) contracts, (2) subcontracts, and (3) agreements with applicants who are themselves performing federally assisted construction contracts, exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause.)

By the submission of this bid, the bidder, offeror, applicant, or subcontractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The bidder, offeror, applicant, or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. He further agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that he will retain such certifications in his files; and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS
OF NONSEGREGATED FACILITIES**

A Certification of Nonsegregated Facilities must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

SUPPLEMENT SHEET TO STANDARD FORM 19-B

a. Item 1 of Standard Form 19-B is deleted and the following Item 1 is substituted therefor:

1. SMALL BUSINESS

He is, is not, a small business concern. [A small business concern for the purpose of Government procurement is a concern, including its affiliates, which is independently owned and operated, is not dominant in the field or operations in which it is bidding on Government contracts, and can further qualify under the criteria concerning number of employees, average annual receipts, or other criteria as prescribed by the Small Business Administration. For additional information, see governing regulations of the Small Business Administration (13 CFR Part 121)].

b. The following is added as Item 8 of Standard Form 19-B:

8. REPRESENTATION, AFFIRMATIVE ACTION PROGRAM

The bidder represents that he (check appropriate box):

- (a) has developed and has on file
 has not developed and does not have on file

at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor (41 CFR 60-1 and 60-2), or

- (b) has not previously had contracts subject to the written affirmative action program requirement of the rules and regulations of the Secretary of Labor.

c. The following is added as Item 9 of Standard Form 19-B:

9. MINORITY BUSINESS ENTERPRISE

The bidder represents that he (check appropriate box):

- is
 is not

a minority business enterprise. A minority business enterprise is defined as a "business, at least 50 percent of which is owned by minority group members or, in case of publicly owned businesses, at least 51 percent of the stock of which is owned by minority group members." For the purpose of this definition, minority group members are Negroes, Spanish-speaking American persons, American-Orientals, American-Indians, American-Eskimos, and American-Aleuts.

d. The following is added as Item 10 of Standard Form 19-B:

10. CLEAN AIR AND WATER CERTIFICATION

(Applicable if the bid exceeds \$100,000, or the contracting officer has determined that orders under an indefinite quantity contract in any year will exceed \$100,000, or a facility to be used has been the subject of a

conviction under the Clean Air Act (42 U.S.C. 1857c-8(c)(1)) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) and is listed by EPA, or is not otherwise exempt.)

The bidder certifies as follows:

(a) Any facility to be utilized in the performance of this proposed contract

has

has not

been listed on the Environmental Protection Agency List of Violating Facilities.

(b) He will promptly notify the contracting officer, prior to award, of the receipt of any communication from the Director, Office of Federal Activities, U.S. Environmental Protection Agency, indicating that any facility which he proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities.

(c) He will include substantially this certification, including this Paragraph (c), in every nonexempt subcontract.

ERDA TEST FACILITIES
EAST MESA TEST SITE
GEOTHERMAL RESOURCE INVESTIGATIONS
IMPERIAL VALLEY, CALIFORNIA

Bids will be considered for award on the following schedule, but no bid will be considered for award for only a part of the schedule.

Bids under these specifications are solicited from and award will be made only to small business concerns (see form in these specifications entitled "Notice of Small Business Set-Aside").

All bids are subject to the provisions contained in the attached Bureau of Reclamation Form 7-1746 entitled "Arithmetic Discrepancies and Mistakes in Bids."

SCHEDULE				
Item	Work or Material	Quantity and Unit	Unit Price	Amount
1	Furnishing and installing a single-cell, induced draft, counter flow, cooling tower			For the lump sum of \$ _____
2	Furnishing, fabricating and erecting steel manifold piping support track and steel frames for motor control center and four test stations			For the lump sum of _____
3	Furnishing and installing electrical and grounding systems			For the lump sum of _____
4	Excavation from borrow	200 cu.yd.	\$ _____	_____
5	Excavation for structures	140 cu.yd.	_____	_____
6	Backfill about structures	80 cu.yd.	_____	_____
7	Compacting backfill about structures	70 cu.yd.	_____	_____
8	Furnishing and placing gravel fills under concrete	145 cu.yd.	_____	_____

BIDDING SCHEDULE FOR
SPECIFICATIONS NO. 300C-333

SCHEDULE - (Continued)

Item	Work or Material	Quantity and Unit	Unit Price	Amount
9	Furnishing and placing concrete for cooling tower base and sump	20 cu.yd.	\$ _____	\$ _____
10	Furnishing and placing concrete for test base and compressor base	280 cu.yd.	_____	_____
11	Furnishing and placing concrete for pipe supports and pipe anchors	10 cu.yd.	_____	_____
12	Furnishing and handling cement	1,725 cwt.	_____	_____
13	Furnishing and placing reinforcement	25,650 lbs.	_____	_____
	Furnishing and installing steel pipe as follows:			
14	8-inch-diameter, schedule 40	680 lin.ft.	_____	_____
15	6-inch-diameter, schedule 40	1,060 lin.ft.	_____	_____
16	4-inch-diameter, schedule 40	60 lin.ft.	_____	_____
17	3-inch, 2-inch, 1½-inch, ¾-inch, and ½-inch galvanized standard weight pipe	850 lbs.	_____	_____
	Furnishing and installing pipe insulation:			
18	on 8-inch-diameter pipe	40 lin.ft.	_____	_____
19	on 6-inch-diameter pipe	750 lin.ft.	_____	_____
20	on 4-inch-diameter pipe	50 lin.ft.	_____	_____

SCHEDULE - (Continued)

Item	Work or Material	Quantity and Unit	Unit Price	Amount
21	Furnishing and installing 6-inch-diameter spool-type rubber expansion joints	24 ea.	\$ _____	\$ _____
	Furnishing and installing flexible ball joints:			
22	Type N, 8-inch-dia.	2 ea.	_____	_____
23	Type N, 6-inch-dia.	8 ea.	_____	_____
24	600 series, 6-inch-dia.	2 ea.	_____	_____
25	Furnishing and installing miscellaneous steel pipe fittings, including but not limited to: tapers, tees, elbows, crosses, flanges, and caps	8,500 lbs.	_____	_____
	Furnishing and installing valves as follows:			
26	6-inch-diameter, gate valve	13 ea.	_____	_____
27	4-inch-diameter, gate valve	21 ea.	_____	_____
28	1-1/2-inch-diameter, gate valve	4 ea.	_____	_____
29	2-inch-diameter pressure relief valve	3 ea.	_____	_____
30	3/4-inch bronze cocks	2 ea.	_____	_____
31	1/2-inch bronze cocks	3 ea.	_____	_____
32	Furnishing and installing pipe trench drains	2 ea.	_____	_____
33	Furnishing and installing types I-IX pipe supports, pipe anchor chairs, and pipe protection saddles	1,300 lbs.	_____	_____

BIDDING SCHEDULE FOR
SPECIFICATIONS NO. 300C-333

SCHEDULE - (Continued)

Item	Work or Material	Quantity and Unit	Unit Price	Amount
34	Miscellaneous Metal- work	5,650 lbs.	\$ _____	\$ _____
TOTAL FOR SCHEDULE				\$ _____

NOTE: Unless bidder intends to furnish NONDOMESTIC construction materials it is unnecessary to complete this form, but it should be returned with the bid.

REPRESENTATIONS BY BIDDER PURSUANT TO "BUY AMERICAN ACT"

Bidder represents that all construction materials to be used, other than those specifically exempt from the requirements of the Buy American Act as listed on the back of this form, will be domestic materials conforming to the clause entitled "Buy American," of the General Provisions (Standard Form 23-A) except as noted below:

<u>Name of each item of nondomestic material</u>	<u>Quantity (weight, feet, no., etc.)</u>	<u>Cost delivered to the job site</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
	Total	\$ _____

The contractor will be limited in the use of nondomestic materials to those listed above and those specifically exempt from the requirements of the Buy American Act as listed on the back of this form.

List below the lowest cost of domestic material comparable to each item of nondomestic material shown above, based upon bidder's canvass of domestic suppliers (as required by Paragraph (b)(2) on the back of this form).

<u>Name of each item of domestic material comparable to offered nondomestic material</u>	<u>Quantity (weight, feet, no., etc.)</u>	<u>Cost delivered to the job site</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
	Total	\$ _____

If nondomestic construction materials are listed above, an alternate bid may be submitted offering comparable domestic materials as described in Paragraph (b)(3) on the reverse hereof. However, unless the bidder specifically states alternate bid prices for specific items of the schedule, based upon use of comparable domestic materials, the bid will be evaluated only on the basis of the foreign materials listed above.

INFORMATION REGARDING BUY AMERICAN ACT

(a) The Buy American Act (41 U.S.C. 10a-10d) generally requires that only domestic construction material be used in the performance of this contract. (See the clause entitled "Buy American" in Standard Form 23-A, General Provisions, Construction contract.) This requirement does not apply to the following construction material or components:

Acetylene black	Graphite, natural
Asbestos, amosite	Mica
Bismuth	Nickel, primary, in ingots, pigs, shot, cathodes, or similar forms; nickel oxide and nickel salts
Books, pamphlets, newspapers, magazines, periodicals, printed briefs, and films which are not printed in the United States and for which domestic editions are not available	Petroleum, crude oil; unfinished oils and finished products
Cadmium, ores and flue dust	Platinum and platinum group metals refined, as sponge, powder, ingots, or cast bars
Calcium cyanamide	Quartz crystals
Chrome ore or chromite	Radium salts
Cobalt, in cathodes, rondelles, or other primary forms	Rubber, crude and latex
Cocoa beans	Sperm oil
Cork, wood or bark and waste	Talc, block steatite
Diamonds, industrial, stones	Tin in bars, blocks and pigs
Fair linen, altar	Wax, carnauba
Fibers of the following types: Abace, agave, coir, jute, and palmyra	Woods of the following species: Angelique, balsa, ekki, greenheart, lignum vitae, mahogany, and teak
Goat and kid skins	

(b)(1) Furthermore, bids or proposals offering use of additional nondomestic construction material may be acceptable for award if the Government determines that use of comparable domestic construction material is impracticable or would unreasonably increase the cost or that domestic construction material (in sufficient and reasonably available commercial quantities and of a satisfactory quality) is unavailable. Reliable evidence shall be furnished justifying such use of additional nondomestic construction material.

(2) Where it is alleged that use of domestic construction material would unreasonably increase the cost:

(i) Data shall be included by the bidder, based on a reasonable canvass of suppliers, demonstrating that the cost of each such domestic construction material would exceed by more than 6 percent the cost of comparable nondomestic construction material. (All costs of delivery to the construction site shall be included, as well as any applicable duty.)

(ii) For evaluation purposes, 6 percent of the cost of all additional nondomestic construction material, which qualifies under Paragraph (i) above, will be added to the bid or proposal.

(3) When offering additional nondomestic construction material, bids or proposals may also offer, at stated prices, any available comparable domestic construction material, so as to avoid the possibility that failure of a nondomestic construction material to be acceptable under (1) above, will cause rejection of the entire bid.

ARITHMETIC DISCREPANCIES AND MISTAKES IN BIDS

1. a. For the purpose of initial evaluation of bids, the following procedures will be utilized in resolving arithmetic discrepancies found on the face of the bidding schedule as submitted by bidders:

- (1) In case of discrepancy between unit price and extended price, the unit price will govern;
- (2) Obviously misplaced decimal points will be corrected;
- (3) Apparent errors in extension of unit prices will be corrected; and
- (4) Apparent errors in addition of lump-sum and extended prices will be corrected.

For the purposes of bid evaluation, the Government will proceed on the assumption that the bidder intends his bid to be evaluated on the basis of the unit prices, extensions, and totals arrived at by resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.

b. It shall be the responsibility of each bidder to promptly check his own figures and advise the contracting officer of any instance where his bid as thus corrected does not represent his intentions. Such allegations will be processed in accordance with the procedures contained in Paragraph 2 below.

c. Arithmetic discrepancies resolved in accordance with Paragraph 1a above will not be subject to the provisions of Paragraph 2 below.

2. The following provisions shall apply to all allegations of mistakes in bids made by bidders pursuant to 41 CFR Sec. 1-2.406.

a. If the bidder alleges mistakes in his bid, he hereby waives that portion of any alleged mistake or mistakes in his bid which falls within the following amounts:

- (1) If original bid is \$250,000 or less - 5 percent of the original bid;
- (2) If original bid is more than \$250,000 and less than \$500,000 - \$12,500 plus 4 percent of the original bid over \$250,000;
- (3) If original bid is \$500,000 or more, and less than \$1,000,000 - \$22,500 plus 3 percent of the original bid over \$500,000;
- (4) If original bid is \$1,000,000 or more - \$37,500 plus 2 percent of the original bid over \$1,000,000.

These provisions shall not be applicable to allegations of mistakes which, as allowed, result in a reduction of the bid price.

In cases where the allegation of mistake exceeds the applicable waived amount and the request for correction is allowed, the amount waived will be excluded and deducted from the contract price; however, the amount waived as provided herein will not be deducted for the purpose of evaluating bids to determine the low bidder. Such deduction for the amount waived will be made as a lump-sum deduction from the first progress payment, or such succeeding payments as may be necessary, after 50 percent of the work has been completed.

b. Allegations of mistakes in bids result in delays to the Government in processing and making timely award of contract, thus delaying the ultimate completion of the work. For the purpose of these bidding conditions, 30 calendar days after the date of opening of bids shall be considered as the Government's normal processing time for making award of contract. The bidder further agrees that the period allowed for completion of the work, or any part thereof for which a separate completion period is stated, shall be reduced by 1 calendar day for each calendar day of delay in excess of 30 calendar days from the date of bid opening resulting from the bidder's allegation of mistake, or mistakes, in the bid: Provided, That in no case will such reduction for excess time exceed 10 percent of completion period stated for the work or any part thereof for which a separate completion period is stated.

NOTICE OF SMALL BUSINESS SET-ASIDE

a. **Restriction.**—Bids or proposals for construction under these specifications are solicited from small business concerns only and contract will be awarded only to one or more small business concerns. This action is based on a determination by the contracting officer, alone or in conjunction with a representative of the Small Business Administration, that it is in the interest of maintaining or mobilizing the Nation's full productive capacity, in the interest of war or national defense programs, or in the interest of assuring that a fair proportion of Government procurement is placed with small business concerns. Bids or proposals received from firms which are not small business concerns shall be considered nonresponsive.

b. **Definitions.**—A "small business concern" is a domestic concern, including its affiliates, which is independently owned and operated, is not dominant in the field of operation in which it is bidding on Government contracts, and, for the purpose of bidding on construction contracts, any concern is small if its average annual receipts for its preceding three fiscal years do not exceed \$12,000,000, except that where a concern has 50 percent or more of its annual receipts attributable to business activity within Alaska, this dollar limitation is increased by 25 percent. ("Annual receipts" means the annual receipts, less returns and allowances, of a concern and its affiliates.)

c. **Surety Bond Assistance.**—The following clause is applicable if the bid does not exceed \$500,000.

As provided in 13 CFR 115, published at 37 Federal Register, page 6922, April 8, 1972, the Small Business Administration may, under certain conditions, provide assistance to small businesses on surety bonds required hereunder. Further information may be obtained from the contracting officer or the nearest office of the Small Business Administration.

**INCLUSION OF LABOR STANDARDS PROVISIONS
IN SUBCONTRACTS**

The Labor Standards Provisions (Standard Form 19-A) must be inserted physically in all subcontracts for construction work under the specifications. (Incorporation of these provisions by reference is not in compliance with this requirement.)

Within 7 days after the making of each subcontract, the contractor shall provide a copy of the subcontract for review by the contracting officer to determine compliance with this requirement. Such copy need not contain the subcontract prices.

GENERAL PROVISIONS

(Construction Contract)

1. DEFINITIONS

(a) The term "head of the agency" or "Secretary" as used herein means the Secretary, the Under Secretary, any Assistant Secretary, or any other head or assistant head of the executive or military department or other Federal agency; and the term "his duly authorized representative" means any person or persons or board (other than the Contracting Officer) authorized to act for the head of the agency or the Secretary.

(b) The term "Contracting Officer" as used herein means the person executing this contract on behalf of the Government and includes a duly appointed successor or authorized representative.

2. SPECIFICATIONS AND DRAWINGS

The Contractor shall keep on the work a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy either in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at his own risk and expense. The Contracting Officer shall furnish from time to time such detail drawings and other information as he may consider necessary, unless otherwise provided.

3. CHANGES

(a) The Contracting Officer may, at any time, without notice to the sureties, by written order designated or indicated to be a change order, make any change in the work within the general scope of the contract, including but not limited to changes:

(1) In the specifications (including drawings and designs);

(2) In the method or manner of performance of the work;

(3) In the Government-furnished facilities, equipment, materials, services, or site; or

(4) Directing acceleration in the performance of the work.

(b) Any other written order or an oral order (which terms as used in this paragraph (b) shall include direction, instruction, interpretation, or determination) from the Contracting Officer, which causes any such change, shall be treated as a change order under this clause, provided that the Contractor gives the Contracting Officer written notice stating the date, circumstances, and source of the order and that the Contractor regards the order as a change order.

(c) Except as herein provided, no order, statement, or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment hereunder.

(d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any order, an equitable adjustment shall be made and the contract modified in writing accordingly: *Provided, however,* That except for claims based on defective specifications, no claim for any change under (b) above shall be allowed for any costs incurred more than 20 days before the Contractor gives written notice as therein required: *And provided further,* That in the case of defective specifications for which the Government is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with such defective specifications.

(e) If the Contractor intends to assert a claim for an equitable adjustment under this clause, he must, within 30 days after receipt of a written change order under (a) above or the furnishing of a written notice under (b) above, submit to the Contracting Officer a written statement setting forth the general nature and monetary extent of such claim,

unless this period is extended by the Government. The statement of claim hereunder may be included in the notice under (b) above.

(f) No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this contract.

4. DIFFERING SITE CONDITIONS

(a) The Contractor shall promptly, and before such conditions are disturbed, notify the Contracting Officer in writing of: (1) Subsurface or latent physical conditions at the site differing materially from those indicated in this contract, or (2) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in this contract. The Contracting Officer shall promptly investigate the conditions, and if he finds that such conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the work under this contract, whether or not changed as a result of such conditions, an equitable adjustment shall be made and the contract modified in writing accordingly.

(b) No claim of the Contractor under this clause shall be allowed unless the Contractor has given the notice required in (a) above; provided, however, the time prescribed therefor may be extended by the Government.

(c) No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this contract.

5. TERMINATION FOR DEFAULT—DAMAGES FOR DELAY—TIME EXTENSIONS

(a) If the Contractor refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time specified in this contract, or any extension thereof, or fails to complete said work within such time, the Government may, by written notice to the Contractor, terminate his right to proceed with the work or such part of the work as to which there has been delay. In such event the Government may take over the work and prosecute the same to completion, by contract or otherwise, and may take possession of and utilize in completing the work such materials, appliances, and plant as may be on the site of the work and necessary therefor. Whether or not the Contractor's right to proceed with the work is terminated, he and his sureties shall be liable for any damage to the Government resulting from his refusal or failure to complete the work within the specified time.

(b) If fixed and agreed liquidated damages are provided in the contract and if the Government so terminates the Contractor's right to proceed, the resulting damage will consist of such liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Government in completing the work.

(c) If fixed and agreed liquidated damages are provided in the contract and if the Government does not so terminate the Contractor's right to proceed, the resulting damage will consist of such liquidated damages until the work is completed or accepted.

(d) The Contractor's right to proceed shall not be so terminated nor the Contractor charged with resulting damage if:

(1) The delay in the completion of the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, acts of the public enemy, acts of the Government in either its sovereign or contractual capacity, acts of another contractor in the performance of a contract with the Government, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather, or delays of subcontractors or suppliers arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and such subcontractors or suppliers; and

(2) The Contractor, within 10 days from the beginning of any such delay (unless the Contracting Officer grants a further period of time before the date of final payment

under the contract), notifies the Contracting Officer in writing of the causes of delay.

The Contracting Officer shall ascertain the facts and the extent of the delay and extend the time for completing the work when, in his judgment, the findings of fact justify such an extension, and his findings of fact shall be final and conclusive on the parties, subject only to appeal as provided in Clause 6 of these General Provisions.

(e) If, after notice of termination of the Contractor's right to proceed under the provisions of this clause, it is determined for any reason that the Contractor was not in default under the provisions of this clause, or that the delay was excusable under the provisions of this clause, the rights and obligations of the parties shall, if the contract contains a clause providing for termination for convenience of the Government, be the same as if the notice of termination had been issued pursuant to such clause. If, in the foregoing circumstances, this contract does not contain a clause providing for termination for convenience of the Government, the contract shall be equitably adjusted to compensate for such termination and the contract modified accordingly; failure to agree to any such adjustment shall be a dispute concerning a question of fact within the meaning of the clause of this contract entitled "Disputes."

(f) The rights and remedies of the Government provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

(g) As used in Paragraph (d) (1) of this clause, the term "subcontractors or suppliers" means subcontractors or suppliers at any tier.

6. DISPUTES

(a) Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor. The decision of the Contracting Officer shall be final and conclusive unless, within 30 days from the date of receipt of such copy, the Contractor mails or otherwise furnishes to the Contracting Officer a written appeal addressed to the head of the agency involved. The decision of the head of the agency or his duly authorized representative for the determination of such appeals shall be final and conclusive. This provision shall not be pleaded in any suit involving a question of fact arising under this contract as limiting judicial review of any such decision to cases where fraud by such official or his representative or board is alleged: *Provided, however,* That any such decision shall be final and conclusive unless the same is fraudulent or capricious or arbitrary or so grossly erroneous as necessarily to imply bad faith or is not supported by substantial evidence. In connection with any appeal proceeding under this clause, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of his appeal. Pending final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision.

(b) This Disputes clause does not preclude consideration of questions of law in connection with decisions provided for in paragraph (a) above. Nothing in this contract, however, shall be construed as making final the decision of any administrative official, representative, or board on a question of law.

7. PAYMENTS TO CONTRACTOR

(a) The Government will pay the contract price as herein provided.

(b) The Government will make progress payments monthly as the work proceeds, or at more frequent intervals as determined by the Contracting Officer, on estimates approved by the Contracting Officer. If requested by the Contracting Officer, the Contractor shall furnish a breakdown of the total contract price showing the amount included therein for each principal category of the work, in such detail as requested, to provide a basis for determining progress payments. In the preparation of estimates the Contracting Officer, at his discretion, may authorize material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the Contractor at locations other than the site may also be taken into consideration (1) if such consideration is specifically authorized by the contract and (2) if the Contractor furnishes satisfactory evidence that he has acquired title to such material and that it will be utilized on the work covered by this contract.

(c) In making such progress payments, there shall be retained 10 percent of the estimated amount until final com-

pletion and acceptance of the contract work. However, if the Contracting Officer, at any time after 50 percent of the work has been completed, finds that satisfactory progress is being made, he may authorize payment in full of each progress payment for work performed beyond the 50 percent stage of completion. Also, whenever the work is substantially complete, the Contracting Officer, if he considers the amount retained to be in excess of the amount adequate for the protection of the Government, at his discretion, may release to the Contractor all or a portion of such excess amount. Furthermore, on completion and acceptance of each separate building, public work, or other division of the contract, on which the price is stated separately in the contract, payment may be made therefor without retention of a percentage.

(d) All material and work covered by progress payments made shall thereupon become the sole property of the Government, but this provision shall not be construed as relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work or as waiving the right of the Government to require the fulfillment of all of the terms of the contract.

(e) Upon completion and acceptance of all work, the amount due the Contractor under this contract shall be paid upon the presentation of a properly executed voucher and after the Contractor shall have furnished the Government with a release of all claims against the Government arising by virtue of this contract, other than claims in stated amounts as may be specifically excepted by the Contractor from the operation of the release. If the Contractor's claim to amounts payable under the contract has been assigned under the Assignment of Claims Act of 1940, as amended (31 U.S.C. 203, 41 U.S.C. 15), a release may also be required of the assignee.

8. ASSIGNMENT OF CLAIMS

(a) Pursuant to the provisions of the Assignment of Claims Act of 1940, as amended (31 U.S.C. 203, 41 U.S.C. 15), if this contract provides for payments aggregating \$1,000 or more, claims for moneys due or to become due the Contractor from the Government under this contract may be assigned to a bank, trust company, or other financing institution, including any Federal lending agency, and may thereafter be further assigned and reassigned to any such institution. Any such assignment or reassignment shall cover all amounts payable under this contract and not already paid, and shall not be made to more than one party, except that any such assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in such financing. Unless otherwise provided in this contract, payments to an assignee of any moneys due or to become due under this contract shall not, to the extent provided in said Act, as amended, be subject to reduction or setoff. (The preceding sentence applies only if this contract is made in time of war or national emergency as defined in said Act; and is with the Department of Defense, the General Services Administration, the Energy Research and Development Administration, the National Aeronautics and Space Administration, the Federal Aviation Administration, or any other department or agency of the United States designated by the President pursuant to Clause 4 of the proviso of section 1 of the Assignment of Claims Act of 1940, as amended by the Act of May 15, 1951, 65 Stat. 41.)

(b) In no event shall copies of this contract or of any plans, specifications, or other similar documents relating to work under this contract, if marked "Top Secret," "Secret," or "Confidential," be furnished to any assignee of any claim arising under this contract or to any other person not entitled to receive the same. However, a copy of any part or all of this contract so marked may be furnished, or any information contained therein may be disclosed, to such assignee upon the prior written authorization of the Contracting Officer.

9. MATERIAL AND WORKMANSHIP

(a) Unless otherwise specifically provided in this contract, all equipment, material, and articles incorporated in the work covered by this contract are to be new and of the most suitable grade for the purpose intended. Unless otherwise specifically provided in this contract, reference to any equipment, material, article, or patented process, by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition, and the Contractor may, at his option, use any equipment, material, article, or process, which, in the judgment of the Contracting Officer, is equal to that named. The Contractor shall furnish to the Contracting Officer for his approval the name of the manufacturer, the model number,

and other identifying data and information respecting the performance, capacity, nature, and rating of the machinery and mechanical and other equipment which the Contractor contemplates incorporating in the work. When required by this contract or when called for by the Contracting Officer, the Contractor shall furnish the Contracting Officer for approval full information concerning the material or articles which he contemplates incorporating in the work. When so directed, samples shall be submitted for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material, and articles installed or used without required approval shall be at the risk of subsequent rejection.

(b) All work under this contract shall be performed in a skillful and workmanlike manner. The Contracting Officer may, in writing, require the Contractor to remove from the work any employee the Contracting Officer deems incompetent, careless or otherwise objectionable.

10. INSPECTION AND ACCEPTANCE

(a) All work (which term includes but is not restricted to materials, workmanship, and manufacture and fabrication of components) shall be subject to inspection and test by the Government at all reasonable times and at all places prior to acceptance. Any such inspection and test is for the sole benefit of the Government and shall not relieve the Contractor of the responsibility of providing quality control measures to assure that the work strictly complies with the contract requirements. No inspection or test by the Government shall be construed as constituting or implying acceptance. Inspection or test shall not relieve the Contractor of responsibility for damage to or loss of the material prior to acceptance, nor in any way affect the continuing rights of the Government after acceptance of the completed work under the terms of paragraph (f) of this clause, except as hereinabove provided.

(b) The Contractor shall, without charge, replace any material or correct any workmanship found by the Government not to conform to the contract requirements, unless in the public interest the Government consents to accept such material or workmanship with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.

(c) If the Contractor does not promptly replace rejected material or correct rejected workmanship, the Government (1) may, by contract or otherwise, replace such material or correct such workmanship and charge the cost thereof to the Contractor, or (2) may terminate the Contractor's right to proceed in accordance with the clause of this contract entitled "Termination for Default—Damages for Delay—Time Extensions."

(d) The Contractor shall furnish promptly, without additional charge, all facilities, labor, and material reasonably needed for performing such safe and convenient inspection and test as may be required by the Contracting Officer. All inspection and test by the Government shall be performed in such manner as not unnecessarily to delay the work. Special, full size, and performance tests shall be performed as described in this contract. The Government reserves the right to charge to the Contractor any additional cost of inspection or test when material or workmanship is not ready at the time specified by the Contractor for inspection or test or when reinspection or retest is necessitated by prior rejection.

(e) Should it be considered necessary or advisable by the Government at any time before acceptance of the entire work to make an examination of work already completed, by removing or tearing out same, the Contractor shall, on request, promptly furnish all necessary facilities, labor, and material. If such work is found to be defective or nonconforming in any material respect, due to the fault of the Contractor or his subcontractors, he shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, an equitable adjustment shall be made in the contract price to compensate the Contractor for the additional services involved in such examination and reconstruction and, if completion of the work has been delayed thereby, he shall, in addition, be granted a suitable extension of time.

(f) Unless otherwise provided in this contract, acceptance by the Government shall be made as promptly as practicable after completion and inspection of all work required by this contract, or that portion of the work that the Contracting Officer determines can be accepted separately. Acceptance shall be final and conclusive except as regards latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the Government's rights under any warranty or guarantee.

11. SUPERINTENDENCE BY CONTRACTOR

The Contractor, at all times during performance and until the work is completed and accepted, shall give his personal superintendence to the work or have on the work a competent superintendent, satisfactory to the Contracting Officer and with authority to act for the Contractor.

12. PERMITS AND RESPONSIBILITIES

The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for complying with any applicable Federal, State, and municipal laws, codes, and regulations, in connection with the prosecution of the work. He shall be similarly responsible for all damages to persons or property that occur as a result of his fault or negligence. He shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others. He shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire construction work, except for any completed unit of construction thereof which theretofore may have been accepted.

13. CONDITIONS AFFECTING THE WORK

The Contractor shall be responsible for having taken steps reasonably necessary to ascertain the nature and location of the work, and the general and local conditions which can affect the work or the cost thereof. Any failure by the Contractor to do so will not relieve him from responsibility for successfully performing the work without additional expense to the Government. The Government assumes no responsibility for any understanding or representations concerning conditions made by any of its officers or agents prior to the execution of this contract, unless such understanding or representations by the Government are expressly stated in the contract.

14. OTHER CONTRACTS

The Government may undertake or award other contracts for additional work, and the Contractor shall fully cooperate with such other contractors and Government employees and carefully fit his own work to such additional work as may be directed by the Contracting Officer. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other contractor or by Government employees.

15. SHOP DRAWINGS

(a) The term "shop drawings" includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract.

(b) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with contract requirements and shall indicate his approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate his approval or disapproval of the shop drawings and if not approved as submitted shall indicate his reasons therefor. Any work done prior to such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (c) below.

(c) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Contracting Officer approves any such variation(s), he shall issue an appropriate contract modification, except that, if the variation is minor and does not involve a change in price or in time of performance, a modification need not be issued.

16. USE AND POSSESSION PRIOR TO COMPLETION

The Government shall have the right to take possession of or use any completed or partially completed part of the work. Prior to such possession or use, the Contracting Officer shall furnish the Contractor an itemized list of work remaining to be performed or corrected on such portions of the project as are to be possessed or used by the Government, provided that failure to list any item of work shall not relieve the Contractor of responsibility for compliance with the terms of the

contract. Such possession or use shall not be deemed an acceptance of any work under the contract. While the Government has such possession or use, the Contractor, notwithstanding the provisions of the clause of this contract entitled "Permits and Responsibilities," shall be relieved of the responsibility for the loss or damage to the work resulting from the Government's possession or use. If such prior possession or use by the Government delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment in the contract price or the time of completion will be made and the contract shall be modified in writing accordingly.

17. SUSPENSION OF WORK

(a) The Contracting Officer may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as he may determine to be appropriate for the convenience of the Government.

(b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the Contracting Officer in the administration of this contract, or by his failure to act within the time specified in this contract (or if no time is specified, within a reasonable time), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent (1) that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or (2) for which an equitable adjustment is provided for or excluded under any other provision of this contract.

(c) No claim under this clause shall be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of such suspension, delay, or interruption, but not later than the date of final payment under the contract.

18. TERMINATION FOR CONVENIENCE OF THE GOVERNMENT

If not physically incorporated elsewhere, the clause in Section 1-8.703 of the Federal Procurement Regulations, or paragraph 7-602.29(a) of the Armed Services Procurement Regulation, as applicable, in effect on the date of this contract is hereby incorporated by reference as fully as if set forth at length herein.

19. PAYMENT OF INTEREST ON CONTRACTORS' CLAIMS

(a) If an appeal is filed by the Contractor from a final decision of the Contracting Officer under the Disputes clause of this contract, denying a claim arising under the contract, simple interest on the amount of the claim finally determined owed by the Government shall be payable to the Contractor. Such interest shall be at the rate determined by the Secretary of the Treasury pursuant to Public Law 92-41, 85 Stat. 97, from the date the Contractor furnishes to the Contracting Officer his written appeal under the Disputes clause of this contract, to the date of (1) a final judgment by a court of competent jurisdiction, or (2) mailing to the Contractor of a supplemental agreement for execution either confirming completed negotiations between the parties or carrying out a decision of a board of contract appeals.

(b) Notwithstanding (a) above, (1) interest shall be applied only from the date payment was due, if such date is later than the filing of appeal; and (2) interest shall not be paid for any period of time that the Contracting Officer determines the Contractor has unduly delayed in pursuing his remedies before a board of contract appeals or a court of competent jurisdiction.

20. PRICING OF ADJUSTMENTS

When costs are a factor in any determination of a contract price adjustment pursuant to the Changes clause or any other provision of this contract, such costs shall be in accordance with the contract cost principles and procedures in Part 1-15 of the Federal Procurement Regulations, (41 CFR 1-15) or Section XV of the Armed Services Procurement Regulation, as applicable, which are in effect on the date of this contract.

21. PATENT INDEMNITY

Except as otherwise provided, the Contractor agrees to indemnify the Government and its officers, agents, and em-

ployees against liability, including costs and expenses, for infringement upon any Letters Patent of the United States (except Letters Patent issued upon an application which is now or may hereafter be, for reasons of national security, ordered by the Government to be kept secret or otherwise withheld from issue) arising out of the performance of this contract or out of the use or disposal by or for the account of the Government of supplies furnished or construction work performed hereunder.

22. ADDITIONAL BOND SECURITY

If any surety upon any bond furnished in connection with this contract becomes unacceptable to the Government, or if any such surety fails to furnish reports as to his financial condition from time to time as requested by the Government, or if the contract price is increased to such an extent that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer, the Contractor shall promptly furnish such additional security as may be required from time to time to protect the interests of the Government and of persons supplying labor or materials in the prosecution of the work contemplated by this contract.

23. EXAMINATION OF RECORDS BY COMPTROLLER GENERAL

(a) This clause is applicable if the amount of this contract exceeds \$10,000 and was entered into by means of negotiation, including small business restricted advertising, but is not applicable if this contract was entered into by means of formal advertising.

(b) The contractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of 3 years after final payment under this contract or such lesser time specified in either Appendix M of the Armed Services Procurement Regulation or the Federal Procurement Regulations Part 1-20, as appropriate, have access to and the right to examine any directly pertinent books, documents, papers, and records of the contractor involving transactions related to this contract.

(c) The Contractor further agrees to include in all his subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of 3 years after final payment under the subcontract or such lesser time specified in either Appendix M of the Armed Services Procurement Regulation or the Federal Procurement Regulations Part 1-20, as appropriate, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor, involving transactions related to the subcontract. The term "subcontract" as used in this clause excludes (1) purchase orders not exceeding \$10,000 and (2) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public.

(d) The periods of access and examination described in (b) and (c), above, for records which relate to (1) appeals under the "Disputes" clause of this contract; (2) litigation or the settlement of claims arising out of the performance of this contract, or (3) costs and expenses of this contract as to which exception has been taken by the Comptroller General or any of his duly authorized representatives, shall continue until such appeals, litigation, claims, or exceptions have been disposed of.

24. BUY AMERICAN

(a) *Agreement.* In accordance with the Buy American Act (41 U.S.C. 10a-10d), and Executive Order 10582, December 17, 1954 (3 CFR, 1954-58 Comp., p. 230), as amended by Executive Order 11051, September 27, 1962 (3 CFR, 1959-63 Comp., p. 635), the Contractor agrees that only domestic construction material will be used (by the Contractor, subcontractors, materialmen, and suppliers) in the performance of this contract, except for nondomestic material listed in the contract.

(b) *Domestic construction material.* "Construction material" means any article, material, or supply brought to the construction site for incorporation in the building or work. An unmanufactured construction material is a "domestic construction material" if it has been mined or produced in the United States. A manufactured construction material is a "domestic construction material" if it has been manufactured in the United States and if the cost of its components which have been mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. "Component" means any article, material, or supply directly incorporated in a construction material.

(c) *Domestic component.* A component shall be considered to have been "mined, produced, or manufactured in the

United States" (regardless of its source in fact) if the article, material, or supply in which it is incorporated was manufactured in the United States and the component is of a class or kind determined by the Government to be not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality.

25. EQUAL OPPORTUNITY

(The following clause is applicable unless this contract is exempt under the rules, regulations, and relevant orders of the Secretary of Labor (41 CFR, ch. 60).)

During the performance of this contract, the Contractor agrees as follows:

(a) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of this Equal Opportunity clause.

(b) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(c) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency Contracting Officer, advising the labor union or workers' representative of the contractor's commitments under this Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(d) The Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(e) The Contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(f) In the event of the Contractor's noncompliance with the Equal Opportunity clause of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended, in whole or in part, and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(g) The Contractor will include the provisions of paragraphs (a) through (f) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: *Provided, however*, that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

26. COVENANT AGAINST CONTINGENT FEES

The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

27. OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress or resident Commissioner shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

28. CONVICT LABOR

In connection with the performance of work under this contract, the Contractor agrees not to employ any person undergoing sentence of imprisonment at hard labor except as provided by Public Law 89-176, September 10, 1965 (18 U.S.C. 4082(c)(2)) and Executive Order 11755, December 29, 1973.

29. UTILIZATION OF SMALL BUSINESS CONCERNS

(a) It is the policy of the Government as declared by the Congress that a fair proportion of the purchases and contracts for supplies and services for the Government be placed with small business concerns.

(b) The Contractor agrees to accomplish the maximum amount of subcontracting to small business concerns that the Contractor finds to be consistent with the efficient performance of this contract.

30. UTILIZATION OF MINORITY BUSINESS ENTERPRISES

(a) It is the policy of the Government that minority business enterprises shall have the maximum practicable opportunity to participate in the performance of Government contracts.

(b) The Contractor agrees to use his best efforts to carry out this policy in the award of his subcontracts to the fullest extent consistent with the efficient performance of this contract. As used in this contract, the term "minority business enterprise" means a business, at least 50 percent of which is owned by minority group members or, in case of publicly-owned businesses, at least 51 percent of the stock of which is owned by minority group members. For the purposes of this definition, minority group members are Negroes, Spanish-speaking American persons, American-Orientals, American-Indians, American-Eskimos, and American-Aleuts. Contractors may rely on written representations by subcontractors regarding their status as minority business enterprises in lieu of an independent investigation.

31. FEDERAL, STATE, AND LOCAL TAXES

(a) Except as may be otherwise provided in this contract, the contract price includes all applicable Federal, State and local taxes and duties.

(b) Nevertheless, with respect to any Federal excise tax or duty on the transactions or property covered by this contract, if a statute, court decision, written ruling, or regulation takes effect after the contract date, and—

(1) Results in the Contractor being required to pay or bear the burden of any such Federal excise tax or duty or increase in the rate thereof which would not otherwise have been payable on such transactions or property, the contract price shall be increased by the amount of such tax or duty or rate increase: *Provided*, That the Contractor if requested by the Contracting Officer, warrants in writing that no amount for such newly imposed Federal excise tax or duty or rate increase was included in the contract price as a contingency reserve or otherwise; or

(2) Results in the Contractor not being required to pay or bear the burden of, or in his obtaining a refund or drawback of, any such Federal excise tax or duty which would otherwise have been payable on such transactions or property or which was the basis of an increase in the contract price, the contract price shall be decreased by the amount of the relief, refund, or drawback, or that amount shall be paid to the Government, as directed by the Contracting Officer. The contract price shall be similarly decreased if the Contractor, through his fault or negligence or his failure to follow instructions of the Contract-

ing Officer, is required to pay or bear the burden of, or does not obtain a refund or drawback of, any such Federal excise tax or duty.

(c) No adjustment pursuant to paragraph b above will be made under this contract unless the aggregate amount thereof is or may reasonably be expected to be over \$100.00.

(d) As used in paragraph b above, the term "contract date" means the date set for the bid opening, or if this is a negotiated contract, the date of this contract. As to additional supplies or services procured by modification to this contract, the term "contract date" means the date of such modification.

(e) Unless there does not exist any reasonable basis to sustain an exemption, the Government, upon request of the

Contractor, without further liability, agrees, except as otherwise provided in this contract, to furnish evidence appropriate to establish exemption from any tax which the Contractor warrants in writing was excluded from the contract price. In addition, the Contracting Officer may furnish evidence to establish exemption from any tax that may, pursuant to this Clause, give rise to either an increase or decrease in the contract price. Except as otherwise provided in this contract, evidence appropriate to establish exemption from duties will be furnished only at the discretion of the Contracting Officer.

(f) The Contractor shall promptly notify the Contracting Officer of matters which will result in either an increase or decrease in the contract price, and shall take action with respect thereto as directed by the Contracting Officer.

SUPPLEMENT TO GENERAL PROVISIONS
(Standard Form 23-A, April 1975 Edition)

a. Clause No. 5.—At the end of Paragraph 5(d)(2) the period after the word "delay" is deleted, a colon is substituted therefor, and the following is added:

"Provided, That the Contractor shall be excused for delays of suppliers only if the Contracting Officer shall determine that the materials or supplies to be furnished are not procurable in the open market."

b. Clause No. 7.—Paragraph 7(c) is deleted and the following Paragraph 7(c) is substituted therefor:

"(c) In making such progress payments, there shall be retained 10 percent of the estimated amount until final completion and acceptance of the contract work. However, if the Contracting Officer, finds that satisfactory progress was achieved during any period for which a progress payment is to be made, he may authorize such payment to be made in full without retention of a percentage. Also, whenever the work is substantially complete, the Contracting Officer shall retain an amount he considers adequate for protection of the Government and, at his discretion, may release to the Contractor all or a portion of any excess amount. Furthermore, on completion and acceptance of each separate building, public work, or other division of the contract, on which the price is stated separately in the contract, payment may be made therefor without retention of a percentage."

c. Clause No. 12.—At the end of Clause No. 12 the following is added:

"Upon completion of the contract, or final acceptance of any completed unit thereof, the work shall be delivered complete and undamaged."

d. Clause No. 21.—At the end of Clause No. 21 the following is added:

"Any patented invention, the use of which by these specifications is required or permitted in the alternative to be used and which the United States has the right to use royalty free, shall be available to the contractor without the payment of the royalty."

e. Clause No. 32.—The following is added as Clause No. 32 of the General Provisions:

**"32. LISTING OF EMPLOYMENT
OPENINGS**

(This clause is applicable pursuant to 41 CFR 50-250.)

(a) The contractor agrees, in order to provide special emphasis to the employment of qualified disabled veterans and veterans of the Vietnam era, that all suitable employment openings of the contractor which exist at the time of the execution of this contract and those which occur during the performance of this contract, including those not generated by this contract and including those occurring at an establishment other than the one wherein the contract is being performed but excluding those of independently operated corporate

affiliates, shall be offered for listing at an appropriate local office of the State employment service system wherein the opening occurs and to provide such reports to such local office regarding employment openings and hires as may be required.

(b) Listing of employment openings with the employment service system pursuant to this clause shall be made at least concurrently with the use of any other recruitment service or effort and shall involve the normal obligations which attach to the placing of a bona fide job order, including the acceptance of referrals of veterans and nonveterans. This listing of employment openings does not require the hiring of any particular job applicant or from any particular group of job applicants, and nothing herein is intended to relieve the contractor from any requirements in any statutes, Executive Orders, or regulations regarding nondiscrimination in employment.

(c) The reports required by Paragraph (a) of this clause shall include, but not be limited to, periodic reports which shall be filed at least quarterly with the appropriate local office or, where the contractor has more than one establishment in a State, with the central office of the State employment service. Such reports shall indicate for each establishment (i) the number of individuals who were hired during the reporting period, (ii) the number of those hired who were disabled veterans, and (iii) the number of those hired who were nondisabled veterans of the Vietnam era. The contractor shall submit a report within 30 days after the end of each reporting period wherein any performance is made under this contract. The contractor shall maintain copies of the reports submitted until the expiration of 1 year after final payment under the contract, during which time they shall be made available, upon request, for examination by any authorized representatives of the contracting officer or of the Secretary of Labor.

(d) Whenever the contractor becomes contractually bound by the listing provisions of this clause, he shall advise the employment service system in each State wherein he has establishments of the name and location of each such establishment in the State. As long as the contractor is contractually bound to these provisions and has so advised the State employment system, there is no need to advise the State system of subsequent contracts. The contractor may advise the State system when it is no longer bound by this contract clause.

(e) This clause does not apply to the listing of employment openings which occur and are filled outside of the 50 States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, and the Virgin Islands.

(f) This clause does not apply to openings which the contractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement. This exclusion does not apply to a particular opening once an employer decides to consider applicants outside of his

own organization or employer-union arrangement for that opening.

(g) As used in this clause:

(1) "All suitable employment openings" includes, but is not limited to, openings which occur in the following job categories: Production and nonproduction; plant and office; laborers and mechanics; supervisory and nonsupervisory; technical; and executive, administrative, and professional openings which are compensated on a salary basis of less than \$18,000 per year. The term includes full-time employment, temporary employment of more than 3 days' duration, and part-time employment. It does not include openings which the contractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement.

(2) "Appropriate office of the State employment service system" means the local office of the Federal-State national system of public employment offices with assigned responsibility for serving the area of the establishment where the employment opening is to be filled, including the District of Columbia, the Commonwealth of Puerto Rico, Guam, and the Virgin Islands.

(3) "Openings which the contractor proposes to fill from within his own organization" means employment openings for which no consideration will be given to persons outside the contractor's own organization (including any affiliates, subsidiaries, and parent companies), and includes any openings which the contractor proposes to fill from regularly established "recall" or "rehire" lists.

(4) "Openings which the contractor proposes to fill pursuant to a customary and traditional employer-union hiring arrangement" means employment openings for which no consideration will be given to persons outside of a special hiring arrangement, including openings which the contractor proposes to fill from union halls, which is part of the customary and traditional hiring relationship which exists between the contractor and representatives of his employees.

(5) "Disabled veteran" means a person entitled to disability compensation under laws administered by the Veterans Administration for a disability rated at 30 percentum or more, or a person whose discharge or release from active duty was for a disability incurred or aggravated in line of duty.

(6) "Veteran of the Vietnam era" means a person (A) who served on active duty with the Armed Forces for a period of more than 180 days, any part of which occurred after August 5, 1964, and was discharged or released therefrom with other than a dishonorable discharge; or (ii) was discharged or released from active duty for service-connected disability if any part of such duty was performed after August 5, 1964, and (B) who was so discharged or released within the 48 months preceding his application for employment covered by this clause.

(h) If any disabled veteran or veteran of the Vietnam era believes that the contractor (or any first-tier subcontractor) has failed or refuses to comply with the provisions of this contract clause relating to giving special emphasis in employment to veterans, such veteran may file a complaint with the veterans' employment representative at a local State employment service office who will attempt to informally resolve the complaint and then refer the complaint with a report on the attempt to resolve the matter to the State office of the Veterans' Employment Service of the Department of Labor. Such complaint shall then be promptly referred through the Regional Manpower Administrator to the Secretary of Labor who shall investigate such complaint and shall take such action thereon as the facts and circumstances warrant consistent with the terms of this contract and the laws and regulations applicable thereto.

(i) The contractor agrees to place this clause (excluding this Paragraph (i)) in any subcontract directly under this contract."

f. Clause No. 33.—The following is added as Clause No. 33 of the General Provisions:

"33. EMPLOYMENT OF THE HANDICAPPED

(This clause applies to all nonexempt contracts and subcontracts which exceed \$2,500 as follows: (1) Part A applies to contracts and subcontracts which provide for performance in less than 90 days, (2) Parts A and B apply to contracts and subcontracts which provide for performance in 90 days or more and the amount of the contract or subcontract is less than \$500,000, and (3) Parts A, B, and C apply to contracts and subcontracts which provide for performance in 90 days or more and the amount of the contract or subcontract is \$500,000 or more.)

PART A

(a) The Contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant for employment is qualified. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

(b) The Contractor agrees that, if a handicapped individual files a complaint with the Contractor that he is not complying with the requirements of the Act, he will (1) investigate the complaint and take appropriate action consistent with the requirements of 20 CFR 741.29 and (2) maintain on file for 3 years, the record regarding the complaint and the actions taken.

(c) The Contractor agrees that, if a handicapped individual files a complaint with the Department of

Labor that he has not complied with the requirements of the Act, (1) he will cooperate with the Department in its investigation of the complaint, and (2) he will provide all pertinent information regarding his employment practices with respect to the handicapped.

(d) The Contractor agrees to comply with the rules and regulations of the Secretary of Labor in 20 CFR Chapter VI, Part 741.

(e) In the event of the Contractor's noncompliance with the requirements of this clause, the contract may be terminated or suspended in whole or in part.

(f) This clause shall be included in all subcontracts over \$2,500.

PART B

(g) The Contractor agrees (1) to establish an affirmative action program, including appropriate procedures consistent with the guidelines and the rules of the Secretary of Labor, which will provide the affirmative action regarding the employment and advancement of the handicapped required by P.L. 93-112, (2) to publish the program in his employee's or personnel handbook or otherwise distribute a copy to all personnel, (3) to review his program on or before March 31 of each year and to make such changes as may be appropriate, and (4) to designate one of his principal officials to be responsible for the establishment and operation of the program.

(h) The Contractor agrees to permit the examination by appropriate contracting agency officials or the Assistant Secretary for Employment Standards or his designee, of pertinent books, documents, papers, and records concerning his employment and advancement of the handicapped.

(i) The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Assistant Secretary for Employment Standards, provided by the contracting officer stating Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped employees and applicants for employment and the rights and remedies available.

(j) The Contractor will notify each labor union or representative of workers with which he has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Rehabilitation Act, and is committed to take affirmative action to employ and advance in employment physically and mentally handicapped individuals.

PART C

(k) The Contractor agrees to submit a copy of his affirmative action program to the Assistant Secretary for Employment Standards within 90 days after the award to him of a contract or subcontract.

(l) The Contractor agrees to submit a summary report to the Assistant Secretary for Employment Standards, by March 31 of each year during performance of the Contract, and by March 31 of the year following completion of the contract, in the form prescribed by the Assistant Secretary, covering employment and complaint experience, accommodations made, and all steps taken to effectuate and carry out the commitments set forth in the affirmative action program."

g. Clause No. 34.--The following is added as Clause No. 34 of the General Provisions:

"34. CLEAN AIR AND WATER

(Applicable only if the contract exceeds \$100,000 or the Contracting Officer has determined that the orders under an indefinite quantity contract in any one year will exceed \$100,000, or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-8(c)(1)) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) and is listed by EPA, or the contract is not otherwise exempt.)

(a) The Contractor agrees as follows:

(1) To comply with all the requirements of Section 114 of the Clean Air Act, as amended (42 U.S.C. 1857, et seq., as amended by Public Law 91-604) and Section 308 of the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq., as amended by Public Law 92-500), respectively, relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in Section 114 and Section 308 of the Air Act and the Water Act, respectively, and all regulations and guidelines issued thereunder before the award of this contract.

(2) That no portion of the work required by this prime contract will be performed in a facility listed on the Environmental Protection Agency List of Violating Facilities on the date when this contract was awarded unless and until the EPA eliminates the name of such facility or facilities from such listing.

(3) To use his best efforts to comply with clean air standards and clean water standards at the facility in which the contract is being performed.

(4) To insert the substance of the provisions of this clause in any nonexempt subcontract, including this Paragraph (a)(4).

(b) The terms used in this clause have the following meanings:

(1) The term "Air Act" means the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Public Law 91-604).

(2) The term "Water Act" means Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Public Law 92-500).

(3) The term "clean air standards" means any

enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order No. 11738, an applicable implementation plan as described in Section 110(d) of the Clean Air Act (42 U.S.C. 1857c-5(d)), an approved implementation procedure or plan under Section 111(c) or Section 111(d), respectively, of the Air Act (42 U.S.C. 1857c-6(c) or (d)), or an approved implementation procedure under Section 112(d) of the Air Act (42 U.S.C. 1857c-7(d)).

(4) The term "clean water standards" means any enforceable limitation, control, condition, prohibition, standard, or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a state under an approved program, as authorized by Section 402 of the Water Act (33 U.S.C. 1342), or by a local government to ensure compliance with pretreatment regulations as required by Section 307 of the Water Act (33 U.S.C. 1317).

(5) The term "compliance" means compliance with clean air or water standards. Compliance shall also mean compliance with a schedule or plan ordered or approved by a court of competent jurisdiction, the Environmental Protection Agency, or an air or water pollution control agency in accordance with the requirements of the Air Act or Water Act and regulations issued pursuant thereto.

(6) The term "facility" means any building, plant, installation, structure, mine, vessel, or other floating craft, location, or site of operations, owned, leased, or supervised by a contractor or subcontractor, to be utilized in the performance of a contract or subcontract. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location or site shall be deemed to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are colocated in one geographical area.

LABOR STANDARDS PROVISIONS

APPLICABLE TO CONTRACTS IN EXCESS OF \$2,000

1. DAVIS-BACON ACT (40 U.S.C. 276a-276a-7)

(a) All mechanics and laborers, including apprentices and trainees, employed or working directly upon the site of the work shall be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by the Copeland Regulations, 29 CFR Part 3), the full amounts due at time of payment computed at wage rates not less than the aggregate of the basic hourly rates and the rates of payments, contributions, or costs for any fringe benefits contained in the wage determination decision of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor or subcontractor and such laborers and mechanics. A copy of such wage determination decision shall be kept posted by the Contractor at the site of the work in a prominent place where it can be easily seen by the workers.

(b) The Contractor may discharge his obligation under this clause to workers in any classification for which the wage determination decision contains:

(1) Only a basic hourly rate of pay, by making payment at not less than such basic hourly rate, except as otherwise provided in the Copeland Regulations (29 CFR Part 3); or

(2) Both a basic hourly rate of pay and fringe benefits payments, by making payment in cash, by irrevocably making contributions pursuant to a fund, plan, or program for, and/or by assuming an enforceable commitment to bear the cost of, bona fide fringe benefits contemplated by the Davis-Bacon Act, or by any combination thereof. Contributions made, or costs assumed, on other than a weekly basis shall be considered as having been constructively made or assumed during a weekly period to the extent that they apply to such period. Where a fringe benefit is expressed in a wage determination in any manner other than as an hourly rate and the Contractor pays a cash equivalent or provides an alternative fringe benefit, he shall furnish information with his payrolls showing how he determined that the cost incurred to make the cash payment or to provide the alternative fringe benefit is equal to the cost of the wage determination fringe benefit. In any case where the Contractor provides a fringe benefit different from any contained in the wage determination, he shall similarly show how he arrived at the hourly rate shown therefor. In the event of disagreement between or among the interested parties as to an equivalent of any fringe benefit, the Contracting Officer shall submit the question, together with his recommendation, to the Secretary of Labor for final determination.

(c) The assumption of an enforceable commitment to bear the cost of fringe benefits, or the provision of any fringe benefits not expressly listed in section 1(b)(2) of the Davis-Bacon Act or in the wage determination decision forming a part of the contract, may be considered as payment of wages only with the approval of the Secretary of Labor pursuant to a written request by the Contractor. The Secretary of Labor may require the Contractor to set aside assets, in a separate account, to meet his obligations under any unfunded plan or program.

(d) The Contracting Officer shall require that any class of laborers or mechanics, including apprentices and trainees, which is not listed in the wage determination decision and which is to be employed under the contract shall be classified or reclassified conformably to the wage determination decision, and shall report the action taken to the Secretary of Labor. If the interested parties cannot agree on the proper classification or reclassification of a particular class of laborers or mechanics to be used, the Contracting Officer shall submit the question, together with his recommendation, to the Secretary of Labor for final determination. Apprentices and trainees may be added under this clause only where they are employed pursuant to an apprenticeship or trainee program meeting the requirements of the Apprentices and Trainees clause below.

(e) In the event it is found by the Contracting Officer that any laborer or mechanic, including apprentices and trainees, employed by the Contractor or any subcontractor directly on the site of the work covered by this contract has been or is being paid at a rate of wages less than the rate of wages required by paragraph (a) of this clause, the Contracting Officer may (1) by written notice to the Government Prime Contractor terminate his right to proceed with the work, or such part of the work as to which there has been a failure to pay said required wages, and (2) prosecute the work to completion by contract or otherwise, whereupon such Contractor and Subcontractor and his sureties shall be liable to the Government for any excess costs occasioned the Government thereby.

(f) Paragraphs (a) through (e) of the clause shall apply to this contract to the extent that it is (1) a prime contract with the Government subject to the Davis-Bacon Act, or (2) a subcontract also subject to the Davis-Bacon Act under such prime contract.

2. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT—OVERTIME COMPENSATION (40 U.S.C. 327-333)

This contract is subject to the Contract Work Hours and Safety Standards Act and to the applicable rules, regulations, and interpretations of the Secretary of Labor.

(a) The Contractor shall not require or permit any laborer or mechanic, including apprentices, trainees, watchmen, and guards, in any workweek in which he is employed on any work under this contract to work in excess of 8 hours in any calendar day or in excess of 40 hours in such workweek on work subject to the provisions of the Contract Work Hours and Safety Standards Act unless such laborer or mechanic, including apprentices, trainees, watchmen, and guards, receives compensation at a rate not less than 1½ times his basic rate of pay for all such hours worked in excess of 8 hours in any calendar day or in excess of 40 hours in such workweek, whichever is the greater number of overtime hours. The "basic rate of pay," as used in this clause, shall be the amount paid per hour exclusive of the Contractor's contribution or cost for fringe benefits, and any cash payment made in lieu of providing fringe benefits, or the basic hourly rate contained in the wage determination, whichever is greater.

(b) In the event of any violation of the provisions of paragraph (a), the Contractor shall be liable to any affected employee for any amounts due, and to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including an apprentice, trainee, watchman, or guard, employed in violation of the provisions of paragraph (a) in the sum of \$10 for each calendar day on which such employee was required or permitted to be employed on such work in excess of 8 hours or in excess of the standard workweek of 40 hours without payment of the overtime wages required by paragraph (a).

3. APPRENTICES AND TRAINEES

(a) Apprentices shall be permitted to work as such only when they are registered, individually, under a bona fide apprenticeship program registered with a State apprenticeship agency which is recognized by the Bureau of Apprenticeship and Training, U.S. Department of Labor; or if no such recognized agency exists in a State, under a program registered with the aforesaid Bureau of Apprenticeship and Training. The allowable ratio of apprentices to journeymen in any craft classification shall not be greater than the ratio permitted to the Contractor as to his entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate who is not a trainee as defined in paragraph (b) of this clause, and who is not registered as above, shall be paid the wage rate determined by the Secretary of Labor for the classification of work he actually performed. The Contractor shall furnish to the Contracting Officer written evidence of the registration of his program and apprentices, as well as of the appropriate ratios allowed and the wage rates required to be paid thereunder for the area of construction, prior to using any apprentices in the contract work. The term "apprentice" means (1) a person employed and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or (2) a person in his first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training, or a State Apprenticeship Council (where appropriate) to be eligible for probationary employment as an apprentice.

(b) Trainees shall be permitted to work as such when they are bona fide trainees employed pursuant to a program approved by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training. The term "trainee" means a person receiving on-the-job training in a construction occupation under a program which is approved (but not necessarily sponsored) by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training, and which is reviewed from time to time by the Manpower Administration to insure that the training meets adequate standards.

(c) In connection with contracts in excess of \$10,000, the Contractor agrees as follows:

(1) The Contractor shall make a diligent effort to hire for performance of work under this contract a number of apprentices or trainees, or both, in each occupation, which bears to the average number of the journeymen in that occupation to be employed in the performance of the contract the applicable ratio as set forth in paragraph (c)(7) of this clause.

(2) The Contractor shall insure that 25 percent of such apprentices or trainees in each occupation are in their first year of training, where feasible. Feasibility here involves a consideration of (i) the availability of training opportunities for first year apprentices, (ii) the hazardous nature of the work for beginning workers, and (iii) excessive unemployment of apprentices in their second and subsequent years of training.

(3) The Contractor shall, during the performance of the contract, to the greatest extent possible, employ the number of apprentices or trainees necessary to meet currently the requirements of paragraph (c)(1) and (c)(2) of this clause.

(4) The Contractor shall maintain records of employment on this contract by trade of the number of apprentices and trainees, apprentices and trainees in first year of training, and of journeymen, and wages paid and hours of work of such apprentices, trainees, and journeymen. In addition, the Contractor who claims compliance based on the criterion set forth in paragraph (c)(6)(ii) of this clause shall maintain such records of employment on all his construction work in the same labor market area, both public and private, during the performance of this contract. In each of the above cases the Contractor shall make such records available for inspection upon request of the Department of Labor or the Contracting Officer.

(5) The Contractor shall supply one copy of each of the written notices required in accordance with paragraph (c)(6)(iii) of this clause at the request of the Contracting Officer. The Contractor also agrees to supply at 3-month intervals during the performance of the contract and after completion of contract performance a statement describing steps taken toward making a diligent effort and containing a breakdown by craft, of hours worked and wages paid for first year apprentices and trainees, other apprentices and trainees, and journeymen. One copy of the statement will be sent to the Contracting Officer and one copy to the Secretary of Labor.

(6) The Contractor will be deemed to have made a "diligent effort" as required by paragraph (c)(1) if during the performance of this contract, he accomplishes at least one of the following three objectives: (i) The Contractor employs under this contract a number of apprentices and trainees by craft, at least equal to the ratios established in accordance with paragraph (c)(7) of this clause; or (ii) the Contractor employs, on all his construction work, both public and private, in the same labor

market area, an average number of apprentices and trainees by craft at least equal to the ratios established in accordance with paragraph (c) (7) of this clause, or (iii) the Contractor (A) if covered by a collective bargaining agreement, before commencement of any work on the project, has given written notice to all joint apprenticeship committees, the local U.S. Employment Security Office, local chapter of the Urban League, Workers Defense League, or other local organizations concerned with minority employment, and the Bureau of Apprenticeship and Training Representative, U.S. Department of Labor, for the locality of the work; (B) if not covered by a collective bargaining agreement, has given written notice to all of the groups stated above, except joint apprenticeship committees, and will in addition notify all non-joint apprenticeship sponsors in the labor market area; (C) has employed all qualified applicants referred to him through normal channels (such as the Employment Service, the Joint Apprenticeship Committees and where applicable, minority organizations and apprentice outreach programs who have been delegated this function) at least up to the number of such apprentices and trainees required by paragraph (c) (7) of this clause. The notice, as referred to herein, will include at least the Contractor's name and address, the agency designation, the contract number, job site address, value of the contract, expected starting and completion dates, the estimated average number of employees in each occupation to be employed over the duration of the contract work, and a statement of his willingness to employ a number of apprentices and trainees at least equal to the ratios established in accordance with paragraph (c) (7) of this clause.

(7) The Contractor recognizes that the Secretary of Labor has determined that the applicable ratios of apprentices and trainees to journeymen in any occupation for the purpose of this clause shall be as follows: (i) In any occupation the applicable ratio of apprentices and trainees to journeymen shall be equal to the predominant ratio for the occupation in the area where the construction is being undertaken, set forth in collective bargaining agreements, or other employment agreements, and available through the Bureau of Apprenticeship and Training Representative, U.S. Department of Labor, for the applicable area; (ii) for any occupation for which no ratio is found, the ratio of apprentices and trainees to journeymen shall be determined by the Contractor in accordance with the recommendations set forth in the Standards of the National Joint Apprenticeship Committee for the occupation, which are on file at offices of the U.S. Department of Labor's Bureau of Apprenticeship and Training; and (iii) for any occupation for which no such recommendations are found, the ratio of apprentices and trainees to journeymen shall be at least one apprentice or trainee for every five journeymen.

4. PAYROLLS AND BASIC RECORDS

(a) The Contractor shall maintain payrolls and basic records relating thereto during the course of the work and shall preserve them for a period of 3 years thereafter for all laborers and mechanics, including apprentices, trainees, watchmen, and guards working at the site of the work. Such records shall contain the name and address of each such employee, his correct classification, rate of pay (including rates of contributions for, or costs assumed to provide, fringe benefits), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Contractor has obtained approval from the Secretary of Labor as provided in paragraph (c) the clause entitled "Davis-Bacon Act," he shall maintain records which show the commitment, its approval, written communication of the plan or program to the laborers or mechanics affected, and the costs anticipated or incurred under the plan or program.

(b) The Contractor shall submit weekly a copy of all payrolls to the Contracting Officer. The Government Prime Contractor shall be responsible for the submission of copies of payrolls of all subcontractors. The copy shall be accompanied by a statement signed by the Contractor indicating that the payrolls are correct and complete, that the wage rates contained

therein are not less than those determined by the Secretary of Labor, and that the classifications set forth for each laborer or mechanic, including apprentices and trainees, conform with the work he performed. Submission of the "Weekly Statement of Compliance" required under this contract and the Copeland Regulations of the Secretary of Labor (29 CFR Part 3) shall satisfy the requirement for submission of the above statement. The Contractor shall submit also a copy of any approval by the Secretary of Labor with respect to fringe benefits which is required by paragraph (c) of the clause entitled "Davis-Bacon Act."

(c) The Contractor shall make the records required under this clause available for inspection by authorized representatives of the Contracting Officer and the Department of Labor, and shall permit such representatives to interview employees during working hours on the job.

5. COMPLIANCE WITH COPELAND REGULATIONS

The Contractor shall comply with the Copeland Regulations of the Secretary of Labor (29 CFR Part 3) which are incorporated herein by reference.

6. WITHHOLDING OF FUNDS

(a) The Contracting Officer may withhold or cause to be withheld from the Government Prime Contractor so much of the accrued payments or advances as may be considered necessary (1) to pay laborers and mechanics, including apprentices, trainees, watchmen, and guards employed by the Contractor or any subcontractor on the work the full amount of wages required by the contract, and (2) to satisfy any liability of any Contractor and Subcontractor for liquidated damages under paragraph (b) of the clause entitled "Contract Work Hours and Safety Standards Act—Overtime Compensation."

(b) If any Contractor or subcontractor fails to pay any laborer, mechanic, apprentice, trainee, watchman, or guard employed or working on the site of work, all or part of the wages required by the contract, the Contracting Officer may, after written notice to the Government Prime Contractor, take such action as may be necessary to cause suspension of any further payments or advances until such violations have ceased.

7. SUBCONTRACTS

The Contractor agrees to insert the clauses hereof entitled "Davis-Bacon Act," "Contract Work Hours and Safety Standards Act—Overtime Compensation," "Apprentices and Trainees," "Payrolls and Basic Records," "Compliance with Copeland Regulations," "Withholding of Funds," "Subcontracts," and "Contract Termination—Debarment" in all subcontracts. The term "Contractor" as used in such clauses in any subcontract shall be deemed to refer to the subcontractor except in the phrase "Government Prime Contractor."

8. CONTRACT TERMINATION—DEBARMENT

A breach of the clauses hereof entitled "Davis-Bacon Act," "Contract Work Hours and Safety Standards Act—Overtime Compensation," "Apprentices and Trainees," "Payrolls and Basic Records," "Compliance with Copeland Regulations," "Withholding of Funds," and "Subcontracts" may be grounds for termination of the contract, and for debarment as provided in 29 CFR 5.6.

9. DISPUTES CONCERNING LABOR STANDARDS

Disputes arising out of the labor standards provisions of this contract shall be subject to the Disputes clause except to the extent such disputes involve the meaning of classifications or wage rates contained in the wage determination decision of the Secretary of Labor or the applicability of the labor provisions of this contract which questions shall be referred to the Secretary of Labor in accordance with the procedures of the Department of Labor.

SUPPLEMENT TO LABOR STANDARDS PROVISIONS
(Standard Form 19-A, November 1972 Edition)

a. Clause No. 3.—Clause No. 3 is deleted in its entirety and the following Clause No. 3 is substituted therefor:

"3. APPRENTICES AND TRAINEES

"(a) Apprentices shall be permitted to work at less than the predetermined rate for the work they performed (1) when they are employed and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or (2) if a person is employed in his first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen in any craft classification shall not be greater than the ratio permitted to the contractor as to his entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not a trainee as defined in Paragraph (b) of this clause and who is not registered or otherwise employed as stated above, shall be paid the wage rate determined by the Secretary of Labor for the classification of work he actually performed. The Contractor shall furnish to the Contracting Officer or a representative of the Wage-Hour Division of the U.S. Department of Labor written evidence of the registration of his program and apprentices as well as the appropriate ratios allowed and wage rates (expressed in percentages of the journeyman hourly rates) for the area of construction, prior to using any apprentices on the contract work. The wage rate paid apprentices shall be not less than the appropriate percentage of the journeyman's rate contained in the applicable wage determination.

"(b) Except as provided in 29 CFR 5.15 trainees shall not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification, by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training. The term "trainee" means a person registered and receiving on-the-job training in a construction occupation under a program which has been approved in advance by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training, as meeting its standards for on-the-job training programs and which has been so certified by the Bureau. The ratio of trainees to journeymen shall not be greater than the ratio permitted under the plan approved by the Bureau of Apprenticeship and Training. Every trainee must be paid at not less than the rate specified in the approved program for his level of progress. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Bureau of Apprenticeship and Training shall be paid not less than the wage rate determined by the Secretary of Labor for the classification of work he actually performed. The Contractor shall furnish the Contracting Officer or a representative of the Wage-Hour Division of the U.S. Department of Labor written evidence of the certification

of his program, the registration of the trainees, and the ratios and wage rates prescribed in that program. In the event the Bureau of Apprenticeship and Training withdraws approval of a training program, the contractor shall no longer utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

"(c) The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of Executive Order No. 11246, as amended, and 29 CFR Part 30.

"(d) If at any time the Bureau of Apprenticeship and Training determines, after opportunity for a hearing, that the standards of a training program have not been complied with, or that such a program fails to provide adequate training for participants, the Contractor shall not utilize trainees at less than the predetermined rate for the classification of work actually performed until an acceptable program is approved. If the contractor brings an appeal pursuant to 29 CFR 5.17 within 30 days of his receipt of a certified letter withdrawing the Bureau of Apprenticeship and Training's approval, the effect of the withdrawal of approval of the program will be delayed until a decision is rendered on the appeal pursuant to 29 CFR 5.17."

b. Clause No. 4.—Clause No. 4 is deleted in its entirety and the following Clause No. 4 is substituted therefor:

"4. PAYROLLS AND BASIC RECORDS

"(a) The Contractor shall maintain payrolls and basic records relating thereto during the course of the work and shall preserve them for a period of 3 years thereafter for all laborers and mechanics, including apprentices, trainees, watchmen, and guards working at the site of the work. Such records shall contain the name and address of each such employee, his correct classification, rate of pay (including rates of contributing for or costs assumed to provide fringe benefits), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Contractor has obtained approval from the Secretary of Labor as provided in paragraph (c) of the clause entitled "Davis-Bacon Act," he shall maintain records which show the commitment, its approval, written communication of the plan or program to the laborers or mechanics affected, and the costs anticipated or incurred under the plan or program.

"(b) The Contractor shall submit weekly a copy of all payrolls to the Contracting Officer. The Government Prime Contractor shall be responsible for the submission of copies of payrolls for all subcontractors. The copy shall be accompanied by a statement signed by the contractor indicating that the payrolls are correct and complete, that the wage rates contained therein are not less than those determined by the Secretary of Labor, and that the classifications set forth for each laborer or mechanic, including apprentices and trainees, conform with the work he performed. Submission of the "Weekly Statement of Compliance" required under this contract and the Copeland

Regulations of the Secretary of Labor (29 CFR Part 3) shall satisfy the requirement for submission of the above statement. The contractor shall submit also a copy of any approval by the Secretary of Labor with respect to fringe benefits which is required by paragraph (c) of the clause entitled "Davis-Bacon Act."

"Contractors employing apprentices or trainees under approved programs shall include a notation of the first weekly certified payrolls submitted to the contracting agencies that their employment is pursuant to an approved program and shall identify the program.

"(c) The contractor shall make the records required under this clause available for inspection by authorized representatives of the contracting officer and the Department of Labor, and shall permit such representatives to interview employees during working hours on the job."

SPECIFICATIONS

DIVISION 1—GENERAL REQUIREMENTS

SECTION 1.1—GENERAL CONDITIONS

1.1.1. BONDS

a. Bid guarantee.—The bidder shall furnish guarantee with each bid in an amount not less than 20 percent of the amount of the bid: Provided, That guarantee in excess of \$3,000,000 will not be required. (See Standard Form 22, Instructions to Bidders.)

b. The contractor shall furnish bonds as follows:

(1) Performance bond with approved surety, or sureties, and with a penal amount equal to 100 percent of the contract price at the time of award.

(2) Payment bond.—If the amount of the contract exceeds \$2,000, the contractor shall furnish to the United States, in addition to the bond required under Subparagraph b.(1) hereof, a payment bond with a surety or sureties satisfactory to the officer awarding the contract, for the protection of all persons supplying labor and material in the prosecution of the work provided for in the contract, for the use of each such person. Whenever the total amount payable by the terms of the contract shall be not more than \$1,000,000, the payment bond shall be in the sum of one-half of the total amount payable by the terms of the contract. Whenever the total amount payable by the terms of the contract shall be more than \$1,000,000 and not more than \$5,000,000, the payment bond shall be in the sum of 40 percent of the total amount payable by the terms of the contract. Whenever the total amount payable by the terms of the contract shall be more than \$5,000,000, the payment bond shall be in the sum of \$2,500,000.

c. Requirements for execution of surety bonds.—Each surety company bond (bid, performance, payment), which purports to have been executed by an agent or attorney-in-fact for the corporate surety, is required to have submitted with it a power of attorney to the signatory agent or attorney-in-fact, and executed by the corporate surety upon a date reasonably proximate to the date of the bond, or the power of attorney shall be accompanied by a certification of the surety to the

effect that the power of attorney was in full force and effect upon a date reasonably proximate to the date of the bond.

1.1.2. RESPONSIBILITY AND BONDING OF SUB-CONTRACTORS

The prime contractor shall be responsible to assure that all work at the jobsite which is subcontracted under these specifications shall be performed only by reliable and financially responsible subcontractors.

For the purposes of this paragraph, the term "subcontractor" shall mean every party to whom a part of the contract may be sublet to perform construction, alteration, or repair work on the jobsite regardless of the tier in the chain of subcontractual relationships. The term "subcontractor" does not include suppliers or others not actually performing work at the jobsite.

Except for subcontracts of \$5,000 or less, the prime contractor shall require every subcontractor of whatever tier, as evidence of his reliability and financial responsibility, to furnish a payment bond in form and with a responsible surety thereon acceptable to the prime contractor in a penal sum of not less than 50 percent of the subcontract price to assure payment to all persons supplying labor, materials, and rental equipment to such subcontractor for either incorporation or consumption in the work covered by these specifications or in its performance: Provided, That the maximum penal sum required will be \$250,000.

The obligee under the payment bond shall be the party who has let the subcontract. The bond shall give a right of action to those persons supplying such labor, materials, or rental equipment due to loss caused by the nonpayment of any and all moneys owing on account thereof: Provided however, That written notice of such indebtedness is furnished to the prime contractor, the principal, and surety within 90 days, and suit therefor is initiated within 1 year, both periods to commence on the day on which the last of the labor, materials, or rental equipment were performed or furnished.

At the time the prime contractor submits a copy of each subcontract as required under the Labor

Standards Provisions, he shall also furnish to the contracting officer a copy of the payment bond, which copy shall be accompanied by a properly dated power of attorney as provided in Subparagraph I.I.I.c.

Nothing contained in this paragraph shall create any contractual relationship between any subcontractor and the Government.

1.1.3. RIGHTS-OF-WAY

The Government will provide the right-of-way or the site for permanent works or installations, the site for borrow pits, channels, spoil banks, and ditches, and right-of-way for access thereto over routes established by the contracting officer. The contractor will be permitted to use such land for construction purposes, but any additional right-of-way or land desired by the contractor for construction purposes shall be provided by the contractor without expense to the Government.

1.1.4. SAFETY AND HEALTH

a. The contractor shall not require any laborer or mechanic employed in the performance of the contract to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health or safety, as determined under construction safety and health standards promulgated by regulations of the Secretary of Labor.

b. The contractor shall comply with the Department of Labor Safety and Health Regulations for Construction promulgated under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327 et seq.), as amended, and with the Bureau of Reclamation Supplement thereto. The Bureau of Reclamation has published a handbook entitled "Safety and Health Regulations for Construction" which contains the Department of Labor Regulations and the Bureau Supplement. This handbook will be provided at no charge for use in connection with these specifications.

c. The contractor shall: (1) Submit a proposed safety program to the contracting officer, for his approval prior to start of construction operations; (2) Provide for weekly 5-minute "tool-box" safety meetings, conducted by his foremen and attended by all mechanics and laborers at the worksite; (3) Conduct regularly scheduled safety meetings, at least monthly, for all levels of supervision; (4) Provide adequate facilities and trained personnel to

insure prompt and efficient first aid and medical care of injured employees—such facilities shall meet the requirements as set forth in the Bureau of Reclamation Supplement to "Safety and Health Regulations for Construction"; and (5) Designate a competent supervisory employee to carry out the contractor's accident prevention program.

d. The contractor is responsible for being cognizant of and insuring compliance with the requirements set forth in Safety and Health Regulations for Construction. Such responsibility shall apply to both his operations and those of his subcontractors. When violations of the safety and health regulations are called to his attention by the contracting officer or his authorized representatives, the contractor shall immediately correct the condition to which attention has been directed. Such notice, either oral or written, when served on the contractor or his representative(s) shall be deemed sufficient.

e. In the event the contractor fails or refuses to promptly comply with the compliance directive issued under Subparagraph d. above, the contracting officer or his authorized representative may issue an order to suspend all or any part of the work. When satisfactory corrective action is taken, an order to resume work will be issued. The contractor shall not be entitled to any extension of time, nor to any claim for damage or to excess costs by reason of either the directive or the suspension order. Failure of the contracting officer or his representative to order discontinuance of any or all of the contractor's operations shall not relieve the contractor of his responsibility for the safety of personnel and property.

f. The contractor shall maintain an accurate record of, and shall report to the contracting officer in the manner prescribed by the contracting officer, all cases of death, occupational diseases, or traumatic injury to employees or the public involved, and property damage by accident in excess of \$100 incident to performance of work under this contract.

g. The contractor shall indemnify and hold the Government harmless for any and all losses, damages, or liability on account of personal injury, death, or property damage, or claims for personal injury, death, or property damage of any nature whatsoever and by whomsoever made, arising out of the activities of the contractor, his employees, subcontractors, or agents under the contract. Such

indemnity shall include, but shall not be limited to, the failure of the contractor, his employees, subcontractors, or agents to comply with the safety and health provisions contained in these specifications.

h. The rights and remedies of the Government provided in this paragraph are in addition to any other rights and remedies provided by law or under this contract.

i. In the event there is a conflict between the requirements of this paragraph and any requirement of the U.S. Department of Labor in its regulation of the Construction Safety Act, the more stringent requirement will prevail.

1.1.5. PROTESTS

If the contractor disagrees with any direction, instruction, interpretation, or determination of the contracting officer, his authorized representative, or an inspector, he shall immediately ask, in writing, for written instructions from the contracting officer or his authorized representative. Upon receipt of the instructions, the contractor shall proceed without delay to comply therewith. Directions, instructions, interpretations, or determinations of the contracting officer or his authorized representative relating to drawings, samples, and literature shall be subject to the provisions of this paragraph.

1.1.6. INSPECTION AND TESTS BY GOVERNMENT

In addition to tests specifically outlined in these specifications, the Government reserves the right to inspect and test materials, equipment, and workmanship during the life of the contract in accordance with Clause No. 10 of the General Provisions. The contractor shall cooperate with the contracting officer in arrangements for such inspections and tests so that they may be made without unnecessarily delaying the work or endangering personnel.

SECTION 1.2--SPECIAL CONDITIONS

1.2.1. The Requirement

It is required that there be constructed and completed, in accordance with the Construction Contract (Standard Form 23), including the General Provisions (Standard Form 23A), Labor Standards Provisions (Standard Form 19A), these specifications, and the drawings listed in Paragraph 10.1.2. (List of Drawings) hereof, ERDA Test Facilities, East Mesa Test Site, Geothermal Resource Investigations, Imperial Valley, California. The work is situated approximately 10 miles east of Holtville, California, in Imperial County.

1.2.2. Description of the Work

The principal components of the work to be performed under these specifications include the following:

a. Furnishing and installing a single cell, induced draft, counterflow cooling tower with closed deck and internal down-spray distribution system; complete with redwood basin, fan, gear reducer and motor driver, guard rails, access ladder, and fan guard. Additional features of the work relative to cooling tower include all piping and electrical facilities required inside the cooling tower.

b. Furnishing and placing reinforced concrete foundation and sump for the cooling tower, and reinforced concrete bases for equipment and for ERDA test facilities, and concrete pipe trenches with steel gratings and pipe trench drains. Additional features include:

(1) Placing all pipe, conduits, anchor bolts and miscellaneous metal required to be embedded in the concrete foundation, sump, and bases.

(2) All earthwork required for completion of work as specified.

c. Furnish, fabricate, and erect on the concrete test base, a steel support rack for manifold piping, including steel frames for 4 test stations and a steel frame on the equipment base for support of the motor control center facilities.

d. Furnish and install manifold piping consisting of 8-, 6-, and 4-inch diameter, schedule 40 steel pipe insulated with 2-inch thickness of aluminum-jacketed calcium silicate insulation, complete with pipe anchor chairs, pipe supports, pipe rollers, pipe expansion joints, pipe protection saddles, 6- and 4-inch gate valves, and miscellaneous fittings as required.

Par. 1.2.2.

e. Furnish and install (above-ground) 6-inch-diameter, schedule 40, steel pipelines from Wells Mesa 6-1, 6-2, and from the existing Mesa 8-1 pipeline to the manifold piping, to the existing injection pipeline and associated structures. Additional features of these pipelines will include construction partially in concrete trenches with steel gratings, pipe supports, pipe anchor chairs, pipe rollers, expansion joints, flexible joints, all earthwork required and 2 inches thickness of aluminum-jacketed calcium silicate pipe insulation.

f. Electrical and grounding systems including two separate (3-350MCM feeders each) 480 volt service, 3 pole S/N fused switches (100 amp and 30 amp) at 4 points on the concrete test base, one 480-240 Y/120 v transformer, 30 kVa, 3 phase, dry type with weatherproof distribution panel containing circuit breakers for power to the cooling tower, air compressor-air dryer, 120 and 208 receptacles on the concrete test base, outdoor lighting, electrical wiring and cables, copper grounding plates, as required, grounding of all circuits to the existing ground mat, all earthwork required and miscellaneous features as required to serve the instrumentation, power transformer, outdoor lighting, equipment base, and cooling tower equipment.

g. All earthwork required for completing the ERDA Test Facilities as required.

1.2.3. Commencement, Prosecution and Completion of Work

a. Completion period.--The contractor shall begin work within thirty (30) calendar days after date of receipt of notice to proceed, and shall complete all of the work within one hundred thirty-five (135) calendar days from the date of receipt of such notice: Provided, That the period allowed for the completion of the work shall be reduced by one (1) calendar day for each calendar day in excess of ten (10) calendar days, or any extension thereof, elapsing between the contractor's receipt of and return of properly executed contract, and performance and payment bonds as required in the Bid Form (Standard Form 21).

The drawings and data required to be submitted for approval under these specifications are described in Paragraphs 4.1.2., 4.1.5., and 8.1.3. The contracting officer will require twenty (20) calendar days for review of drawings or data submitted by the contractor for approval and this review time will apply to each separate submittal or resubmittal whether the drawings or data are approved, not approved, or returned for revision. If the contracting officer uses time in excess of the above-stated number of days for review of any submittal or resubmittal, the excess time will be added to the time allowed the contractor for completion of the work affected by such excess time: Provided, That if the review of two or more separate submittals or resubmittals is late and results in concurrent days of excess time, such days will be counted only once in computing an extension of the completion date. The number of calendar days required for review of drawings or data submitted or resubmitted for approval will include the date the drawings or

data are received by the contracting officer and will extend through the date of return mailing to the contractor, either approved or for correction.

b. Prosecution of the work.--The capacity of the contractor's construction plant, sequence of operations, method of operation, and the forces employed shall, at all times during the continuance of the contract, be subject to the approval of the contracting officer and shall be such as to insure the completion of the work within the specified period of time.

c. Priorities.--If performance under these specifications is delayed by operations of any United States national priorities or material allocation system, the time for performance will be extended to compensate for such delays.

d. Occupancy prior to completion of the work.--The Government may make use of any feature of the work where the construction work has been completed to such a point that said occupancy or use will not cause material interference with the completion of said building, as agreed in writing by the contractor and the contracting officer. Final acceptance will be made of the portions of the work which have been completed prior to such occupancy and use and the contractor will be relieved of responsibility for damages to such accepted portions of the work due to causes beyond the control and without the fault or negligence of the contractor: Provided, That such final acceptance shall not require a release of the percentages withheld from progress payments under the clause of the General Provisions entitled "Payments to Contractor."

1.2.4. Liquidated Damages

In case of failure on the part of the contractor to complete the work within the time fixed in the contract or any extensions thereof, the contractor shall pay to the Government as fixed, agreed, and liquidated damages, pursuant to the clause of this contract entitled "Termination for Default-Damages for Delay-Time Extensions," the sum of one hundred dollars (\$100) for each calendar day of delay in completion of the work.

1.2.5. Rates of Wages

Pursuant to the provisions of the Davis-Bacon Act, 40 U.S.C. 276(a), as amended, the Secretary of Labor has determined that rates of wages and fringe benefits listed in this paragraph are those prevailing for the classifications specified in the locality of the work covered by these specifications and said rates of wages and fringe benefits shall be the minimum rates per hour to be paid for the work covered by the specifications.

Fringe benefit payments include medical and hospital care, compensation for injuries or illness resulting from occupational activity, unemployment benefits, life insurance, disability and sickness insurance, accident insurance

Par. 1.2.5.

(all designated as health and welfare), pensions, vacation and holiday pay, apprenticeship, or other similar programs, and other bona fide fringe benefits.

While the wage rates and fringe benefits shown are the minimum rates required by these specifications to be paid during the life of the contract, it is the responsibility of bidders to inform themselves as to local labor conditions such as the length of workday or workweek, overtime compensation, fringe benefit contributions, labor supply, and prospective changes or adjustments of wage rates or fringe benefits. No increase in the contract price will be allowed or authorized on account of the payment of wage rates or fringe benefits in excess of those listed herein.

STATE: California

COUNTIES: Imperial, Inyo, Kern,
Los Angeles, Mono, Orange, Riverside,
San Bernardino, San Luis Obispo,
Santa Barbara and Ventura

DECISION NUMBER: CA75-3148

DATE: Date of Publication

Supersedes Decision No. CA75-3087 dated July 23, 1975, in 40 FR 31487
DESCRIPTION OF WORK: Building Construction (excluding single family homes and garden
type apartments up to and including 4 stories), heavy and highway construction and
dredging.

DECISION NO. CA75-3148

	Base Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
ASBESTOS WORKERS	\$12.40	.80	.97		.06
BOILERMAKERS	10.85	.65	1.00	.50	.02
BRICKLAYERS: Stonemasons:					
Imperial County	9.80	.77	.98		.06
Inyo, Kern and Mono Counties	9.30	.70	1.00		.07
Los Angeles County (Cities of Santa Monica, Malibu, Venice, Pasadena, South Pasadena, Arcadia, Monrovia and South of Rosecrans Blvd., including Long Beach); Orange County	10.03	.80	1.10		.07
Los Angeles County (except Cities of Santa Monica, Malibu, Venice, Pasadena, South Pasadena, Arcadia, Monrovia and South of Rosecrans Blvd., including Long Beach)	10.03	.80	1.20		.07
Riverside and San Bernardino Counties	10.50	.70	.80		.07
Santa Barbara and San Luis Obispo Counties	8.47	1.05	1.20	.85	.01
Ventura County	9.80	.78	1.15		.02
BRICK TENDERS	7.805	.85	1.65	.50	
CARPENTERS:					
Carpenters	9.07	1.02	1.55	.80	.06
Saw Filers	9.15	1.02	1.55	.80	.06
Table power saw operators	9.17	1.02	1.55	.80	.06
Shinglers; Piledrivermen, bridge or dock carpenters; Derrick bargemen; Rock slinger	9.20	1.02	1.55	.80	.06
Hardwood floor layers	9.27	1.02	1.55	.80	.06
Head Rock Slinger	9.30	1.02	1.55	.80	.06
Pneumatic nailer	9.32	1.02	1.55	.80	.06
Millwrights	9.57	1.02	1.55	.80	.06

CEMENT MASONS:
Cement Masons
Cement floating and troweling
machine
DRYWALL INSTALLERS
ELECTRICIANS:
Imperial County
Electricians
Cable Splicers
Kern (China Lake Naval Ordnance
Test Station, Edwards AFB)
Electricians; Technicians
Cable Splicers
Kern County (Remainder of
County)
Electricians; Technicians
Cable Splicers
Los Angeles County
Electricians
Cable Splicers
Traffic Signal and Street
Lighting:
Electricians
Utility Technician No. 1
Utility Technician No. 2
Tunnels:
Electricians
Cable Splicers
Sound Technicians:
Sound Technicians (on building
construction)
Sound Technicians (on
modification of existing
buildings)
Orange County
Electricians
Cable Splicers
Riverside County
Electricians
Cable Splicers

Base Hourly Rates	Fringe Benefits Payments				Education and/or Appr. Tr.
	H & W	Pensions	Vacation	Education and/or Appr. Tr.	
\$8.76	.95	1.55	1.00		.05
9.01	.95	1.55	1.00		.08
10.74	1.02	1.55	.80		.07
11.15	.50	12+1.25			
11.43	.50	12+1.25			
12.75	.70	12+1.00			.10
14.025	.70	12+1.00			.10
10.25	.70	12+1.00			.10
11.275	.70	12+1.00			.10
10.23	.71	12+1.25			.02
10.53	.71	12+1.25			.02
10.23	.71	12+1.25			.02
7.67	.71	12+1.25			.02
7.16	.71	12+1.25			.02
11.25	.71	12+1.25			.02
11.53	.71	12+1.25			.02
10.17	.50	12			
8.21	.50	12			
11.40	.45	12+.85			.02
11.92	.45	12+.85			.02
9.91	.60	12+.40			.04
10.21	.60	12+.40			.04

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	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
ELECTRICIANS: (Cont'd)					
Inyo, Mono and San Bernardino Counties					
Electricians	\$9.36	.50	1%+1.25		.04
Cable Splicers	9.66	.50	1%+1.25		.04
Tunnel Laborers:					
Electricians	9.32	.40	1%+.75		.02
Cable Splicers	9.62	.40	1%+.75		.02
San Luis Obispo County					
Electricians	10.23	.88	1%+1.15		.03
Cable Splicers	11.25	.88	1%+1.15		.03
Santa Barbara County (Vandenburg AFB)					
Electricians	11.75	.70	1%+1.15		.05
Cable Splicers	12.75	.70	1%+1.15		.05
Remainder of County					
Electricians	10.50	.70	1%+1.15		.05
Cable Splicers	11.50	.70	1%+1.15		.05
Ventura County					
Electricians	11.17	.70	1%+.80		.02
Cable Splicers	12.29	.70	1%+.80		.02
ELEVATOR CONSTRUCTORS:					
Imperial, Inyo, Kern (South of Tehachapi Range), Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara and Ventura Counties					
Elevator Constructors	10.76	.445	.29	3%+a	.02
Elevator Constructors' Helpers	70%JR	.445	.29	3%+a	.02
Elevator Constructors' Helpers (Prob.)	50%JR				
Kern County (North of Tehachapi Range)					
Elevator Constructors	10.70	.445	.29	3%+a	.02
Elevator Constructors' Helpers	70%JR	.445	.29	3%+a	.02
Elevator Constructors' Helpers (Prob.)	50%JR				

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
GLAZIERS:					
Imperial County					
Inyo, Kern, Mono Counties	\$9.69	.55	.60		
Los Angeles, Orange, Riverside, San Bernardino, Santa Barbara, San Luis Obispo and Ventura Counties	7.68	.41	.55	.66	.05
IRONWORKERS:					
Fence Erectors					
Reinforcing	10.76	.55	.95		.04
Ornamental; Structural	9.34	.93	1.65	1.10	.03
IRRIGATION AND LAWN SPRINKLERS:					
Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara and Ventura Counties					
	8.70	10%	16%	13%	3/4%
LATHERS:					
Inyo, Kern and Mono Counties					
Los Angeles County (except City of Lancaster)	9.13	.60	1.30	.70	.05
Los Angeles County (City of Lancaster Only)	11.00	.60	.75		.03
Orange County	8.50	.50			.02
Ventura County	8.29	.55	.65	.50	.03
San Luis Obispo and Santa Barbara Counties	9.06	.60	1.10	1.00	.02
LINE CONSTRUCTION:					
Imperial County					
Groundmen	8.72	.57	1.00	1.50	
Linemen	8.92	.50	1%+1.25		
Cable Splicers	11.15	.50	1%+1.25		
Kern (China Lake Naval Ordnance Test Station and Edwards AFB)					
Groundmen	11.43	.50	1%+1.25		
Linemen	10.1875	.70	1%+1.00		.10
Cable Splicers	12.75	.70	1%+1.00		.10
Kern County (Remainder of County)	14.025	.70	1%+1.00		.10
Groundmen	7.6875	.70	1%+1.00		.10
Linemen	10.25	.70	1%+1.00		.10
Cable Splicers	11.275	.70	1%+1.00		.10

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DECISION NO. CA75-5148

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
LINE CONSTRUCTION: (Cont'd)					
Los Angeles County					
Groundmen	\$7.86		1%		
Linemen	10.48		1%		
Cable Splicers	10.78		1%		
Riverside County					
Groundmen	7.45	.60	1%+.40	.04	
Linemen; Line Equipment Operators	9.93	.60	1%+.40	.04	
Cable Splicers	10.23	.60	1%+.40	.04	
Ventura County					
Groundmen	9.24	.70	1%+.55	.02	
Linemen	10.42	.70	1%+.55	.02	
Cable Splicers	11.46	.70	1%+.55	.02	
MARBLE SETTERS:					
Inyo and Mono Counties	9.26	.81	.51	1.03	
Imperial County	9.64	.62	1.00	.75	
Kern, Los Angeles, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara and Ventura Counties	8.16	.65	.55		
PAINTERS:					
Imperial, Orange, Riverside, Los Angeles (Pomona Area), San Bernardino (excluding Western portion)					
Brush; Paint burners	9.27	.69	.95	.70	.07
Paperhangers; Iron, steel and bridge (swing stage); Sheet rock taper	9.77	.69	.95	.70	.07
Brush (swing stage); Spray	9.52	.69	.95	.70	.07
Steeplejack	10.67	.69	.95	.70	.07
Inyo, Kern (Lancaster, Mojave, Palmdale, China Lake Naval Ordnance Test Station and Edwards AFB), Los Angeles (except Pomona Area), Mono, San Bernardino (West of a line North in Trono including China Lake Area, Johannesburg, Boron, South including the Wrightwood Area)					
Brush	9.67	.405	.50	.40	.01

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	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
PAINTERS: (Cont'd)					
Structural steel and bridge; Paint burner	\$9.79	.405	.50	.40	.01
Tapers	10.195	.405	.50	.40	.01
Brush Swing stage (13 stories or less); Paperhangers; Sandblasters; Spray	9.92	.405	.50	.40	.01
Brush swing stage (over 13 stories)	10.04	.405	.50	.40	.01
Structural steel and bridge, swing	10.07	.405	.50	.40	.01
Spray sandblaster swing stage (13 stories or less); Paste Machine; Special coating spray	10.17	.405	.50	.40	.01
Steeplejack	10.92	.405	.50	.40	.01
Kern County (Remainder of County)					
Brush	9.27	.45	.51		.03
Brush or Roller, swing stage; Paperhangers; Taping joint; sheet rock	9.52	.45	.51		.03
Spray; Sandblasters	9.77	.45	.51		.03
Steeplejack	10.77	.45	.51		.03
San Luis Obispo, Santa Barbara, and Ventura Counties					
Brush	10.24	.55	.50		.03
Iron and steel; Paperhangers; Paste machine operator; Sandblaster	10.49	.55	.50		.03
Spraymen	10.74	.55	.50		.03
Steeplejack	11.49	.55	.50		.03
Tapers, sheet rock	10.36	.55	.50		.03
Parking Lot Striping Work and/or Highway Markers:					
Inyo and Mono Counties					
Striper	7.92	.40	.20	b	
Striper Helper	6.82	.40	.20	b	
Traffic Delineating Device Applicator; Traffic Surface Sandblaster	6.82	.40	.20	b	

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	Base Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or App. Tr.
PAINTERS: (Cont'd)					
Helper (traffic delineating device applicator, traffic surface sandblaster)	\$6.32	.40	.20	b	
Remaining Counties					
Traffic delineating device applicator	6.82	.40	.20	b	
Traffic surface protective coating applicator; Wheel stop installer; Traffic surface sandblaster; Striper	6.43	.40	.20	b	
Helper (traffic surface protective coating applicator, wheel stop installer, traffic surface sandblaster, striper)	5.43	.40	.20	b	
PLASTERERS:					
Imperial County	10.07	.45	1.00	.85	.06
Inyo, Kern and Mono Counties	7.77	.45	.60	.60	.06
Los Angeles and Orange Counties	9.745	.68	1.85	.70	.10
Riverside and San Bernardino Counties	10.675				.01
San Luis Obispo County	10.35				.01
Santa Barbara County	8.69	.70	1.05		.02
Ventura County	8.625	.55	.50		
PLASTER TEMPLERS:					
Imperial, Inyo, Mono, Riverside and San Bernardino Counties	9.53	.85	1.65	.45	
Kern County	7.87	.75	1.50	.43	
Los Angeles and Orange Counties	9.225	.85	1.95	.75	
San Luis Obispo County	7.75	.85	1.65	.50	
Santa Barbara County (except Santa Maria)	8.98	.85	1.65	.50	
Santa Barbara County (Santa Maria)	9.18	.85	1.65	.50	
Ventura County	9.08	.85	1.65	1.05	
PLUMBERS: Steamfitters:					
Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara and Ventura Counties	10.95	10%	16%	13%	3/4%

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	Base Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or App. Tr.
PLUMBERS; Steamfitters: (Cont'd)					
Inyo, Kern (except east of Los Angeles (Aqueduct) and Mono Counties)	\$10.03	.60	1.60	1.00	.17
Kern County (East of Los Angeles Aqueduct)	12.28	.60	1.60	1.00	.17
REFRIGERATION AND AIR CONDITIONING:					
Riverside and San Bernardino Counties	7.85	.70	.50	.60	.03
ROOFERS:					
Imperial County	9.34	.40	.75	1.00	
Inyo, Kern and Mono Counties	7.75	.50	.50		
Riverside and San Bernardino Counties	9.30	.60	.65	1.00	
Los Angeles, Orange and Ventura Counties	10.74	.82	.80		.045
San Luis Obispo and Santa Barbara Counties	8.83	.535	.34		.0025
SHEET METAL WORKERS:					
Imperial County	8.93	.74	1.20		
Inyo, Kern, Los Angeles (North of line between Gorman and Big Pines) and Mono Counties	9.47	.84	1.35		.02
Los Angeles County (Remaining portion)	11.53	.94	1.50		.02
Orange County	9.52	.69	1.20		
Riverside and San Bernardino Counties	8.25	.69	1.05		.03
San Luis Obispo, Santa Barbara and Ventura Counties	9.72	.69	1.05		
SOFT FLOOR LAYERS:					
Imperial County	8.33	.45	.90	.90	.06
Inyo (including Inyo-Kern Naval Reservation), Kern (East of the Los Angeles Aqueduct), Los Angeles, Orange, Riverside, Santa Barbara, San Bernardino, San Luis Obispo and Ventura Counties	9.12	.65	.62	.52	.03
Kern County (remaining portion)	9.02	.60	.45	.52	.03

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SPRINKLER FITTERS:
 Imperial, Inyo, Kern, Mono,
 Orange (except Santa Ana),
 Riverside, San Bernardino
 (except Ontario, San Luis
 Obispo, Santa Barbara and
 Ventura (except Santa Paula,
 Point Mugu and Port Hueneme)
 Los Angeles (Los Angeles City
 and Area within 25 miles and
 Pomona), Orange (Santa Ana),
 San Bernardino (Ontario), and
 Ventura (Santa Paula, Point
 Mugu and Port Hueneme)

TERRAZZO WORKERS:
 Imperial County

TILE SETTERS:
 Imperial County

Los Angeles, Orange and Ventura
 Counties

San Luis Obispo and Santa
 Barbara Counties.

TILE SETTERS' HELPERS:
 Imperial County

Los Angeles, Orange and Ventura
 Counties

Basic Hourly Rates	Prize Benefits Payments			
	H & W	Pensions	Vacation	Education and/or Appx. Tr.
\$13.72	.50	.80		.08
11.14	.54	.60		.09
9.64	.62	1.00	.75	
9.64	.62	1.00	.75	
9.25	.495	.70		.06
8.47	1.05	1.20	.85	.01
7.64	.40	.65	.75	
8.005	.57	1.00		.12

PAID HOLIDAYS:

A-New Year's Day; B-Memorial Day; C-Independence Day; D-Labor Day; E-Thanksgiving Day; F-Christmas Day.

FOOTNOTES:

- a. Employer contributes 4% basic hourly rate for over 5 years' service and 2% basic hourly rate for 6 months to 5 years' service as Vacation Pay Credit. Six Paid Holidays: A through F.
- b. Employer contributes \$.17 per hour to Holiday Fund plus \$.10 per hour to Vacation Fund for one year's service; \$.33 per hour after one year, but less than 5 years' service, \$.40 per hour after 5 years' but less than 10 years' service, and \$.50 per hour after 10 years' service.

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DECISION NO. CA75-5148

LABORERS

CLEANING AND HANDLING OF PANEL FORMS; Concrete screeding for rough strike off; Concrete, water curing; Demolition laborer, the cleaning of brick and lumber; Dry packing of concrete, plugging, filling of shee-bolt holes; Fire watcher, limbers, brush loaders, piers and debris handler; Gas and oil pipeline; Laborers, general or construction; Laborer, temporary water and air lines; Material hoseman (walls, slab, floors and decks); Mixer-truck chute man (Walls, Slab Decks, floors, foundations and footing-curb and gutter and sidewalks); Rigging and signalling; Slip form raisers; Window cleaner

Basic Hourly Rates	Fringe Benefits Payments			
	H & W	Pension	Vacation	App. Tr.
\$7.20	.85	1.65	.50	.10
7.25	.85	1.65	.50	.10
7.38	.85	1.65	.50	.10
7.30	.85	1.65	.50	.10
7.32	.85	1.65	.50	.10
7.33	.85	1.65	.50	.10
7.35	.85	1.65	.50	.10
7.38	.85	1.65	.50	.10

CUTTING TORCH (Demolition); Scaler Tarman; Mortarman

GUINEA CHASER

ASPHALT SHOVELER; Fine grader, highway and street paving, airports, runways, and similar type heavy construction; Landscape gardener and nursery man

PACKING ROD STEEL AND PANS; Tanks scaler and cleaner

UNDERGROUND (INCLUDING CAISSON BELLOWERS)

CHUCK TENDER; Septic tank digger and installer

CESSPOOL DIGGER AND INSTALLER

DECISION NO. CA75-5148

LABORERS (Cont'd)

CONCRETE CURER-IMPERVIOUS MEMBRANE AND FORM OILER; Rip rap stonepaver placing stone or sacked concrete; Sandblaster (pot tender)

PIPELAYERS' BACKUP MAN, COATING, GROUTING, MAKING OF JOINTS, SEALING, CAULKING, DIAPERING and INCLUDING RUBBER GASKET JOINTS, POINTING and ANY and ALL OTHER SERVICES

BUCKYMOBILE MAN; Cement dumper (on 1 yd. or larger mixer and handling bulk cement); Gas and oil pipeline wrapper-pot tender; Power broom sweepers (small); Roto scraper and-tiller; Tree climber, faller, chain saw operator, Pittsburg chipper and similar type brush shredders; Trenching machine, hand propelled

ASPHALT RAKER, LUTEMAN and IRONER; Concrete core cutter, grinder or sander; Concrete saw man, cutting, scoring old or new concrete, impact wrench, multi-plate; Pneumatic, gas, electric tools, vibrating machines and similar mechanical tools not separately classified herein; Tamper, barko wacker and similar type

ROCK SLINGER

DRILLER, JACKHAMMER - 2½ ft. DRILL STEEL OR LONGER

CONCRETE VIBRATOR OPERATOR, 70 lbs. and over

Basic Hourly Rates	Fringe Benefits Payments			
	H & W	Pension	Vacation	App. Tr.
\$7.39	.85	1.65	.50	.10
7.49	.85	1.65	.50	.10
7.41	.85	1.65	.50	.10
7.51	.85	1.65	.50	.10
7.46			.50	.10
7.59	.85	1.65	.50	.10
7.61	.85	1.65	.50	.10

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DECISION NO. CA75-5148

LABORERS (Cont'd)

GAS AND OIL PIPELINE WRAPPER - (6" and over); Kettlemen, pot men and men applying asphalt, lay-kold, creosote, lime caustic and similar type materials

Basic Hourly Rates	Fringe Benefits Payments			
	N & W	Pensions	Vacation	App. Tr.
\$7.54	.85	1.65	.50	.10
7.71	.85	1.65	.50	.10
7.85	.85	1.65	.50	.10
7.62	.85	1.65	.50	.10
7.65	.85	1.65	.50	.10
7.85	.85	1.65	.50	.10
7.72	.85	1.65	.50	.10
8.82	.85	1.65	.50	
8.32	.85	1.65	.50	
7.36	.85	1.65	.50	

ON-SITE LABORERS:

Nozzlemen and Rodmen

Crimbs

Reboundmen

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LABORERS (Tunnel)

BATCH PLANT LABORERS; Bull gang mucker, trackman; Concrete crew, including rodders and spreaders; Dumpman; Dumpman (outside); Swamper (brakeman and switchman on tunnel work); Tunnel materials handling man; Tool man

CABLE TENDER, Chucktender; Ripper; Steel form raiser and setter's helper; Vibratorman, jackhammer, pneumatic tools (except driller)

BLASTER, Driller, Powderman; Chemical grout jetman; Cherry pickerman; Grout gunman; Grout mixerman; Grout pumpman; Jackleg miner; Jumbo man; Kemper and other pneumatic Concrete placer operator; Miner tunnel (hand or machine); Powderman (primer house); Primer man; Shotcrete man; Steel form raiser and setter; Timberman; Retimberman (wood or steel); Tunnel concrete finisher

SHAFT, Raise miner; Diamond driller

Basic Hourly Rates	Fringe Benefits Payments			
	N & W	Pensions	Vacation	App. Tr.
\$8.68	.85	1.65	.50	
8.80	.85	1.65	.50	
8.96	.85	1.65	.50	
9.24	.85	1.65	.50	

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POWER EQUIPMENT OPERATORS
(DREDGING)
HYDRAULIC SUCTION DREDGES

LEVERMAN
WATCH ENGINEER; Welder
DECKMATE
WINCH MAN (stern winch or dredge)
BARGE MAN; Deckhand; Fireman;
Oiler; Leveehand

(CLAM SHELL DREDGES)

LEVERMAN
WATCH ENGINEER
DECKMATE
BARGE MAN
BARGE MAN; Deckhand; Fireman;
Oiler

Basic Hourly Rates	Pringo Benefits Payments			
	H & V	Pensions	Vacation	App. Tr.
\$10.27	.95	1.75	.30	.04
9.72	.95	1.75	.30	.04
9.27	.95	1.75	.30	.04
9.20	.95	1.75	.30	.04
8.69	.95	1.75	.30	.04
10.27	.95	1.75	.30	.04
9.72	.95	1.75	.30	.04
9.27	.95	1.75	.30	.04
9.20	.95	1.75	.30	.04
8.69	.95	1.75	.30	.04

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POWER EQUIPMENT OPERATORS
(Except Piledriving and Steel
Erection)

Group 1:
Group 2:
Group 3:
Group 4:
Group 5:
Group 6:
Group 7:
Group 8:
Group 9:

TRUCK DRIVERS

Group 1:
Group 2:
Group 3:
Group 4:
Group 5:
Group 6:
Group 7:
Group 8:
Group 9:
Group 10:
Group 11:
Group 12:
Group 13:
Group 14:
Group 15:
Group 16:

Basic Hourly Rates	Pringo Benefits Payments			
	H & V	Pensions	Vacation	App. Tr.
\$8.52	.95	1.75	.30	.04
8.79	.95	1.75	.30	.04
9.06	.95	1.75	.30	.04
9.19	.95	1.75	.30	.04
9.40	.95	1.75	.30	.04
9.50	.95	1.75	.30	.04
9.62	.95	1.75	.30	.04
9.78	.95	1.75	.30	.04
9.90	.95	1.75	.30	.04
8.07	1.00	.65	1.00	.10
8.15	1.00	.65	1.00	.10
8.21	1.00	.65	1.00	.10
8.30	1.00	.65	1.00	.10
8.33	1.00	.65	1.00	.10
8.35	1.00	.65	1.00	.10
8.39	1.00	.65	1.00	.10
8.40	1.00	.65	1.00	.10
8.45	1.00	.65	1.00	.10
8.48	1.00	.65	1.00	.10
8.53	1.00	.65	1.00	.10
8.55	1.00	.65	1.00	.10
8.60	1.00	.65	1.00	.10
8.85	1.00	.65	1.00	.10
9.10	1.00	.65	1.00	.10
9.20	1.00	.65	1.00	.10

NOTICES

POWER EQUIPMENT OPERATORS
(Except Pile-driving and Steel Erection)

Group 1: Brakeman; Compressor operator; Deck hand; Engineer oiler; Generator operator; Heavy duty repairman helper; Pump operator; Signalman; Switchman

Group 2: Concrete mixer, skip type; Conveyor; Fireman; Generator, pump or compressor, (2-5 inclusive) portal units - over 3 units, 10¢ per hour for each additional unit up to nine units; Hydrostatic pump; Oilier crusher (asphalt or concrete plant); Plant operator, generator, pump or compressor; Skiploader - wheel type up to 3/4 yd. without attachment; Tar pot fireman; Temporary heating plant operator; Trenching machine oiler; Truck crane oiler

Group 3: A-Frame or winch truck; Chainman; Elevator (inside); Equipment greaser (rack); Ford Ferguson (with dragtype attachments); Helicopter Radioman (Ground); Power concrete curing machine; Power concrete saw; Power-driven jumbo form setter; Ross carrier (jobsite); Stationary pipe wrapping and cleaning machine

Group 4: Asphalt plant fireman; Boring machine; Boxman or mixerman (asphalt or concrete); Chip spreading machine; Concrete pump (small portable); Bridge type unloader and turntable; Dinky locomotive or motorman (up to and including 10 tons); Equipment greaser (grease truck); Helicopter hoist operator; Highline cableway signalman; Hydra-hammer-aero stamper; Power sweeper; Roller (compacting); Screed (asphalt or concrete); Rodman; Trenching machine (up to 6 ft.)

Group 5: Asphalt plant engineer; Concrete batch plant operator - (oiler or journeyman - trainee required); Backhoe (up to and including 3/4 yds.); Bit sharpener; Concrete joint machine operator (canal and similar type); Concrete planer; Deck engine operator; Drilling machine (including water walls); Forklift (under 5 ton capacity); Hydrographic seeder machine (straw, pulp or seed); Instrumentman; Machine tool; Maginnis Internal Full Size Vibrator; Mechanical berm, curb or gutter (concrete or asphalt); Mechanical finisher operator (concrete Clary-Johnson-Bidwell or similar); Pavement breaker (truck mounted, oiler) Road oil mixing machine; Roller operator (asphalt or finish); Rubber tired earth moving equipment, (single engine up to and including 25 yds. struck); Self-propelled tar pipelining machine operator; Slip form pump (power driven hydraulic lifting device for concrete forms); Tugger hoist (1 drum); Tunnel locomotive operator (over 10 and up to and including 30 tons); Stinger crane (Austin - Western or similar type); Skiploader operator (crawler and wheel type over 3/4 yd. and up to and including 1 1/2 yds.); Tractor operator, Bulldozer, Tamper, Scraper (single engine, up to 100 h.p. flywheel and similar types, up to and including D-5 and similar types); Welder - general

POWER EQUIPMENT OPERATORS (Cont'd)
(Except Pile-driving and Steel Erection)

Group 6: Asphalt or concrete spreader (tamping or finishing); Asphalt paving machine (Barber Green or similar type - 2 screedman required); BHL Lima Road Factor, Wagner Factor or similar; Bridge crane operator; Cast in place pipe laying machine operator; Combination mixer and compressor (gunite work); Compactor, self-propelled operator; Concrete pump (truck mounted) (oiler required); Concrete mixer operator - paving; Crane operator (up to and including 25 ton capacity); Crushing plant operator; Elevating grader; Forklift (over 5 tons); Grade checker; Gradall operator; Grouting machine; Heading shield; Heavy duty repairman; Hoist operator (Chicago boom and similar type); Kolman belt loader and similar type; Le-Tourneau blob compactor or similar type; Lift slab machine (Vagtbord and similar types); Lift mobile operator, Loader operator (Athey, Euclid, Sierra and similar type); Material hoist; Mucking machine (1 1/2 yd. rubber-tired, rail or track type); Pneumatic concrete placing machine (Hackley-Presswell or similar type); Pneumatic heading shield (tunnel); Pumpcrete gun; Rubber-tired earth moving equipment, (single engine - Caterpillar, Euclid, Athey, Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 cu. yds. struck); Rubber-tired scraper (self-loading-paddle wheel type); Skiploader (crawler and wheel type over 1-1/2 yds., up to and including 6-1/2 yds.); Self-propelled curb and gutter machine; Surface heaters and planer; Rubber-tired earth moving equipment, multiple engine, (up to and including 25 yds. struck); Trenching machine (over 6 ft. depth capacity, manufacturer's rating); Tower crane; Tractor compressor drill combination; Tractor (any type larger than D-5-100 Flywheel HP and over or similar) (Bulldozer, tamper, scraper, and push tractor, single engine); Tractor boom attachments; Traveling pipe wrapping, cleaning and bending machine; Tunnel locomotive (over 30 tons); Shovel, Backhoe, Dragline, Clamshell (over 3/4 yds. and up to 5 cu. yds. M.R.C.

Group 7: Crane - over 25 tons up to and including 100 tons; Derrick barge; (Long boom pay applicable); Dual drum mixer; Heavy duty repairman-welder combination; Hoist operator; Stiff Legs, Guy Derricks or similar type up to and including 100 tons (Long boom pay applicable); Minorail locomotive (Diesel, gas or electric); Motor patrol - blade (single engine); Multiple engine tractor (Euclid and similar type, except Quad 9 cat.; Party Chief; Rubber-tired earth moving equipment, single engine over fifty (50) yds. struck; Rubber-tired earth moving equipment (multiple engine, Euclid, Caterpillar and similar) (over 25 yds. and up to 50 cu. yds. struck); Tractor loader (crawler and wheel type over 6-1/2 yds.); Tower crane repairman; Shovel, Backhoe, Dragline, Clamshell (over 5 cu. yds.; M.R.C.; (Long Boom pay applicable); Wood mixer and similar pugmill equipment

Group 8: Auto grader operator; Automatic slip form; Crane - over 100 tons (Long Boom pay applicable); Hoist, Stiff legs, Guy Derricks or similar types (cable of hoisting 100 tons or more) (Long boom pay applicable); Mass excavator; Mechanical finishing machine; Mobile Farm Traveler Operator; Motor

POWER EQUIPMENT OPERATORS (Cont'd)
(Except Pile-driving and Steel Erection)

patrol (Multi-engine); Pipe mobile machine; Rubber-tired earth moving equipment (multiple engine, Euclid, Caterpillar and similar type over 50 cu. yds. struck); Rubber-tired scraper (Push-pull) (.50¢ per hour additional to base rate); Rubber-tired self-loading scraper operator (Paddle wheel-auger type, self-loading - 2 or more units); Tandem equipment operators (2 units only); Tandem tractor operator (Quad 9 or similar type); Tunnel mole boring machine operator

Group 9: Canal liner; Canal trimmer; Helicopter pilot; Highline Cableway; Rubber-tired self-loading scraper (paddle wheel-Auger type self-loading - 2 or more units); Wheel excavator (over 750 cu. yds.); Remote controlled earth moving equipment operator (\$1.00 per hour additional)

TRUCK DRIVERS

Group 1: Warehouseman and Teamster

Group 2: Driver or vehicle or combinations of vehicles of 2 axles (including all vehicles less than six tons); Traffic Control Pilot Car, excluding moving heavy equipment permit load

Group 3: Truck mounted Power Broom

Group 4: Drivers of vehicles or combination of vehicles of 3 axles

Group 5: Bootman; Cement Distributor; Fuel Truck; Road Oil Spreader Truck; Water Truck, 2 axle

Group 6: Dump, of less than 16 yards

Group 7: Transit-mix, under 3 yards; Dumpcrete, less than 6 1/2 yards

Group 8: Truck Repairman Helper

Group 9: Water Truck, 3 or more axles

Group 10: PB and similar type truck when performing within the Teamsters' jurisdiction; Pipeline and utility working truck including winch, but limited to truck applicable to Pipeline and Utility work, where a composite crew is used; Slurry Driver; Truck Greaser and Tireman (50¢ per hour additional for Tireman)

Group 11: Transit-mix, 3 yards or more; Dumpcrete, 6 1/2 yards and over

Group 12: Driver of vehicle or combination of vehicles of 4 or more axles

Group 13: Dump, 16 yards but less than 25 yards

Group 14: A-Frame or Swedish Crane, or similar type of equipment driver; Fork Lift Driver; Ross Carrier, highway

Group 15: All-off-highway equipment within Teamsters Jurisdiction (off highway combination of vehicles or equipment with multiple power sources, \$1.00 per hour additional); Dump, 25 yards or more; Truck Repairman

Group 16: Truck Repairman Welder

MODIFICATIONS P. 1

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
DECISION #AL75-1086 - Mod. #3 (40 FR 4146 - September 26, 1975) Jefferson and Shelby Counties, Alabama	\$ 9.75	.40	.65	.10	.07
CHANGE: Plumbers; Pipefitters					
DECISION NO. CA75-5148 - Mod. #1 (40 FR 58016 - December 12, 1975) Imperial, Inyo, Kern, Los Angeles, Mono, Orange, River- side, San Bernardino, San Luis Obispo, Santa Barbara and Ventura, California	\$ 7.71	.85	1.65	.50	.10
Add: Laborers: Pipelayers (non-metallic in- cluding Sewer, Drain and Underground Tile); Prefab- ricated Manhole Installers					
DECISION # FL75-1087 - Mod. # 2 (40 FR 4156) - September 5, 1975) Brevard and Volusia (Cape Kennedy, Kennedy Space Flight Center and Patrick Air Force Base and including Melrose Radar Site) Florida	9.90	.49	.51	.05	
Change: Plumbers					

MODIFICATIONS P. 2

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
DECISION #IA75-4177 - Mod. #2 (40 FR 50891 - October 31, 1975) Folk County, Iowa	\$9.355				
Change: Building Construction: Cement masons					
DECISION #IA75-4179 - Mod. #2 (40 FR 50897 - October 31, 1975) Story County (City of Ames & abutting municipalities), Iowa	9.355				
Change: Building Construction: Cement masons					

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MODIFICATION P. 1

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
DECISION NO. CA75-5148 - Mod. #2					
(40 FR 58016 - December 12, 1975)					
Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara and Ventura Counties, California					
Change:					
Electricians:					
Kern (China Lake Naval Ordnance Test Station, Edwards AFB)					
Electricians; Technicians	\$ 13.30	.70	IX + \$1.25		
Cable Splicers	14.63	.70	IX + 1.25	.15	.15
Kern County (Remainder of County)					
Electricians; Technicians	10.80	.70	IX + 1.25	.15	.15
Cable Splicers	11.88	.70	IX + 1.25	.15	.15
Los Angeles County					
Electricians; Technicians	11.44	.80	IX + 1.55	.02	.02
Cable Splicers	11.74	.80	IX + 1.55	.02	.02
Traffic Signal & Street Lighting:					
Electricians	11.44	.80	IX + 1.55	.02	.02
Utility Technician No. 1	8.58	.80	IX + 1.55	.02	.02
Utility Technician No. 2	8.01	.80	IX + 1.55	.02	.02
Tunnel:					
Electricians	12.58	.80	IX + 1.55	.02	.02
Cable Splicers	12.88	.80	IX + 1.55	.02	.02
Sound Technicians:					
Sound Technicians (on new building construction)	11.07	.50	IX		
Sound Technicians (on modification of existing buildings)	8.71	.50	IX		
Riverside County					
Electricians	10.71	.60	IX + 1.25	.04	.04
Cable Splicers	11.01	.60	IX + 1.25	.04	.04

MODIFICATION P. 2

DECISION NO. CA75-5148 (Cont'd)	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
Electricians: (Cont'd)					
San Luis Obispo County					
Electricians	\$ 10.98	.88	IX + 1.15		.03
Cable Splicers	12.08	.88	IX + 1.15		.03
Ventura County					
Electricians	11.78	.84	IX + .80		.02
Cable Splicers	12.96	.84	IX + .80		.02
Ironworkers:					
Fence Erectors	9.64	\$ 1.03	\$1.65	\$ 1.10	.03
Reinforcing	10.53	1.03	1.65	1.10	.03
Ornamental, Structural	10.53	1.03	1.65	1.10	.03
Line Construction:					
Los Angeles County:					
Groundmen	8.83	.71	IX		
Linemen	11.77	.71	IX		
Cable Splicers	12.07	.71	IX		
Riverside County:					
Groundmen	8.05	.60	IX + 1.25		.04
Linemen; Line Equipment					
Operators	10.73	.60	IX + 1.25		.04
Cable Splicers	11.03	.60	IX + 1.25		.04
Painters:					
Imperial, Orange, Riverside, Los Angeles (Pomona Area), San Bernardino (excluding Western portion)					
Brush; Paint burners	9.82	.74	1.10	.75	.07
Paperhangers; Iron, steel and bridge (swing stage); Sheetrock tapers	10.32	.74	1.10	.75	.07
Brush (swing stage); Spray	10.57	.74	1.10	.75	.07
Steeplejack	11.22	.74	1.10	.75	.07
Inyo, Kern (Lancaster), Mojave, Palmdale, China Lake Naval Ordnance Test Station and Edwards AFB, Los Angeles (except Pomona Area), Mono, San Bernardino (West of a line North in Trono incl. China Lake Area, Johannesburg, Boron South					

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MODIFICATION P. 3

DECISION NO. CA75-5146 (Cont'd)	Basic Hourly Rate	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
Painters: (Cont'd) including the Wrightwood Area					
Brush	10.27	.41	.50	.50	.01
Structural steel & bridge; Paint burner	10.39	.41	.50	.50	.01
Tapers	10.72	.41	.50	.50	.01
Brush (swing stage (13 stories or less); Paper hangers; Sandblasters; Spray	10.52	.41	.50	.50	.01
Brush (swing stage) over 13 stories	10.64	.41	.50	.50	.01
Structural steel & bridge, swing (13 stories or less)	10.67	.41	.50	.50	.01
Spray sandblaster swing stage (13 stories or less); Paste machine; Special coatings, spray	10.77	.41	.50	.50	.01
Steeplejack	11.52	.41	.50	.50	.01
Parking Lot Striping Work and/or Highway Markers: Inyo and Mono Counties					
Striper	9.37	.45	.30	b	
Striper Helper	7.87	.45	.30	b	
Traffic Delineating Device Applicator; Wheel Stop Installer; Traffic Surface Sandblaster	8.27	.45	.30	b	
Helper (traffic delineating device applicator, wheel stop installer, traffic surface sandblaster)	7.37	.45	.30	b	
Remaining Counties					
Traffic Delineating Device Applicator	8.27	.45	.30	b	
Striper; Wheel Stop Installer; Traffic Surface Sandblaster	7.88	.45	.30	b	

MODIFICATION P. 4

DECISION NO. CA75-5146 (Cont'd)	Basic Hourly Rate	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
Helper (striper, wheel stop installer, traffic surface sandblaster)	\$6.48	.45	.30	b	
Plumbers; Steamfitters: Inyo, Kern (Except East of Los Angeles Aqueduct) and Mono Counties	10.53	.95	1.60	1.00	.17
Kern County (East of the Los Angeles Aqueduct)	13.03	.95	1.60	1.00	.17
Sheet Metal Workers: San Luis Obispo, Santa Barbara and Ventura Counties	11.00	.94	1.60		
Imperial County	11.25	.94	1.90		
Sprinkler Fitters: Los Angeles (Los Angeles City and area within 25 miles and Pomona), Orange (Santa Ana), San Bernardino (Ontario) and Ventura (Santa Paula, Point Mugu and Fort Huenceme)	13.86	.56	.80		.09
Tile Setters: Los Angeles, Orange and Ventura Counties	10.79	.695	.80		.06
Add: Parking Lot Striping and/or Highway Markers - Inyo and Mono Counties:					
Slurry Seal Operation					
Mixer Operator	8.27	.45	.30	b	
Squeegee Man	7.77	.45	.30	b	
Applicator Operator	7.37	.45	.30	b	
Shuttleman	6.30	.45	.30	b	
Top Man	5.87	.45	.30	b	

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MODIFICATION P. 5

MODIFICATION P. 6

DECISION NO. CA73-3148 (Cont'd)

Remaining Countless
Slurry Seal Operation
Mixer Operator
Squeegee Man
Applicator Operator
Shuttleman
Top Man

Basic Hourly Rates	Fringe Benefits Payments			
	H & W	Pensions	Vacation	Education and/or Appr. Tr.
\$7.88	.45	.30	b	
6.88	.45	.30	b	
6.48	.45	.30	b	
6.30	.45	.30	b	
5.48	.45	.30	b	

Footnote:

b. Employer contributes \$.21 per hour to Holiday Fund plus \$.12 per hour to Vacation Fund for the first year of employment, 1 year but less than 5 years \$.32 per hour to Vacation Fund, 5 years but less than 10 years \$.42 per hour to Vacation Fund; over 10 years \$.52 per hour to Vacation Fund.

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Basic Hourly Rates	Fringe Benefits Payments			
	H & W	Pensions	Vacation	Education and/or Appr. Tr.
\$13.30	.75	12+1.25		.15
14.63		12+1.25		.15
10.80	.60	12+1.25		.15
11.88	.70	12+1.25		.15
11.74	.80	12+1.55		.06
11.74	.80	12+1.55		.02
10.71	.60	12+1.25		.04
12.01	.60	12+1.25		.04
10.98	.88	12+1.15		.03
12.08	.88	12+1.15		.03
11.78	.84	12+.80		.02
12.96	.84	12+.80		.02
9.64	1.03	1.65	1.10	.03
10.53	1.03	1.65	1.10	.03
10.53	1.03	1.65	1.10	.03
9.82	.74	1.10	.75	.07

Change:

Electricians:
Kern (China Lake Naval Ordnance Test Station, Edwards AFB):
Electricians; Technicians
Cable Splicers
Kern County (Remainder of County):
Electricians; Technicians
Cable Splicers
Los Angeles County:
Electricians; Technicians
Cable Splicers
Riverside County:
Electricians
Cable Splicers
San Luis Obispo County:
Electricians
Cable Splicers
Ventura County:
Electricians
Cable Splicers
Ironworkers:
Fence Erector
Reinforcing
Ornamental; Structural
Painters:
Imperial, Orange, Riverside, Los Angeles (Pomona Area), San Bernardino (excluding Western portion):
Brush; Paint Burners

1.2.6. Staking Out Work

a. Lines and grades.--The contracting officer will establish lines and grades required for proper execution of the work.

The contractor shall, without additional cost to the Government give such assistance and provide such drill holes, forms, ladders, spikes, nails, and lumber as may be required by the contracting officer in establishing lines and grades. The contractor shall adjust his construction operations at such points and for such reasonable time as may be necessary to assist with the work of transferring lines and marking points for line and grade.

The Government will provide only the minimum of survey crew services essential to orderly performance of the work, and Government survey crews will not be available at all times for the work under these specifications. The contractor shall keep the contracting officer, advised on a current basis, of construction survey requirements so that survey work may be coordinated with the contractor's sequence of operations.

b. Replacement of survey stakes.--Where construction operations require removal of the Government's stakes or other survey marks, the contractor shall reference such points in an approved manner. Survey stakes or marks established by the Government shall be preserved by the contractor unless he is authorized to remove them, and in case of their destruction or removal by the contractor's forces, they will be replaced by the Government at the contractor's expense. The actual cost to the Government of replacing survey stakes or marks will be deducted from payments due the contractor. Such actual cost will include a reasonable charge for use of Government supplies and equipment plus 15 percent overhead as provided elsewhere in these specifications.

1.2.7. Performance and Supervision of Work by Contractor

a. Performance of work.--The contractor shall perform on the site and with his own organization and forces on his payroll, work equivalent to at least 20 percent of the total amount of construction work at the site. The cost of contractor-furnished material and equipment incorporated in the work shall not be included in computing the total amount of construction work at the site.

b. Supervision of work.--If the contractor does not give personal superintendence to the work at all times during its progress, he shall provide a superintendent fully authorized to act in his behalf, as required under Clause No. 11 of the General Provisions. Said superintendent shall be an employee of the contractor and on the contractor's payroll. The superintendent shall give personal supervision to the work, including coordinating, directing, and expediting of all subcontracted work, until completion of all work under the contract. All directions given to such superintendent shall be considered as given to the contractor and shall be binding on the contractor.

Par. 1.3.1.

SECTION 1.3--PAYMENTS AND ADJUSTMENTS

1.3.1. Funds Available for Earnings

Funds for earnings under this contract will be made available as provided in this paragraph.

a. Funds have been reserved to finance the estimated face value of the contract during the current fiscal year. The contractor will be notified of the amount so reserved.

b. As to any work which may be done in excess of the amount for which funds have been reserved under the provisions of this paragraph, the liability of the United States is contingent upon the necessary appropriations being made therefor by the Congress and an appropriate reservation of funds thereunder. Further, the Government shall not be liable for damages under this contract on account of delays in payments due to lack of funds.

c. If at any time the contracting officer finds that the balance of this reservation is in excess of the estimated amount required to meet all payments due and to become due the contractor because of work performed or to be performed prior to the beginning of the next fiscal year, the right is reserved to reduce said reservation by the amount of such excess. The contractor will be notified in writing of any such reduction.

d. If the rate of progress of the work is such that the contracting officer finds that the balance of the reservation is less than the estimated amount required to meet all payments due and to become due because of work performed prior to the beginning of the next fiscal year, the Government may reserve additional funds for payments under this contract if there are funds available for such purpose. The contractor will be notified in writing of such additional reservation.

e. Should it become apparent to the contractor that existing fund reservations will be exhausted within the next 30 days, and before completion of work under this contract, the contractor shall at that time give written notice thereof to the contracting officer. If additional funds can be made available, the contracting officer may issue an additional fund reservation as provided for in Subparagraph d. hereof. It is expressly understood, however, that the Government has no obligation to provide funds in addition to those already reserved. The contractor is also cautioned that the prosecution of the work at a rate that will exhaust the funds reserved before completion of the contract work will be at his own risk. If additional funds cannot be made available, the contracting officer will give written notice thereof to the contractor. If at any time funds are being made available by appropriations for interim periods prior to the enactment of an

Appropriation Act, the contractor will be so advised in writing in which case the other notice requirements of this subparagraph will not apply.

If the contractor so elects, he may continue work under the conditions and restrictions of the specifications after funds have been exhausted, so long as there are funds for inspection and supervision, concerning which he will be notified in writing. No payment will be made for any work done after funds have been exhausted unless and until sufficient additional funds have been provided by the Congress. When funds again become available, the contractor will be notified in writing as to the amount thereof reserved for payments under this contract. The amount so reserved shall be subject to decrease or increase as that provided in Subparagraphs c. and d. hereof: Provided, That, if the contractor so elects, the work may be suspended when the available funds have been exhausted. Should work be thus suspended, additional time for completion will be allowed equal to the period during which the work is necessarily so suspended.

f. The procedure above described in this paragraph shall be repeated as often as necessary on account of exhaustion of available funds and the necessity of awaiting the appropriation of additional funds by Congress.

g. Should Congress fail to provide the expected additional funds during its regular session, the contract may, at the option of the contractor, by written notice, be terminated and considered to be completed without prejudice to him or liability to the Government at any time subsequent to 30 days after payments are discontinued, or subsequent to 30 days after passage of the Act which would ordinarily carry an appropriation for continuing the work, or after adjournment of the Congress which failed to make the necessary appropriations.

1.3.2. Progress Payments

Estimates for progress payments as provided in Clause No. 7 of the General Provisions, will include items of materials delivered on the site which will become a part of the finished construction work and for which the contractor presents satisfactory evidence that he has acquired title to such materials. Invoices receipted by the supplier showing that payment in full has been made, or certificates from both the contractor and the supplier warranting that full title to the materials is vested in the contractor and that the materials are free of liens and encumbrances, will be accepted as satisfactory evidence that the contractor has acquired title to the materials. No consideration, however, will be given to individual purchases of less than three hundred dollars (\$300) for any one item. At the discretion of the contracting officer, progress payments may also include materials delivered to the contractor in whole or in part at locations other than the site, including his supplier's plant or plants, subject to the above provisions. No consideration will be given to any other preparatory work done.

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Clause No. 7(c) of the General Provisions provides for payment without retention of a percentage on completion and acceptance of each separate building, public work, or other division of the contract on which the price is separately stated in the contract. Any separate building, public work, or other division of the contract which is intended to come under this provision of Clause No. 7(c) will be specifically so identified elsewhere in the contract.

After completion of work, and prior to final payment, the contractor shall furnish to the contracting officer, a release of claims against the United States arising out of the contract, other than claims specifically excepted from the operation of the release.

1.3.3. Quantities and Prices

The quantities stated in the schedule are estimated quantities for comparison of bids, and no claim shall be made against the Government for excess or deficiency therein. Payment at the unit or lump-sum prices agreed upon will be in full for the completed work and will cover materials, supplies, transportation, labor, tools, machinery, and all expenditures incident to satisfactory compliance with the contract, unless otherwise specifically provided.

1.3.4. Backcharges to Contractor

Where these specifications provide for charges to the contractor for costs incurred by the Government for services, materials, or use of equipment, such charges will include the costs of labor and materials, a reasonable allowance for use of plant and equipment, and other expenditures which can be directly assigned to the services or materials furnished, plus 15 percent of such total costs for Government overhead.

In the event of termination of the contract for default under Clause No. 5 of the General Provisions the increased costs occasioned the Government in completing the work thereunder shall include those administrative costs which are necessary for and directly assignable to completing the work following such termination and which would not have been required had termination not been necessary. In addition, the Government shall be entitled to 15 percent of the total of such administrative costs for Government overhead.

1.3.5. Contract Adjustments

a. General.--If the contractor requests adjustment under Clauses No. 3, 4, or 17 of the General Provisions of this contract, the contractor shall submit sufficient data to establish his entitlement to adjustment thereunder. Insofar as possible, prices will be negotiated in advance for adjustments under Clauses No. 3, 4, and 17. Such prices may be lump sums, unit prices, or other agreed rates for properly allocated charges which may include such items as labor, material, equipment ownership and operation, rental of equipment not owned by the contractor, and plant, overhead, or other proper indirect expense. Allowable costs in price adjustments shall be made in

accordance with the cost principles stated in Part 1-15 of the Federal Procurement Regulations (41 CFR 1-15) except that equipment ownership and operation expense shall be computed in accordance with the paragraph included in these specifications entitled "Equipment Ownership and Operation Expense." Where the amount of the adjustment is not agreed upon in advance, the contractor shall keep sufficient records and data to establish the cost of the work in accordance with the requirements of 41 CFR Part 1-15.

b. Availability of records.--For the purpose of determining the amount allowable for contract adjustments, pursuant to 41 CFR Sec. 1-3.809, the contracting officer, through his authorized agents, shall have access to all payrolls, records of personnel, invoices of materials, records of plant and equipment, and any and all other data relevant to the performance of the contract or necessary to determine its costs. Where it is determined to be necessary for computation of the proper amount of an adjustment, the contractor shall furnish any pertinent part of his original bid computations and supporting documents thereto.

c. Indirect cost and profit.--Allowances for indirect cost (overhead) shall be made where appropriate. (See 41 CFR Sec. 1-3.807.11.) There shall be no duplication of direct costs in any allowance for indirect cost. Allowances for profit shall be made where appropriate under these clauses pursuant to the principles stated in 41 CFR Sec. 1-3.808. An amount for interest (including any paid for capital investments) may be considered in establishing an allowable amount of profit. Where adjustments are allowed for performance wholly or substantially by subcontractors or suppliers, such adjustments may include an allowance for the prime contractor's indirect cost and profit shall not exceed 10 percent of the adjustment allowed for the subcontractor or supplier. Where more than one tier of subcontractors or suppliers are involved in the performance, the total allowance for indirect cost and profit allowed for each tier shall not exceed 10 percent of the adjustment allowed for the subcontractor or supplier who wholly or substantially performs the work.

d. Truth in negotiation.--The provisions of the "Truth in Negotiation" regulations (41 CFR Part 1-3) are applicable to any modification of this contract exceeding \$100,000 in amount.

1.3.6. Equipment Ownership and Operation Expense

a. General.--Adjustments allowed under Clause No. 3 or 4 of the General Provisions of this contract may include allowances for ownership of equipment owned by the contractor or any subcontractor and available at the site of the work. It will be normally anticipated that allowances for equipment ownership will be made in accordance with the tables in the "Contractors' Equipment Manual" in effect on the date of the contract, as published by the Associated General Contractors of America, except as herein modified. However, for contract modifications over \$100,000 the contracting officer may, at his option, compute allowances for equipment ownership expense based on actual cost records complying with 41 CFR Parts 1-3.8 and 1-15.

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It is to be understood that allowances for equipment ownership and operating expense as herein provided are for only equipment in good operating condition. If the AGC tables are generally used for an adjustment, rates allowed for equipment ownership expense for the use of items of equipment not listed by the AGC will be established by agreement or by the contracting officer by comparison with items which are listed in the AGC tables. The contractor shall furnish a complete description of each item of equipment which is involved in any request for adjustment, listing the make, model, size, capacity, mounting, type of power, and any and all accessory equipment which is attached thereto for the particular work to be performed. The contractor shall furnish acceptable evidence of his acquisition cost for the equipment. If used equipment is reconditioned and recapitalized, its acquisition cost may be adjusted accordingly. If acceptable evidence to determine acquisition cost is not supplied, the contracting officer may determine the value by use of national publications which list current average equipment values or such other means as he deems appropriate.

b. Equipment ownership allowances.--Allowances for equipment ownership will be determined using the AGC Manual as follows:

(1) Depreciation.--The expense per working hour for depreciation will be determined by multiplying the acquisition cost by the percentage given in the column "Depreciation" and dividing by the number listed in the column "Average Use Hours Per Year" modified as necessary to reflect experience at the individual project area. In accordance with the last sentence in the first paragraph of Subparagraph a. above, consideration will be given to shorter periods of depreciation writeoff than provided in the AGC Manual if the contractor supplies sufficient data to establish his entitlement thereto, pursuant to 41 CFR Sec. 1-15.205-9.

(2) Taxes, insurance, and incidentals.--The expense per working hour for taxes, insurance, and incidentals will be determined by multiplying the acquisition cost by 3 percent and dividing by the average number of hours use per year determined as in (1) above. The amount allowed hereunder shall not be duplicated in any general allowance for overhead.

(3) Interest on investment and replacement cost escalation.--No allowance is made under this paragraph for interest on investment (see 41 CFR Sec. 1-15.205-17) or for replacement cost escalation.

The sum of allowances for depreciation, taxes, insurance, and incidentals computed in accordance with the above criteria shall constitute the hourly cost of ownership of equipment.

c. Idle time.--Ownership expense allowance for idle time of equipment allowed under Clauses No. 3 and 4 will be made on the basis of 50 percent of the hourly rate. A maximum of 40 hours per week will be allowed. No allowance will be made for Saturdays, Sundays, or holidays, when work is

not actually performed. This 50 percent factor shall be applied to ownership rates allowed for working time. Periods of time less than 2 hours on which equipment is down for normal and regular servicing and for minor field repair or field maintenance shall be considered as operating rather than idle time and such periods will not be deducted from use or operating time. No allowance will be made for idle time for equipment which is not in good operating condition. This paragraph shall not apply to adjustments under Clause No. 17.

d. Small tools.--Small tools shall mean all items having a replacement value of less than \$400. For modifications in excess of \$100,000 small tool allowances shall be made based on information furnished by the contractor. For contract modifications amounting to \$100,000 or less, at the option of the contracting officer, an allowance for small tools not to exceed 5 percent of direct labor may be made where appropriate.

e. Equipment ownership expense under Clause No. 17.--Allowances for equipment ownership under Clause No. 17 shall be made on the basis of depreciation only, based on acceptable evidence thereof furnished by the contractor.

f. Equipment operating expense.--Allowances for the cost of operating equipment such as operating crew labor, servicing labor and equipment, labor and parts for all repairs, fuel, oil, grease, and supplies will be made in addition to the amounts allowed for equipment ownership expense. Equipment operating expense allowances shall be based on the contractor's cost records or other sources complying with 41 CFR Parts 1.3-8 and 1-15 as approved by the contracting officer. For forward-priced adjustments, operating expense figures developed for use by the contractor in estimating or bidding generally from historical accounting records or actual cost experience under this contract will be accepted if evidence thereof satisfactory to the contracting officer is furnished.

1.3.7. Price Reduction for Defective Cost or Pricing Data - Price Adjustments

a. This paragraph shall become operative only with respect to any modification of this contract which involves aggregate increases and/or decreases in costs plus applicable profits in excess of \$100,000 unless the modification is priced on the basis of adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation. The right to price reduction under this paragraph is limited to defects in data relating to such modification.

b. If any price, including profit or fee, negotiated in connection with any price adjustment under this contract was increased by any significant sums because:

(1) The contractor furnished cost or pricing data which was not accurate, complete, and current as certified in the contractor's Certificate of Current Cost or Pricing Data;

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(2) A subcontractor, pursuant to the paragraph of this contract entitled "Subcontractor Cost or Pricing Data--Price Adjustments" or any subcontract paragraph therein required, furnished cost or pricing data which was not accurate, complete, and current as certified in the subcontractor's Certificate of Current Cost or Pricing Data;

(3) A subcontractor or prospective subcontractor furnished cost or pricing data which was required to be accurate, complete, and current and to be submitted to support a subcontract cost estimate furnished by the contractor but which was not accurate, complete, and current as of the date certified in the contractor's Certificate of Current Cost or Pricing Data; or

(4) The contractor or a subcontractor or prospective subcontractor furnished any data, not within (1), (2), or (3) above, which was not accurate, as submitted;

the price shall be reduced accordingly and the contract shall be modified in writing as may be necessary to reflect such reduction. However, any reduction in the contract price due to defective subcontract data of a prospective subcontractor, when the subcontract was not subsequently awarded to such subcontractor, will be limited to the amount (plus applicable overhead and profit markup) by which the actual subcontract, or actual cost to the contractor if there was no subcontract, was less than the prospective subcontract cost estimate submitted by the contractor: Provided, the actual subcontract price was not affected by defective cost or pricing data.

(Note: Since the contract is subject to reduction under this paragraph by reason of defective cost or pricing data submitted in connection with certain subcontracts, it is expected that the contractor may wish to include a paragraph in each such subcontract requiring the subcontractor to appropriately indemnify the contractor. It is also expected that any subcontractor subject to such indemnification will generally require substantially similar indemnification for defective cost or pricing data required to be submitted by his lower tier subcontractors.)

c. Failure to agree on a reduction shall be a dispute concerning a question of fact within the meaning of the "Disputes" clause of this contract.

1.3.8. Audit

a. General.--The contracting officer or his representatives shall have the audit and inspection rights described in the applicable Subparagraphs b., c., and d. below.

b. Examination of costs.--If this is a cost-reimbursement-type, incentive, time-and-materials, labor-hour, or price-redeterminable contract, or any combination thereof, the contractor shall maintain, and the contracting officer or his representatives shall have the right to examine books, records, documents, and other evidence and accounting procedures and

practices, sufficient to reflect properly all direct and indirect costs of whatever nature claimed to have been incurred and anticipated to be incurred for the performance of this contract. Such right of examination shall include inspection at all reasonable times of the contractor's plants, or such parts thereof, as may be engaged in the performance of this contract.

c. Cost or pricing data.--If the contractor submitted cost or pricing data in connection with the pricing of this contract or any change or modification thereto, unless such pricing was based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation, the contracting officer or his representatives who are employees of the United States Government shall have the right to examine all books, records, documents, and other data of the contractor related to the negotiation, pricing, or performance of such contract, change, or modification, for the purpose of evaluating the accuracy, completeness, and currency of the cost or pricing data submitted. Additionally, in the case of pricing any change or modification exceeding \$100,000 to formally advertised contracts, the Comptroller General of the United States or his representatives who are employees of the United States Government shall have such rights. The right of examination shall extend to all documents necessary to permit adequate evaluation of the cost or pricing data submitted, along with the computations and projections used therein.

d. Availability.--The materials described in Subparagraphs b. and c. above, shall be made available at the office of the contractor, at all reasonable times, for inspection, audit, or reproduction, until the expiration of 3 years from the date of final payment under this contract or such lesser time specified in Part 1-20 of the Federal Procurement Regulations (41 CFR Part 1-20) and for such longer period, if any, as is required by applicable statute, or by other clauses of this contract, or by (1) and (2) below:

(1) If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for a period of 3 years from the date of any resulting final settlement.

(2) Records which relate to appeals under the "Disputes" clause of this contract, or litigation or the settlement of claims arising out of the performance of this contract, shall be made available until such appeals, litigation, or claims have been disposed of.

e. The contractor shall insert a paragraph containing all the provisions of this paragraph, including this Subparagraph e., in all subcontracts hereunder except altered as necessary for proper identification of the contracting parties and the contracting officer under the Government prime contract.

1.3.9. Subcontractor Cost or Pricing Data - Price Adjustments

a. Subparagraphs b. and c. of this paragraph shall become operative only with respect to any modification made pursuant to one or more provisions of

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this contract which involves aggregate increases and/or decreases in costs plus applicable profits expected to exceed \$100,000. The requirements of this paragraph shall be limited to such modifications.

b. The contractor shall require subcontractors hereunder to submit cost or pricing data under the following circumstances:

(1) Prior to the award of any subcontract, the amount of which is expected to exceed \$100,000 when entered into;

(2) Prior to the pricing of any subcontract modification which involves aggregate increases and/or decreases in costs plus applicable profits expected to exceed \$100,000; except where the price is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation.

c. The contractor shall require subcontractors to certify that to the best of their knowledge and belief the cost or pricing data submitted under Subparagraph b. above is accurate, complete, and current as of the date of agreement on the negotiated price of the subcontract or subcontract change or modification.

d. The contractor shall insert the substance of this paragraph including this Subparagraph d. in each subcontract which exceeds \$100,000.

1.3.10. Examination of Records by Comptroller General

a. This clause is applicable if the amount of this contract exceeds ten thousand dollars (\$10,000) and was entered into by means of negotiation, including small business restricted advertising, but is not applicable if this contract was entered into by means of formal advertising.

b. The contractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until expiration of 3 years after final payment under this contract or such lesser time specified in the Federal Procurement Regulations Part 1-20, have access to and the right to examine any directly pertinent books, documents, papers, and records of the contractor involving transactions related to this contract.

c. The contractor further agrees to include in all his subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until expiration of 3 years after final payment under the subcontract or such lesser time specified in the Federal Procurement Regulations Part 1-20, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor, involving transactions related to the subcontract. The term "Subcontract" as used in this clause excludes (1) purchase orders not exceeding ten thousand dollars (\$10,000)

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and (2) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public.

d. The periods of access and examination described in b. and c. above, for records which relate to (1) appeals under the "Disputes" clause of this contract, (2) litigation or the settlement of claims arising out of the performance of this contract, or (3) costs and expenses of this contract as to which exception has been taken by the Comptroller General or any of his duly authorized representatives, shall continue until such appeals, litigations, claims, or exceptions have been disposed of.

1.3.11. Audit of Modifications

The "Examination of Records of Contract Modifications" clause contained in 41 CFR 14-63.104-3 shall be included in every document modifying the price to the Government when the pricing of any modification to a formally advertised or negotiated contract (whether or not cost of pricing data was required under the initial contract) involves aggregate increases and/or decreases, plus applicable profits, in excess of \$100,000.

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SECTION 1.4--MATERIALS

1.4.1. Materials to be Furnished by the Contractor

a. General.--The contractor shall furnish all materials required for completion of 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 bid 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 bid 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 the 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 favor of the Government, and where the amount involved or the importance of the substitution warrants, an order for changes will be issued, otherwise the adjustment will be handled by deduction from payments to the contractor on the basis of prices stated in the written approval. No payments in excess of prices bid in the schedule will be made because of substitution of one material for another or because of the use of one alternate material in place of another.

b. Inspection of materials.--Materials and equipment furnished by the contractor which will become a part of the completed construction work, shall be subject to inspection in accordance with Clauses Nos. 9 and 10 of the General Provisions at any one or more of the following locations as determined by the contracting officer: at the place of production or manufacture, at the shipping point, or at the site of the work. To allow sufficient time to provide for inspection, the contractor shall submit to the contracting officer, at the time of issuance, copies in triplicate of purchase orders, including drawings and other pertinent information, covering materials and equipment on which inspection will be made as advised by the contracting officer, or shall submit other evidence in the event such purchase orders are issued verbally or by letter.

The inspection of materials and equipment at any of the locations specified above or the waiving of the inspection thereof shall not be construed as

being conclusive as to whether the materials and equipment conform to the contract requirements under Clause No. 10(a) of the General Provisions, nor shall the contractor be relieved thereby of the responsibility for furnishing materials and equipment meeting the requirements of these specifications. Acceptance of all materials and equipment will be made only at the site of the work.

1.4.2. Reference Specifications and Standards

a. General.--The materials to be furnished by the contractor which are specified by reference to Federal Specifications, Federal Standards, or other standard specifications or codes shall be in compliance with the latest editions or revisions thereof in effect on the date bids are received, including any amendments or supplements. In the event of conflicting requirements between a referenced specification, standard, or code, and these specifications, these specifications shall govern.

Unless otherwise specified, all materials that will become a part of the completed work shall be new and shall conform to the Federal or other specifications and standards referred to herein. Where reference specifications numbers are designated throughout these specifications, they refer to Federal Specifications unless otherwise noted. In the event that the materials are not covered by Federal or other specifications, the materials furnished shall be of standard commercial quality. Where types, grades, or other options offered in the reference specifications are not specified in these specifications, the material furnished will be acceptable if it is in accordance with any one of the types, grades, or options offered.

The references to materials, wherein manufacturer's products or brands are specified, are made as standards of comparison only as to type, design, character, or quality of the article required, and do not restrict bidders to the manufacturer's products or to the specific brands named. It shall be the responsibility of the contractor to provide all descriptive information, test results, and other evidence as may be necessary to prove the equality of materials or products which he offers as being equal to those referenced.

Copies of the Federal Specifications may be examined at the office of the Bureau of Reclamation, Engineering and Research Center, Building 67, Denver Federal Center, Denver, Colorado, or the Regional Office, Bureau of Reclamation, Nevada Highway and Park Street (P.O. Box 427), Boulder City, Nevada 89005. Single copies of Federal Specifications required for bidding purposes may be obtained without charge at Business Service Centers of Regional Offices of the General Services Administration. Specifications, standards, and codes published by associations or other standardizing agencies should be obtained by the contractor, at his expense, directly from those agencies.

b. Addresses for obtaining reference specifications and standards.--
Addresses for obtaining some of the referenced specifications, standards,

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and codes are listed below. Information on other specifications, standards, and codes referred to in these specifications may be obtained from the Bureau of Reclamation, Engineering and Research Center, P.O. Box 25007, Denver Federal Center, Denver, Colorado 80225.

Federal Specifications and Standards--Specification Sales (3 FRSBS), Building 197, Washington Navy Yard, General Services Administration, Washington, D.C. 20407

Bureau of Reclamation Specifications--Bureau of Reclamation, Engineering and Research Center, P.O. Box 25007, Denver Federal Center, Denver, Colorado 80225

Military Specifications and Standards--Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120

Maritime Administration Specifications--Materials Section, Division of Ship Construction and Repair, Maritime Administration, Department of Commerce, Washington, D.C. 20235

AISC--American Institute of Steel Construction, Inc., 1221 Avenue of the Americas, New York, New York 10020

AISI--American Iron and Steel Institute, 150 East 42nd Street, New York, New York 10017

ANSI--American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018

ASME--American Society of Mechanical Engineers, 345 East 47th Street, New York, New York 10017

ASTM--American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103

AWS--American Welding Society, Inc., 345 East 47th Street, New York, New York 10017

AWWA--American Water Works Association, Inc., Two Park Avenue, New York, New York 10016

IEEE--Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, New York 10017

IPCEA--Insulated Power Cable Engineers Association, 192 Washington Street, Belmont, Massachusetts 02178

JIC--Joint Industrial Council, 7901 West Park Drive, McLean, Virginia 22101

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NEC--National Electrical Code, American Insurance Association, 110 William Street, New York, New York 10038

NEMA--National Electrical Manufacturers Association, 155 East 44th Street, New York, New York 10017

SAE--Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, Pennsylvania 15096

UL--Underwriters' Laboratories, Inc. 207 East Ohio Street, Chicago, Illinois 60611

1.4.3. Materials and Workmanship

As stated in Clause No. 9 of the General Provisions, materials used in the manufacture of equipment to be furnished by the contractor shall be of the most suitable grade for the purpose intended. The contractor shall be responsible for the accurate manufacture and fabrication of the equipment in accordance with the best modern practice and the requirements of these specifications notwithstanding minor errors or omissions therefrom.

Liberal factors of safety and adequate shock-absorbing features shall be used throughout the designs and especially in the design of all parts subject to stresses or shock, including alternating- and vibrating-type stresses and shock. Shock-absorbing features shall include provisions which prevent components from loosening. For all rotating parts of motors and exciters, the maximum unit stress due to runaway speed shall not exceed two-thirds of the yield point.

Unless otherwise specified, materials used in the manufacture of the equipment shall conform to applicable Federal Specifications or Federal Standards, and if there are no applicable Federal Specifications or Federal Standards, shall conform to the applicable specifications of the American Society for Testing and Materials, the Society of Automotive Engineers, or the American National Standards Institute. If the contractor for justifiable cause proposes to deviate from or to use materials not covered by the Federal Specifications or Federal Standards, he shall state the reasons for and exact nature of the deviation and shall submit for the approval of the contracting officer complete specifications for the materials that he proposes to use.

Parts shall be made accurately to standard gage where possible so as to facilitate replacement and repair. Bolts, nuts, screws, taps, pipes, and pipefittings shall be unified screw threads conforming to ANSI B1.1 and B2.1. For internal connections of individual items of equipment only, the contractor will be permitted to deviate from the American National Standards: Provided, That he furnishes a complete set of all such necessary taps and dies which might be required by the Government to facilitate repair or replacement.

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1.4.4. Weights of Metal Parts

The weights of structural steel, metalwork, metal pipe, reinforcing steel, and other metal parts, the furnishing, installing, handling, or placing of which is to be paid for on the basis of weight, will be determined by the contracting officer. The Government will not provide scales for actually weighing all of the material, but the contracting officer will determine the weight of each part or item involved in the most practicable manner and will use for this purpose railroad shipping weights, manufacturer's weights, catalog weights, and estimated weights, subject to the provisions of Clause No. 6 of the General Provisions in case of dispute.

1.4.5. Right to Operate and Use Unsatisfactory Materials or Equipment

If, after installation, the operation or use of the materials or equipment furnished by the contractor proves to be unsatisfactory to the contracting officer, the Government shall have the right to operate or use such materials or equipment until correction of defects, errors or omissions, by repair or by partial or complete replacement, can be made without interfering with Government operations. Except for any warranty provided for elsewhere in this contract or unless otherwise agreed upon in advance, the period of such operation or use, pending correction of defects, will not exceed 1 year.

SECTION 1.5--LOCAL CONDITIONS

1.5.1. Investigation of Site Conditions

Bidders are urged to visit the site of the work and by their own investigations satisfy themselves as to the existing conditions affecting the work to be done under these specifications. If the bidder chooses not to visit the site or conduct investigations he will nevertheless be charged with knowledge of conditions which reasonable inspection and investigations would have disclosed.

Bidders and the contractor shall assume all responsibility for deductions and conclusions as to the difficulties in performing the work.

1.5.2. Access to the Work and Haul Routes

Rights-of-way for access to the work from existing roads will be provided by the Government in accordance with Paragraph 1.1.3. (Rights-of-Way). All work on the rights-of-way necessary for access to the site shall be performed by the contractor at his expense. The Government assumes no responsibility for the condition or maintenance of any existing road or structure thereon that may be used by the contractor for performing the work under these specifications and for traveling to and from the site of the work. No direct payment will be made to the contractor for constructing temporary roads or for improving, repairing, or maintaining any existing road or structure thereon that may be used by the contractor for performance of the work under these specifications.

The hauling of equipment, concrete, steel, or other materials, over public highways, roads, or bridges shall be in compliance with the applicable local regulations and shall be such as to minimize interference with or congestion of local traffic. Where haul routes cross public highways or roads the contractor shall provide barricades, flagmen, and other necessary precautions for safety of the public as provided in Paragraph 1.5.4. (Safety of Personnel).

The cost of all work described in this paragraph shall be included in the prices bid in the schedule for the various items of work under these specifications.

1.5.3. Use of Land for Construction Purposes

The contractor will be permitted to use Government land, controlled by the Bureau of Reclamation, for field office, plant, storage yards, shops, and other facilities required for construction operations: Provided, That such use shall not interfere with any activity of the Government or of the work of other contractors or permittees. Personnel housing will not be permitted on Government land, except housing for guards or watchmen as approved by the contracting officer.

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The location, construction, maintenance, operation, and removal of the contractor's construction facilities on Government land shall be subject to the approval of the contracting officer.

1.5.4. Safety of Personnel

The contractor shall provide, erect, and maintain all necessary barricades, suitable and sufficient flasher lights, flagmen, danger signals, and signs, and shall take all necessary precautions for the protection of the work and the safety of the public, contractor employees, employees of the Government and other contractors or permittees. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise.

The cost of all work required by this paragraph shall be included in the prices bid in the schedule for the various items of work under these specifications.

1.5.5. Rollover Protective Structures for Material Handling Equipment

This paragraph applies to the following types of material handling equipment, with or without attachments: Rubber-tired self-propelled scrapers, rubber-tired front-end loaders, rubber-tired dozers, crawler tractors, crawler-type loaders, and motor graders. The requirement does not apply to sideboom pipelaying tractors.

Equipment described above manufactured on or after September 1, 1972, shall be equipped with rollover protective structures which meet the minimum performance standards prescribed in Sections 1926.1001 and 1926.1002, as applicable, of Subpart W--Rollover Protective Structures, Overhead Protection, of U.S. Department of Labor Occupational Safety and Health Administration Regulations for Construction (Part 1926 of Title 29, Code of Federal Regulations). Further, equipment as described above manufactured during the period July 1, 1969, to September 1, 1972, shall be equipped with rollover protective structures meeting the minimum performance standards detailed in Sections 1926.1001 and 1926.1002, as applicable, or with structures designed, fabricated and installed in a manner which will support, based on ultimate strength of the metal, at least two times the weight of the prime mover applied at the point of impact. Equipment manufactured prior to September 1, 1972, presently in use and equipped with rollover protective structures meeting the design or performance requirements of the State of California, the U.S. Army Corps of Engineers, or the Bureau of Reclamation shall be deemed in compliance.

All rubber-tired farm and industrial tractors shall be equipped as provided in Paragraph 9.8 of the publication "Safety and Health Regulations for Construction."

Where there is a conflict between the requirements of this paragraph and the requirements of the publication, "Safety and Health Regulations for Construction," the requirements of this paragraph shall govern.

The cost of providing the above-described protection shall be included in prices bid in the schedule for the various items of work under these specifications.

1.5.6. Protection of Existing Installations

The contractor shall preserve and protect all existing structures, facilities, and installations. The contractor shall be responsible for any damage to existing structures, facilities, and installations which results from his operations or failure to provide adequate protection. The Government may, at its option, as determined by the contracting officer, require the contractor to repair or replace at contractor's cost and expense any existing structure, facility or installation which may be so damaged or have the repair or replacement of such existing structure, facility, or installation performed by Government forces and the actual cost thereof backcharged to the contractor. The cost of preserving and protecting all existing structures, facilities, and installations shall be included in the prices bid in the schedule for the various items of work.

1.5.7. Coordination and Interference with Other Work

During the period of time covered by the contract, other contractors may be engaged in other construction work in the vicinity of the work covered by these specifications. The contractor shall arrange and prosecute the work under these specifications so as to coordinate and not interfere with the operations of other Government contractors.

1.5.8. Electric Power for Construction Purposes

Electric power for the construction work to be performed under these specifications will be available to the contractor at the site of the work.

The contractor shall furnish, install, and maintain in a safe and serviceable condition, from the point of delivery, at his own expense all necessary transformers, distribution circuits, and other electrical equipment required for transforming the power to the contractors utilization voltage and for distributing the power to the places of use.

1.5.9. Water for Construction Purposes

Water for construction purposes will be available to the contractor for his operations from the Government wells and storage tanks at Geothermal Well Site Mesa 6-1. The contractor shall provide at his expense all hauling equipment, piping, fittings, pumps, or other equipment and facilities as required for conveying the water to the places of use as required by his operations.

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SECTION 1.6--ENVIRONMENTAL QUALITY PROTECTION

1.6.1. Landscape Preservation

a. General.--The contractor shall exercise care to preserve the natural landscape and shall conduct his construction operations so as to prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work. Movement of crews and equipment within the right-of-way and over routes provided for access to the work shall be performed in a manner to prevent damage to Government property.

b. Contractor's campsite.--The contractor's camp, shop, office, and yard area shall be located and arranged in a manner to preserve trees and vegetation to the maximum practicable extent. On abandonment all camp, storage, and construction buildings and all construction materials and debris shall be removed from the site. The camp area shall be left in a neat and natural appearing condition.

c. Costs.--The cost of all work required by this paragraph shall be included in the prices bid in the schedule for other items of work.

1.6.2. Abatement of Air Pollution

The contractor shall comply with applicable Federal, State, and local laws and regulations concerning the prevention and control of air pollution.

In conduct of construction activities and operation of equipment, the contractor shall utilize such practicable methods and devices as are reasonably available to control, prevent, and otherwise minimize atmospheric emissions or discharges of air contaminants.

The emission of dust into the atmosphere will not be permitted during the manufacture, handling, and storage of concrete aggregates, and the contractor shall use such methods and equipment as are necessary for the collection and disposal, or prevention, of dust during these operations. The contractor's methods of storing and handling cement and pozzolans shall also include means of eliminating atmospheric discharges of dust.

Equipment and vehicles that show excessive emissions of exhaust gases due to poor engine adjustments, or other inefficient operating conditions, shall not be operated until corrective repairs or adjustments are made.

Storage and handling of flammable and combustible materials, provisions for fire prevention, and control of dust resulting from drilling operations shall be in accordance with the applicable provisions of the Department of Labor "Safety and Health Regulations for Construction," and the Bureau of Reclamation Supplement thereto.

Dust nuisance resulting from construction activities shall be prevented in accordance with Paragraph 1.6.3. (Dust Abatement).

The costs of complying with this paragraph shall be included in the prices bid in the schedule for the various items of work.

1.6.3. Dust Abatement

During the performance of the work required by these specifications or any operations appurtenant thereto, whether on right-of-way provided by the Government or elsewhere, the contractor shall furnish all the labor, equipment, materials, and means required, and shall carry out proper and efficient measures wherever and as often as necessary to reduce the dust nuisance, and to prevent dust which has originated from his operations from affecting operations at the East Mesa Test Site, or causing a nuisance to persons. The contractor will be held liable for any damage resulting from dust originating from his operations under these specifications.

The cost of sprinkling or of other methods of reducing formation of dust shall be included in the prices bid in the schedule for other items of work.

1.6.4. Pesticides

Pesticides include herbicides, insecticides, fungicides, and rodenticides. Should the contractor find it necessary to use pesticides in work areas of this contract, he shall submit his plan for such use to the contracting officer for written approval. Such plan shall be subject to submittal to and review by the Federal Working Group on Pest Management before the plan is approved.

Pesticides shall only be those registered with the Environmental Protection Agency in compliance with the Federal Environmental Pesticide Control Act of 1972 and other Federal pesticide acts. Pesticides named on the Department of the Interior's "Prohibited List" shall not be used. A copy of the "Prohibited List" can be obtained from regional offices of the Bureau of Reclamation or from the Bureau of Reclamation, Engineering and Research Center, P.O. Box 25007, Denver Federal Center, Denver, Colorado 80225, Attention: Code 203.

1.6.5. Cleanup and Disposal of Waste Materials

a. Cleanup.--The contractor shall at all times keep the construction area, including storage areas used by him, free from accumulations of waste materials or rubbish.

Prior to completion of the work, the contractor shall remove from the vicinity of the work all plant facilities, buildings, rubbish, unused materials, concrete forms, and other like material, belonging to him or used under his direction during construction. All work areas shall be graded and left in a neat manner conforming to the natural appearance of the landscape as provided in Paragraph 1.6.1. (Landscape Preservation).

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In the event of the contractor's failure to perform the above work, the work may be performed by the Government, at the expense of the contractor, and his surety or sureties shall be liable therefor.

b. Disposal of 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. Disposal of combustible materials shall be by burying, where burial of such materials is approved by the contracting officer; by burning, where burning of such materials is permitted in accordance with state and local laws; or by removal from the construction area. Disposal of noncombustible materials shall be by burying, where burial of such materials is approved by the contracting officer, or by removal from the construction area. Waste materials removed from the construction area shall be dumped at an approved dump.

(2) Disposal of material by burying.--Only materials approved by the contracting officer may be buried. Burial shall be in pits at locations shown on the drawings or as otherwise approved by the contracting officer. The pits shall be covered by at least 2 feet of earth material prior to abandonment.

(3) Disposal of material by burning.--The contractor shall secure the necessary burning permits from the state and local authorities. All burning shall be in accordance with state and local laws.

All materials to be burned shall be piled in designated burning areas in such a manner as will cause the least fire hazards. Burning shall be thorough and complete and all charred pieces remaining after burning, except for scattered small pieces, shall be removed from the construction area and disposed of as otherwise provided in this paragraph.

The contractor shall, at all times, take special precautions to prevent fire from spreading beyond the piles being burned and shall be liable for any damage caused by his burning operations. The contractor shall have available, at all times, suitable equipment and supplies for use in preventing and suppressing fires and shall be subject to all laws and regulations locally applicable for presuppression, suppression, and prevention of fires.

(4) Disposal of material by removal.--Materials disposed of by removal from the construction area shall be removed from such lands prior to the completion of the work under these specifications. All materials removed shall become the property of the contractor.

Materials to be disposed of by dumping shall be hauled to an approved dump. It shall be the responsibility of the contractor to make any necessary arrangements with private parties and with county officials

pertinent to locations and regulations of such dumping. Any fees or charges required to be paid for dumping of materials shall be paid by the contractor.

C. Costs.--The costs of complying with this paragraph shall be included in the prices bid in the schedule for the various items of work.

1.6.6. Environmental Litigation

If construction under these specifications is suspended, delayed, or interrupted through no fault of the contractor by an order of a court of competent jurisdiction pursuant to environmental litigation, such suspension, delay, or interruption will be considered to be an unreasonable suspension, delay, or interruption pursuant to the provisions of Clause No. 17 of the General Provisions, "Suspension of the Work."

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DIVISION 2--EARTHWORK

SECTION 2.1--EARTHWORK

2.1.1. Classification of Excavation

a. General.--Materials excavated will not be classified for payment. Except as otherwise provided in these specifications, material excavated will not be measured and the cost of excavation of all materials required to be excavated shall be included in the prices bid in the schedule for various items of work. No additional allowance will be made on account of any of the material being wet or frozen. Bidders and the contractor must assume all responsibility for deductions and conclusions as to the nature of the materials to be excavated and the difficulties of making and maintaining the required excavations.

b. Clearing.--Any brush, plant growth, or other unsuitable material shall be removed and disposed of as provided in Paragraph 1.6.5. (Cleanup and Disposal of Waste Materials). The cost of all clearing shall be included in the prices bid in the schedule for various items of work.

2.1.2. Site Grading

a. General.--The contractor shall perform all excavation for site grading to the subgrade for final elevations as shown on the drawings or established by the contracting officer. The contractor shall use materials removed in excavation for constructing fills. Fills shall be constructed and compacted in accordance with provisions of Subparagraph b., hereof. Any extra or unsuitable excavated material from site grading shall be disposed of in waste areas as directed by the contracting officer.

b. Constructing fills.--The area on which fills are to be placed shall be scarified to a depth of 3 inches, moistened and compacted to meet the requirements of Paragraph 2.1.10. (Compacting Earth Materials). Fills shall be constructed to the established lines and grades shown on the drawings and as required for the construction of the floor slab for the building. Fills shall be placed in continuous approximately horizontal layers not more than 6 inches in thickness after compaction. The layers shall be carried across the entire width of the fill as it is being constructed. The fills shall be compacted in accordance with Paragraph 2.1.10. (Compacting Earth Materials). Where required excavations do not provide sufficient suitable materials for construction of required fills, the contractor shall procure additional earth materials for construction of required fills from borrow pits approved by the contracting officer.

c. Costs.--The cost of site grading shall be included in the prices bid in the schedule for various items of work, which prices shall include the cost of all labor, equipment, and incidentals required to perform the site grading as herein specified.

2.1.3. Excavation for Structures

a. Measurement for payment.--Excavation for structures will be measured for payment to excavation pay lines shown on the drawings, or if not shown on the drawings to pay lines in accordance with the provisions of this paragraph. Regardless of quantities removed, measurement for payment will be made to the prescribed pay lines: Except, That for purposes of safety or other practicable reasons in connection with individual structures the Government reserves the right to require the contractor to excavate to the prescribed pay lines. No payment will be made for excavation or removal of material which is outside of the prescribed pay lines.

Measurement of excavation will be in accordance with the following:

(1) Cooling tower foundation and sump, concrete pipe trench, and other structures which form a continuation of the concrete bases.--Measurement of excavation for structures will include all required excavation for the structure below the original ground surface and between vertical planes at the ends of the structure or combination of adjoining structures. Such measurement will also include any excavation for the structure outside of these vertical planes which may be required below the original ground surface and outside of the pay lines for excavation for the foundation, sump, and concrete bases. Measurement of excavation will be made to dimensions 1 foot outside of the foundations of the structures and to slopes of 1:1 to ground surface.

(2) Pipe portions of the structures listed in (1) above.--Excavation of the trench for a single pipe conduit, or electric cable will not be measured and payment therefor will be made as provided in 2.1.6. (Excavation and Backfill for Trenches).

b. Foundations for structures.--Excavation for the foundation of structures shall be to the elevations shown on the drawings or established by the contracting officer. The contractor shall prepare the foundations at structure sites by methods which will provide firm foundations for the structures. The bottom and side slopes of common excavation, upon or against which the structure is to be placed, shall be finished to the prescribed dimensions, and the surfaces so prepared shall be moistened and tamped with suitable tools to form firm foundations upon or against which to place the structure.

Where rock or other unsuitable material is encountered in the foundation for a structure, the contracting officer will direct additional excavation to remove the unsuitable material. This additional excavation shall be made to provide a minimum clearance between the undisturbed foundation and the underside of the structure and the additional excavation shall be refilled with compacted backfill to provide a firm foundation for the structure. Measurement and payment for excavation, backfill, and compacting backfill will be made to depths and dimensions prescribed by the contracting officer.

If at any point in excavation the foundation material is excavated beyond the lines required to receive the structure, the overexcavation shall be filled

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with suitable materials and compacted in accordance with Paragraph 2.1.10. (Compacting Earth Materials). If at any point in excavation, the natural foundation material is disturbed or loosened during the excavation process or otherwise, it shall be compacted in place or, where directed, it shall be removed and replaced with suitable material and compacted in accordance with Paragraph 2.1.10. (Compacting Earth Materials). Any and all excess excavation or overexcavation performed by the contractor for any purpose or reason except for additional excavation as may be prescribed by the contracting officer and whether or not due to the fault of the contractor, shall be at the expense of the contractor. Fill and compacting of fill for such excess excavation or over excavation shall be at the expense of the contractor.

c. Payment.--Insofar as practicable, the material moved in excavation for structures shall be used for backfill and embankments, otherwise it shall be wasted as directed by the contracting officer. Payment for excavation for structures will be made at the unit price per cubic yard bid therefor in the schedule. The unit price bid in the schedule for excavation for structures shall include the cost of all labor and materials, of all other work necessary to maintain the excavations in good order during construction, and shall include the cost of disposal of the excavated material.

2.1.4. Backfill About Structures

a. General.--Backfill about structures shall be placed to the lines shown on the drawings, as prescribed in this paragraph, or as directed. The type of material used for backfill, the amount thereof, and the manner of depositing the material shall be subject to approval. Insofar as practicable, backfill material shall be obtained from material moved in excavating for structures, but when sufficient suitable material is not available from this source or from adjacent canal excavation, additional material shall be obtained from approved borrow pits. Except as otherwise provided in Paragraph 2.1.5. (Compacting Backfill About Structures), special compaction of the backfill will not be required.

b. Structures on fill.--Where the original ground surface is below the base of a structure or below the bottom of a structure, all fill required for the structure foundation and all fill up to the bottom of a structure shall be placed as embankment. All fill about the structures above the original ground surface and outside of the above-described backfill shall be placed as embankment.

c. Measurement and payment.--Excavation refill required to be placed about structures that is within the payline limits for excavation for the structures will be measured in place for payment as backfill about structures. Fill about the structures above the original ground surface and within the slopes of excavation pay lines for such structures as extended to intersect the finished surfaces of adjacent earthwork will be measured for payment as backfill about structures: Except, That above the original ground surface the excavation pay lines will be extended to intersect the finished surfaces at slopes of one to one. Where the original ground surface is below

the base of a structure, measurement, for payment, of backfill will be made above the structure base and within the lines prescribed in Subparagraph b. for backfill.

Measurement, for payment, of backfill about structures will be made only for the quantities actually placed within the limits of the established pay lines.

Payment for backfill about structures will be made at the unit price per cubic yard bid therefor in the schedule, which unit price shall include the cost of all work connected therewith, including the excavation and haul of the necessary material: Provided, That material from required excavation used for backfill about structures will be paid for both as excavation when removed from original position and as backfill when placed. Where additional material is obtained from approved borrow pits and used for backfill about structures, payment will not be made for backfill about structures but payment for such materials will be made as provided in Paragraph 2.1.7. (Excavation from Borrow).

Refill of excavation performed outside of the established pay lines for excavation for structures shall be placed in the same manner as specified for the adjacent backfill, and such refill shall be placed at the expense of the contractor.

2.1.5. Compacting Backfill About Structures

a. General.--Unless otherwise shown on the drawings, backfill about structures shall be compacted as prescribed in this paragraph or as directed.

To provide adequate protection for compacted backfill about a structure, the Government reserves the right to direct the contractor to place a sufficient amount of backfill or embankment material over the compacted backfill within 72 hours after compacting of the backfill has been completed.

The 1:1 slopes specified below shall extend from the top of the concrete walls to their intersection with the surfaces of the excavation or embankment as the case may be.

b. Location of compacted backfill.--

(1) Backfill about the cooling tower foundation and sump, concrete pipe trench, concrete test base and equipment base shall be compacted to slopes of 1:1 from the concrete bases to the ground surface: Provided, That where the structure is located in compacted embankment, the backfill shall be compacted to the elevation prescribed for the adjacent compacted embankment.

c. Material and compacting.--The material used for backfill to be compacted shall be selected material, containing no stones larger than 3 inches in diameter, approved by the contracting officer, and obtained from required

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excavation or approved borrow pits. To prevent unequal loadings and displacement of structures, the backfill shall be placed and compacted in layers having essentially the same top elevation on each side of the structure. All materials in backfill to be compacted shall be placed, moistened, and compacted as provided in Paragraph 2.1.10. (Compacting Earth Materials).

d. Measurement and payment.--Measurement for payment for compacting backfill about structures will be made in place to the lines shown on the drawings, as prescribed in this paragraph, or as directed by the contracting officer and will be made only for the quantities actually compacted within the limits of the established pay lines for backfill about structures, and the compacting of refill outside of excavation pay lines shall be performed at the expense of the contractor. Payment for compacting backfill about structures will be made at the unit price per cubic yard bid therefor in the schedule and will be in addition to the payment made for backfill about structures. The unit price bid in the schedule for compacting backfill about structures shall include the costs of furnishing water and moistening the materials.

2.1.6. Excavation and Backfill for Trenches

a. General.--Excavation, backfill, and compacting backfill for trenches include all excavation, backfill, and compacting backfill required for trenches for electrical cable, conduits, and grounding cables.

b. Excavation.--All excavation for trenches shall be made to the lines, depths, and grades shown on the drawings or directed by the contracting officer. The bottom of the trench shall be finished accurately to the lines and grades shown on the drawings or established by the contracting officer and in a manner suitable and as provided for the facility to be placed in the trench. The bottom of the trenches shall be prepared so as to provide a firm, even, and unyielding foundation. Trenches for small diameter pipe, conduit, or cable may be excavated by trencher but the backfill shall be compacted as provided for in this paragraph.

If at any point in excavation the material is excavated beyond the lines required, the overexcavation shall be filled with suitable materials and compacted in accordance with Paragraph 2.1.10. (Compacting Earth Materials). If at any point in excavation the natural foundation material is disturbed or loosened during the excavation process or otherwise, it shall be compacted in place, or where directed, it shall be removed and replaced with suitable material and compacted in accordance with Paragraph 2.1.10. (Compacting Earth Materials). Any and all excess excavation or overexcavation performed by the contractor for any purposes or reason, except for such additional excavation as may be prescribed by the contracting officer and, whether or not due to the fault of the contractor, shall be at the expense of the contractor. Fill and compacting of fill for such excess excavation or overexcavation shall be at the expense of the contractor.

c. Backfill.--All backfill shall be placed carefully to give the conduit or cable a continuous even bearing on the bottom and sides. Backfill shall not

be dropped directly on the conduit or cable. Rocks and clods, larger than 3 inches in maximum dimensions, shall not be placed within 6 inches of the conduit or cable.

d. Compacting backfill.--All backfill in trenches under paving, structures, and where otherwise directed by the contracting officer, shall be compacted. All backfill shall be placed, moistened, and compacted in accordance with the applicable provisions of Paragraph 2.1.10. (Compacting Earth Materials). The backfill shall be compacted in layers having the same elevation on both sides of the pipe or cable to prevent unequal loading and displacement.

e. Costs.--The cost of excavation for trenches, backfill for trenches, and compacting backfill for trenches shall be included in the prices bid in the schedule for other items of work, which prices shall include the cost of all labor and equipment required to perform the excavation, backfill and compacting backfill for the various trenches.

2.1.7. Excavation from Borrow

a. General.--Where the required excavation at any section does not furnish sufficient suitable material for embankments, and for refill of excavation, suitable material shall be obtained from the borrow area shown on the drawings or approved by the contracting officer. The surface of borrow pits shall be left in a reasonably smooth and even condition approved by the contracting officer. Where necessary, as determined by the contracting officer, to prevent the accumulation of standing water, borrow pits shall be drained by means of open ditches. Borrow pits shall be left in a safe condition with side slopes not steeper than 1-1/2 to 1.

b. Measurement and payment.--Measurement, for payment, of material taken from borrow pits will be made in excavation, except that, where determined to be necessary by the contracting officer, the quantity of excavated material may be computed by application of a factor to the quantity of borrowed material as measured in fill or embankment in place. Measurement, for payment, of excavation from borrow will be made of only such quantities as are required for embankments, or such as by direction of the contracting officer are excavated and wasted or laid aside. Payment for excavation of material from borrow required for embankments will be made at the unit price bid in the schedule for excavation from borrow, which unit price shall include the cost of excavating, loading, hauling, and placing of the borrow material.

2.1.8. Disposal of Excavated Materials

All suitable material from required excavations, or as much thereof as may be needed, as determined by the contracting officer, shall be used for backfill, construction of fills, and for other required earthwork, as directed by the contracting officer. Material removed in excavation and not suitable for backfill or other required earthwork shall be wasted on right-of-way owned by the Government at such points as may be approved by the contracting officer. Unless otherwise directed, no material shall be wasted in drainage

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channels. Waste banks shall be left with reasonably even and regular surfaces as approved by the contracting officer. The cost of all work described in this paragraph for the disposal of excavated materials shall be included in the prices bid in the schedule for other items of work. Waste asphalt, concrete, or other than natural earth materials shall be wasted at special nearby disposal areas, as designated by the contracting officer, where such materials will not be exposed to public view or present an unsightly appearance from public roadways or regular places of travel.

2.1.9. Gravel Fills

a. General.--The contractor shall be responsible for furnishing all materials and performing all work for placing gravel fills under the concrete floor of the cooling tower foundation and sump, equipment base, concrete test base, and concrete pipe trench. Gravel fills under the concrete floor slabs shall be covered with sheet polyethylene. The contractor shall furnish all gravel for gravel fills and the sheet polyethylene.

b. Materials.--

(1) Gravel.--The material for gravel fills shall be composed of hard, dense, durable rock particles, obtained from any approved source and shall range from 3/16 to 3/4 of an inch in size.

(2) Sheet polyethylene.--The sheet polyethylene material shall be equal to 0.006 inch thick "Visqueen," as manufactured by the Visking Company, 6733 West 65th Street, Chicago, Illinois 60638.

c. Placing gravel fills.--Before gravel is placed, the subgrades shall be leveled to a uniform cross section, free from depressions and soft spots. All gravel shall be placed to the lines and grades shown on the drawings or as directed.

Gravel fills under the concrete floor slabs shall be deposited and compacted as specified in Paragraph 2.1.10. (Compacting Earth Materials) and shall be covered with sheet polyethylene. Before the sheet polyethylene is placed, the surfaces of the gravel fills shall be prepared by any suitable means satisfactory to the contracting officer which will prevent protrusions that may cause damage to the sheet polyethylene. The sheet polyethylene shall be lapped 6 inches at all ends and edges with the top lap in the direction of the spreading of the concrete. The contractor shall exercise care in placing materials and in his operations so as not to damage the sheet polyethylene covering.

d. Payment.--Payment for furnishing and placing gravel fills under concrete will be made at the unit price bid therefor in the schedule, which price shall include the cost of furnishing and placing gravel and sheet polyethylene, of all work required for loading, hauling, placing, spreading, and compacting the gravel; and the cost of preparing, shaping, and compacting the subgrade surface as necessary for a satisfactory base for the gravel fill.

2.1.10. Compacting Earth Materials

a. General.--Where compacting of earth materials is required, the materials shall be deposited in horizontal layers and compacted as specified in this paragraph. The excavation, placing, moistening, and compacting operations shall be such that the material will be uniformly compacted throughout the required section and will be homogeneous, free from lenses, pockets, streaks, laminations, or other imperfections.

b. Compacting clayey and silty materials.--Where compaction of earth materials containing appreciable amounts of clay or silt is required, the materials shall be deposited in horizontal layers. The thickness of each horizontal layer after compaction shall be not more than 6 inches. The excavation and placing operations shall be such that the materials when compacted will be blended sufficiently to secure the highest practicable unit weight and best impermeability and stability.

Prior to and during compaction operations, the materials shall have a moisture content of not greater than 2 percent wet or less than 2 percent dry of optimum moisture, as determined by the contracting officer and the moisture content shall be uniform throughout each layer.

Insofar as practicable, as determined by the contracting officer, moistening of the material shall be performed at the site of excavation but such moistening shall be supplemented by sprinkling at the site of compaction, if necessary. If the moisture content is less than optimum for compaction by more than 2 percentage points or is greater than optimum for compaction by more than 2 percentage points, the compaction operations shall not proceed, except with the specific approval of the contracting officer, until the material has been wetted or allowed to dry out, as may be required, to obtain optimum moisture content within the tolerances permitted above, and no adjustment in price will be made on account of any operations of the contractor in wetting or drying the materials or on account of any delays occasioned thereby.

When the material has been conditioned as hereinbefore specified, it shall be compacted by rollers or by hand or power tampers. Where hand or power tampers are used to compact soils in confined areas such as under pipe, they shall be equipped with suitably shaped heads to obtain the required density.

The density (dry) of the soil fraction in the compacted material shall not be less than 95 percent of the laboratory standard maximum soil density (dry) as determined by the Bureau of Reclamation Proctor Compaction Tests for the materials being compacted.

(1) Compaction test.--The compaction tests will be made by the Government. The standard maximum soil density is the dry weight per cubic foot of the soil compacted at optimum moisture content by laboratory procedure. The compaction test is the same as ASTM Designation:

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D 698, Method A, except that a 1/20-cubic-foot compaction mold is used and the rammer is dropped from a height of 18 inches, resulting in the same energy of compaction per unit volume.

c. Compacting cohesionless materials.--

(1) Compacting cohesionless free-draining materials.--Where compaction of cohesionless free-draining materials, such as sands and gravels, is required, the materials shall be deposited in horizontal layers and compacted to the relative density specified below. The excavating and placing operations shall be such that the materials, when compacted, will be blended sufficiently to secure the highest practicable unit weight and best stability. Water shall be added to the materials as may be required to obtain the specified density by method of compaction being used.

The thickness of the horizontal layers after compaction shall not be more than 6 inches if compaction is performed by tampers or rollers; not more than 12 inches if compaction is performed by treads of crawler-type tractors, surface vibrators, or similar equipment; and not more than the penetrating depth of the vibrator if compaction is performed by internal vibrators.

The relative density of the compacted materials shall be not less than 70 percent as determined by the standard Bureau of Reclamation relative density tests for cohesionless free-draining soils.

(a) Relative density test.--The relative density tests will be made by the Government. The relative density of a cohesionless free-draining soil, expressed as a percentage, is defined as its state of compactness with respect to the loosest and most compact states at which it can be placed by laboratory procedures. The relative density will be based on the following formula, wherein the maximum density is the highest unit weight of the soil, minimum density is the lowest unit weight of the soil, and in-place density is the unit weight of the soil in place. Tests for moisture content are made on the materials and the unit weights are expressed in terms of oven-dry weights.

$$\text{Rel. Den. (\%)} = \frac{\text{max. den.} \times (\text{in-place den.} - \text{min. den.})}{\text{in-place den.} \times \text{max. den.} - \text{min. den.}} \times 100$$

(2) Compacting cohesionless materials containing some clay and silt.--Cohesionless materials containing clay and silt may not be free draining. When compaction of cohesionless materials containing sufficient clay and silt as to impede free drainage is required, the material shall be placed and compacted in accordance with the provisions of c.(1) above. These materials shall be compacted to a dry density in

accordance with either of the following control tests whichever shows the higher dry unit weight.

(a) Ninety-five percent of the laboratory standard maximum soil density (dry) as determined by the Bureau of Reclamation Proctor Compaction Test as prescribed in b.(1) above, or

(b) The dry density of the material at 70 percent relative density as determined by the relative density test as prescribed in c.(1)(a) above.

d. Costs.--The costs of compacting earth materials as described in this paragraph shall be included in the prices bid in the schedule for other items of work.

2.1.11. Cutting and Repairing Asphalt Surfacing

Reference in this paragraph to asphalt surfacing and the requirements of this paragraph shall apply to all cutting and repairs necessary to asphalt surfacing. All operations of the contractor at the East Mesa Test Site shall be subject to the approval of the contracting officer.

Asphalt shall be cut on neat, trim, and straight lines. All surfacing cut or damaged in the course of the construction operations shall be reconstructed with the same kind of material and to the same dimensions and standards as the original surfacing. Minimum compacted thickness of the original bituminous surfacing was 2-1/2 inches. All backfill shall be compacted beneath such surfacing.

No direct payment will be made for cutting and repairing of the asphalt surfacing, or any other work as specified herein in connection with cutting and repairing asphalt surfacing, and the cost thereof shall be included in the prices bid in the schedule for items requiring the cutting of asphalt surfacing, which prices shall include the cost of compacted backfill, asphaltic materials, and all other labor, materials, and equipment required for cutting and repairing asphalt surfacing as specified herein and disposal of bituminous materials removed.

Par. 3.1.1.

DIVISION 3--CONCRETE

SECTION 3.1--CONCRETE

3.1.1. Concrete, General

The contractor shall construct the reinforced concrete foundation and sump for the cooling tower, reinforced concrete test base, reinforced concrete equipment base, and pipe trench with drains, as shown on the drawings and herein specified.

All concrete construction shall conform to Paragraphs 3.1.1. (Concrete, General) to 3.1.9 (Measurement and Payment) inclusive, and to the requirements of Section 3.2--SPECIAL CONCRETE REQUIREMENTS. Concrete finishes shall conform to Paragraph 3.1.5. (Forms, Preparation for Placing, and Placing) and shall be as noted on the drawings.

All structures shall be built to the prescribed lines, grades, and dimensions. The location of all construction joints shall be subject to approval. Joints shall be constructed as shown on the drawings. The contractor shall place and attach to the structure all timber, metal, or other accessories necessary for its completion as shown on the drawings. The cost of such work, for which specific prices are not provided in the schedule, shall be included in the respective unit price per cubic yard bid in the schedule for furnishing and placing concrete.

The dimensions of the structures shown on the drawings may be subject to such reasonable changes as may be found necessary by the contracting officer.

3.1.2. Materials

The contractor shall furnish all materials for use in concrete, including cement, water, sand and coarse aggregate, and air-entraining agent, and shall furnish all reinforcing bars and materials for curing concrete. Air-entraining agent and curing compound will be accepted on manufacturer's certification of compliance with specification requirements: Provided, That the Government reserves the right to require submission of and to perform tests on samples of the agent and/or compound prior to shipment and use in the work.

Except as hereinafter provided, cement shall be obtained from a commercial (non-Government tested) bin and shipped on manufacturer's certificate of compliance with specification requirements, the certification to be accompanied by mill test report. If the cement company does not have a commercial bin of cement meeting the specified requirements and which they can certify, Government tested and approved cement may be shipped, if available at the cement plant concerned, in which case certification by the manufacturer will not be necessary. If cement is shipped under the foregoing conditions from a Government-tested bin, the contractor will be charged by deduction from payments due for the cost of testing of all such cement he obtains in excess

of the quantity used in work under these specifications, which charge, including Government overhead, will be at the rate of 3.5 cents per cwt (hundredweight).

Permission to ship on manufacturer's certification shall in no way relieve the contractor of the responsibility for furnishing materials meeting specification requirements. The contractor shall be responsible for the accuracy and completeness of certifications and mill test reports furnished.

a. Cement.--Cement shall meet the requirements of Federal Specification SS-C-192G, including Amendment-3 thereto, for Type II low alkali, and shall meet the false-set limitation specified therein. The cement shall be free from lumps and damaged cement when used in concrete.

b. Water.--Water shall be free from objectionable quantities of silt, organic matter, alkalies, salts, or other impurities.

c. Sand and coarse aggregate.--Sand and coarse aggregate shall be furnished from any approved source. The sand particles shall be clean, hard, dense, durable, uncoated rock fragments that will pass a screen having 3/16- or 1/4-inch-square openings. The sand shall be well graded from fine to coarse and shall be free from injurious amounts of dirt, organic matter, and other deleterious substances. The coarse aggregate shall consist of clean, hard, dense, durable, uncoated rock fragments, shall be free from injurious amounts of thin pieces, organic matter, or other deleterious substances, shall be reasonably well graded from 3/16 of an inch to 1 and 1/2 inches, and shall be separated into two sizes by an intermediate screen having 3/4-inch-square openings. Screens having openings of other sizes and shapes may be used, if equivalent results, as determined by the contracting officer are obtained. The Government reserves the right to test the sand and coarse aggregate and if required, the contractor shall submit, for preliminary tests and approval, representative samples of the sand and coarse aggregate proposed for use in the concrete work.

d. Air-entraining agent.--The air-entraining agent shall conform to ASTM Designation: C 260, except that the limitation and test on bleeding by concrete containing the agent and time of setting requirement shall not apply.

e. Reinforcing bars.--Reinforcing bars shall conform to ASTM Designation: A 615, Grade 60, or ASTM Designation: A 617, Grade 60.

Fabric shall be electrically welded-wire fabric conforming to ASTM Designation: A 815.

f. Wax-base curing compound.--Wax-base curing compound shall be white-pigmented compound conforming to Bureau of Reclamation "Specifications for Wax-Base Curing Compound," dated May 1, 1973.

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3.1.3. Composition

Sand and coarse aggregate shall be mixed in proportions as directed by the contracting officer. One and one-half-inch-maximum-size coarse aggregate shall be used where practicable from the standpoint of satisfactory placing and consolidation of the concrete. Concrete which contains 1 and 1/2-inch-maximum-size aggregate shall have a cement content of not less than 517 pounds per cubic yard, and concrete which contains 3/4-inch-maximum-size aggregate shall have a cement content of not less than 611 pounds per cubic yard. The net water-cement ratio of the concrete (exclusive of water absorbed by the aggregates) shall not exceed 0.47 by weight. The concrete shall develop a minimum compressive strength of 3,000 lb/in² at 28 days as determined by standard specimens. The compressive strength of the concrete will be determined by the Government through the medium of tests of 6- by 12-inch cylinders made and tested in accordance with Designations 29 to 33, inclusive, of the Seventh Edition of the Bureau of Reclamation Concrete Manual.

The use of calcium chloride in concrete will not be permitted.

Air-entraining agent shall be used in such amount as will effect the entrainment of from 4 to 6 percent of air, by volume, of the concrete as discharged from the mixer.

The slump of the concrete shall not exceed 2 inches for slabs, and 3 inches for all other concrete.

3.1.4. Batching and Mixing

The sand and coarse aggregate shall be weighed and shall be proportioned on the basis of integral bags of cement unless the cement is weighed. Weighing equipment of the beam type may be used. The contractor shall provide equipment and shall maintain and operate the equipment as required to accurately determine and control the amount of each separate ingredient entering the concrete. Batching shall be such that combined inaccuracies in feeding and measuring the materials will not exceed 1 and 1/2 percent for water and weighed cement and 2 percent for sand and each size of coarse aggregate. The concrete shall be uniform in composition and consistency throughout the mixed batch, and from batch to batch, except where changes in composition or consistency are directed. The mixing time shall be at least 1 and 1/2 minutes. Excessive overmixing requiring the addition of water to preserve the required consistency will not be permitted. The temperature of the concrete when it is being placed shall be not more than 90°F and not less than 40°F in moderate weather or 50°F when the mean daily temperature drops below 40°F. Truck mixers will be permitted only when the mixers and their operation are such that the concrete throughout the mixed batch and from batch to batch is uniform with respect to consistency and grading. Any concrete retained in truck mixers so long as to require additional water to permit satisfactory placing shall be wasted.

3.1.5. Forms, Preparation for Placing, and Placing

Forms shall be sufficiently tight to prevent loss of mortar from the concrete and shall be maintained rigidly in position until the concrete has hardened sufficiently to prevent damage by form removal. All surfaces of foundations upon or against which concrete is to be placed shall be free from standing water, mud, and debris. The surfaces of absorptive foundations against which concrete is to be placed shall be moistened thoroughly so that moisture will not be drawn from the freshly placed concrete. The surfaces of construction joints shall be clean, rough, and surface dry when covered with fresh concrete. Cleaning shall consist of the removal of all laitance, loose or defective concrete, coatings, sand, curing compound if used, and other foreign material. A mortar layer shall not be used on concrete construction joints. Unless otherwise directed in formed work, structural concrete placements shall be started with an oversanded mix containing 3/4-inch-maximum-size aggregate; a maximum net water-cement ratio of 0.47, by weight; 6 percent air, by volume of concrete; and having a maximum slump of 4 inches; placed several inches deep on the joint at the bottom of the placement.

The methods and equipment used for transporting concrete, and the time that elapses during transportation shall be such as will not cause appreciable segregation of coarse aggregate or slump loss in excess of 1 inch in the concrete as it is delivered into the work. Retempering of concrete will not be permitted. Any concrete which has become so stiff that proper placing cannot be assured shall be wasted. Formed concrete shall be placed in continuous approximately horizontal layers, the depths of which generally shall not exceed 20 inches. Concrete shall be vibrated until it has been consolidated to the maximum practicable density, is free from rock pockets of coarse aggregate, and closes snugly against all surfaces of forms and embedded materials.

Exposed unformed surfaces of concrete shall be brought to uniform surfaces and worked with suitable tools to a reasonably smooth wood-float or steel-trowel finish as directed.

3.1.6. Protection and Curing

The contractor shall protect all concrete against injury until final acceptance by the Government. The concrete shall be cured by water curing or by application of wax-base curing compound. If concrete is cured by water curing, the concrete shall be kept continuously moist for at least 14 days after being placed by sprinkling or spraying or by other methods approved by the contracting officer. If concrete is to be cured by application of curing compound, the application of the curing compound shall be in accordance with the procedures contained in the Seventh Edition of the Bureau of Reclamation Concrete Manual for curing with sealing compounds.

Par. 3.1.7.

3.1.7. Repair of Concrete

Any concrete that is damaged or defective from any cause; concrete that is honeycombed, fractured, or otherwise defective; and concrete which, because of excessive surface depressions, must be excavated and built up to bring the surfaces to the prescribed lines; shall be removed and replaced; and any imperfections and irregularities on concrete surfaces shall be corrected.

The removal and replacement of damaged or defective concrete, and the correction of surface imperfections and irregularities shall be made with concrete, dry pack, or mortar (portland cement mortar); or, at the option of the contractor, with epoxy-bonded concrete, or epoxy-bonded epoxy mortar; where and as applicable for the type of repair involved, in accordance with Bureau of Reclamation "Standard Specifications for Repair of Concrete" dated November 15, 1970. The cost of all materials, labor, and equipment required in the repair of concrete and the correction of surface imperfections and irregularities shall be borne by the contractor.

3.1.8. Reinforcement

Steel reinforcing bars shall be placed in the concrete where shown on the drawings. Before reinforcement is placed, the surfaces shall be cleaned of heavy flaky rust, loose mill scale, dirt, grease, or other foreign substances. Reinforcement shall be accurately placed and secured in position so that it will not be displaced during the placing of the concrete. Welding or tack-welding of Grade 60 reinforcing bars will not be permitted except at locations shown on the drawings.

Unless otherwise shown on the drawings, the reinforcement shall be placed so that there will be a clear distance of at least 1 inch between the reinforcement and any anchor bolts, form ties, or other embedded metalwork.

The Government will not furnish supplemental bar-placing diagrams, bar lists, and bar-bending diagrams. Any such additional diagrams and bar lists of this type which the contractor may require to facilitate the fabrication and placement of reinforcement shall be provided by the contractor. The cost of preparing such additional diagrams and bar lists, if provided, shall be included in the lump sum price bid in the schedule for furnishing and placing reinforcement. Reinforcement will be inspected for compliance with requirements as to size, shape, length, splicing, position, and amount after it has been placed.

Any bar-placing diagrams, bar lists, and bar-bending diagrams prepared by the contractor shall conform to the requirements shown on Drawing No. 21 (40-D-6123) unless otherwise shown on the reinforcement design drawings.

3.1.9. Measurement and Payment

Measurement, for payment, of reinforcement will be made only of the weight of the reinforcement placed in the concrete, in accordance with the drawings or

Par. 3.1.9.

as directed. Payment for furnishing and placing reinforcement will be made at the unit price per pound bid therefor in the schedule, which unit price shall include the cost of furnishing and attaching wire ties and metal or other approved supports, if used, and of cutting, bending, cleaning, and securing and maintaining in position all reinforcement as shown on the drawings or as directed.

Cement will be paid for on the basis of the cwt (hundredweight) of cement used in the work covered by these specifications. One bag of cement shall be considered as 0.94 cwt of cement. Measurement, for payment, of cement will be on the basis of the number of bags of cement used at the mixer, except that no payment will be made for cement used in wasted concrete, cement used in damaged or defective concrete, or cement used in concrete required as a result of careless excavation, or excavation intentionally performed by the contractor to facilitate his operations, as determined by the contracting officer. Payment for furnishing and handling cement will be made at the unit price per cwt bid therefor in the schedule.

Measurement, for payment, of furnishing and placing concrete will be on the basis of cubic yards of concrete having the dimensions shown on the drawings or prescribed by the contracting officer. Payment for furnishing and placing concrete will be made at the unit price per cubic yard bid in the schedule therefor, which unit price shall include the cost of all labor and materials except that payment for furnishing and handling cement, and payment for furnishing and placing reinforcement will be made at the respective unit price bid therefor in the schedule.

Par. 3.2.1.

SECTION 3.2--SPECIAL CONCRETE REQUIREMENTS

3.2.1. Joints in Concrete

a. Construction joints.--Construction joints are joints which are either purposely placed in structures to facilitate construction or which occur in structures as a result of inadvertent delays in concrete placing operations. Construction joints are located to facilitate the contractor's operations, to reduce initial shrinkage stresses and cracks, to allow time for the installation of embedded metalwork, or to allow for the subsequent placing of other concrete, backfill concrete, or second-stage concrete. Bond is required at construction joints regardless of whether or not reinforcement is continuous across the joint.

The location of all construction joints shall be as shown on the drawings or as directed by the contracting officer. Construction joints shall be constructed in accordance with Paragraph 3.1.5. (Forms, Preparation for Placing, and Placing.

b. Expansion joints.--Expansion joints are joints placed in structures or slabs to provide for volumetric shrinkage of a monolithic unit or movement between monolithic units. The joints shall be so constructed that there will be no bond between the concrete surfaces forming the joint. Except as otherwise provided for dowels, reinforcement is never continuous across an expansion joint. Expansion joints shall be located as shown on the drawings or as directed by the contracting officer.

Preformed bituminous joint filler shall be placed in the expansion joints. The joint filler shall cover the entire surface of the concrete at the joint, and shall be laid against the completed side of the joint and held rigidly in place by copper nails or bonding cement while the concrete is placed on the other side of the joint. All joints in the joint filler shall be tight-fitting butt joints.

c. Materials.--

(1) Preformed bituminous joint filler.--HH-F-341f, Type I.

(2) Copper nails.--FF-N-105 for common copper nails.

d. Cost.--Except as hereafter provided in Paragraph 3.2.5. (Dowels), the entire cost of constructing joints in concrete shall be included in the price bid in the schedule for the concrete in which the joints are required, which price shall include the cost of furnishing all labor, materials, tools, and incidentals required to construct joints in concrete as shown on the drawings and herein specified.

3.2.2. Tooled Edges and Toolled Grooves

The top edges of concrete bases, edges at expansion joints, and other edges where shown on the drawings or as directed shall be tooled. The edges shall

be tooled neatly with an edging tool. Tooled grooves shall be constructed in the concrete base as directed by the contracting officer. The tooled grooves shall have a width of approximately 1/4 inch and a depth of about 3/8 inch. The top edges of the grooves shall be tooled.

The cost of tooling edges and grooves shall be included in the prices bid in the schedule for various items of work, which prices shall include the cost of all labor, tools, and incidentals required to tool edges and grooves as herein specified.

3.2.3. Concrete Floor Hardener

a. General.--The contractor shall furnish and apply a liquid floor hardener to the surfaces of the concrete test base and the equipment base.

b. Materials.--Fluosilicate crystals shall be used for floor hardener and shall be magnesium fluosilicate or zinc fluosilicate or a combination of both.

c. Applying liquid floor hardener.--Two coats of liquid floor hardener shall be applied to the concrete floors in a manner approved by the contracting officer. After the concrete floors have been cured thoroughly and at such time as directed by the contracting officer, the surface shall be cleaned thoroughly of all dirt, grease, laitance, or other foreign matter and shall be allowed to dry, immediately after which the floor hardener shall be applied. The contractor shall prepare the hardener solution by dissolving fluosilicate crystals in the proportion of one-half pound of crystals per gallon of water for the first coat and 2 pounds of crystals per gallon of water for the second coat. The hardener solution shall be applied at a maximum coverage of 100-square-feet-per-gallon per coat. The solution shall be applied liberally by means of floor mops. Each coat shall be spread uniformly, and the presence of pools of the hardener solution shall be avoided. The first coat shall be allowed to dry thoroughly before the second coat is applied. After the second coat has dried, the floors shall be brushed and washed with water to remove any crystals which may have formed on the surface.

The contractor's cost for furnishing and applying liquid floor hardener and any work connected therewith shall be included in prices bid in the schedule for other items of work.

3.2.4. Grouting Mortar for Metalwork

a. General.--Grouting mortar required to be placed under the baseplates of all equipment and metalwork, for the manifold piping support rack, the frame for the pressure relief manifold, motor control center frame and the outdoor lighting poles shall be in accordance with this paragraph. The contractor shall furnish all materials.

b. Grouting mortar.--Grouting mortar shall be composed of cement, water, and sand. Cement, water and sand shall be in accordance with Paragraph

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3.1.2. (Materials), except that sand passing a No. 16 screen shall be used when clearances are such that the specified grading for sand is not suitable. Grouting mortar shall be mixed in the proportion of 1 part of portland cement to 2 and 1/2 parts of sand, by weight, and to the consistency prescribed by the contracting officer.

c. Preparation for placing and placing.--Before placing grouting mortar, the surfaces of base concrete to which the mortar will be bonded shall be roughened and shall be cleaned of all laitance, loose or defective concrete, coatings, and other foreign material by effective means, followed by thorough washing with water. If any delay occurs between the washing of the concrete and placing of the mortar, the surfaces of the concrete shall be lubricated by washing with water immediately prior to placing of the mortar. Forms shall be used, where required, to confine the grouting mortar. The mortar shall be placed so as to completely fill spaces adjacent to equipment and metalwork as shown on the drawings.

d. Curing.--The exposed surfaces of mortar shall be cured for 72 hours by keeping them covered with moist burlap, damp sand, or by other effective means approved by the contracting officer.

Loads shall not be applied to the mortar sooner than 72 hours after placement and shall be applied only after the mortar has attained a compressive strength of at least 3,000 psi. The time required for the mortars used to attain this strength will be determined by the Government. Care shall be taken when applying loads on the hardened mortar and the contractor shall be responsible for any damage thereto resulting from impact loads when positioning equipment or metalwork.

e. Cost.--The costs of all work in connection with the grouting mortar operations and the cost of the cement, water and sand for mortar shall be included in the prices bid in the schedule for the items of work for which the mortar is required.

3.2.5. Dowels

Dowel bars shall be furnished and placed across expansion joints as shown on the drawings. The dowels shall be smooth round bars conforming to Federal Specifications QQ-S-632c, Type I.

The dowel bars shall be cleaned and painted with red lead on the full length of the bar and the paint shall be thoroughly dry before placement in concrete. The bars shall be spaced as shown on the drawings and placed across the expansion joint so that one-half of the bar will be embedded in the first placement, except that dowels to the concrete pipe trench shall be as located on Drawing No. 4(1241-300-213) and welded to the 5/8 anchor bolts. The dowels shall be positioned parallel to each other and to the surfaces of the floor slab where dowels are used. Special care shall be taken to maintain the dowels accurately in position during concrete placement operations.

Immediately before placement of concrete, the half-length of dowel to be initially embedded shall be coated with a film of oil having an SAE viscosity of not less than 250. Before final set of the concrete in the initial placement, the dowels shall be twisted and withdrawn 1 inch to break bond.

Payment for furnishing and placing dowels will be made at the unit price per pound bid in the schedule for furnishing and placing and reinforcement, as specified in Paragraph 3.1.9. (Measurement and Payment).

3.2.6. Rubber Water Stop

a. General.--Rubber water stop shall be furnished and placed in the joints at the locations shown on the drawings or where directed. The contractor shall also furnish all labor and materials for making field splices in rubber water stop.

Type "B" rubber water stops shall be in accordance with the details shown on Drawing No. 20(40-D-2867).

The contractor shall take suitable precautions to support and protect the water stop during the progress of the work and shall repair or replace any damaged water stop. All water stops shall be protected from oil or grease.

b. Materials.--

(1) Rubber water stop.--The rubber water stop shall be fabricated from a high-grade, tread-type compound. The basic polymer shall be natural rubber or a synthetic rubber. The material shall be compounded and cured to have the following physical characteristics:

	<u>Natural Rubber</u>	<u>Synthetic Rubber</u>
Tensile strength, pounds per square inch, minimum	3,500	3,000
Tensile strength at 300 percent modulus, pounds per square inch, minimum	1,450	1,150
Elongation at break, percent, minimum	500	450
Shore durometer (Type A)	60 to 70	60 to 70
Specific gravity	1.15±0.03	1.15±0.03
Change in volume, water immersion, percent maximum (2 days at 70°C)	5	5
Compression set (constant deflection) percent of original deflection, maximum	30	30

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Tensile strength after oxygen pressure test (48 hours, 70°C, 300 pounds per square inch) percent of tensile strength before aging, minimum	80	80
Elongation after oxygen pressure test (48 hours, 70°C, 300 pounds per square inch) percent of elongation before aging, minimum	30	80

(2) Gum rubber and rubber cement.--Gum rubber and rubber cement shall be suitable for making field connections in rubber water stops as described in Subparagraph f. below.

c. Fabrication.--The rubber water stop may be molded or extruded. All material shall be molded or extruded and cured in such a manner that any cross section will be dense, homogeneous, and free from porosity and other imperfections. The following minor surface defects will be acceptable:

(1) Lumps and depressions not exceeding 1/4 inch in longest lateral dimensions and 1/16 inch deep with no limit to the frequency of occurrence.

(2) Lumps and depressions between 1/4 and 1/2 inch in longest lateral dimension and 3/32 inch deep as long as the frequency of occurrence does not exceed six in a 50-foot length, and there is at least 2 inches between any two such defects.

(3) Marks resulting from the tubing operation or handling during manufacture with no limit to width or frequency of occurrence as long as the thickness of material below the mark is not less than the minimum thickness.

(4) Coarse or grainy surface texture.

(5) Suck-back along flash lines of molded goods if not more than 1/16 inch wide, 1/16 inch deep, and not more than 2 feet long.

The tolerances, shown on the drawing, shall govern all cross-sectional dimensions. Any defects which are not within the above limitations either shall be repaired as approved by the contracting officer or shall be removed from the finished product by cutting out a length of water stop containing such defects and splicing the water stop at that point. All factory splices shall be molded splices. Molded splices shall be made by vulcanizing the splices in a steel mold for a time sufficient to produce maximum strength in the splice. All molded splices shall withstand being bent 180° around a 2-inch-diameter pin without any separation at the splice.

d. Shipping and storing.--Rubber water stop may be shipped in rolls to facilitate handling. All water stop shall be stored in as cool a place as

practicable, preferably at 70°F or less. Water stop shall not be stored in the open or where it will be exposed to the direct rays of the sun.

e. Installation.--

(1) General.--The water stop shall be installed with approximately one-half of the width of the material embedded in the concrete on each side of the joint. Care shall be exercised in placing and vibrating the concrete about the water stop to insure complete filling of the concrete forms under and about the water stop and to obtain a continuous bond between the concrete and the water stop at all points around the periphery of the water stop.

Field splices in Type "B" rubber water stops.--All field splices in Type "B" rubber water stops shall be molded splices. All molded splices shall be made by vulcanizing the splices in a steel mold as follows: The adjoining ends at splices shall be beveled at an angle of 45° or flatter by the use of a saw and miter box so that the ends to be spliced together will be pressed together when the mold is closed. The beveled ends and the sides for at least one-fourth of an inch back from the ends shall be buffed thoroughly to provide clean, rough surfaces. All buffed surfaces shall be given two thin coats of rubber cement and each coat shall be permitted to dry thoroughly. A piece of gum rubber cut to the same dimensions as the beveled face shall then be applied to the end of one strip after removing the cloth backing from the gum rubber. The adjoining strip shall then be placed accurately in position, and all edges shall be stitched thoroughly together with a suitable handsticher. The mold shall be heated to a temperature of 290°F before the splice is placed in the mold. The prepared splice shall be placed in the mold with the splice in the center of the mold, and the mold shall be closed tightly to prevent slipping during the vulcanizing process. The splice shall remain in the mold 25 minutes after the mold is closed completely, during which time the mold shall be maintained at a temperature of 290°F.

Each finished splice shall withstand a bend test by bending the water stop 180° around a 2-inch-diameter pin without showing any separation at the splice.

The contractor shall furnish all materials for splices and all field splicing molds.

f. Cost.--The cost of furnishing and placing the rubber water stop shall be included in the unit price per cubic yard bid in the schedule for furnishing and placing concrete in cooling tower base and sump, which unit price shall include the cost of furnishing all material, making field splices, and installing the water stop; except that payment for furnishing and handling cement and for furnishing and placing reinforcement will be made as provided elsewhere.

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3.2.7. Pipe Trench Drains

The contractor shall construct pipe trench drains at the location and in accordance with details shown on Drawing No. 4(1241-300-212). Concrete shall conform to the applicable provisions of DIVISION 3--CONCRETE. Gravel fill (1 cubic yard each drain) shall be gravel or crushed rock, well graded from minimum 3/4-inch to maximum 3-inch size. Cast-iron drain pipe shall be a standard weight 4-inch-diameter cast-iron soil pipe (WW-P-401E, Type 1, Class SV, single hub, 4-inch diameter). Grating for hub of pipe shall be equal to catalog No. 2462K11, as supplied by McMaster-Carr Supply Company, Los Angeles, California (catalog No. 80).

Payment for furnishing and installing pipe trench drains will be made at the unit price each bid therefor in the schedule which unit price shall include the cost of all labor, materials, and incidentals associated therewith.

DIVISION 4--COOLING TOWER

SECTION 4.1--COOLING TOWER

4.1.1. Cooling Tower

The contractor shall furnish all labor, materials, tools, equipment, and facilities required for the design, manufacture and installation of the cooling tower as shown on the drawings and as specified herein. The cooling tower shall be furnished and erected complete with fan, gear reducer, and motor driver. Related work, including but not limited to motor control panel, electrical wiring, and piping required for operation of the tower, tower water circulating pump, and tower water level controls is covered in succeeding paragraphs of these specifications. Concrete base and sump for the cooling tower shall be constructed as shown on the drawings and in accordance with the provisions of DIVISION 3--CONCRETE.

The cooling tower shall be an induced draft, cross-flow cooling tower. It shall be Marley Model No. 364-101, or approved equal. The tower shall be field-assembled by the cooling tower manufacturer on the concrete tower water basin specified in another section of these specifications.

The cooling tower shall be capable of cooling 700 gallons per minute of tower water from 140°F to 90°F when operating at 79°F wet bulb temperature. (17,500,000 BTUH) The maximum drift loss shall not exceed 0.2% of the circulated flow over the tower. The tower shall be guaranteed to perform at the specified design conditions when tested in compliance with the Cooling Tower Institute Acceptance Test Procedure ATP-105.

The tower dimensions shall be approximately 9 feet by 21 feet by 13 feet maximum height. The overall dimensions shall not exceed those shown on the drawings.

The structural framework shall be clear heart or select California redwood or treated fir designed for the operational loads and a 30-pounds-per-square-foot wind pressure on any projected area and shall transmit the wind loads to the anchorage.

All bolts, nuts and washers shall be stainless steel. Nails shall be stainless steel. All steel components shall be hot dip galvanized after fabrication.

Plywood components shall be Coastal region douglas fir waterproof plywood.

All fir lumber shall be preservative treated with chromated copper arsenate after fabrication.

The casing shall be 3/8" corrugated asbestos-cement board with lapped joints. The louvers shall be corrugated asbestos-cement board of slipfit type supported by routed fir members on 4'0" centers. The fan deck shall be 1" minimum T & G redwood.

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The fill splashbars shall consist of treated wood supported on not more than 2'0" centers. Splashbars shall be supported in glass reinforced polyester grid supports with four grids per four foot bay which are firmly attached to structural girt members. Drift eliminators shall be two-pass asbestos honey-comb designed to limit drift loss to less than 0.2%.

The hot water distribution basin floor shall be 5/8" plywood of the open gravity type with plastic diffusing type metering orifices distributing water uniformly over the entire fill area. A cast iron body adjustable valve with locking bar shall be included to control the flow of water.

An access ladder shall be provided to give safe access to the fan deck. An access door shall be provided for access to the eliminate plenum. A fir hand-rail, kneerail and toeboard shall be furnished around the tower deck perimeter. A reinforced steel fan guard shall be installed over the fan cylinder.

The cooling tower shall be equipped with a propeller type fan with six or more cast aluminum blades. Each blade shall be adjustable and individually attached to a cast iron hub. The fan drive shall be through a right angle spiral bevel gear-reducer. Oil lines and oil guage shall be extended outside of the fan cylinder. The drive motor shall be a 15 H.P., 1800 RPM, 460 VAC, 3 phase, 60 cycle, TEFC motor. A tapered glass reinforced polyester fan cylinder shall be provided. The drive-shaft shall be stainless steel.

4.1.2. Drawings and Data to be Submitted by the Contractor

a. Approval drawings and data.--Within forty-five (45) calendar days after date of receipt of notice to proceed and before proceeding with procurement of materials, the contractor shall submit to the Government five sets of drawings and data for approval. The drawings and data shall include:

- (1) Drawings showing overall dimensions, arrangement and construction details.
- (2) Column loadings for dead loads, wind loads and seismic loads.
- (3) Steel grillage and anchorage layout.
- (4) List of construction materials.
- (5) Fan and driver data; diameter, speed, BHP, manufacturers data.
- (6) Performance Curves.

Any material shipped before approval of drawings and data will be at the contractor's risk. The time allowed for mailing and approval of drawings and data submitted to the Government for approval shall be as provided in Paragraph 1.2.3. (Commencement, Prosecution, and Completion of Work). The Government shall have the right to require the contractor to make any changes

in the equipment design and installation details which may be necessary to make the equipment conform to the requirements and intent of these specifications without additional cost to the Government. Approval of drawings and data by the Government shall not be held to relieve the contractor of any part of the contractor's obligation to meet all of the requirements of these specifications nor of the responsibility for the correctness of the drawings and data submitted.

The submittal of data required under this paragraph shall be complete, shall be made at one time, and shall include all data required to be submitted under the provisions of this paragraph. Three copies of all data required above shall be forwarded by the contractor and not by subcontractors, to the Construction Engineer, Yuma Projects Office, P. O. Bin 5569, Yuma, Arizona 85364. The contractor shall forward a copy of his transmittal letter with the other two copies to the Regional Director, Lower Colorado Region, P. O. Box 427, Boulder City, Nevada 89005.

b. Cost.--The cost of submitting drawings and data to the Government shall be included in the price bid in the schedule for furnishing and installing a single-cell, induced-draft, counterflow, cooling tower.

4.1.3. Erection

The cooling tower shall be erected in accordance with the manufacturers instructions and under the continual supervision of the tower manufacturer's factory superintendent.

Following the completion of erection, all waste material, wood chips, sawdust, dirt, etc., shall be removed from the tower structure and basin and the entire work left clean and orderly ready for operation.

4.1.4. Cooling Tower Piping

The contractor shall furnish and install all cooling tower water piping including fittings and valves as herein specified, as shown on the drawings, and in accordance with the manufacturer's recommendations.

a. Materials.--Materials shall be as follows:

(1) Pipe shall be carbon steel, black, A-53, A-120, welded or seamless, schedule 30.

(2) Welding fittings shall be ASA B 16.9, ASTM-234, schedule 30 (std. wgt.). All elbows shall be long radius elbows. Taylor Forge or approved equal.

(3) Flanges shall be forged steel ASA B 16.5, 150# ASA slip-on or welding neck flanges as shown on the drawings. Taylor Forge or approved equal.

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(4) Valves:

(a) The pump discharge check valve shall be an 8" Mission Duo-Check Check valve, Style "B", series 150 ASA; with steel plate and body material, buna "N" seat and raised face end connection. Mission Duo-Chek 15SMF, 8" size; or approved equal.

(b) The pump discharge shutoff valve shall be an 8" butterfly valve with a ductile iron wafertype body, a 416 SS stem, a bronze disc, a phenolic seat ring, a buna "N" elastomer and a lever lock actuation. The pump discharge shutoff valve shall have a weather-proof gear operator with a gray iron case and ductile iron gear material and shall be equipped with a hand wheel. The pump discharge shutoff valve shall be a DEMCO 3467-1114311, size 8", with a DEMCO operator 2098-11321; or approved equal.

(5) Flange bolts shall be hex head steel machine bolts with heavy hex nut and flat washers unless otherwise specified on the drawings. All bolts, nuts, and washers shall be galvanized or cadmium plated.

(6) Flange gaskets shall be 1/16" compressed asbestos Garlock #900; or approved equal. Full face gaskets shall be used on flat flange joints. Ring gaskets may be used with 1/16" RF flanges.

(7) Structural steel piping supports and columns shall conform to ASTM A7-55T. All shop fabricated structural steel pipe supports shall receive (1) shop coat of Rustoleum 769 DP primer.

b. Installation.--Installation of cooling tower piping shall be as follows:

(1) All piping shall be of the sizes given on the drawings and shall run in locations shown subject to actual field measurement. Pipe shall be cut accurately to measurements established in the field. All piping shall be fabricated in such a manner that it will bolt and join together without residual stresses.

(2) All material shall be clean and free of all chips, dirt, scale, welding "berries" and foreign matter prior to installation. All openings shall be kept closed during construction to prevent entrance of foreign matter.

(3) All piping shall be adequately supported, anchored and braced to prevent sagging and to provide for thermal expansion. Additional supports, bracing and anchors shall be furnished and installed where required, in the opinion of the Engineer, to prevent undue stress in piping and equipment connections. No valve or piece of apparatus shall support the weight of any pipe. The piping column returning the tower water to the cooling tower deck shall be supported independently of the cooling tower. The cooling tower shall not support this pipe.

(4) Expansion bolts and inserts driven into concrete for equipment and pipe supports shall be installed without damage to the structure.

(5) All piping shall be run true to line and grade. The finished work shall present a neat and workmanlike appearance.

c. Welding.--Welding of pipe joints shall conform to the requirements of the ASME Code for Pressure Piping, ASA B31.1955 as supplemented.

All pipe welders to be employed in the work shall be certified as having passed qualification tests as prescribed by the National Certified Pipe Welding Bureau, or other reputable testing laboratory or agency, using the procedures approved by the ASME Code for Pressure Piping ASA B31.1955 or the American Welding Society Standards B3.041T.

d. Tests.--The following tests shall be performed by the contractor prior to acceptance of the cooling tower:

(1) Hydrostatic tests.--

(a) All new piping shall be tested hydrostatically with clean domestic water at a pressure of 100 psig. These pressure shall be held for at least two (2) hours to the satisfaction of the inspector.

(b) Should any piece of apparatus, any material or work fail in any of these tests, it shall be immediately removed and replaced at the expense of the contractor with perfect material, and the portion of the work replaced shall again be tested by the contractor at his expense.

(c) The contractor shall furnish all labor, materials, valves, etc., required to make these tests. No test shall be made except in the presence of the contracting officer or his authorized representative.

(2) Operational test.--

(a) After acceptance of the hydrostatic tests, all piping systems shall be flushed out with clean domestic water and completely drained.

(b) Equipment removed or blanked off for the tests shall be re-connected, and the entire work put in an operating condition by the contractor.

(c) The complete installation shall be tested under operating conditions with all pumps, fans controls, and equipment operating for at least 8 hours.

(d) The contractor shall make all adjustments to equipment and controls required and shall make additional tests required by the contracting officer to demonstrate the successful operation of the installation in accordance with the design requirements.

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4.1.5. Auxiliary Equipment

The contractor shall furnish and install auxiliary equipment as follows:

a. Cooling tower water pump.--The cooling tower pump shall delivery 700 gpm at 160 feet TDH. It shall be a vertical pump with an open or semi-open impeller. The pump and motor shall have non-overloading characteristics. The pump shall be a Byron Jackson Model 10" GH four stage vertical turbine pump, 8" x 1-3/16 self lube column, 8" x 16-1/2 C.I. head driven by a 40 hp, V.H.S. motor (TEFC) operating at 1700 rpm, S.R.C., 3-phase, 60-cycle, 230-460-volts; or approved equal.

The pump shall be leveled, bolted, and grouted into place prior to final piping connections so that piping is properly supported and lined and no strain is placed on the pump casings. The pump shall be bolted and grouted directly to the concrete tower basin sump cover as shown on the drawings. The grout shall be nonshrink grout as specified in Paragraph 3.2.4. (Grouting Mortar for Metalwork).

The pump barrel length or suction nozzle shall be adjusted so that the suction is three (3) inches above the floor of the cooling tower sump.

Three copies of the following data shall be submitted to the Construction Engineer for approval on the pump:

- (1) Outline dimension and mounting and piping connection drawings.
- (2) Performance curves; head vs. capacity and BHP.
- (3) Construction details and materials.
- (4) Motor manufacturer, model, speed, hp, and voltage characteristics.

b. Low basin water shutoff.--In order to prevent damage to the tower water pump in the event of low water level in the cooling tower basin, a level control shall be provided and installed at the cooling tower basin. This level control shall consist of a B/W Type E-2 electrode holder equipped with #316 stainless steel electrodes and a Type 2-L relay; or approved equal. The electrodes and electrode holder shall be mounted so that the tower water pump will be shut off when the level of tower water in the basin is approximately one foot below the normal operating level.

c. Tower water makeup valve.--The level control for the domestic water makeup to the cooling tower basin shall be a 1-1/2-inch Clayton 124 float valve (screwed fittings) as supplied by the Cla-Val Co., Newport Beach, California; or approved equal. The level control shall be mounted on the side of the sump and shall be arranged to open the valve when the water in the sump has fallen to a predetermined level. It shall be 1-1/2 inch size, C.I. body, class 125 and shall be installed in accordance with the manufacturer's recommendations.

d. Structural steel frame and stainless steel screens.--The contractor shall furnish all labor, materials, equipment, and incidentals required for the fabrication of structural steel frame and stainless steel screens as shown on Drawings Nos. 15(1241-300-224) and 16(1241-300-225) and hereinafter specified.

(1) Materials.--Materials shall be in accordance with the following requirements:

(a) Structural steel.--Structural steel for the frame shall conform to: QQ-S-741D, ASTM Designation: A7, A36, or ASTM Designation A374, except that Government inspection at the mill will be waived.

(b) Stainless steel for screens.--Stainless steel bars, wire, shapes, plates, sheets, strips, tubing, and forgings shall conform to the requirements of QQ-S-763D or QQ-S-766C, Class 302, 304, 316, or 317. Stainless steel electrodes for welding the stainless steel screens shall be of the type compatible with the class of steel to be welded. Screens, coarse and fine, and rivets shall be stainless steel of best commercial quality.

(c) Lumber for access cover to screens shall be 2-inch x 12-inch Redwood lumber, foundation grade.

(d) Miscellaneous materials.--Miscellaneous materials not specifically covered herein by detailed specifications shall be of the top standard commercial quality and shall be approved by the contracting officer.

(2) Fabrication.--All parts shall be accurately assembled and fabricated as shown on the drawings or as directed by the contracting officer. Members shall not be overstressed during fabrication and hammering that will damage or distort members will not be permitted. Cutting of members with cutting torch will not be permitted.

(3) All welding shall be performed using stainless steel electrodes, as specified on the drawings and in accordance with American Welding Society's code for Welding Stainless Steel.

e. Payment.--Payment for furnishing and installing a single-cell, induced-draft, counterflow cooling tower will be made at the lump sum price bid therefor in the schedule, which price shall include the cost of furnishing all labor, materials, and incidentals required to complete the installation of the cooling tower, including cooling tower piping and electrical facilities inside the tower, the equipment listed in Paragraph 4.1.5. (Auxiliary Equipment), and for performing the specified hydrostatic and operational testing.

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DIVISION 5--PIPELINES AND PIPE MANIFOLDS

SECTION 5.1--PIPELINES AND PIPE MANIFOLDS

5.1.1. Pipelines and Pipe Manifolds

a. General.--The contractor shall furnish pipe and fittings and construct the pipelines and pipe manifold as shown on the drawings and as herein specified.

During manufacturing, transporting, storing, and installing pipe and pipe fittings, the pipe and pipe fittings shall not be dropped or subjected to any unnecessary impact or other treatment that could damage the pipe.

Pipe shall not be stored in the yard or on the jobsite under conditions which would cause damage. Any length of pipe that, in the opinion of the contracting officer, is damaged beyond repair by the contractor by hauling, handling, unloading, storing, or otherwise, shall be removed from the work-site and replaced by and at the expense of the contractor with another length of pipe of equal or greater strength.

b. Pipe.--The contractor shall furnish and install steel pipe and fittings as specified in Paragraph 5.1.4. (Steel Pipe and Fittings).

Gaskets furnished with flanged fittings shall be suitable to withstand temperatures of 500°F.

c. Measurement and payment for pipe.--Measurement, for payment, for furnishing and installing the 8-, 6-, and 4-inch pipeline and pipe manifolds will be made along the centerline of the pipe between ends of the pipe in place and will be continuous through bends and other fittings with no allowance for lap at joints. Measurement for payment, for furnishing the 3-, 1½-, ¾-, and ½-inch galvanized standard weight pipe will be made in pounds of pipe furnished and installed. Weight of pipe will be determined in accordance with Paragraph 1.4.4. (Weights of Metal Parts).

Payment for furnishing and installing the 3-, 6-, and 4-inch Schedule 40 steel pipe will be made at the unit price per linear foot bid therefor in the schedule, which price shall include the cost of furnishing all materials, manufacturing, transportation, installing the pipe, and furnishing maintenance guarantee.

Payment for furnishing and installing 3-, 1-1/2-, 3/4-, and 1/2-inch, galvanized standard weight pipe will be made at the unit price per pound bid therefor in the schedule which price shall include the cost of all labor, materials, installation, testing, and furnishing guarantee.

5.1.2. Testing the Pipeline

a. Pressure test.--After the pipeline has been laid, the joints completed, and the trenches partially backfilled, the contractor shall subject the

pipe to a hydrostatic pressure of 200 lb/in² for a period of not less than one hour. No leakage will be allowed and any and all leaks shall promptly be made watertight.

The contractor shall furnish all pumping equipment, labor, tools, pressure gages, and other equipment, and water required for making the tests.

All exposed piping, fittings, and joints shall be carefully examined during the test. Any cracked or defective piping or fittings discovered during the pressure test shall be removed and replaced by the contractor with sound material and the test repeated as required, all at the expense of the contractor.

All testing shall be done in the presence of a duly authorized representative of the contracting officer.

b. Cost.--The entire cost of testing the pipelines and of furnishing all equipment, labor, and materials for making the tests shall be included in the respective unit price bid in the schedule for furnishing and installing 8-inch, 6-inch, and 4-inch, Schedule 40 steel pipe.

5.1.3. Guarantee

The contractor shall furnish a guarantee against leakage of the pipeline for a period of 1 year from date of acceptance. Any leaks shall be corrected by the contractor, on notice from the contracting officer and at no cost to the Government. Any repairs to the pipeline shall be made in an acceptable manner as approved by the contracting officer.

In lieu of such guarantee the contractor may hydrostatically test the pipeline at 150 percent of the specified test pressure of the pipeline at the lowest point in the line. Any visible leaks shall be repaired. The installation will be considered acceptable when the specified test pressure has been maintained without loss for a period of not less than 2 hours or no leaks are observed during that period of time or such time as necessary for completing inspection of all joints along the pipeline.

5.1.4. Steel Pipe and Fittings

a. General.--The contractor shall furnish, install, and insulate the steel piping and fittings for the pipeline complete with accessories in accordance with the requirements of these specifications and as shown on the drawings.

b. Materials.--Materials shall be in accordance with the following requirements:

(1) 8-, 6-, and 4-inch steel pipe.--WW-P-404D, Type E, Class A53B ERW (Schedule 40), plain end.

(2) 3-inch, 1-1/2-inch, 1-inch, 3/4-inch, and 1/2-inch pipe.--WH-P-404D, Type E, Class A53B ERW, galvanized.

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- (3) Flange gaskets.--Flat, asbestos, metallic reinforced.
- (4) Bolts and nuts.--Bolts - FF-B-575C, Grade II, Type II, or stud bolts; Nuts - FF-N-836D, Type II (Hexagon), Style 4; VNC coarse thread series.
- (5) Steel welding flanges.--ASTM Designation A181, Grade I.
- (6) Steel fittings.--ASTM Designation A234.
- (7) Flexible ball joints.--Flexible ball joints shall be equal to BARCO, Type N, Style 7WEN-8WEN, or 600 Series, Style 7AWE-8BWE, weld end, carbon steel, with asbestos gaskets (Code 11N) as furnished by Aeroquip Corporation/BARCO Division, Barrington, Illinois 60010.
- (8) Spool type rubber expansion joints.--Rubber expansion joints shall be one-piece construction, rubber-and-fabric, concentric spool type. Materials in body construction shall be fiberglass and chlorobutyl and shall be rated for 250°F. maximum temperature, standard drilling for 125 lbs ANSI flanges, equal to Style 204-HP as supplied by Garlock, Inc., Palmyra, New York.
- (9) Insulation.--Insulation for the steel pipe and fittings, including flexible ball joints, shall be equal to Johns-Manville "Metal-On" aluminum-jacketed, calcium silicate insulation in nominal thickness of 2 inches as furnished by Johns-Manville, 22 East 40th Street, New York, New York 10016, and shall comply with the requirements of Federal Specification HH-1-523c, Type II, Class C.
- (10) Gate valves.--2-inch through 6-inch gate valves required under these specifications shall conform to the requirements at Federal Specifications No. WW-V-58B, Type I, Class 2, NRS, flanged ends. 1-1/2" gate valves.--WW-V-54D, Type 1, Class C, Style 2.
- (11) Pressure relief valves.--2-inch pressure relief valves shall be a diaphragm type valve, hydraulically-operated, pilot controlled, modulating type, flanged ends, 250 ANSI B16.1 similar to Clayton 50G Pressure Relief Valve as manufactured by Cla-Val Company, Newport Beach, California, or approved equal.
- (12) Bronze Cock.--1/2-inch and 3/4-inch bronze cock shall be Crane No. 80E, as supplied by Crane Co., New York, New York, or approved equal.
- (13) Miscellaneous materials.--Where materials are required but are not specified herein, the contractor shall furnish standard commercial quality material suitable for the intended use.

c. Fabrication.--The steel pipe shall be fabricated in accordance with these specifications, the drawings and the requirements of the American

Water Works Association Standard C201. Where provisions of the AWWA Standards conflict with provisions of these specifications and/or drawings, the provisions of these specifications and/or drawings shall govern. The requirements of Sections 5.1 to 5.4, inclusive, of the AWWA Standard C201 are not a part of these specifications. The shell thickness of the pipe shall not be less than 0.250 inches.

d. Installation.--The steel pipe and fittings shall be assembled and erected in place as shown on the drawings. The contractor shall furnish and install such temporary supports and bracing as may be required to hold the pipe in place and prevent distortion during placing of concrete; however, the embedment of timber supports or the welding of temporary supports to the pipe shell will not be permitted. Flexible ball joints, rubber expansion joints, and pipe insulation shall be installed in accordance with the manufacturer's instructions.

e. Measurement and payment.--Measurement for payment and payment for furnishing and installing steel pipe will be made as provided in Subparagraph 5.1.1.c. (Measurement and Payment for Pipe).

Payment for furnishing and installing 6-inch flexible ball joints, Type N, and 600 Series, will be made at the respective unit price per each bid therefor in the bidding schedule, which unit price shall include the cost of all labor, transportation, material, and incidental costs associated therewith.

Measurement, for payment, for furnishing and installing the pipe insulation will be made along the centerline of the pipe between ends of the pipe in place and will be continuous through bends and other fittings with no allowance for lap at joints.

Payment for furnishing and installing pipe insulation and the various sizes of pipe will be made at the respective unit price per linear foot bid therefor in the schedule, which unit price shall include the cost of furnishing all materials, transportation, labor, and incidental costs associated therewith.

Payment for furnishing and installing the various sizes of gate valves, pressure relief valves, and bronze cocks, will be made at the respective unit price per each bid therefor in the schedule, which unit price shall include the cost of all labor, materials, and incidentals associated therewith.

Payment for furnishing and installing 6-inch-diameter spool-type rubber expansion joints will be made at the unit price each bid therefor in the schedule which unit price shall include the cost of all labor and materials and incidentals associated therewith.

The weight of steel pipe fittings will be determined as specified in Paragraph 1.4.4. (Weights of Metal Parts) and payment for furnishing and installing the miscellaneous steel pipe fittings, including but not limited to: tapers, tees, elbows, crosses, flanges, nuts, bolts, gaskets, and caps, will be made at the unit price per pound bid therefor in the schedule which unit price shall include the cost of all labor, materials, and incidentals associated therewith.

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DIVISION 6--MANIFOLD PIPING SUPPORT RACK

SECTION 6.1--MANIFOLD PIPING SUPPORT RACK

6.1.1. Manifold Piping Support Rack

a. General.--The contractor shall furnish, fabricate, and erect the manifold piping support rack and support frames for the motor control center and for panelboards at test stations 1 through 4, as shown on the drawings and hereinafter specified. Furnishing and erecting steel for the support rack and frames includes furnishing and installing anchor bolts and other related accessory materials required for the complete erection of the support rack and frames as shown on the drawings and herein specified. The steel frames required for the motor-control center and test stations 1 through 4 on the concrete test base shall conform to the applicable provisions of this paragraph.

For the purpose of these specifications, the term "steel" includes all materials defined as structural steel in the AISE "Code of Standard Practice for Steel Buildings and Bridges" as given in pages 5-172 and 5-173 of the Seventh Edition of the Manual of Steel Construction of the American Institute of Steel Construction, Inc.

The contractor shall furnish all materials, including steel, anchor bolts, and other related accessory materials, required for the complete erection of steel for the support rack and frames notwithstanding any omissions from these specifications or drawings.

b. Materials.--

(1) Structural Steel.--All structural steel shall conform to: QQ-S-741D, ASTM Designation: A 7, A 36, or ASTM Designation: A 374, except that Government inspection at the mill will be waived. Structural steel tubing shall conform to ASTM Designation: A 500 or A 501.

(2) Expansion anchors.--FF-S-325, Group 1, shield, expansion (lead, bolt and steel anchors), Type 2 (nut out), Class 2, Style 2 (multiple, disk units anchors).

(3) Nuts.--Nuts shall be Type II, Style 4, steel nuts in accordance with FF-N-836D(1).

(4) Washers.--All washers shall be round, carbon steel washers in accordance with FF-W-92B, Type A, Grade I, Class A, or ASTM Designation: A 325.

(5) Arc-welding electrodes.--All arc-welding electrodes shall be of the E60 classification in accordance with the latest edition of the American Welding Society Specifications for Iron and Steel Arc-Welding

Electrodes and shall be suitable for the base materials, positions, and other conditions of intended use.

(6) Miscellaneous materials.--Miscellaneous materials not specifically covered herein by detailed specifications shall be of the top standard commercial quality.

c. Details of design.--In detailing the structures, details and setting dimensions for embedded materials shall be adhered to exactly. The details for connections shown on the drawings are typical and may be varied slightly provided that the change is in accordance with these specifications. Splices shall be made only where indicated on the drawings, or where authorized by the contracting officer. The details of the splices shall be as shown on the drawings.

d. Workmanship and defective materials.--All work shall be equal to the best modern practice in the manufacture and fabrication of materials of the types covered by these specifications, notwithstanding any omissions from these specifications or drawings. The contractor shall be responsible for the correct fitting of all parts. The contractor shall replace, free of cost to the Government, any defective materials discovered during erection, and shall pay all cost of the correction in the field of any errors not previously discovered.

e. Fabrication.--

(1) General.--All work shall be equal to the best modern practice in the manufacture and fabrication of materials of the types covered by these specifications or drawings. Details of design or fabrication not covered by the drawings or by these specifications shall conform to the applicable provisions of the latest "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings," including all supplementary provisions of the American Institute of Steel Construction, and "Specifications for Architecturally Exposed Structural Steel." Cooling tower piping supports and motor control center frame as shown on Drawing 17(1241-300-226) may be fabricated using "Unistrut" members and accessories as supplied by Unistrut Corporation, Wayne, Michigan, or approved equal.

(2) Inspection and tests.--All materials furnished and all work performed shall be subject to rigid inspection. No materials shall be shipped until inspection at the contractor's fabricating plant has been made, and certified copies of tests and analyses have been accepted. Inspection and tests of materials by the Government at the mill will be waived. Inspection of materials at the contractor's plant will be made in accordance with the provisions of these specifications. As soon as practicable after receipt by the contractor of notice to proceed, the contractor shall submit to the Government certified mill test reports of the chemical analysis and physical tests of all structural steel.

(3) Straightening material.--Before being laid out or worked in any way, structural material shall be straight and free from sharp kinks

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and bends. If straightening is necessary, it shall be done by methods that will not damage the metal.

(4) Shearing and cutting.--Shearing and cutting by torch or electric arc shall be performed carefully, and all portions of the work which will be exposed to view after completion shall be finished neatly. Reentrant cuts and copes shall be filleted before cutting.

(5) Baseplates.--Baseplates shall be straight and true and square cut. Baseplates shall be finished where called for on the drawings. Baseplates to be finished shall be planed to obtain satisfactory contact bearing with columns. Edges cut by torch shall be ground straight and smooth.

(6) Machine finish.--Where finished surfaces are specified on the drawings, and where the type of finish is not specified, the type of finish required shall be that most suitable for the part to which it applies and shall be average or rough as defined herein. Where an average finish is required, smooth surfaces shall be produced, but slight toolmarks will be allowed. Where a rough finish is required, rough machining sufficient only to produce a plane surface true to dimensions will be allowed. In general, an average finish will be required for surfaces in permanent contact where a tight joint is required and a rough finish will be required for all other machine surfaces. Where finish is called for on the drawings, the members shall be finished true to line and free from twists, bends, and open joints. All columns marked finish shall be milled.

All machined surfaces which will be exposed during shipment shall be protected by a heavy coat of rust-preventative compound in the shop after machining.

(7) Holes.--

(a) General.--All holes shall be cylindrical, unless otherwise shown on the drawings, perpendicular to the members, and clean cut and without burred or ragged edges. Holes in material more than 3/16 inch thick shall be drilled or subpunched and reamed. Holes for pins shall be bored. All other holes may be punched or drilled to full size.

(b) Drilled holes.--Unless otherwise shown on the drawings, drilled holes shall be 1/16 of an inch larger than the nominal diameter of the bolt. Outside burrs resulting from drilling shall be removed with a tool making a 1/16-inch bevel. Holes shall be drilled so accurately that after assembly not more than 15 percent of any group of contiguous holes in the same place shall show an offset greater than 1/32 of an inch between adjacent thicknesses of metal.

(c) Punched holes.--Unless otherwise shown on the drawings, the diameter of the punch for punching to full size shall be 1/16 of an inch larger than the nominal diameter of the bolt. The diameter of the die shall be not more than 3/32 of an inch larger than the diameter of the punch. The holes shall be punched so accurately that, after the component parts of a member are assembled, a cylindrical pin one-eighth of an inch smaller in diameter than the nominal diameter of the punched hole may be entered perpendicular to the face of the member without drifting in not less than 75 percent of any group of contiguous holes in the same plane. All holes shall pass a pin 3/16 of an inch smaller in diameter than the nominal diameter of the hole.

(8) Edge distances and bolt spacing.--Unless otherwise shown on the drawings or noted in the specifications, edge distances and bolt spacing shall conform to the requirement of the latest "Specifications for Design, Fabrication, and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction.

(9) Bolts, anchors, washers, and nuts.--The length of connection bolts shall be in 1/4-inch variations, and when in the structure, the bolts shall extend at least one-fourth of an inch beyond the nuts. Anchor bolts and tie rods shall be as shown on the drawings. Threads of anchor bolts for the structural-steel framing shall be given a heavy coat of rust-preventive compound in the shop. Washers shall be used under heads of all connection bolts where shown or called for on the drawings.

(10) Welding.--All welding and work related thereto shall comply with the latest edition of the American Welding Society "Code for Welding in Building Construction." All welding terms shall be interpreted in accordance with the American Welding Society definitions of welding terms. Welding symbols shown on the drawings comply with American Welding Society symbols, unless otherwise noted.

All welds shall be of the types specified on the drawings, shall be continuous unless otherwise noted, and shall be made in such a manner that residual shrinkage stresses will be reduced to a minimum. No stress-relieving treatment will be required unless otherwise noted on the drawings.

(11) Qualifications of welding process and operators.--If not previously qualified, the welding process and all welding operators employed in performing the work covered by these specifications shall be qualified in accordance with the American Welding Society Standard Qualification Procedure.

(12) Compression joints.--The surfaces of compression joints depending on contact bearings shall be faced so as to have full contact bearings when alined and welded.

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(13) Stiffeners.--Stiffeners shall be fitted neatly and, when tight fits are required to transmit bearing, shall be milled or ground and brought to true contact with the flanges or structural tubing.

(14) Temperature correction.--The overall length of any member or assembly of members shall be as shown on the shop drawings, within tolerances permitted in standard shop practice, with the temperature of the ambient air at 68°F. If there is any considerable variation from this temperature when measurements are made, the measured dimensions shall be corrected, based on a coefficient of linear expansion of 0.00000636 per unit of length per degree Fahrenheit.

d. Erection.--All steel for the support rack, control center frame, and frames for test stations, shall be assembled and erected in accordance with the approved erection drawings, and the applicable provisions of the "Specifications for Design, Fabrication, and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction.

Anchor bolts shall be supported rigidly in such a manner as to prevent displacement of undue vibration during the placing of concrete. The contractor shall perform all required grouting operations. Bolted connections shall be made with high-strength structural bolts or machine bolts as shown on the approved erection drawings. Installation of high-strength structural bolts shall be in accordance with the applicable provisions of "Specifications for Structural Joints Using ASTM: A 325 Bolts: as approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation and endorsed by the American Institute of Steel Construction." Stud anchors, stud shear connectors, and studbolts shall be welded with automatic end-welding guns.

All structural steel and other related accessory materials for the support rack and frames shall be painted in accordance with the provisions of Section 9.1--PAINTING.

e. Payment.--Payment for furnishing, fabricating and erecting the steel manifold piping support rack, and steel frames for motor control center, four test stations, will be made at the lump sum price bid therefor in the schedule, which price shall include the cost of all labor and materials and incidental cost relative to the completion of the rack and frames as shown on the drawings and herein specified.

DIVISION 7--MISCELLANEOUS METALWORK

SECTION 7.1--MISCELLANEOUS METALWORK

7.1.1. Miscellaneous Metalwork

- a. General.--The contractor shall furnish and install the gratings, shims, serviceline straps, hangers, pipe supports, pipe anchor chairs, and protection saddles, as shown on drawings as miscellaneous metalwork.
- b. Materials.--Materials shall conform to the following requirements:
- (1) Structural steel.--Structural shapes, plates, and bars shall conform to Federal Specification QQ-S-741D, ASTM Designation: A36.
 - (2) Steel pipe.--WW-P-404D(1), Type E, Class A53A, ERW, galvanized.
 - (3) Expansion anchors.--Expansion anchors shall conform to Federal Specifications FF-S-325, Group I, Type 1, Class 2 or Group II, Type 3, Class 2. Proof load test will not be required.
 - (4) Bolts and nuts.--Bolts shall conform to Federal Specification FF-B-575C, Type I or II; Nuts - FF-B-836D, Type I or II, Style 1 or 4.
 - (5) Pipe supports, Types I, III, V, VI, VII, and IX, shall be fabricated as shown on the drawings.
 - (6) Pipe roller supports.--Pipe roller supports for Type II and VIII pipe supports shall be equal to No. 17-C as offered by the Crane Company, Chicago, Illinois (Catalog No. 53).
 - (7) Pipe supports, anchor chairs, shown on Drawing No. 4(1241-300-213) shall be equal to Crane No. 197G, or approved equal.
 - (8) Pipe supports, Type IV, adjustable, shall be Crane No. 264G, or approved equal.
 - (9) Protection saddles.--Saddles for the protection of the pipe insulation on pipe supports shall be equal to Crane No. 186A-G protection saddle for the various sizes of pipe with 2-inch insulation, or approved equal.
 - (10) Damper.--Blowdown damper shown on Drawing No. 11(1241-300-220) shall be fabricated as shown on the drawing.
 - (11) Materials for miscellaneous metalwork not specifically covered herein by detailed specifications shall be of good commercial quality approved by the contracting officer.

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c. Fabrication.--Metalwork shall be fabricated in accordance with the drawings and with the applicable provisions of the "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction.

d. Zinc coating (galvanizing).--Zinc coating (galvanizing) shall conform to ASTM Designations: A123 and A153.

e. Welding.--Welding shall conform with the requirements of the American Welding Society Code AWS D1.0.

f. Installation.--The metalwork to be embedded in concrete shall be supported firmly and accurately in position while the concrete is being placed.

g. Measurement and payment.--Measurement, for payment, for miscellaneous metalwork shall be made in pounds of metalwork incorporated into the work, as determined in accordance with Paragraph 1.4.4. (Weights of Metal Parts).

Payment for types I-IX pipe supports, pipe anchor chairs, and pipe protection saddles will be made at the unit price per pound bid therefor in the schedule, which price shall include the cost of all labor, materials, fabricating, installing and any incidentals associated therewith.

Payment for furnishing and installing all other metalwork for which unit prices are not provided in the schedule will be made as miscellaneous metalwork at the unit price per pound bid therefor in the schedule, which price shall include the cost of all labor, materials and incidentals associated therewith.

DIVISION 8--ELECTRICAL AND GROUNDING SYSTEMS

SECTION 8.1--ELECTRICAL AND GROUNDING SYSTEMS

8.1.1. General

a. General.--The contractor shall furnish and install all electrical equipment and materials to complete and make ready for service the electrical and grounding systems.

The contractor shall place accurately in position, level and plumb, grout, connect, adjust, and make ready for service the transformers, motor control center, lighting and power panelboards, lighting fixtures, wiring devices, grounding system, conduit system, insulated electrical wires and cables, and all other equipment and materials required by these specifications. All installations, assembly operations, and adjustments shall be in accordance with the following, and in the event of conflicting requirements, precedence is established by the order of the following:

- (1) The latest edition of "National Electrical Code," the National Electrical Safety Code, and the adopted electrical code of the county and state in which the construction will be performed.
- (2) Manufacturer's instruction data furnished with the equipment.
- (3) These specifications and the drawings included herein or as directed by the contracting officer.
- (4) The Bureau of Reclamation Design Standards No. 5, "Field Procedures for Electrical Installation," a copy of which will be furnished to the contractor upon request.

The lighting and electrical systems shall be maintained and protected by the contractor in a satisfactory condition until final acceptance by the Government. Defective materials and equipment damaged in the course of installation or testing, shall be replaced or repaired by and at the expense of the contractor in a manner meeting the approval of the contracting officer.

Temporary lighting equipment, if required or necessary to accommodate and facilitate the contractor's work operations, shall be provided, installed, and removed by and at the expense of the contractor.

b. Earthwork.--The excavation of trenches, backfill and compacting of backfill in trenches for conduit, direct burial cable, and grounding cable shall be performed in accordance with the provisions of Paragraph 2.1.6. (Excavation and Backfill for Trenches). Conduits and direct burial cable shall be buried to a minimum depth of 18 inches unless otherwise shown on the drawings or directed by the contracting officer. Conduit and cable shall not be laid one over the top of another but shall be laid parallel with a minimum spacing of 2 inches between the outside diameter. Suitable select backfill shall be placed around all conduit and direct burial cable and all backfill compacted

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as provided in Paragraph 2.1.6. (Excavation and Backfill for Trenches). Timber protection above the low voltage distribution direct burial cable will not be required. No direct payment will be made for earthwork for burying conduit and cable but the cost thereof shall be included in the prices bid in the schedule for related items of work.

c. Payment.--Payment will be made in accordance with Paragraph 8.1.13. (Payment).

8.1.2. Acceptance of Electrical and Grounding Systems

After the work required under these specifications has been completed, the systems will be tested and operated, by and at the expense of the Government. These acceptance tests are exclusive of the operational tests covered under other paragraphs of these specifications. The tests may be witnessed by the contractor or his representative. Final payment under the contract will not be made until each item is completed and accepted in its entirety, these tests are completed, and the contracting officer has determined that the requirements of these specifications have been fulfilled: Except, That if the Government, through no fault of the contractor or of the materials furnished by the contractor is delayed in making the acceptance tests beyond a period of 30 days from the date of final completion of the installation of all equipment, payment of the balance due under the contract will be made at the end of the 30-day period.

8.1.3. Drawings and Data to be Furnished by the Contractor

a. Approval drawings and data.--Within forty-five (45) calendar days after date of receipt of notice to proceed and before proceeding with procurement of materials, the contractor shall submit to the Government five sets of drawings and data for approval. The drawings and data shall include:

- (1) Working drawings of the electrical and grounding systems, including wiring diagrams marked to show circuit designations.
- (2) Manufacturer's detailed drawings, data, and description of the motor control center, lighting, and power panelboards, including manufacturer and catalog numbers and sheets or bulletins of circuit breakers and solderless terminal lugs.
- (3) Detailed data and description of lighting fixtures, light poles, brackets, switches, conduit, cable, and wiring devices, including name of the manufacturer and item catalog number and sheets or bulletins.
- (4) Data and drawings for the transformer showing outline dimensions, wiring, nameplate information, catalog sheets or bulletins, manufacturer, and type of transformer.
- (5) Catalog number and sheet or bulletins for 350 MCM power supply cables.

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Any material shipped before approval of drawings and data will be at the contractor's risk. The Government shall have the right to require the contractor to make any changes in the equipment design and installation details which may be necessary to make the equipment conform to the requirements and intent of these specifications without additional cost to the Government. Approval of drawings and data by the Government shall not be held to relieve the contractor of any part of the contractor's obligation to meet all of the requirements of these specifications nor of the responsibility for the correctness of the drawings and data submitted.

The submittal of data required under this paragraph shall be complete, shall be made at one time, and shall include all data required to be submitted under the provisions of this paragraph. Three copies of all data required above shall be forwarded by the contractor and not by subcontractors, to the Construction Engineer, Yuma Projects Office, P.O. Bin 5569, Yuma, Arizona 85364. The contractor shall forward a copy of his transmittal letter with the other two copies to the Regional Director, Lower Colorado Region, P.O. Box 427, Boulder City, Nevada 89005.

b. Cost.--The cost of submitting drawings and data to the Government shall be included in the lump sum price bid in the schedule for furnishing and installing electrical and grounding systems.

8.1.4. Grounding System

a. General.--The grounding system shall be in accordance with Drawings Nos. 18(1241-300-227) and 19(1241-300-228) and as specified herein.

The contractor shall furnish and install the grounding system, consisting of bare stranded copper cables, ground plates, and accessories. Accessories shall include cable clamps; connectors, ground clamps; materials for Cadweld, Thermoweld, or equivalent process, and other incidentals. The grounding system shall be connected to the existing ground mat.

b. Materials.--

(1) Ground cables.--All ground cables shall be annealed, bare copper cable, concentric stranded, and in accordance with ASTM Designation: B 8, Class B. The solid wires used in forming the cables shall be in accordance with ASTM Designation: B 3.

(2) Cable fittings, lugs, and connectors.--All cable fittings shall be of the solderless type and shall have current-carrying capacity equal to that of the copper cable with which they are used. All cable fittings, lugs, connectors, together with the bolts, nuts, and washers used therewith and the bolts, nuts, and washers which are used to make the connection to the equipment, shall be of copper alloy, containing not more than 4 percent zinc. Cadweld, Thermoweld, or equivalent process,

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shall be used for embedded or buried connections, except connections to conduit shall be of the bolted type. Connections to metal structures may be made with bolted-solderless connectors or with Cadweld, Thermoweld, or equivalent processes. All Cadweld, Thermoweld, or equivalent processes shall be of the heavy-duty type, made of new material from fresh stock and the installation shall be performed with heavy-duty welding equipment in accordance with manufacturer's instructions.

(3) Ground plates.--All ground plates shall be 1/4-inch thick copper plates, 8-inch by 10-inch size and perforated with 1/4-inch holes at approximately 1-1/2-inch spacing both ways.

(4) Ground straps.--All ground straps shall be copper, 1/16-inch thick, 1-inch wide, and perforated with 1/4-inch holes spaced at approximately 3/4-inch centers.

(5) Machine screws, nuts, and washers.--Machine screws, nuts, and washers used with the ground straps shall be of corrosion-resistant material similar to bronze or brass. The machine screws shall be No. 10-32 and shall be 1 inch in length.

c. Installation.--

(1) Ground plates.--Ground plates shall be mounted on the manifold piping support rack as shown on the drawing and shall be connected to the existing ground mat with No. 2 AWG bare copper conductor.

(2) Connections.--The contractor shall make all necessary connections for the complete grounding system. All panelboards, transformers, wireways, conduits, structural members, motor frames, metallic enclosures of all electrical equipment, and lighting standards shall be connected to the ground mat by means of No. 2 AWG copper grounding conductors. The conduit system, if electrically continuous, may serve as the grounding system for 115-volt equipment or a grounding conductor shall be installed with the circuit conductors in accordance with the "National Electrical Code." All 120-208- and 480-volt outlets and equipment shall be connected to the grounding system with a grounding conductor of not less than No. 2 AWG size.

Grounding conductors shall be embedded, buried or concealed insofar as possible. Metallic nonelectrical items within reach of electrical items shall be bonded to the electrical item or to the same ground cable at the closest point. All paint, scale, and enamel shall be removed from the points of contact on metal surfaces before ground connections are made. Where the finish has been removed from equipment to install ground connections, the finish shall be repaired in accordance with Section 9.1--PAINTING. Where it is required that the external surfaces of conduit be protected by a factory-applied protective coat of polyethylene compound, ground connections to conduit shall be made on the

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exposed portion of the conduit; if the conduit is embedded in concrete, so that there is no break made in the protective covering on the conduit. All ground connections shall be made in accordance with the methods outlined on the drawings, and the "Field Procedures for Electrical Installations, Chapter 2, Electrical Standards for Equipment Installation" of the Bureau of Reclamation.

(3) Upon completion of installation of the grounding system the contractor shall determine the ground resistance of the installation by the three-electrode method described in the ninth edition of the Standard Handbook for Electrical Engineers, by A. E. Knowlton, p. 1294, and shall report this value to the contracting officer.

d. Cost.--The cost of furnishing and installing the grounding system shall be included in the lump sum price bid in the schedule, for furnishing and installing electrical and grounding systems, which lump sum price shall include the cost of all materials, labor, and equipment, including earthwork, to install the grounding system.

8.1.5. Electrical Conduit System

a. General.--The contractor shall furnish and install all electrical rigid steel conduit and accessories required for the lighting and power systems as shown on the drawings.

Conduit accessories shall include conduit fittings, bushed elbows, nipples, chase nipples, connectors, reducers, outlet bodies, outlet body extensions, 1/2-inch pipe extensions for conduit drains, outlet boxes, outlet box extensions, caps, pipe plugs, locknuts, bondnuts, bushings, pull boxes, concrete yard pull boxes, junction boxes, junction box extensions, octagonal concrete rings and backplates, adapters, adhesive, sealing varnish, threaded joint compound, expansion couplings, sealtight conduit fittings, materials for sealing the ends of conduits terminating at outdoor equipment, and all other incidentals required to complete the conduit system, and to fasten, clamp, attach, and support conduit in place.

Unless otherwise specified or shown on the drawings, flush-mounted outlet boxes for lighting system wiring devices and junction boxes, shall have a minimum depth of 3-1/2 inches.

b. Materials.--Materials for the electrical conduit installations shall conform to the standards of Underwriters' Laboratories, Inc., and to the latest edition and amendments of the following specifications:

(1) Tubing, electrical, metallic (thin-wall).--WW-C-563A.

(2) Rigid steel conduit.--WW-C-581d(3), zinc coated.

(3) Flexible metal conduit.--Shall be galvanized steel core with a copper bonding conductor between the spiral segments and with an

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extruded synthetic jacket overall to insure a watertight conduit. Conduit shall be American Brass "Sealtite" Type UA or equal with grounding-type fittings approved for this type of flexible conduit.

(4) Conduit fittings.--W-F-406b(1) and W-F-408c(1).

(5) Plastic-coated conduit and plastic-coated conduit fittings.--Shall be rigid steel conduit WW-C-581d(3), W-F-406b(1), and W-F-408c(1), zinc coated, with factory-applied plastic-compound protective coat at least .040 inch thick and placed uniformly around the conduit and equal to Republic Steel Corporation DEKORAN, Pittsburg Standard PLASTI-BOND, General Electric Company plastic-jacketed rigid conduit, or OCAL, made by Occidental Coating Company. All joints of plastic-coated conduit shall be taped so that a complete and positive seal is assured (see Subparagraph (12) below).

(6) Protective varnish.--Protective varnish shall conform to General Electric Company "Glyptal" No. 1201-B, Westinghouse Electric Corporation No. B-6-614, or equal.

(7) Octagonal concrete rings and backplates.--Shall be Appleton Electric Company Types OCR and OCP, or equal.

(8) Outlet bodies.--W-C-586b, cast iron, malleable iron, or cast aluminum, Class 1 for embedded conduit systems. Covers for outlet bodies shall be metal and covers on bodies exposed to moisture shall be provided with gaskets.

(9) Junction boxes; junction box extensions; and junction box covers (steel, cadmium, or zinc coated).--W-J-800c(3).

(10) Pull boxes, terminal boxes, and junction boxes.--Unless stated otherwise in these specifications, these boxes shall be constructed of sheet steel of not less than No. 10 United States Standard gage and shall be thoroughly cleaned and have a primer coat of red vinyl resin paint followed by a coat of gray vinyl resin paint. Terminal blocks shall be provided where required.

(11) Expansion couplings.--Except as otherwise provided, expansion couplings for conduit systems shall be employed at expansion and contraction joints. For 2-inch metal conduit and smaller, couplings shall be equal to Dresser Manufacturing Company's Type 65A. For 2-1/2-inch metal conduit and larger, couplings shall be equal to Dresser Manufacturing Company's Type 38.

(12) Tape.--Tape for wrapping the joints of plastic-coated conduit shall be not less than 2 inches wide and not less than 0.01 inch thick and shall consist of a polyvinyl-chloride or polyethylene film having high-strength and close-molding properties and having a pressure-sensitive adhesive.

c. Installation.--All conduit to be embedded in concrete shall be plastic-coated rigid metal conduit. Conduit, conduit fittings, and conduit boxes to be embedded in concrete, shall be held securely in position while concrete is being placed; all concrete shall be cleaned from the inside of conduit boxes after the forms are removed and the threads for attaching devices and covers shall be cleaned. The ends of conduit shall be protected to prevent the entrance of concrete, sand, or other foreign material. As soon as practicable after conduit runs are completed and the forms are stripped, all conduit runs shall be swabbed with clean dry rags to show they are thoroughly cleaned and dried. The plugs shall then have their threads greased and shall be replaced and left in place until the wire is installed. All conduit shall be installed with necessary fittings and supports, and all bends shall be gradual and smooth to permit the pulling of insulated electrical wires and cables without undue stress or damage to the insulated electrical wires and cable sheath or to the conduit. All conduit runs and bends shall be entirely free from kinks, indentations, or flattened surfaces. All metal conduit bends made in the field shall be bent cold to prevent damage to the protective coating. Burrs and sharp corners at the ends of each piece of metal conduit shall be removed.

The male threads of rigid conduit joints shall be coated with a suitable sealing material before making joints and shall be tightened securely to prevent the entrance of moisture or any other foreign material. For steel conduit, the completed joints and terminations, all wrench marks, and all other places where the zinc covering is damaged shall be covered entirely with a protective varnish to provide protection from corrosion. Bushings or chase nipples shall be installed on the ends of conduit to protect the insulation or sheath of the wires or cables from abrasion; and locknuts and bondnuts shall be installed to provide tight ground connections between conduit boxes, panelboards, and cabinets.

Where conduits cross expansion or contraction joints, the required special fittings or expansion couplings shall be installed.

The exposed conduit runs shall be straight and shall be parallel with each other and with the centerline of the manifold piping support rack, unless otherwise directed. All exposed conduits shall be rigidly supported at intervals of not more than 10 feet, unless otherwise specified or directed. The supports shall be of a design acceptable to the contracting officer. The installation of exposed conduit shall include, where required, the drilling of holes in the bottom and top of enclosures or plates and in the side of enclosures of electrical equipment. The contractor shall drill all holes in concrete or structural members required for installation of expansion anchors or clamps for exposed conduit runs. All exposed conduit shall be tightened securely and shall be supported rigidly in place. Flexible conduit shall be used to make conduit connections to electrical equipment such as motors and equipment where shown. All flexible conduit and connectors shall be approved grounding type.

All metal conduit buried directly in earth shall be protected by a factory-applied plastic coat. All joints of plastic-coated conduit shall be made

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with watertight fittings which shall be taped with polyvinyl-chloride or polyethylene tape or covered in accordance with the manufacturer's instructions and any damaged portions of the protective coat shall be repaired or covered in accordance with the manufacturer's instructions. The covering shall extend at least 3 inches into the concrete or above the ground surface, as applicable. See Paragraph 8.1.4. (Grounding System) for method of grounding this conduit.

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

Buried electrical conduit shall have 2 inches of sand or fine earth around each conduit. The remaining portions of the trenches shall be backfilled and compacted as provided in Paragraph 2.1.6. (Excavation and Backfill for Trenches).

At electrical equipment enclosures not equipped with threaded hubs, conduits shall be terminated in accordance with Drawing No. 23(104-D-254) unless otherwise noted.

Conduit low points shall be drained where and as directed by the contracting officer. Conduits used solely as drains shall be 1/2 inch.

8.1.6. Insulated Electrical Wires and Cables

a. General.--The contractor shall furnish and install all single-conductor insulated electrical wires, cables, fixture wire, and cable installation accessories for the electrical system. Cable installation accessories shall include marking tags, insulating tape, connectors, fittings, and other incidentals required for completing the installations. Aluminum connectors using aluminum screws will not be permitted.

For the electrical installation, the term "wire" applies only where a single solid insulated electrical conductor is used and the term "cable" shall apply to either a stranded electrical conductor (single-conductor cable) or a combination of electrical conductors insulated from one another (multiple-conductor cable), except grounding cable shall be uninsulated.

All wire and cable sizes shall be as shown on the drawings and as specified herein.

b. Materials.--Insulated electrical wires and cables shall be "National Electrical Code" grade of the types listed below and shall have been manufactured within 24 months prior to receipt of notice to proceed. Unless otherwise specified, conductors shall be soft annealed, Class B, stranded copper. All conductors No. 12 AWG and larger shall be stranded.

- (1) 600-volt, single-conductor, copper:
 - (a) For 75⁰C conductor temperature, general use service: Type THW.
 - (b) For 90⁰C conductor temperature: Types THHW or XHHW.
 - (c) Fixture wire: No. 14 AWG stranded, Type SFF-2.
 - (d) Direct burial conductors for power distribution system shall be UL approved for direct burial.

All No. 10 AWG and smaller single-conductor wire and cable used in branch circuits for the lighting and distribution systems shall be color coded in accordance with the requirements of the "National Electrical Code" and the "Field Procedures for Electrical Installations." Branch circuit conductors 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 only where more than one multiwire branch circuit of the same size is contained in a single circuit.

c. Installation.--The contractor shall install the wires and cables in conduits, wireways, or enclosures, where required.

Sufficient length shall be left at the ends of wires and cables to make connections conveniently to the equipment and devices.

Wire and cables 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 the conduit immediately before installing the wire or cable. The wires and cables shall be installed so that there will be no cuts or abrasions in the insulation or protective covering or kinks in the wires and cables. No splices shall be made in wires or cables, except at boxes, wireways, outlets, panelboards, or electrical equipment enclosures. Only gradual and uniform pulling stresses will be permitted on wires and cables. Where a lubricant is needed as an aid to the pulling of wires and cables, only soapstone or other approved material not injurious to the wire or cable sheath shall be used. Any wire or cable damaged during installation shall be removed and replaced with equivalent wire or cable at the contractor's expense.

All wires and cables shall be marked with circuit designation at each end and where the wires or cables are connected to terminals, terminal blocks, or connectors. The designations shall be applied to the wire or cable ends by using identification markers similar to the W. H. Brady Company No. B-500 vinyl-cloth tape with a silicone-plastic overcoating.

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All runs, connections, and taping of wires and cables shall be made carefully and neatly. Bolted solderless-type terminal lugs and connectors shall be used for joining or connecting cables larger than No. 8 AWG. All terminal lugs and connectors shall have current-carrying capacity equal to that of the conductor with which they are used. No. 8 AWG and smaller stranded cables shall have suitable solderless lugs for connecting to terminal blocks and terminal studs. When No. 8 AWG and smaller size wires and cables are spliced, they shall be joined so as to be mechanically and electrically secure. All insulated wire and cable splices and terminations shall be performed in accordance with the cable manufacturer's recommendations and in all cases the contractor shall obtain this information for each type and size of cable being furnished, and shall submit copies of such information to the contracting officer.

8.1.7. Transformer

a. General.--The contractor shall furnish and install a transformer at the location shown on Drawing No. 19(1241-300-228).

b. Equipment.--The transformer shall be distribution, air-cooled, dry type, weatherproof, wall-mounted, and unless otherwise specified, shall be in accordance with applicable provisions included in the latest American National Standard C89.1. Primary and secondary windings shall be insulated from each other (autotransformer will not be accepted). The windings shall be formed with Class B or Class A insulation and shall be suitably treated to resist the effects of moisture and dirt. The transformer shall carry its normal continuous, self-cooled kVA rating with a temperature rise by resistance not to exceed 80°C for Class B insulation above a 40°C ambient. Terminals for connecting external cables shall be located so that the insulation on the incoming cable will not be adversely affected by the heat from the transformers.

The transformer shall be rated as follows:

Type: 3-phase; 60 Hz

Capacity: 30 kVA

High voltage rating: 480 Delta volts with primary fuses

Low voltage rating: 208 Y/120 volts

High voltage taps at rated kVA: +2-1/2, +5-7-1/2, -10 percent

Mounting: Wall-mounted Weatherproof

The transformer shall be finished with the manufacturer's standard finish.

c. Installation.--The transformer shall be leveled and anchored securely to the steel frame as shown on the drawings. The locations and terminations of the conduits shown on the drawings for the transformers shall be modified as required to accommodate the equipment. The contractor shall make all conduit, cable and wiring, and grounding conductor connections required to put the equipment into normal operation.

d. Cost.--The cost of furnishing and installing the transformer shall be included in the lump sum price bid in the schedule for furnishing and installing electrical and grounding systems, which lump sum price shall include the cost of all materials, including all labor and equipment to install the transformer as shown on the drawings and described herein and making all required connections.

8.1.8. Wireways

Wireways shall be UL listed, code gage steel, galvanized after fabrication, and shall be finished with the manufacturer's standard finish. The covers shall be secured by rustproof screws. Wireways shall be without knockouts and shall be drilled and punched in the field.

8.1.9. Motor Control Center, Lighting, and Power Panelboards

a. General.--The contractor shall furnish and install the steel frame, motor control center, lighting, and power distribution panelboards at the locations shown on the drawings. Materials, fabrication, and erection of the steel frame shall be in accordance with applicable provisions of Paragraph 6.1.1. (Manifold Piping Support Rack).

b. Equipment.--Panelboards shall be surface-mounted type for mounting on the steel frame as shown on the drawings. Enclosures shall be the one-piece box type, fabricated of sheet steel having a zinc-coated galvanized finish. The finish shall be applied by hot-dip or electrochemical (plating) process. Enclosures shall be without knockouts and shall be drilled and punched in the field. Steel sheet in cabinets shall have a minimum thickness of No. 14 United States Standard gage. Mounting bolt holes of 9/16-inch diameter shall be provided through back surfaces of cabinets. Adjacent to mounting bolt holes, 1/4-inch-thick steel spacer washers shall be welded to back outside surface of cabinets. Cabinet fronts shall be made of stretcher-leveled steel sheets. Thickness of cabinet fronts shall be not less than No. 12 United States Standard gage. Fronts shall be attached to cabinets with adjustable, indicating-type trim clamps. Overall lengths and widths of fronts shall be approximately 1/4 inch more than overall lengths and widths of cabinets on which fronts are installed. Panelboards shall be dead-front construction with doors. A directory frame with completed directory shall be provided on the back of each door. Equipment in panelboards shall be arranged to provide ample and adequate wiring space. Locks for all panelboard doors shall be keyed alike. Panelboard enclosures shall be finished with the manufacturer's standard finish.

The 480-volt services and motor control center shall be rated for 480-volt, 3-phase, 3-wire, 60-Hz service. The 208Y/120-volt panel shall be rated for 208Y/120-volt, three-phase, 4-wire, 60-Hz service.

Clamp-type lugs or terminals suitable for copper conductors shall be provided on each breaker for the feeder cables and on each bus for the supply

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cables. The lugs shall be sized in accordance with the cable sizes shown on the drawings. Aluminum connectors using aluminum screws will not be permitted.

Circuit breakers shall be in accordance with the latest NEMA Standards (Publication NO. AB1) Molded Case Circuit Breakers. Each circuit breaker shall be trip-free and shall be furnished with thermal and instantaneous overload trip devices. The circuit breakers for the 480-volt motor control center shall have an interrupting rating of not less than 13,000 symmetrical amperes at 480 volts. The circuit breakers for the 208Y/120-volt panelboard shall have an interrupting rating of not less than 10,000 symmetrical amperes at 120 or 208 volts. All 120-volt receptacles shall be fed by 20-ampere circuit breakers and shall be equipped with Ground Fault Interrupter Protection equivalent to Bryant Catalog No. GFCB 120.

An engraved nameplate shall be furnished and mounted on the outside of each lighting and power panelboard. Nameplates shall be similar to nameplates shown on Drawing No. 22(40-D-2567). Nameplates shall be size 6 and shall be Type "B" material. Nameplate for the 480-volt panelboard shall be lettered "MOTOR CONTROL CENTER" on first line and "480 VOLT" on second line. Nameplate for the 208Y/120 panelboard shall be lettered "Lighting-Power Distribution Panel" on first line and "208Y/120 VOLT" on second line.

The panelboards shall be finished with the manufacturer's standard finish.

c. Installation.--The motor control center, lighting, and power panelboards shall be anchored securely to the steel structure. Conduits terminating at panelboards shall be provided with short nipples, locknuts, bondnuts, and bushings. The locations and terminations of the conduits shown on the drawing for the panelboards shall be modified as required to accommodate the equipment. The contractor shall make all conduit, cable and wiring, and grounding conductor connections required to put the panelboards into normal operation. A weatherproof light (150 watt incandescent) shall be furnished and installed by the contractor above the motor control center panel as shown on Drawing No. 18(1241-300-227), complete with mounting bracket, fixture wire, weatherproof switch, and all accessories required for the complete light installation. The fixture shall be equal to Crouse-Hinds "Vaporguard" fixture, as listed in Graybar catalog (No. VXHBF-15GP).

8.1.10. Outdoor Lighting

a. General.--The contractor shall furnish and install outdoor lighting fixtures as shown on Drawing No. 18(1241-300-227). The outdoor lights shall be mounted on rigid steel poles complete with brackets, switches, and all accessories as required for the complete lighting installation.

b. Lighting fixture.--The lighting fixture that the contractor furnishes shall be equal to Type P400C as manufactured by General Electric, Catalog No. C539G506 (400-watt high pressure sodium). The lighting fixture shall be

completely assembled and prewired, with built-in ballast, lamp, wire, and a manually operated weatherproof switch located as shown in Drawing No. 18(1241-300-227).

c. Pole.--The contractor shall furnish a heavy duty round tapered rigid steel pole of 11-gage, single piece construction, anchor base, and plain top (2-3/8" O.D.). The pole shall be equal to General Electric No. 35-112197-50. Poles shall be finished with manufacturers standard rust-inhibitive primer.

d. Installation.--The lighting fixtures shall be mounted on steel poles as specified in Subparagraph c. at the locations shown on the drawings, and shall be installed in accordance with the manufacturer's instructions. The electrical and grounding connections shall be made in accordance with standard practices and as shown on the drawings.

e. Cost.--The cost of furnishing and installing the outdoor lighting shall be included in the lump sum price bid in the schedule for furnishing and installing electrical and grounding systems.

8.1.11. Wiring Devices

a. General.--The contractor shall furnish and install all wiring devices, which shall include lighting switches, plug receptacles, and miscellaneous devices, all forming a part of the lighting and building services distribution systems. All flush-mounted wiring devices shall be furnished with flush plates. All surface-mounted wiring devices shall be furnished with suitable cast or malleable metal plates.

b. Materials.--

(1) Switches.--Lighting switches shall be single-unit, heavy-duty, tumbler type approximately 1 inch deep, rated 20 amperes, 120-277 volts, Arrow-Hart Catalog Nos. 1991, 1992, and 1993, as required, or equal.

(2) 120-volt receptacles.--Convenience outlets shall be weatherproof twin- or duplex- plug receptacles installed in single-gang boxes. Weatherproof receptacles shall be installed in cast metal outlet bodies. Plug receptacle shall be 20 amperes, 125 volts, 3 wire, 2 pole, polarized, grounded, complete with weatherproof cast metal housing and gasket, Crouse-Hinds Catalog No. DS-96, or equal. Weatherproof receptacle housings shall be of the same manufacturer as the outlet bodies on which they are installed.

(3) 208-Y volt Receptacles.--Outlets shall be weatherproof receptacles and shall be installed in single-gauge boxes. Plug receptacles shall be 30-ampere, 600 volts, 5-wire, 3-pole, Graybar Catalog No. 45105, or equal.

(4) Cover plates.--Flush plates for flush-mounted wiring devices shall be made of stainless steel, 0.040 inch thick, with satin finish. Plates

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for surface-mounted wiring devices shall be cast or malleable metal construction.

(5) Miscellaneous devices.--Wiring devices shown on the drawings and not covered herein by detailed specifications shall be of standard commercial grades that are satisfactory to the contracting officer.

c. Installation.--The contractor shall install wiring devices at the locations shown on the drawings. All weatherproof and surface-mounted wiring devices shall be contained in Type FD outlet bodies unless otherwise indicated on the drawings.

8.1.12. Installation of Power Supply

a. General.--The contractor shall furnish and install power supply cables from an existing main distribution panelboard near the substation, to the motor control center panelboard on the equipment base, and to test stations 1 through 4 as shown on Drawings Nos. 2(1241-300-211), 18(1241-300-227), and 19(1241-300-228). The contractor shall also furnish and install two 400-ampere molded case circuit breakers with interchangeable trips, and shall provide each breaker with a shunt strip and ground fault protection system, all of which shall be installed on the existing distribution panelboard, and shall make all necessary connections. The power supply cables shall consist of two underground conduits, 3-350 MCM copper each as provided for in Paragraph 8.1.6. (Insulated Electrical Wires and Cables).

The contractor shall excavate the trench and place selected backfill material around the cable. When backfilling the trench, no stones larger than 1-1/2 inches across shall be allowed to come in contact with the outer sheath of the cables. Backfill in the trench shall be compacted in that portion of the trench located under concrete bases.

b. Cost.--The cost of furnishing and installing power supply cables shall be included in the lump sum price bid in the schedule for furnishing and installing electrical and grounding systems, which price shall include the cost of all materials, labor, and equipment to provide the power supply cables from existing service to the motor control center panelboard and to test stations 1 through 4. Included in the price of furnishing and installing the power supply cable shall be all earthwork associated with the installation of the cables.

8.1.13. Payment

Payment for furnishing and installing electrical and grounding systems shown on the drawings and herein specified will be made at the lump sum price bid therefor in the schedule, which price shall include all labor, materials, earthwork, transportation, and all incidentals required for complete installation of the electrical and grounding systems including the construction of the motor control center, lighting and power panelboards, all earthwork required,

grounding system, all conduits, electrical wires and cables, the transformer, wireways, all outdoor lighting, wiring devices, and installation of power supply from the existing service and all connections to the motor control center and to test stations 1 through 4, and all incidentals associated therewith.

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DIVISION 9--PAINTING

SECTION 9.1--PAINTING

9.1.1. Painting

a. General.--The contractor shall furnish all materials, clean surfaces and apply the paint and protective coatings listed in Paragraph 9.1.2. (Painting Tabulation) and in accordance with Paragraph 9.1.3. (Color Schedule for Painting).

Items or surfaces not required to be painted or coated but which are adjacent to surfaces to be cleaned and painted shall be protected against contamination and damage during the cleaning and painting operations. The cleaning and painting operations shall be so conducted that dust or other contamination from the cleaning process will not fall on wet, newly painted surfaces, and newly painted metalwork shall not be moved until the paint is dry hard. All contractor-applied coatings exposed to view, including any touchup repair painting, shall present a uniform color-matched appearance. Any items or surfaces damaged or contaminated by painting operations shall be returned to their original condition by and at the expense of the contractor. Before topcoating any coated surfaces, the contractor shall reclean any exposed metal and apply paint as necessary to restore to the specified condition all previously applied paint in areas which are defective or damaged. Materials which have been painted shall be handled with care and protected as necessary to preserve the coating in good condition.

Temporary or permanent welding for the convenience of the contractor will not be permitted on areas where the welding will damage paint or other protective coatings unless the areas of coatings which would be damaged thereby are accessible for repairing and inspection. Unless otherwise specified, the contractor will not be required to disassemble machinery, equipment or other metalwork for the purpose of painting the interiors. The contractor shall provide adequate ventilation, lighting and the necessary safety equipment for the protection of the workmen during painting and coating operation.

b. Preparation of surfaces.--Surface preparation shall be in accordance with one of the following methods. The method to be used for each item is indicated in the painting tabulation. Weld spatter, slag burrs, or other objectionable surface irregularities shall be removed or repaired before cleaning. Any contaminants to the paint coating, from cleaning operations or other sources, shall be removed before the surfaces are painted. Cleaning solvent shall be mineral spirits or xylol. Cleaning cloths and solvents shall be discarded before they become contaminated to the extent that a greasy film would remain on the surface after preparation of the surface. In the event that rust forms or the surfaces become otherwise contaminated in the interval between cleaning and painting, or between coats of paint, recleaning will be required. Any coatings not required by and not shown

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in the painting tabulation shall be removed from the surfaces by suitable and effective means, unless otherwise directed.

Method A. All oil, grease, and dirt shall be removed by the use of clean solvent and clean, lint-free wiping material or other effective means. Surfaces with gloss or semigloss paints shall also be sanded lightly.

Method B. All oil and grease shall be removed by the use of clean solvent and clean, lint-free wiping materials. Following the solvent cleaning, the surfaces shall be cleaned of all defective or damaged areas of existing paint, and of all loose rust, loose mill scale, and other foreign substances by scraping, chipping, wire brushing, grit-blasting, commercial grade sandblasting, or other effective means.

c. Preparation of other surfaces.--All surfaces not covered by the above subparagraphs shall be prepared by methods common to good practice for the particular surface being prepared.

d. Application.--Materials shall be thoroughly mixed at the time of application. Surfaces shall be clean and free from moisture at the time of application. Items to be painted that are not thoroughly dry at the time of paint application shall be heated to a sufficient temperature (80°F.) to drive off any moisture present before paint is applied. Effective means shall be provided for removing free oil and moisture from the air-supply lines of all spraying equipment. Care shall be exercised during spray application to hold the nozzle sufficiently close to the surfaces being painted to avoid excessive evaporation of the volatile constituents and loss of material into the air, or the bridging over of crevices and corners.

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 metal or previous coat. Each coat shall be free from runs, pinholes, and sags.

Each coat shall be allowed to dry or to harden before the succeeding coat is applied. Thicknesses shall be measured by an approved dry-film thickness gage and shall be not less than the minimum specified thickness at any point on the coating. Acceptance will be based on the total dry-film thickness as measured by an Elcometer, Mikrotest, or other suitable dry-film thickness gage, after the complete paint system has thoroughly dried.

Red lead priming paint, regular aluminum paint, and enamels, and oil base paints may be thinned if necessary to permit satisfactory application, in which event mineral spirits shall be used and the amount of thinner shall be kept to a minimum but in no event shall it exceed 1 pint per gallon of paint.

9.1.1.

If necessary to improve application properties, cold-applied paints may be heated by means of a hot-water bath to temperatures not to exceed 100°F. Paint shall not be applied when the temperature of the item to be painted or of the surrounding air is under 45°F., except that vinyl resin paints shall not be applied when metal or air temperatures are above 110° or below 40°F. Painting shall proceed only when the humidity and the temperatures of atmosphere and of surfaces to be painted are such that evaporation rather than condensation will result. Brush coats may be applied by the conventional brushing procedure, or the paint may be delivered to the surface in a fluid stream by means of spray equipment employing air pressure only on the material and the paint then spread immediately by brushing to an even smooth coating.

Tinting, where required for color contrast, shall be accomplished by using not more than 3 ounces of tinting color per gallon of paint.

Application of specific materials shall be as follows:

(1) Red lead priming paint shall be applied at a maximum coverage of 500-square-feet-per-gallon per coat for Type II but the dry film thickness shall be not less than 1.0 mil for the first coat. Zinc-dust-zincoxide paint shall be applied at a maximum coverage of 500-square-feet-per-gallon per coat. Following the first coat of red lead paints, an additional tinted coat shall be applied over all rivets, welds, bolts, seams, sharp corners, and edges before subsequent painting. Alternate coats shall be tinted for color contrast using 1B black. The first coat shall be applied by brush or roller and subsequent coats shall be applied by either brush, roller, or spray, except that Type II red lead priming paint may be applied by spraying when Method B surface preparation is specified and the surface is cleaned by "commercial" grade blast cleaning.

(2) Aluminum paints shall be applied by spraying at a maximum coverage of 500-square-feet-per-gallon per coat for regular aluminum paint. The paints shall be prepared by mixing 2 pounds of aluminum paste per gallon of mixing varnish and only enough paint for each day's use shall be prepared at one time. The first coat shall be tinted for color contrast using 2A blue. The final coat of aluminum paint shall be "stripe free" with a uniform appearance.

(3) Enamels, oil base paints, and tinted decorative paints shall be applied by brush, roller, or spray at a maximum coverage of 500-square-feet-per-gallon per coat.

(4) Latex base primer shall be applied by brush, roller, or spray at a maximum coverage of 450-square-feet-per-gallon.

e. Materials.--All pigmented paints and primers shall be purchased in containers not larger than 5 gallons as packaged by the manufacturer. Colors of finish paints shall be as directed in accordance with Federal Standard No. 595a. All colors shall be factory mixed and ground. Tinting

with universal tinting colors will not be permitted, and tinting with colors-in-oil is permitted only where specified for slight contrast between coats. Materials shall be in accordance with the following specifications, or may be in accordance with the subsequent revisions thereto: Provided, That the samples or certifications are identified with the proper specifications revision:

Group I

(1) Federal Specifications.--

- (a) Red lead priming paint, TT-P-86g, Type II.
- (b) Mixing varnish for regular aluminum paint, TT-V-81d, and aluminum paste, TT-P-320c, Type II, Class 2.
- (c) Zinc dust-zinc oxide primer, TT-P-641f, Type II.
- (d) Primer coating, zinc dust, chlorinated rubber, TT-P-001046(1), (Galvanizing repair compound.)
- (e) Enamel, gloss, TT-E-489f(1), Class A.
- (f) Enamel, semigloss:
 - (aa) Interior, TT-E-508b(4) (light colors; for interior walls and woodwork only).
 - (bb) Exterior and interior, TT-E-529c(1), Class A. (All colors; for interiors except as permitted under TT-E-508b(4), and all exteriors.)

(2) Miscellaneous specifications.--

- (a) Paint and coating materials required to be used on work covered by these specifications and which are not covered by this paragraph will be classified as Group I materials, unless otherwise indicated.

Group II

(1) Federal Specifications.--

- (a) Pigment-in-oil (tinting colors), TT-P-381E(1). Colors 1B black and 2A blue, or equal tinting color in oil.
- (b) Mineral spirits, TT-T-291E, Grade 1.
- (c) Xylo1 (xylene), TT-X-916b, Grade A or B.

9.1.1.

f. Sampling, testing, and certification of materials.--The Government will test or require certification of each batch, type, or color of paints or related materials prior to use of application. However, acceptance of the material under the clause of the General Provisions entitled "Inspection and Acceptance" will not be made until the material has been satisfactorily applied and the equipment installed at the jobsite.

The contractor shall furnish copies of all purchase orders for paint or related materials to the contracting officer. Copies of purchase orders shall be furnished far enough in advance of planned use so that the samples, if required, will be available to the Government to allow a testing period of at least 45 days. The Government will then inform the contractor in writing whether materials covered by each purchase order will be tested or whether the manufacturer's certification will be required. The Government will act on certifications as to paint conformance within 16 days after receipt of the certifications by the Government, and will notify the contractor. Purchase orders and the required certifications or samples shall be furnished by the contractor to the Bureau of Reclamation, Construction Engineer, Yuma Projects Office, P. O. Bin 5569, Yuma, Arizona 85364, shipping costs prepaid, and copies of all correspondence shall be sent to the authorized representative of the contracting officer at the jobsite.

Certifications for each type, batch, or color of Group I materials shall include detailed results of laboratory tests covering all of the applicable specifications requirements and a general statement that the materials comply with the requirements of the specifications. Certifications for quantities of 10 gallons or less of each type, batch, or color of Group I materials may be furnished with only the manufacturer's quality control and composition data, and a general statement that the materials comply with the requirements of the specifications. The certifications shall also contain specific identification data as to material identification, batch number, date of manufacture, quantity being furnished, and the Bureau of Reclamation specifications number. Certifications for Group II materials need not include detailed laboratory testing data but shall comply in other respects with the requirements stated above. The Government reserves the right to test any materials furnished on certification when in the opinion of the Government, such tests are necessary. The contractor shall be responsible for the accuracy of all certifications submitted or data contained therein whether submitted by him, a manufacturer, a supplier, or a subcontractor.

The contractor shall purchase the total quantity of each item of material that is expected to be used in a reasonable length of time to avoid repetitive purchases that would impose additional testing expense on the Government. The costs and delays from additional testing required as a result of either unnecessary small purchases or rejection of the materials submitted shall be the responsibility of the contractor.

g. Costs.--The cost of furnishing, preparing, and applying all materials for the cleaning, painting, or coating operations shall be included in the applicable prices bid in the schedule for the items of work requiring painting.

9.1.2. Painting Tabulation

Contractor furnished items shall receive the cleaning and coating systems shown in the tabulation following. Coatings shall be applied as required under Paragraph 9.1.1. (Painting).

No.	Item	Surface Preparation Method	Paint or Coating Material	Number of Coats
1	Damaged areas of paint on metalwork and equipment which are furnished complete painted or coated including: a. Transformers b. Wireways c. Panelboards and enclosures	Repair damaged areas to equal and color match undamaged contiguous areas.		
2	Damaged areas of galvanized surfaces that do not require finish painting	B	Zinc dust-zinc-oxide paint	2
3	Exterior exposed metalwork and exposed piping a. Structural steel manifold piping support rack and frames for motor control center and test stations 1 through 4 b. Light poles	B	Red lead priming paint, Type II, Regular aluminum paint	1 2

9.1.3. Color Schedule for Painting

The colors and gloss of finish coats of paints will be as shown on the drawings or as selected by the contracting officer except as provided in Paragraph 9.1.2. (Painting Tabulation). If items are furnished with a manufacturer's finish painting, the color and gloss of which are acceptable to the contracting officer and which meet the cleaning and painting requirements of Paragraph 9.1.1. (Painting), such items will not require field painting except for repair of damaged painted surfaces.

Color schedules for painting will be provided by the contracting officer.

10.1.1.

DIVISION 10 - DRAWINGS

SECTION 10.1 -- DRAWINGS

10.1.1. Drawings, General

a. General.--Some of the drawings included herein show details of fabrication, and other details and specifications not a part of work required under these specifications. Specifications and details shown on these drawings which are not applicable under these specifications shall be disregarded. Reference drawings referred to on specifications drawings, and not included herein, are not considered necessary for bidding purposes but will be furnished to the contractor, where necessary, for construction purposes. Where details shown on Standard Drawings 40-D- and 104-D series differ from those shown on other drawings or the requirements of these specifications, the details shown on other drawings or the requirements of the specifications shall govern. In the event there are minor differences as determined by the contracting officer between details and dimensions shown on the drawings and those of existing features at the site, the details and dimensions of existing features at the site shall govern.

The contractor shall check all drawings carefully and advise the contracting officer of any errors or omissions discovered.

b. Additional or revised drawings.--Except as otherwise provided in these specifications for drawings to be furnished by the contractor, the specifications drawings will be supplemented by such additional or revised general and detail drawings as may be necessary or desirable as the work progresses; and the contractor shall do no work without proper drawings and instructions. The contractor will be required to perform the work in accordance with the additional general and detail drawings or revisions furnished by the Government at the applicable prices bid in the schedule for such work.

c. Additional copies of drawings.--The contractor will be furnished such additional copies of the specifications and drawings as may be required for carrying out the work.

d. Mailing address.--All drawings and data submitted by the contractor for which a specific mailing address is not given in these specifications shall be submitted to the Construction Engineer, Bureau of Reclamation, Yuma Projects Office, 3800 Avenue 3 East, P. O. Bin 5569, Yuma, Arizona 85364.

10.1.2. List of Drawings

The following drawings are made a part of these specifications:

ERDA TEST FACILITIES
EAST MESA TEST SITE

Construction Design Drawings

1. 1241-300-210

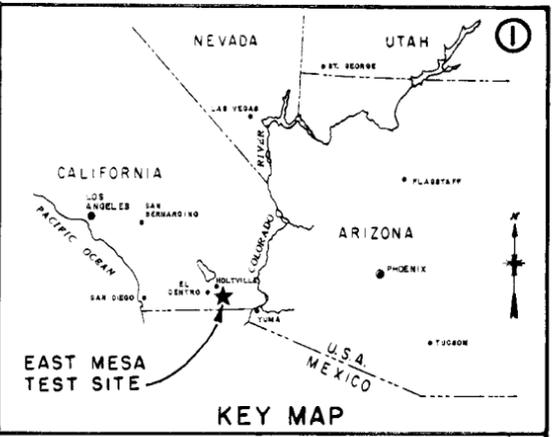
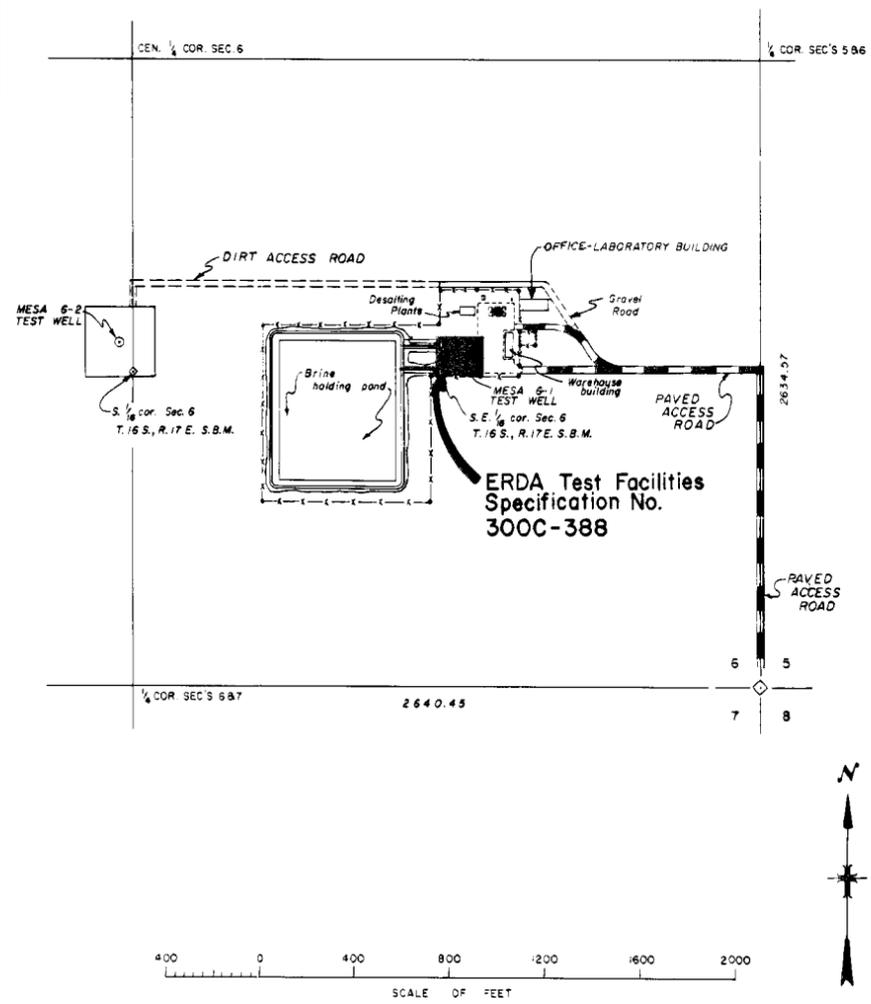
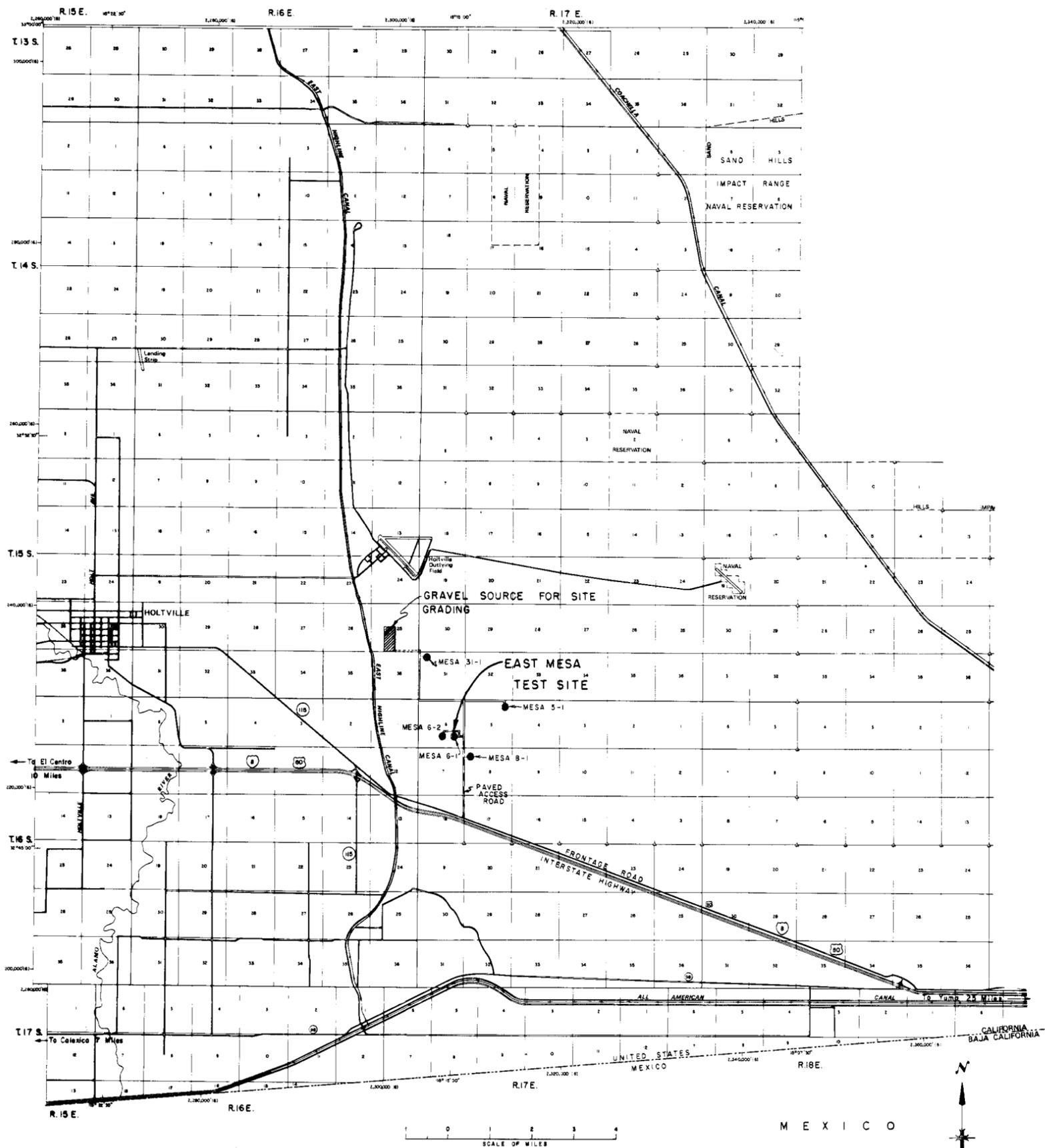
Location Map

2.	1241-300-211	Site Plan
3.	1241-300-212	Plan-Reference Drawings
4.	1241-300-213	Concrete Test Base, Plans-Sections-Details
5.	1241-300-214	Manifold Piping, Plan-Elevation-Sections-Details
6.	1241-300-215	Manifold Piping Support Rack, Plan-Elevation-Sections-Details
7.	1241-300-216	Pressure Relief Manifold, Plan-Sections-Details
8.	1241-300-217	Pipeline Well Mesa 6-2, Plan-Profile-Section-Detail
9.	1241-300-218	Pipeline Well Mesa 6-1, Plan-Profile-Sections-Detail
10.	1241-300-219	Pipeline Well Mesa 8-1, Plan-Profile-Section-Detail
11.	1241-300-220	Reinjection and Blowdown Pipelines, Plans-Profiles-Section-Detail
12.	1241-300-221	Pipe Supports, Plans-Elevation-Sections-Detail
13.	1241-300-222	Pipe Support, Plan-Sections-Schedule of Pipe Supports and Anchors
14.	1241-300-223	Cooling Tower, Plan-Elevations
15.	1241-300-224	Cooling Tower Base-Sump and Equipment Base, Plans-Sections
16.	1241-300-225	Cooling Tower Screen, Plan-Elevation-Sections
17.	1241-300-226	Cooling Tower, Piping Supports, and Motor Control Center Frame, Plan-Elevations-Sections
18.	1241-300-227	Electrical, Plans-Section-Detail-Elevation-Diagrams
19.	1241-300-228	Electrical-Sta. 1, 2, 3, and 4, Elevations-Schematics

Par. 10.1.2.

Standard Drawings

- | | | |
|-----|-----------|--|
| 20. | 40-D-2867 | Rubber Waterstops-Types "A", "B",
"G", and "H" |
| 21. | 40-D-6123 | General Notes and Minimum Requirements
for Detailing Reinforcement - Class 60 |
| 22. | 40-D-2567 | Standard Nameplates |
| 23. | 104-D-254 | Electrical Standards |

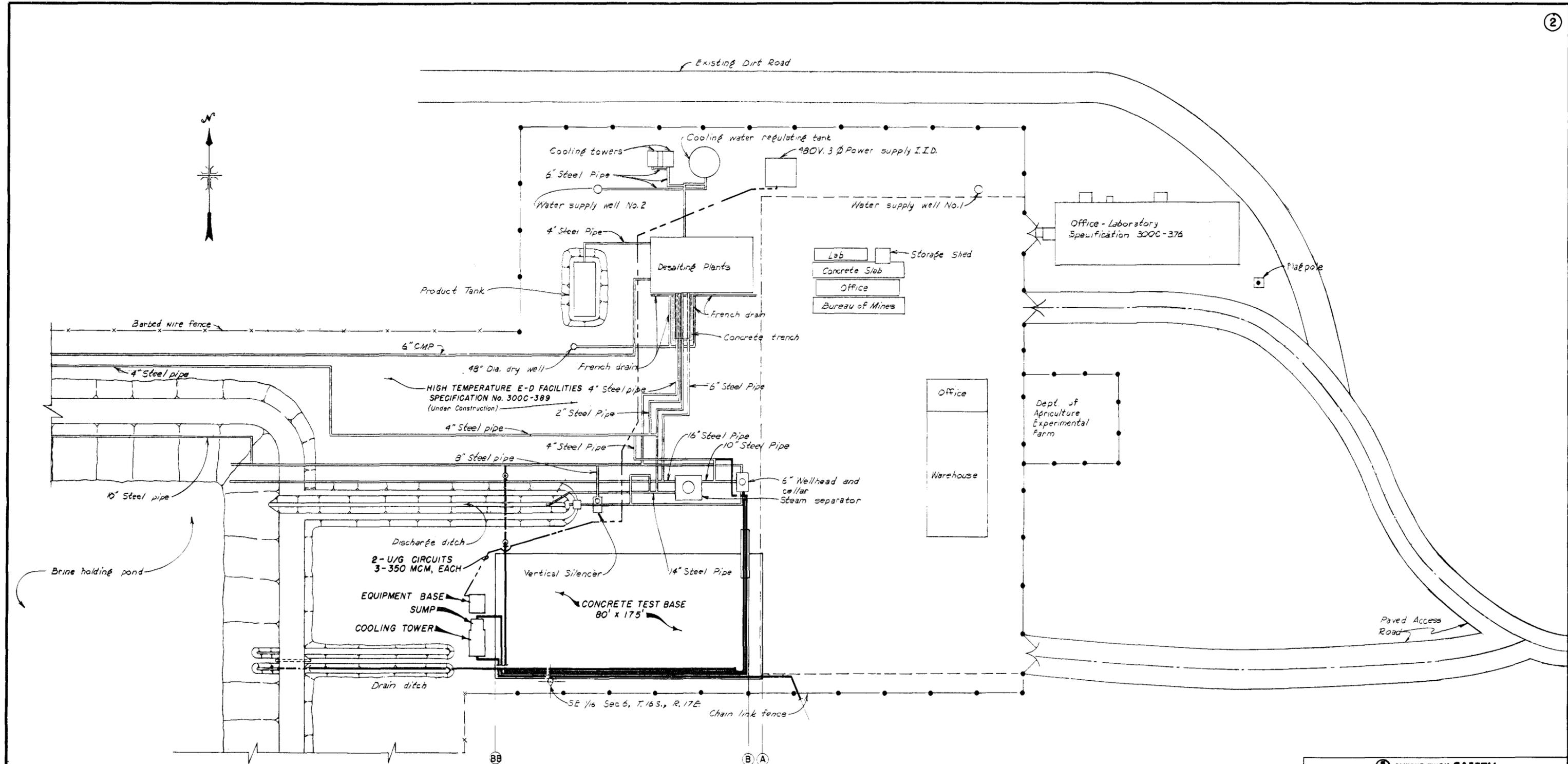


UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
GEOTHERMAL RESOURCE INVESTIGATIONS
IMPERIAL VALLEY - CALIFORNIA
EAST MESA TEST SITE
ERDA TEST FACILITIES
LOCATION MAP

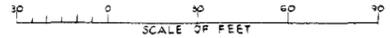
DESIGNED BY B. J. SIMPSON, P.E.
DRAFTED BY M. O. MOORE, P.E.
CHECKED BY M. O. MOORE, P.E.

SUBMITTED BY *[Signature]*
RECOMMENDED BY B. J. SIMPSON, P.E.
APPROVED BY *[Signature]*, P.E.
REGIONAL ENGINEER

BOULDER CITY, NEVADA, FEB. 9, 1978 1241-300-210



NOTE: The location of existing buried pipe, electrical conduits and direct-buried electrical cables will be marked by the Contracting Officer and the Contractor shall be held responsible for and shall repair at his expense any damage to existing facilities.



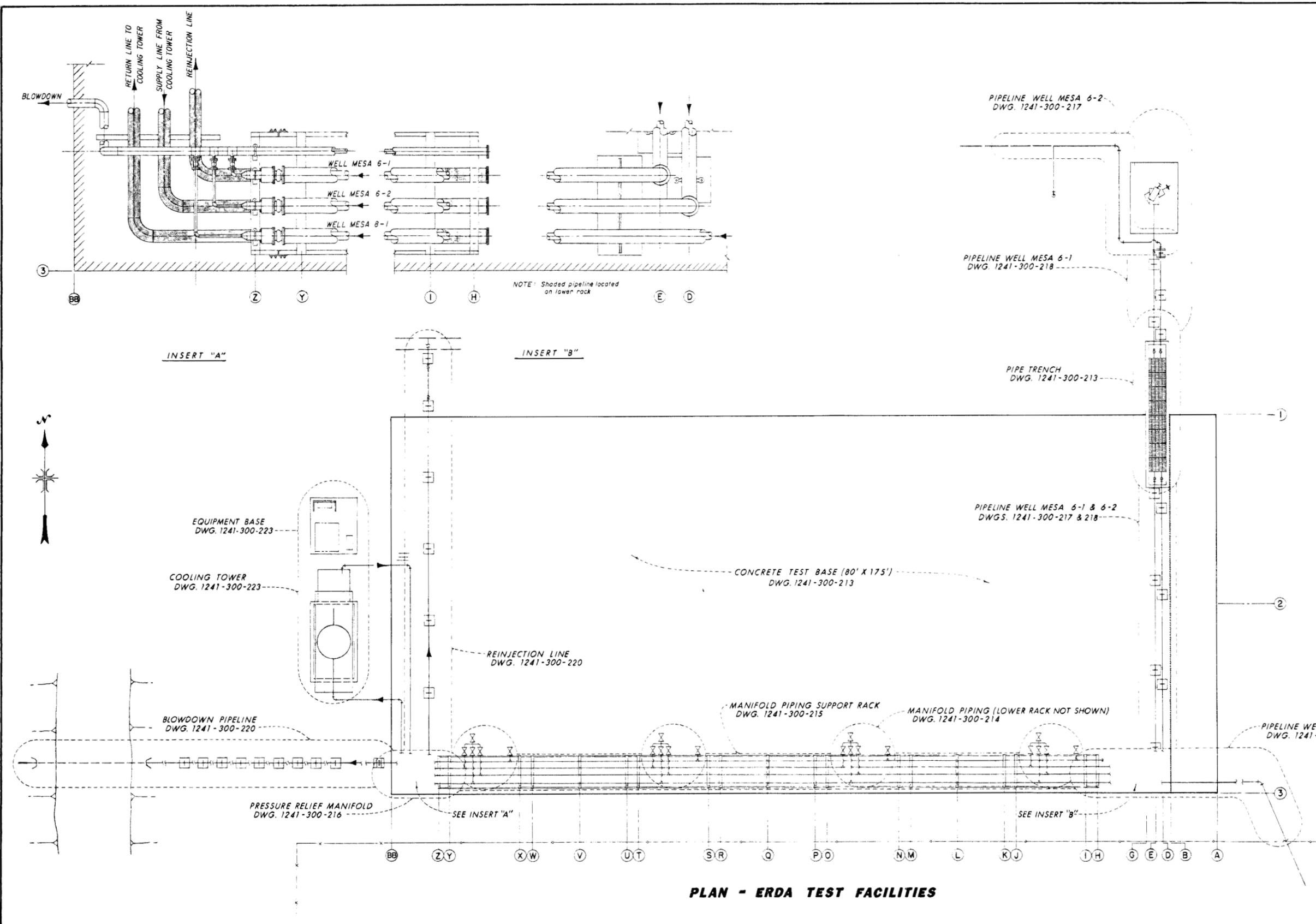
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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
GEOHERMAL RESOURCE INVESTIGATIONS
IMPERIAL VALLEY - CALIFORNIA
EAST MESA TEST SITE

**ERDA TEST FACILITIES
SITE PLAN**

DESIGNED: J.C. DE GARZA, E.I.T. SUBMITTED: [Signature]
DRAWN: [Signature] P.L. DANIELS, RECOMMENDED: [Signature]
CHECKED: M. MOORE, P.E. APPROVED: [Signature] REGIONAL ENGINEER

BOULDER CITY, NEVADA, FEB. 6, 1978 | 1241-300-211



NOTE: Shaded pipeline located on lower rack

REFERENCE DRAWINGS

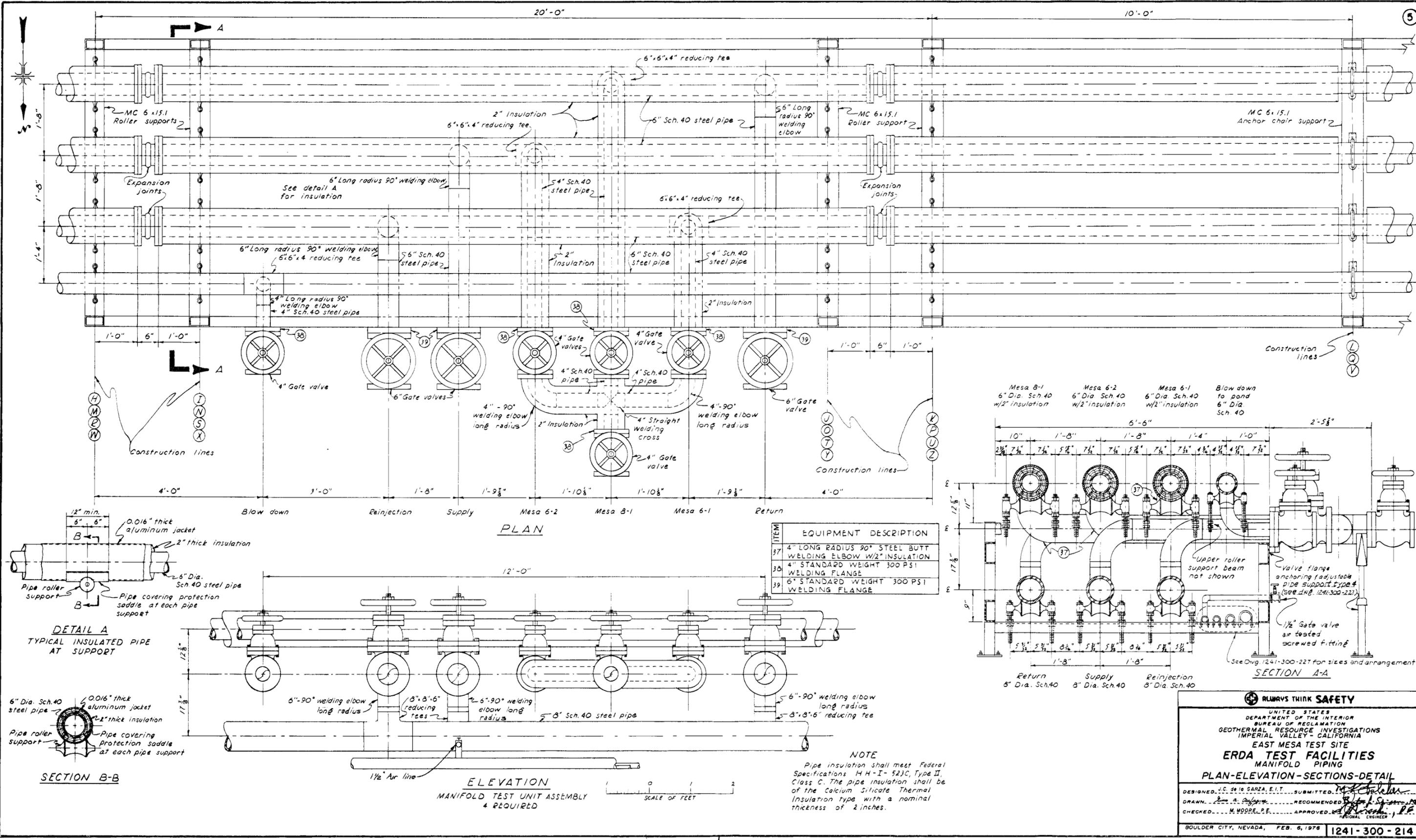
LOCATION MAP.....	1241-300-210
SITE PLAN.....	1241-300-211
PLAN - REFERENCE DRAWINGS.....	1241-300-212
CONCRETE TEST BASE PLANS - SECTIONS - DETAILS.....	1241-300-213
MANIFOLD PIPING PLAN - ELEVATION - SECTIONS - DETAIL.....	1241-300-214
MANIFOLD PIPING SUPPORT RACK PLAN - ELEVATIONS - SECTIONS - DETAILS.....	1241-300-215
PRESSURE RELIEF MANIFOLD PLAN - SECTIONS - DETAILS.....	1241-300-216
PIPELINE WELL MESA 6-2 PLAN - PROFILE - SECTIONS - DETAIL.....	1241-300-217
PIPELINE WELL MESA 6-1 PLAN - PROFILE - SECTION - DETAIL.....	1241-300-218
PIPELINE WELL MESA 8-1 PLAN - PROFILE - SECTION - DETAIL.....	1241-300-219
REINJECTION PIPELINE AND BLOWDOWN PLANS - PROFILES - SECTION - DETAIL.....	1241-300-220
PIPE SUPPORTS PLANS - ELEVATION - SECTIONS - DETAIL.....	1241-300-221
PIPE SUPPORT PLAN - SECS - SCHEDULE OF PIPE SUPPORTS & ANCHORS.....	1241-300-222
COOLING TOWER PLAN - ELEVATIONS.....	1241-300-223
COOLING TOWER BASE - SUMP & EQUIPMENT DETAILS PLANS - SECTIONS - DETAILS.....	1241-300-224
COOLING TOWER SCREEN PLAN - ELEVATION - SECTIONS.....	1241-300-225
COOLING TOWER PIPING SUPPORT & CONTROL CENTER FRAME DETAILS PLAN - ELEVATIONS - SECTIONS.....	1241-300-226
ELECTRICAL PLANS - SECTIONS - DETAIL - ELEVATION - DIAGRAMS.....	1241-300-227
ELECTRICAL - STATIONS 1, 2, 3 & 4 ELEVATIONS - SCHEMATICS.....	1241-300-228
RUBBER WATERSTOPS TYPE 'B'.....	40-D-2867
GENERAL NOTES AND MINIMUM REQUIREMENTS FOR DETAILING REINFORCEMENT - CLASS 60.....	40-D-6123
STANDARD NAMEPLATES.....	40-D-2567
ELECTRICAL STANDARDS.....	104-D-254

PLAN - ERDA TEST FACILITIES

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UNITED STATES
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BUREAU OF RECLAMATION
GEOTHERMAL RESOURCE INVESTIGATIONS
IMPERIAL VALLEY - CALIFORNIA
EAST MESA TEST SITE
ERDA TEST FACILITIES
PLAN - REFERENCE DRAWINGS

DESIGNED... J.C. ORIO GARZA, E.I.T. SUBMITTED...
DRAWN... R.L. RAMIREZ... RECOMMENDED...
CHECKED... M. MOORE, P.E. APPROVED...
BOULDER CITY, NEVADA, FEB. 6, 1976



PLAN

ITEM	EQUIPMENT DESCRIPTION
37	4" LONG RADIUS 90° STEEL BUTT WELDING ELBOW W/2" INSULATION
38	4" STANDARD WEIGHT 300 PSI WELDING FLANGE
39	6" STANDARD WEIGHT 300 PSI WELDING FLANGE

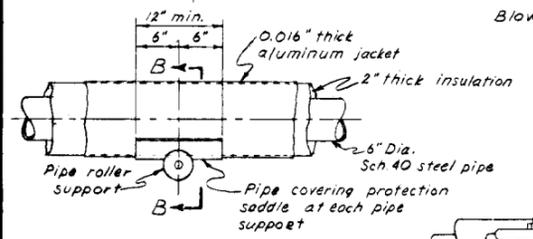
ELEVATION

MANIFOLD TEST UNIT ASSEMBLY
4 REQUIRED

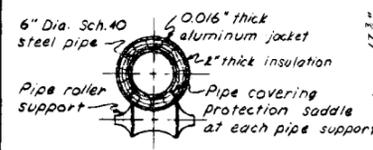
NOTE

Pipe insulation shall meet Federal Specifications H H-I-523C, Type II, Class C. The pipe insulation shall be of the Calcium Silicate Thermal Insulation type with a nominal thickness of 2 inches.

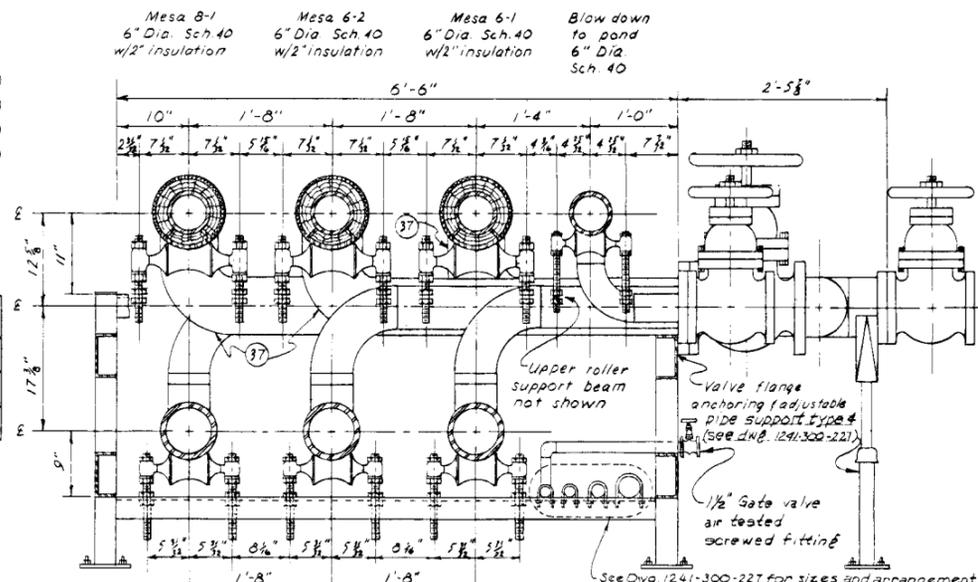
DETAIL A
TYPICAL INSULATED PIPE AT SUPPORT



SECTION B-B



SECTION A-A

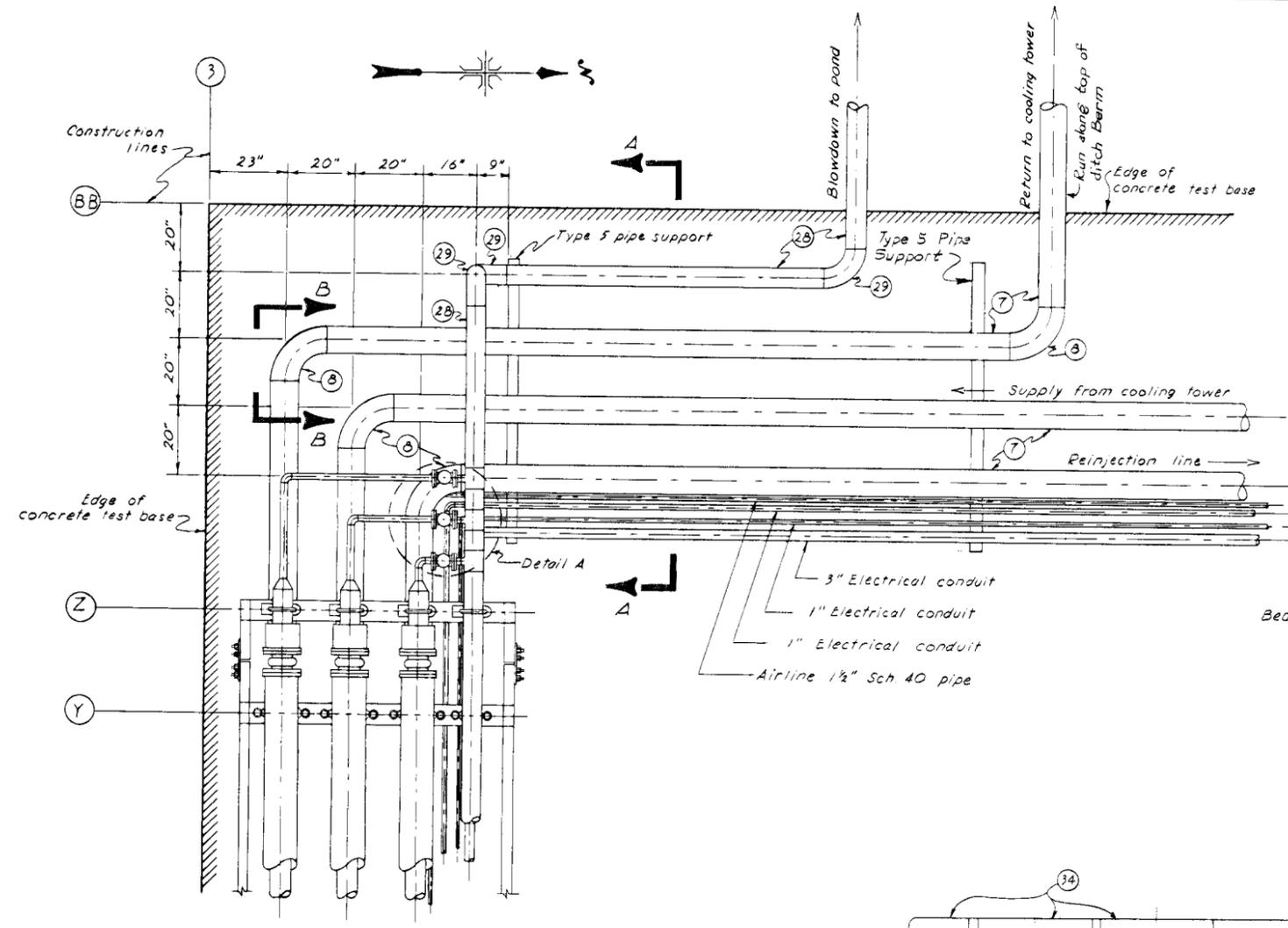


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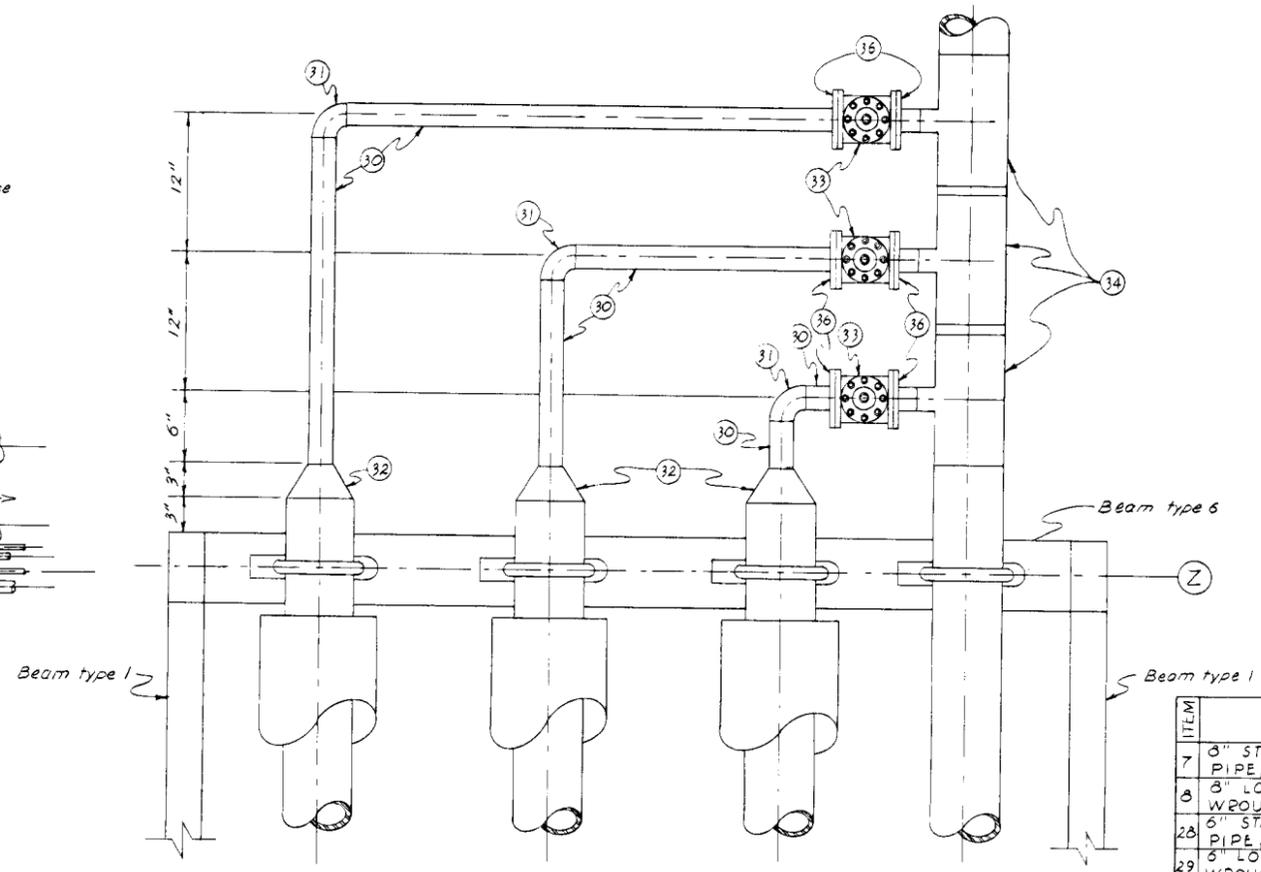
UNITED STATES
DEPARTMENT OF THE INTERIOR
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GEOTHERMAL RESOURCE INVESTIGATIONS
IMPERIAL VALLEY - CALIFORNIA
EAST MESA TEST SITE
ERDA TEST FACILITIES
MANIFOLD PIPING
PLAN-ELEVATION-SECTIONS-DETAIL

DESIGNED: J.C. de la GARZA, E.I.T. SUBMITTED: [Signature]
DRAWN: [Signature] RECOMMENDED: [Signature]
CHECKED: M. MOORE, P.E. APPROVED: [Signature], P.E.
BOULDER CITY, NEVADA, FEB. 6, 1978
1241-300-214

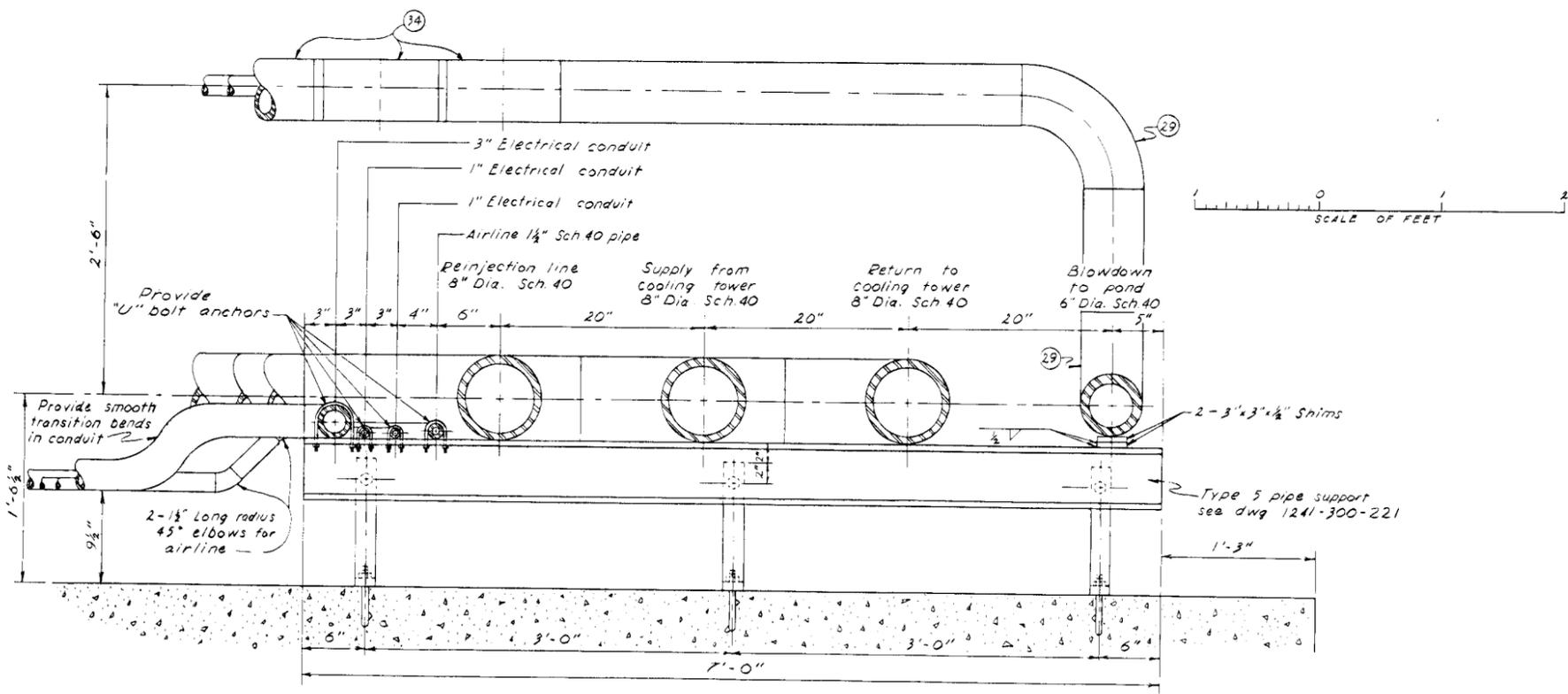
500C-388



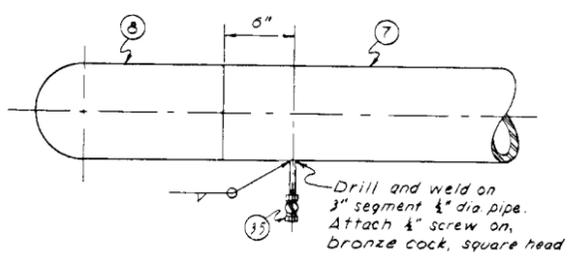
PLAN
SCALE OF FEET
0 1 2 3 4 5



DETAIL A
PRESSURE RELIEF MANIFOLD
1 REQUIRED



SECTION A-A



SECTION B-B
DRAIN ASSEMBLY TYPICAL
3 REQUIRED

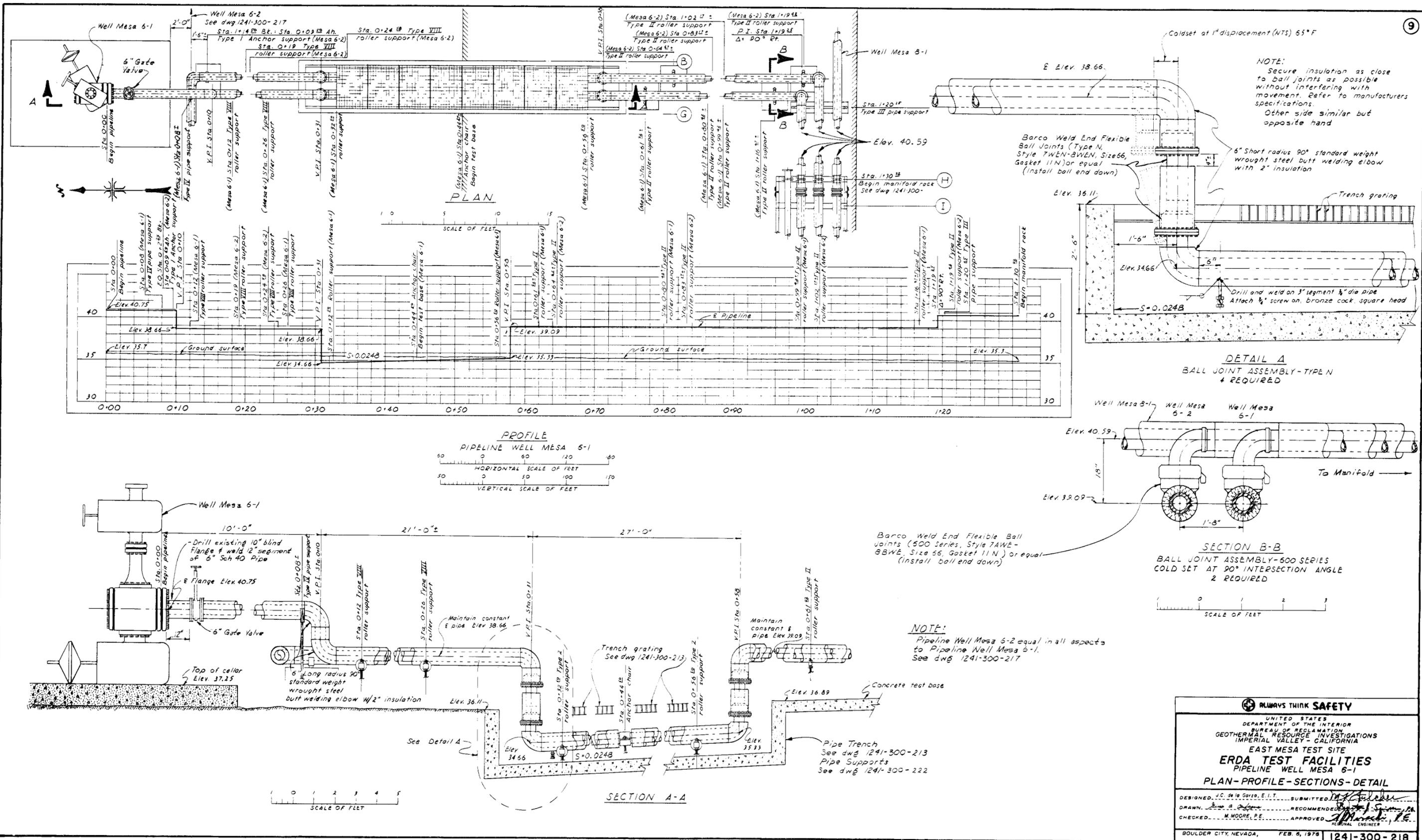
ITEM	EQUIPMENT DESCRIPTION
7	8" STANDARD WEIGHT (SCHEDULE 40) STEEL PIPE, (ASTM A-53, TYPE E)
8	8" LONG RADIUS 90° STANDARD WEIGHT WROUGHT STEEL BUTT WELDING ELBOW (ASA 16.9)
28	6" STANDARD WEIGHT (SCHEDULE 40) STEEL PIPE, (ASTM A-53, TYPE E)
29	6" LONG RADIUS 90° STANDARD WEIGHT WROUGHT STEEL BUTT WELDING ELBOW (ANSI)
30	2" STANDARD WEIGHT (SCHEDULE 40) STEEL PIPE, (ASTM A-53, TYPE E, GALVANIZED)
31	2" SHORT RADIUS 90° STANDARD WEIGHT WROUGHT STEEL BUTT WELDING ELBOW (ANSI)
32	6" x 2" STANDARD WEIGHT WROUGHT STEEL BUTT CONCENTRIC REDUCER (TO BE FABRICATED)
33	PRESSURE RELIEF VALVE, CLAYTON NO. 50G, 250 CLASS, FLANGED ENDS-140 PSI
34	6" x 6" x 2" STANDARD WEIGHT WROUGHT STEEL BUTT WELDING REDUCING TEE (TO BE FABRICATED)
35	CRANE 250 POUND BRONZE COCK, SQUARE HEAD CAT. NO. 80 E OR EQUAL
36	2" STANDARD WEIGHT 300 PSI WELDING FLANGE

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IMPERIAL VALLEY - CALIFORNIA
EAST MESA TEST SITE
**ERDA TEST FACILITIES
PRESSURE RELIEF MANIFOLD
PLAN-SECTIONS-DETAILS**

DESIGNED: J.C. DE LO GARZA, E.I.T. SUBMITTED: *[Signature]*
 DRAWN: *[Signature]* RECOMMENDED: *[Signature]*
 CHECKED: M.O. MOORE, P.E. APPROVED: *[Signature]* REGIONAL ENGINEER

BOULDER CITY, NEVADA, FEB. 6, 1978



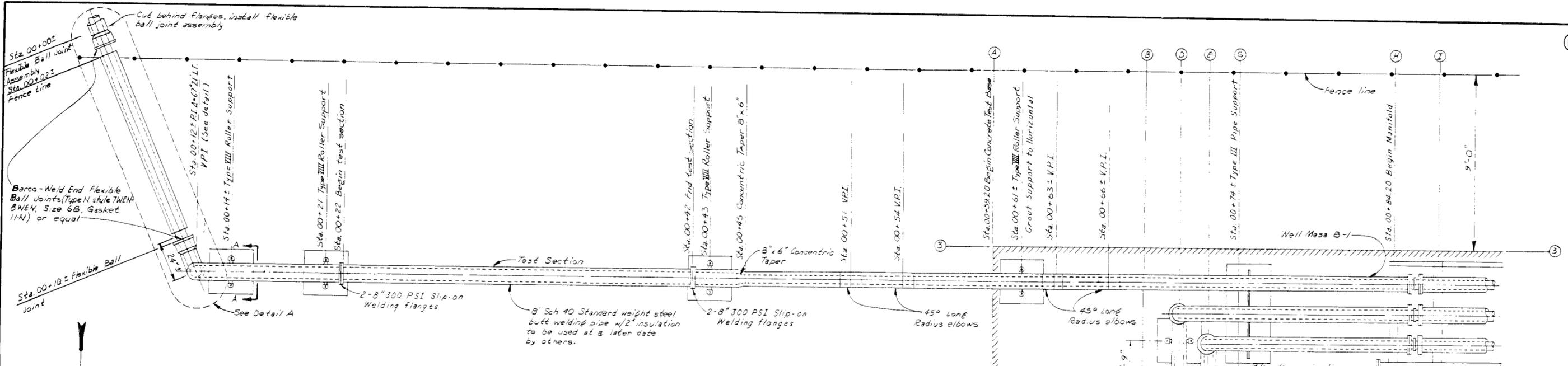
300C-368

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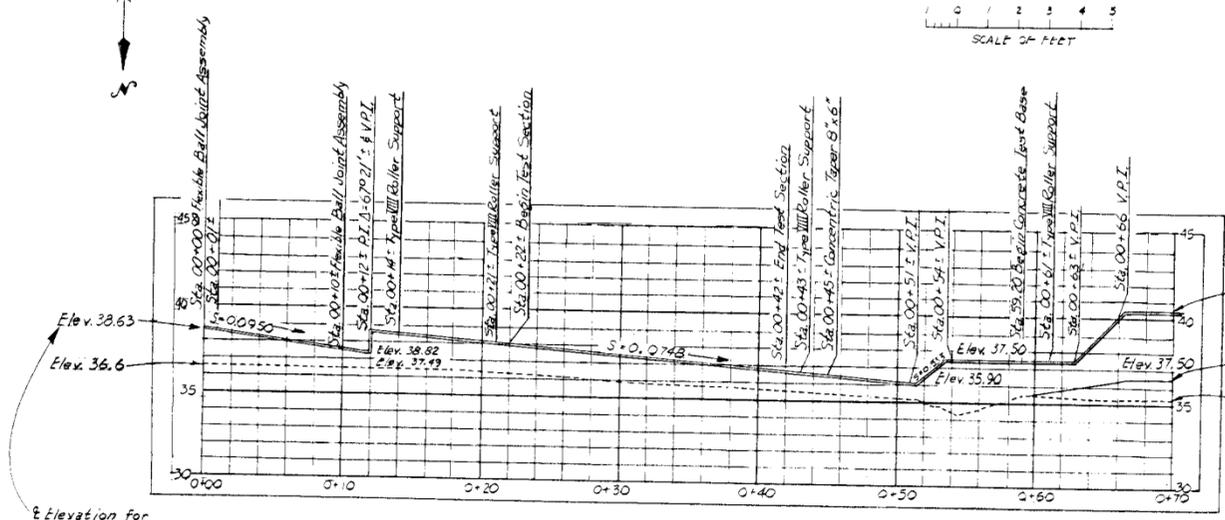
UNITED STATES
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GEOTHERMAL RESOURCE INVESTIGATIONS
IMPERIAL VALLEY - CALIFORNIA
EAST MESA TEST SITE
ERDA TEST FACILITIES
PIPELINE WELL MESA 6-1
PLAN - PROFILE - SECTIONS - DETAIL

DESIGNED: J.C. de la Garza, E.I.T. SUBMITTED: [Signature]
DRAWN: [Signature] RECOMMENDED: [Signature]
CHECKED: M. MOORE, P.E. APPROVED: [Signature]
REGIONAL ENGINEER

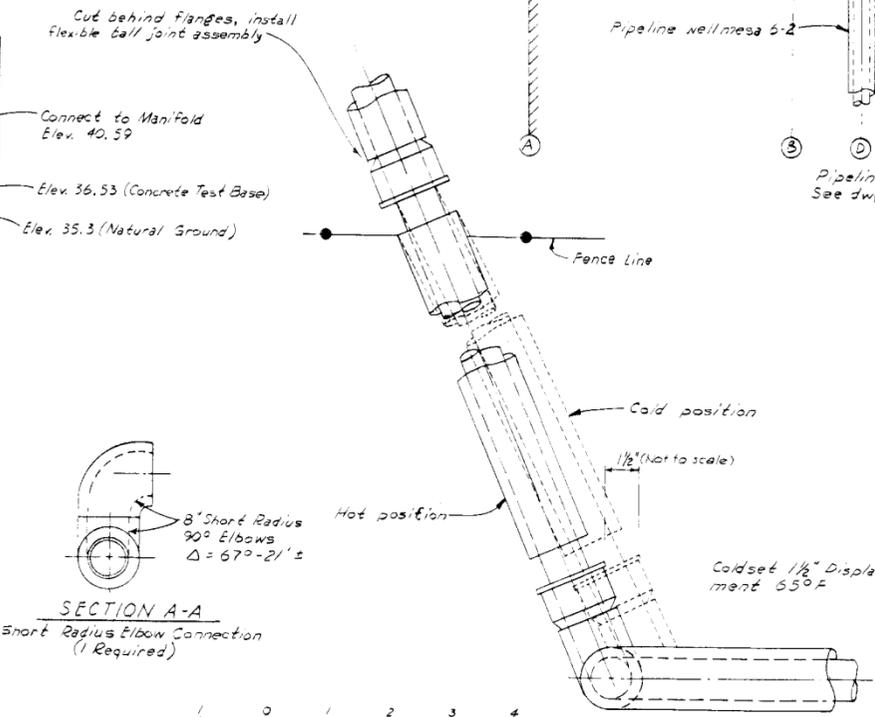
BOULDER CITY, NEVADA, FEB. 6, 1978 1241-300-218



PLAN
Pipeline Well Mesa B-1
SCALE OF FEET



PROFILE
Pipeline Well Mesa B-1
SCALE OF FEET - VERTICAL
SCALE OF FEET - HORIZONTAL



DETAIL A
Ball Joint Assembly
(1 Required)

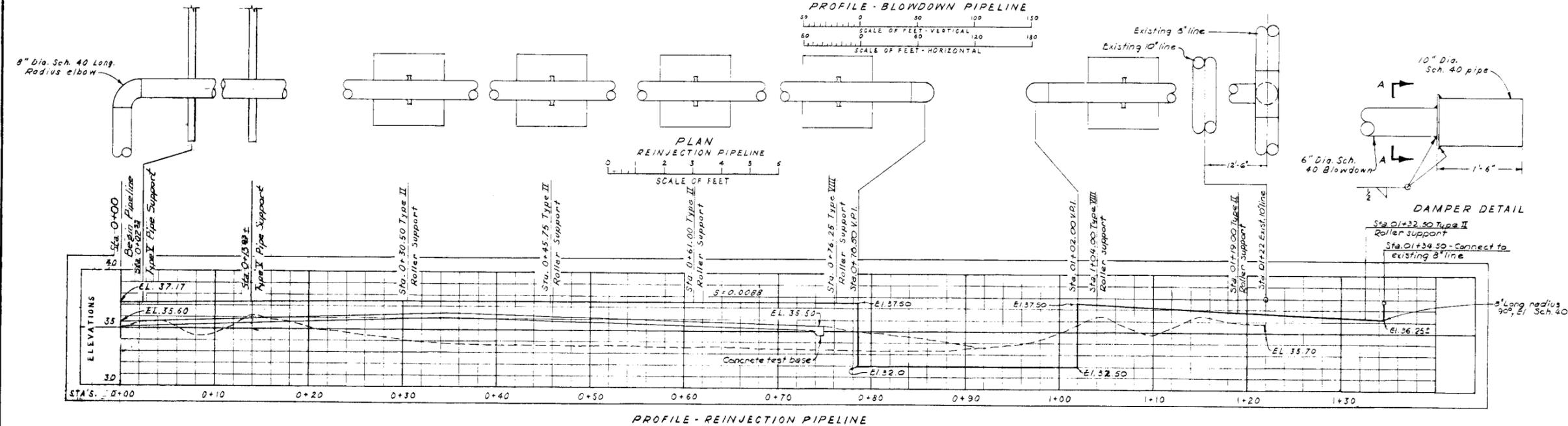
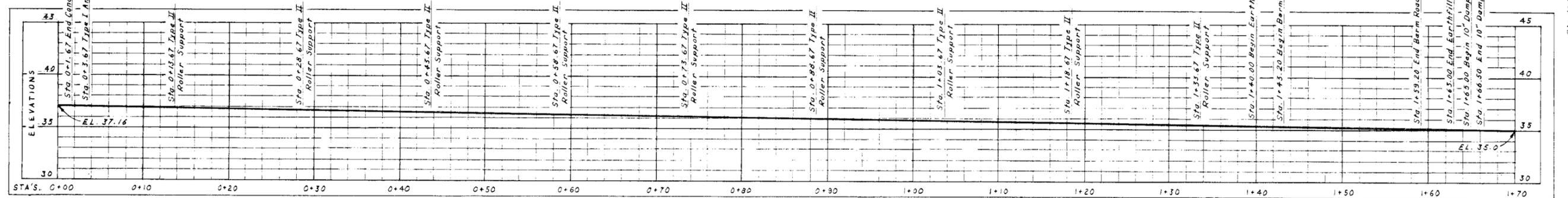
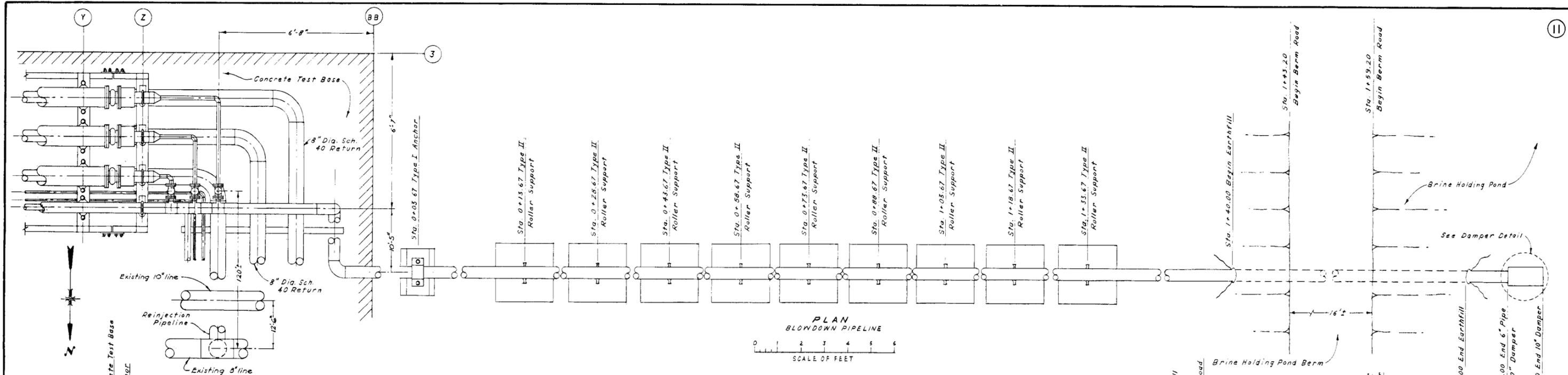
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IMPERIAL VALLEY - CALIFORNIA
EAST MESA TEST SITE
ERDA TEST FACILITIES
PIPELINE WELL MESA B-1
PLAN - PROFILE - SECTION - DETAIL

DESIGNED: J. C. GARCIA, E.E.T. SUBMITTED: [Signature]
DRAWN: [Signature] RECOMMENDED: [Signature]
CHECKED: M. MOORE, P.E. APPROVED: [Signature]
REGIONAL ENGINEER

BOULDER CITY, NEVADA, FEB. 6, 1976 **1241-300-219**

300C-388



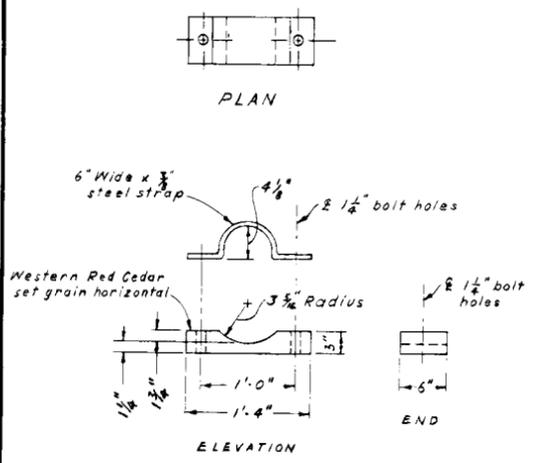
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IMPERIAL VALLEY-CALIFORNIA
EAST MESA TEST SITE
ERDA TEST FACILITIES
REINJECTION AND BLOWDOWN PIPELINES
PLANS - PROFILES - SECTION - DETAIL

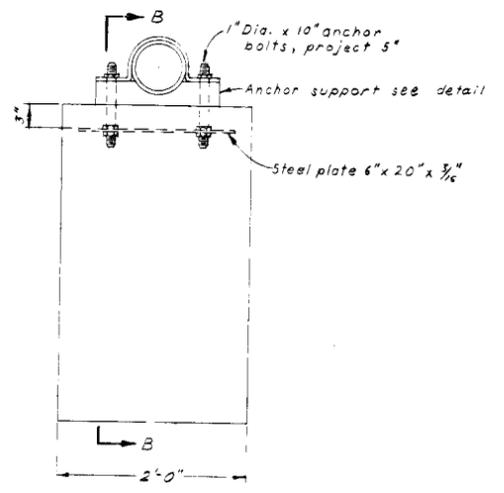
DESIGNED BY G. B. GARRA, E.I.T. SUBMITTED BY [Signature]
DRAWN BY [Signature] RECOMMENDED BY [Signature]
CHECKED BY M. MOORE, P.E. APPROVED BY [Signature] REGIONAL ENGINEER

BOULDER CITY, NEVADA, FEB. 6, 1978 1241-300-220

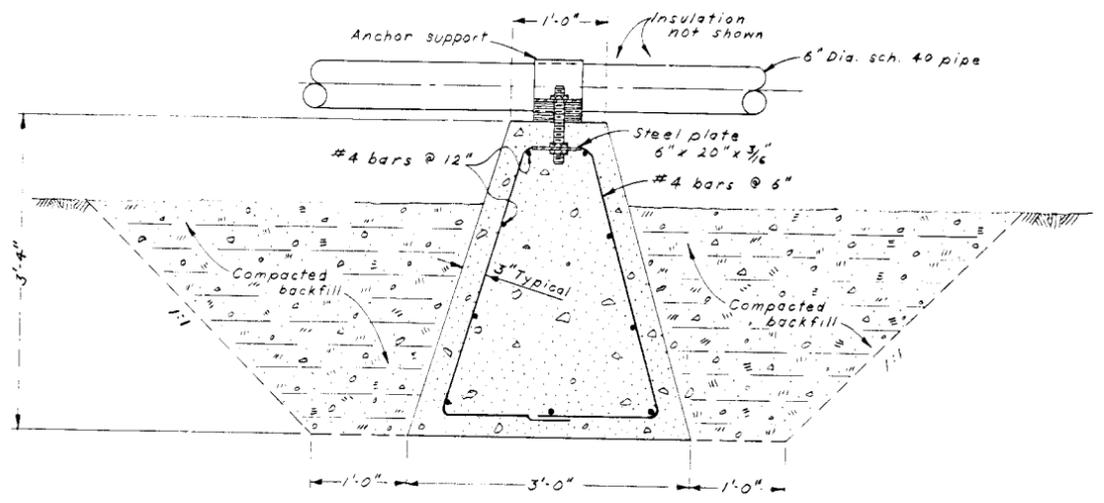
300C-388



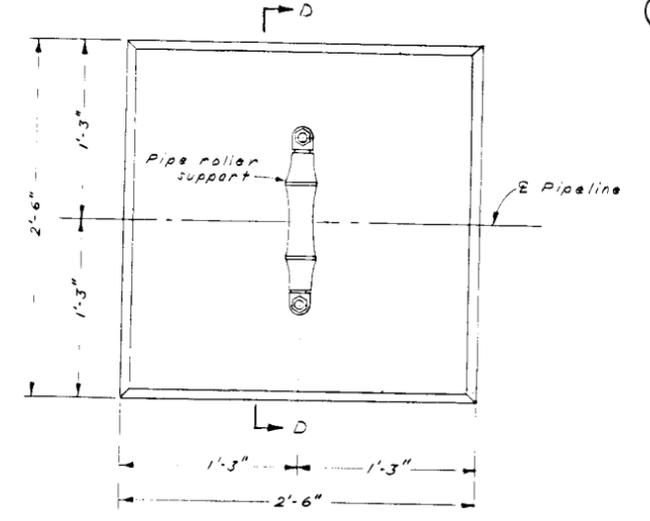
DETAIL ANCHOR SUPPORT TYPE I



ELEVATION OF ANCHOR

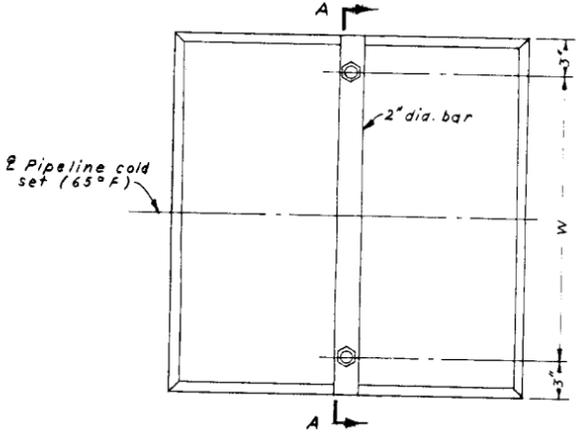


SECTION B-B

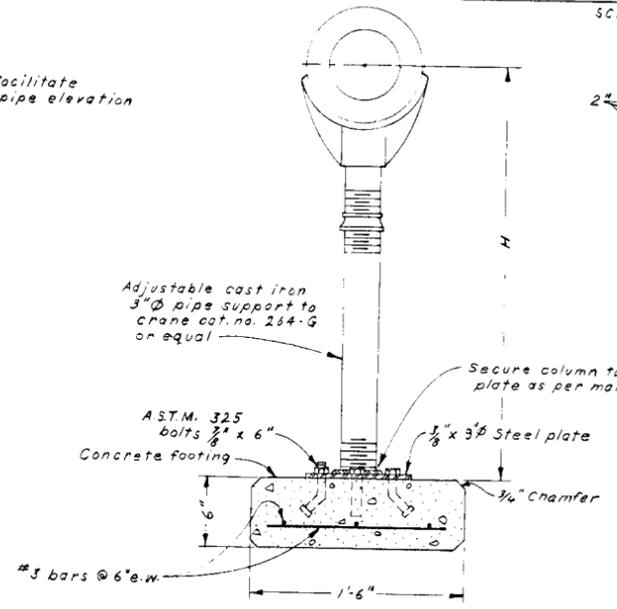


PLAN LOW PROFILE PIPE SUPPORT-TYPE II

Note: Dimensions may vary to facilitate installation to correct pipe elevation

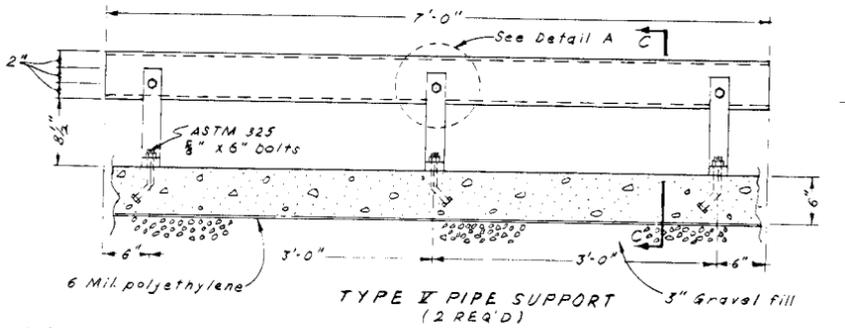


PLAN LOW PROFILE PIPE SUPPORT-TYPE III

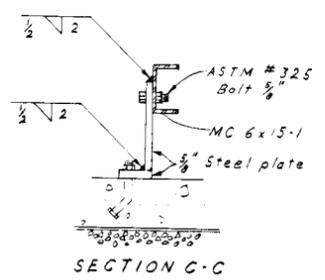


STANCHION SADDLE TYPE IV PIPE SUPPORT

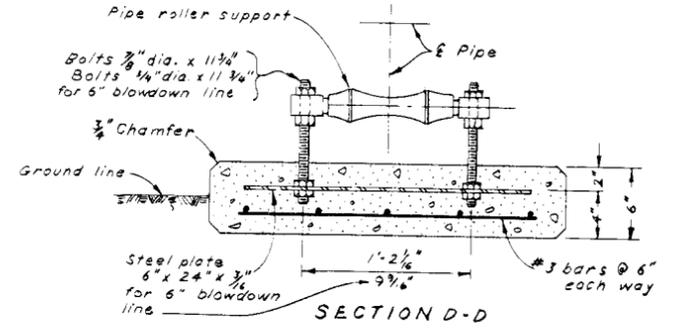
(4 req'd) 3" Diam. H=2'-11 1/2" at manifold concrete Test base (No Footing req'd), see Dwg. No. 1241-300-1 (1 req'd) 10" Diam. H=4' Sta. 00+08 Pipeline from Well Mesa 6-1, see Dwg. No. 1241-300-213



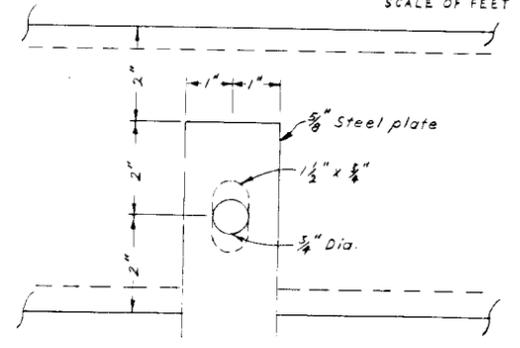
TYPE V PIPE SUPPORT (2 REQ'D)



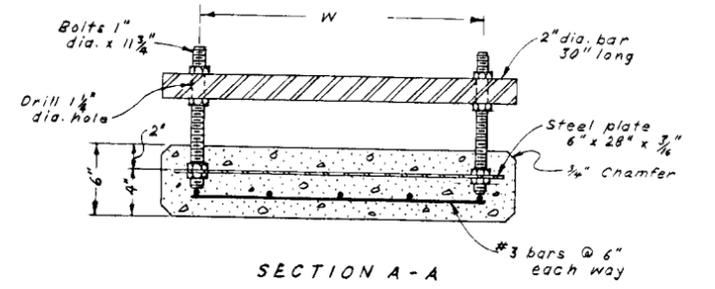
SECTION C-C



SECTION D-D

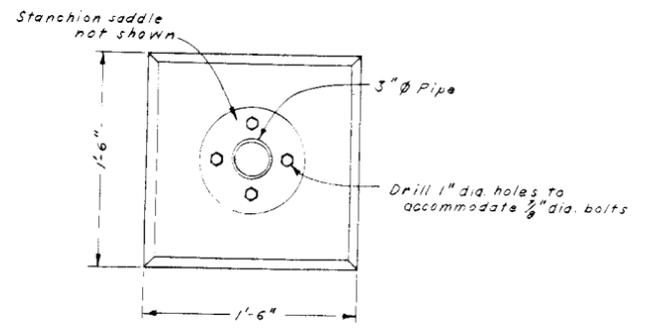


DETAIL A

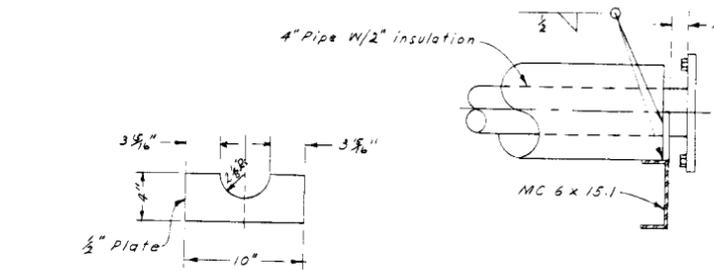


SECTION A-A

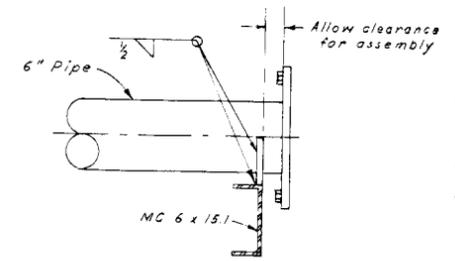
W = 50" Supporting pipeline 8-1 at Sta. 0+76, see Dwg. 1241-300-219
W = 24" Supporting single pipelines



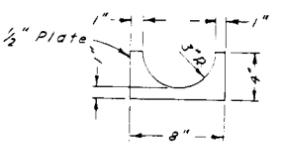
PLAN



TYPE VII PIPE SUPPORT VALVE FLANGE ANCHORS FOR 4" PIPE W/1/2" INSULATION (16 REQ'D)



TYPE VIII PIPE SUPPORT TYPICAL



TYPE IX PIPE SUPPORT VALVE FLANGE ANCHORS FOR 6" PIPE (12 REQ'D)

NOTES

Pipe insulation shall meet Federal Specifications 4H-I-523, Type II, Class C. The pipe insulation shall be of the Calcium Silicate Thermal insulation type with a nominal thickness of 2-inches. All pipe and pipe fittings shall be schedule 40.

All insulated pipe shall have protection saddles at all supports other than Type I anchor supports and anchor chairs.

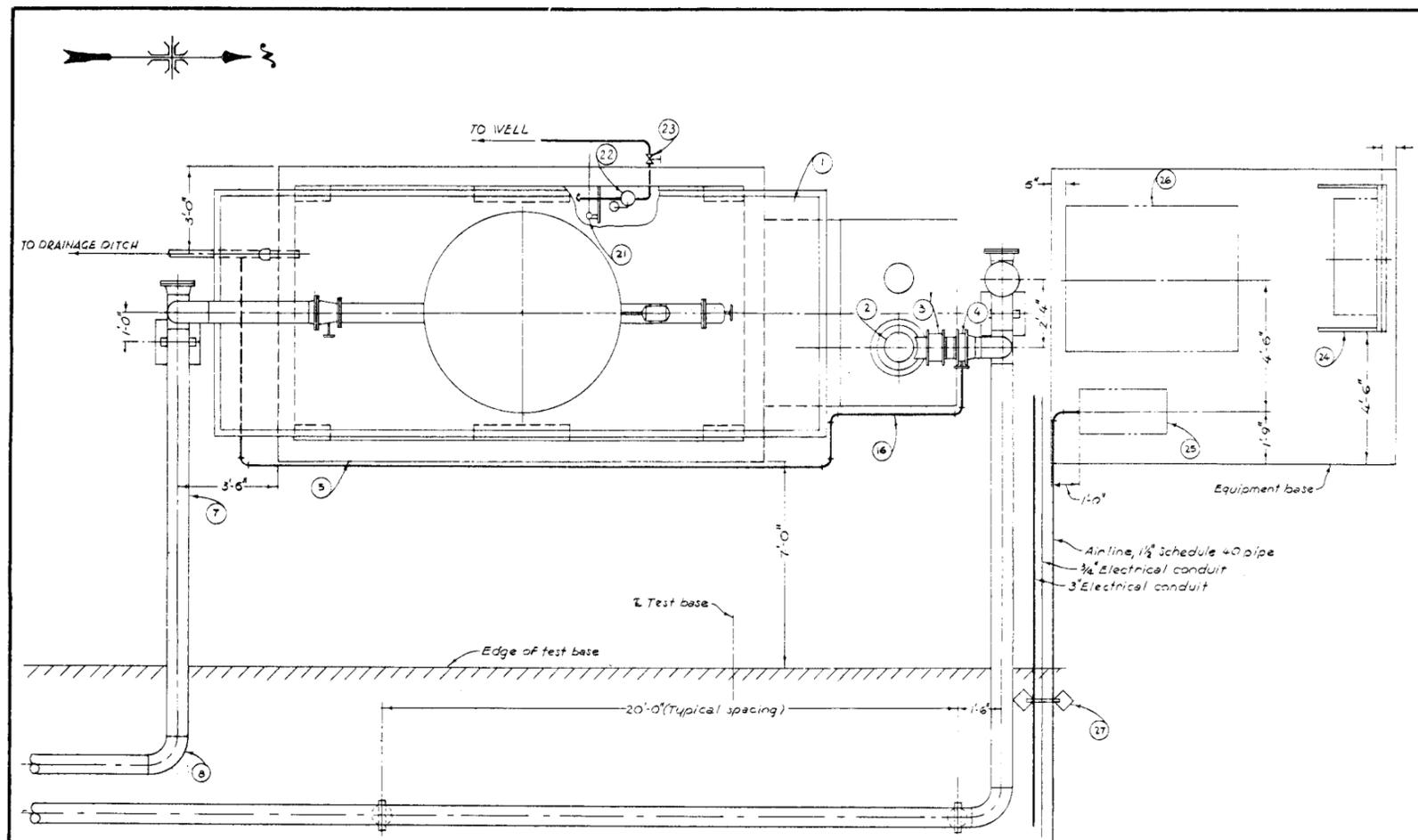
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IMPERIAL VALLEY - CALIFORNIA
EAST MESA TEST SITE
ERDA TEST FACILITIES
PIPE SUPPORTS

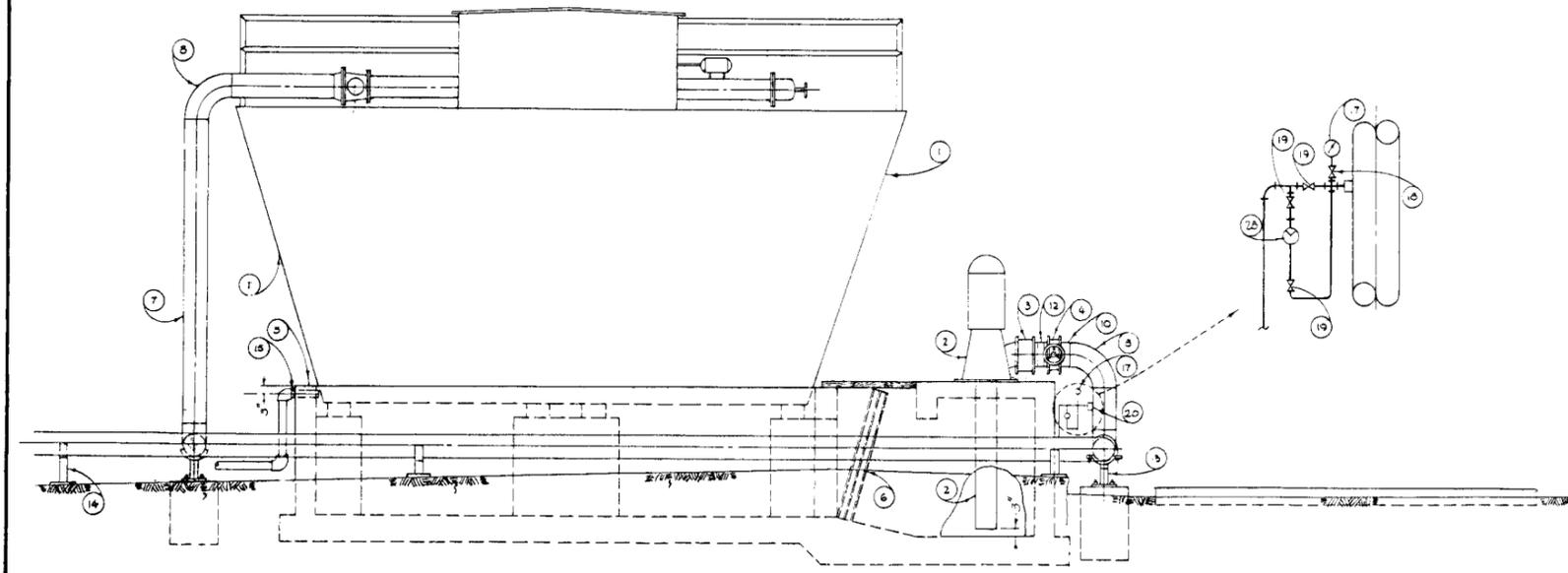
PLANS - ELEVATION - SECTIONS - DETAIL

DESIGNED: L.S. & R. GARZA, E.L.T. SUBMITTED: [Signature]
DRAWN: [Signature] RECOMMENDED: [Signature]
CHECKED: M. MOORE, P.E. APPROVED: [Signature]
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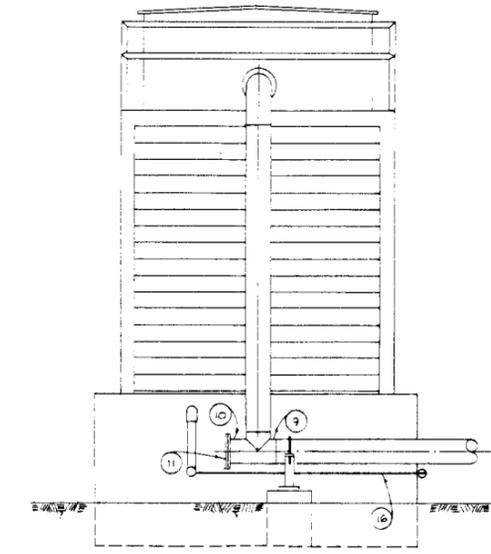
BOULDER CITY, NEVADA, FEB. 6, 1978
SHEET 1 OF 2 **1241-300-221**



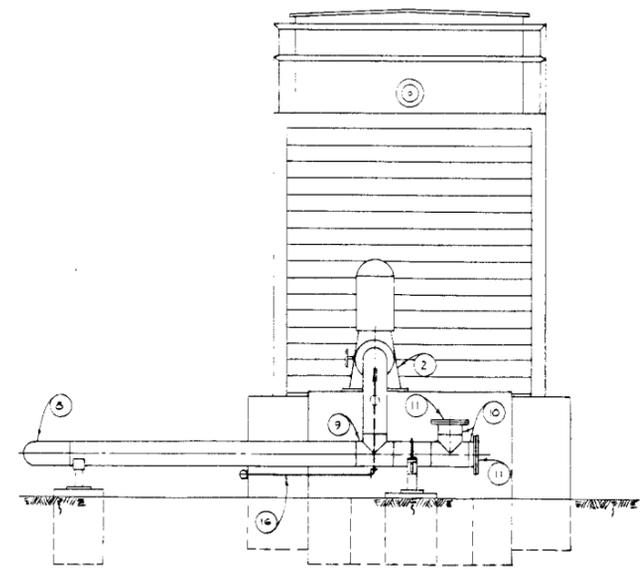
PLAN



EAST ELEVATION



SOUTH ELEVATION



NORTH ELEVATION

ITEM	EQUIPMENT DESCRIPTION
1	COOLING TOWER; HARLEY MDL #324-101; 15.5 HP, 1500 RPM, 460 VAC, 57 60 CYCLE TEFC FAN MOTOR, OR EQUAL
2	TOWER WATER PUMP; 700 GPM @ 150 TDH; BYRON JACKSON MODEL 10" CI WITH 4 STAGE BOWL 8" X 1 3/4" SELF LUBE COLUMN 8" X 1 1/4" GSA C.I. HEAD; 40 HP V.H.S. TEFC MOTOR, 1770 RPM, S.R.C. 3", 60 HZ 230-460 VAC OR EQUAL
3	CHECK VALVE; 8" MISSION DUO-CHECK, STYLE 'B' 150 ASA NO 13-SMP OR EQUAL
4	BUTTERFLY SHUTOFF VALVE; 8" DEMCO NO. 3467-1114311 WITH GEAR OPERATOR 2096-11321, OR EQUAL
5	COOLING TOWER BASE; FOR DETAILS SEE DWG. 1241-300-224
6	COOLING TOWER PUMP SCREENS; FOR DETAILS SEE DWG. 1241-300-225
7	8" STANDARD WEIGHT (SCHEDULE 40) STEEL PIPE, (A-53 ASTM-170)
8	8" LONG RADIUS 90° STANDARD WEIGHT WROUGHT STEEL BUTT WELDING ELBOW (ASA 16.9)
9	8" STANDARD WEIGHT WROUGHT STEEL WELDING TEE (ASA 16.9)
10	8" 50# ASA FORGED STEEL WELDING NECK FLANGE (ASA 16.5)
11	8" 150# ASA FORGED STEEL BLIND FLANGE (ASA 16.5)
12	8" FLANGED SPOOL, 8" FACE TO FACE, 150# ASA SLIP-ON FLANGES
13	PIPE SUPPORT, FOR DETAILS SEE DWG. 1241-300-226
14	TYPICAL PIPE SUPPORT; FOR DETAILS SEE DWG. 1241-300-226
15	SUMP OVERFLOW DRAIN; 3" SCHEDULE 40 PIPE WITH SCREWED FITTINGS; CORE HOLE IN CONCRETE GROUT PIPE IN PLACE AS SHOWN
16	COOLING TOWER BLOWDOWN LINE; 1" PIPE WITH SCREWED FITTINGS
17	PRESSURE GAGE; ASHCROFT, 0-160 PSI, 1/2" D. FACE, 1/4" NPT FITTING, OR EQUAL
18	1/4" INSTRUMENT VALVE; ASHCROFT #01305, OR EQUAL
19	1" GLOBE VALVE; GRINNELL FIG. I-409, OR EQUAL
20	1" REDUCER; GRINNELL WELDOUST 1" THREADED, WELDED TO PIPE
21	ELECTRODE ASSEMBLY, FOR DETAILS SEE DWG. 1241-300-226
22	FLOAT VALVE, FOR DETAILS SEE DWG. 1241-300-226
23	1/4" GLOBE VALVE; GRINNELL FIG. I-409 OR EQUAL
24	CONTROL CENTER SUPPORT FRAME, SEE DWG. 1241-300-226
25	AIR DRYER, GOVERNMENT FURNISHED EQUIPMENT (GFE).
26	AIR COMPRESSOR (GFE)
27	CONDUIT AND AIR LINE SUPPORT (TYP.), SPACE AT 10-FOOT INTERVALS. SEE DWG. 1241-300-227.
28	1" SIGHT FLOW INDICATOR, 3-13 GPM; SK TYPE 16125

NOTES
 In addition to the pipe supports shown, the pipe shall be supported at all horizontal changes of direction and at 20-ft. intervals between these supports.
 A 1/2" Clayton 124 Float valve, C.I. body, Class 125, or approved equal, shall be mounted on the side of the basin and connected to the domestic water service.
 For electrical details, see Dwg. 1241-300-227.

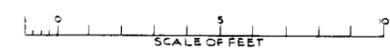
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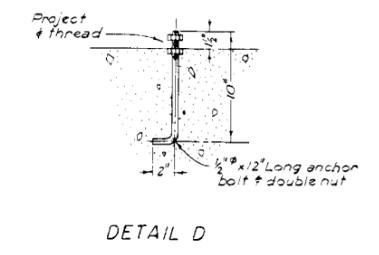
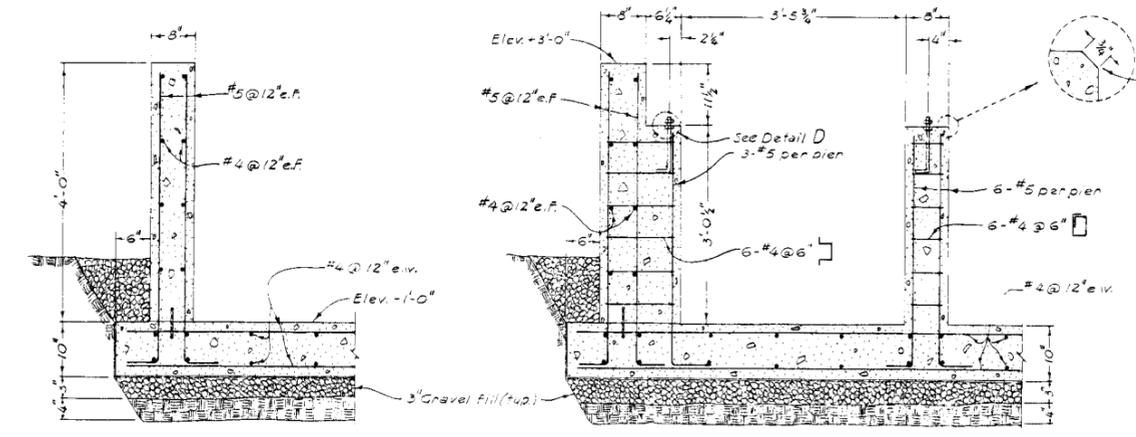
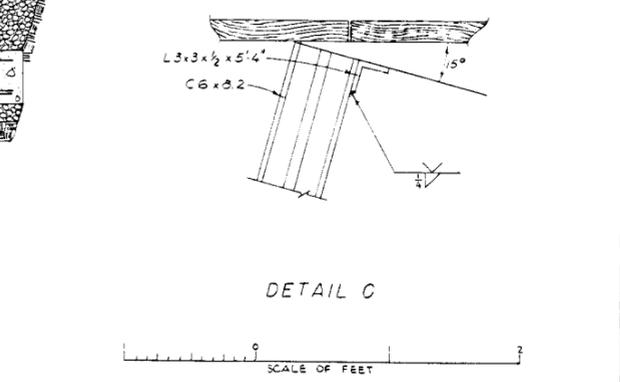
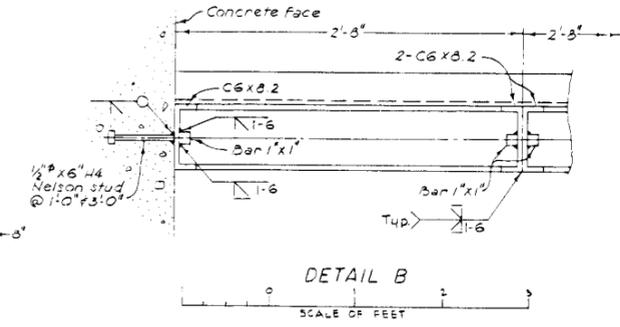
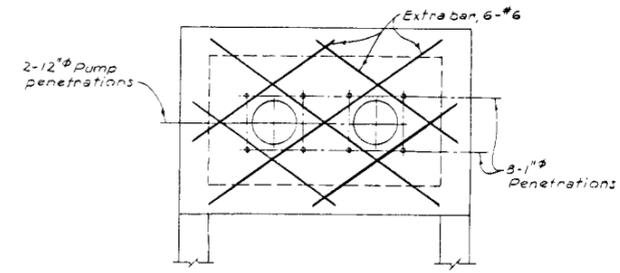
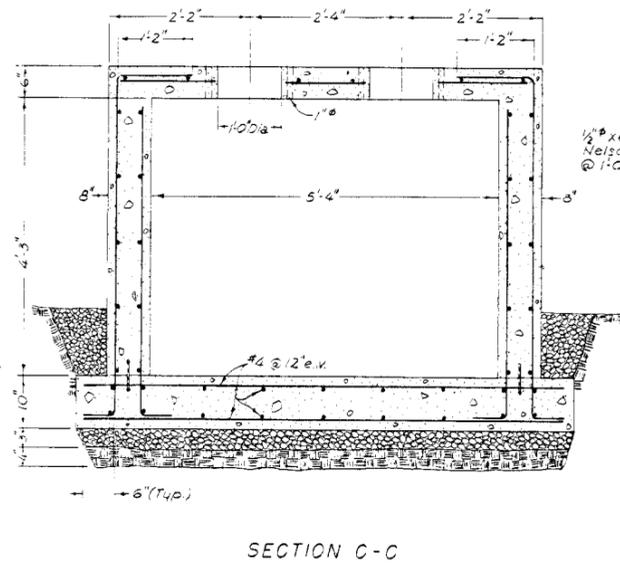
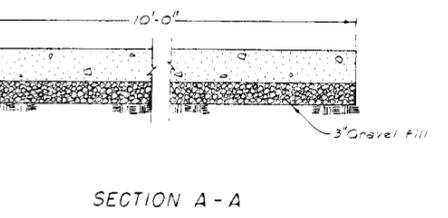
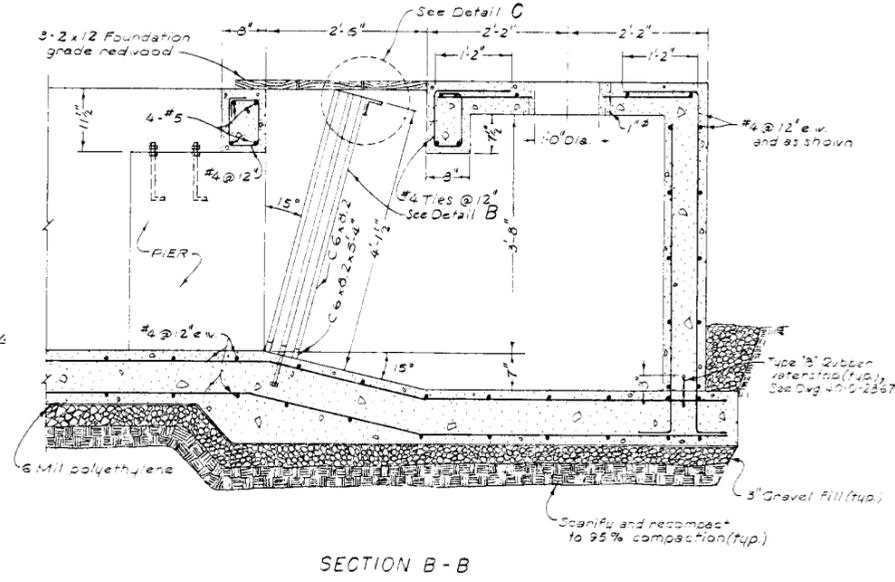
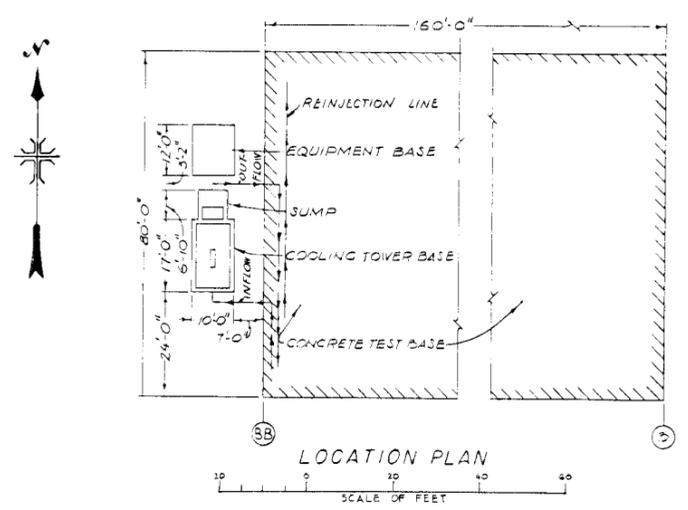
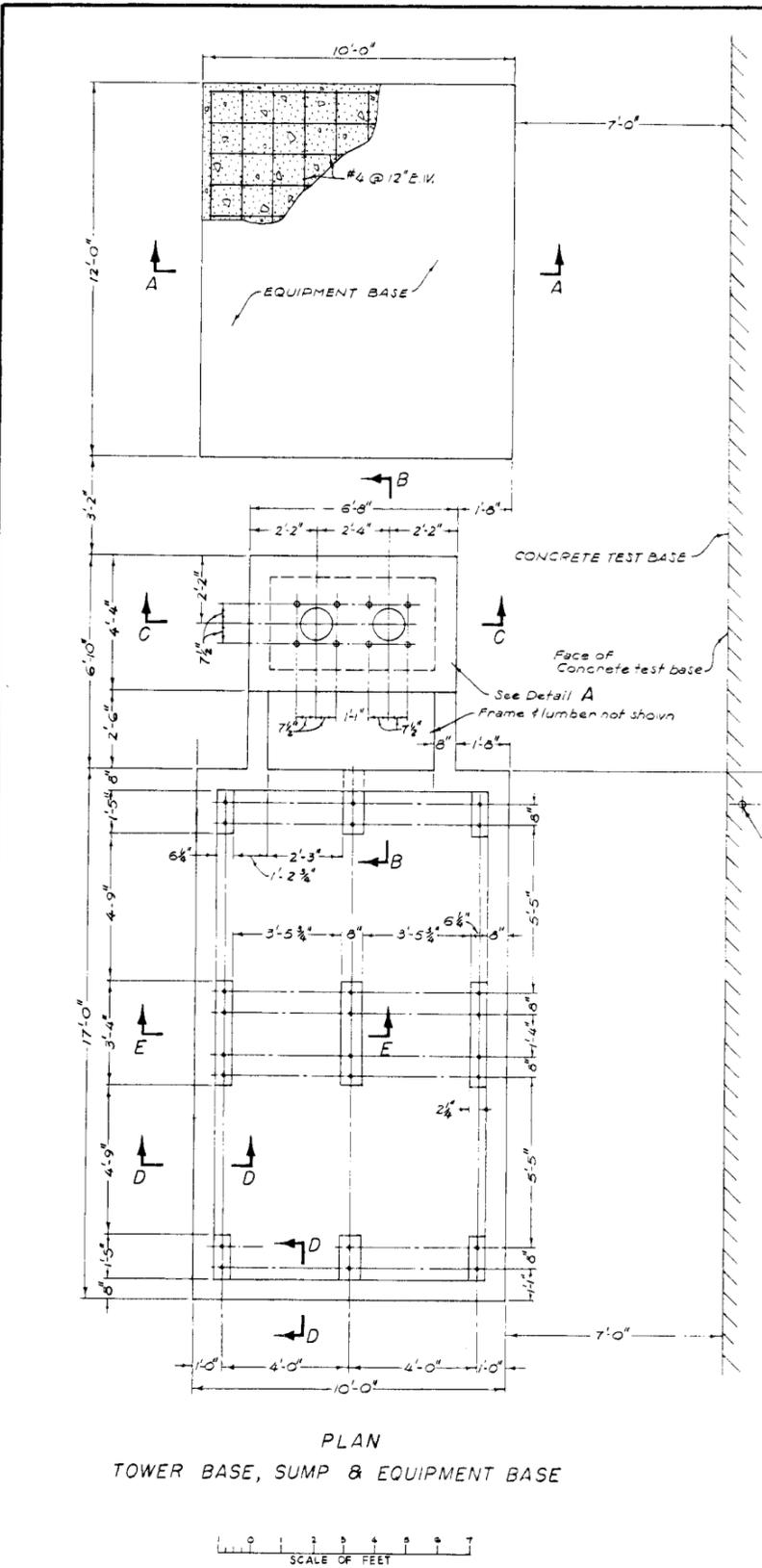
UNITED STATES
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 GEOTHERMAL RESOURCE INVESTIGATIONS
 IMPERIAL VALLEY - CALIFORNIA
 EAST MESA TEST SITE
ERDA TEST FACILITIES
 COOLING TOWER
PLAN - ELEVATIONS

DESIGNED: LAWRENCE SERRETT LABORATORY... SUBMITTED: *[Signature]*
 DRAWN: B.L. DANIELS... RECOMMENDED: *[Signature]*
 CHECKED: M. MOORE, P.E. ... APPROVED: *[Signature]*, P.E.
 REGIONAL ENGINEER

BOULDER CITY, NEVADA, FEB. 9, 1976
 SHEET 1 OF 4 **1241-300-223**

300C-368





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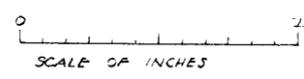
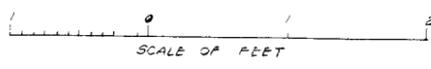
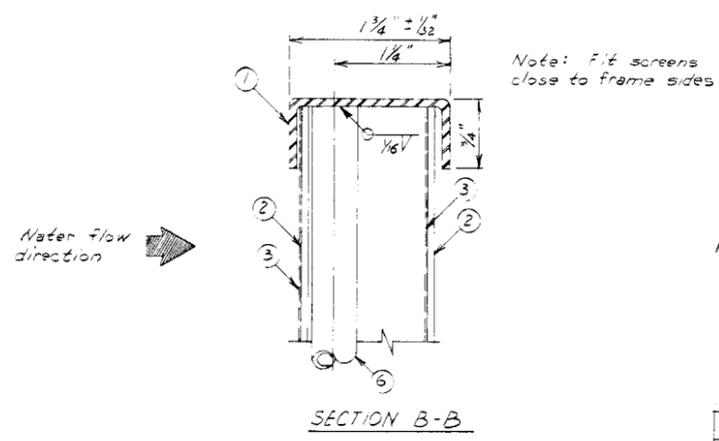
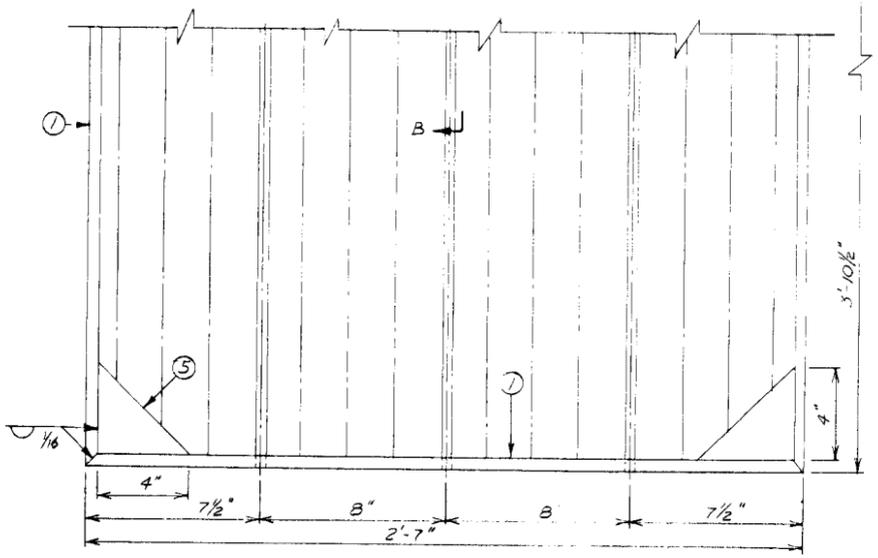
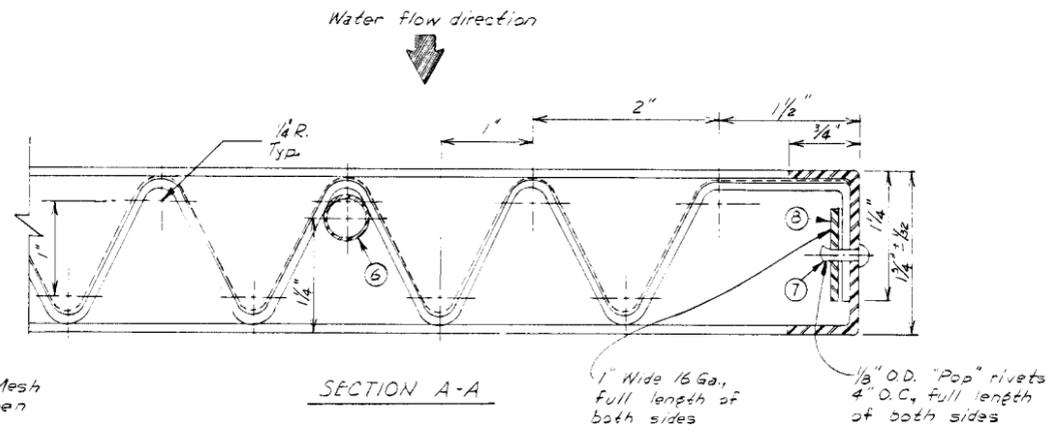
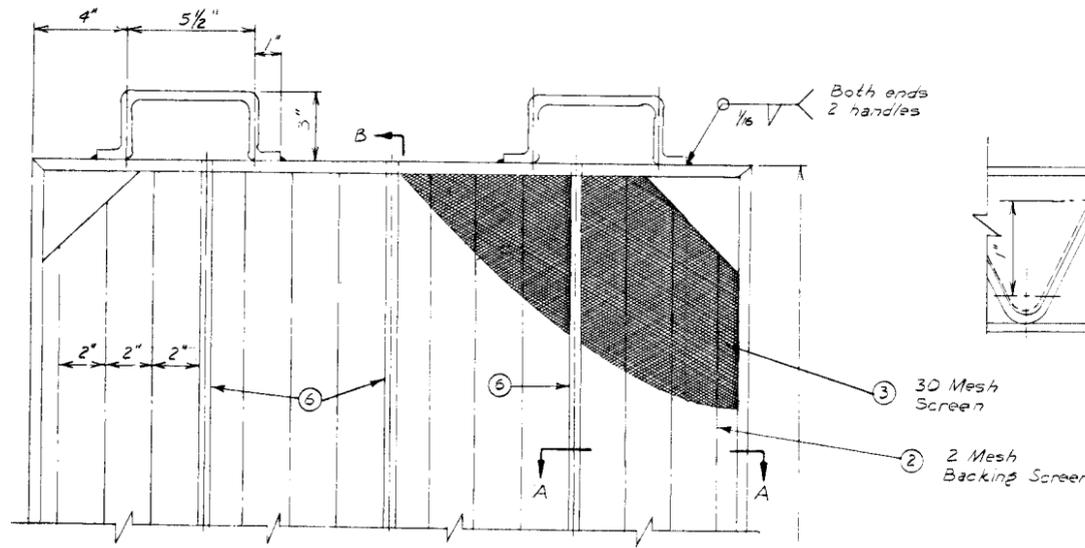
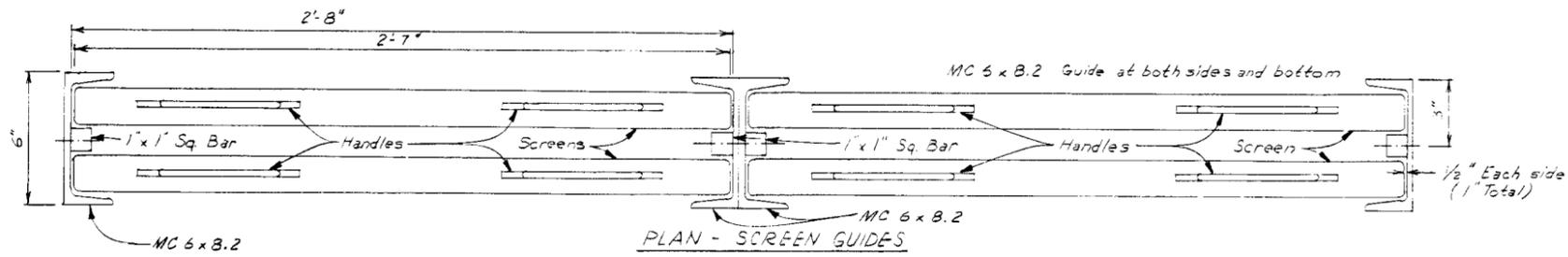
UNITED STATES
DEPARTMENT OF THE INTERIOR
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GEOTHERMAL RESOURCE INVESTIGATIONS
IMPERIAL VALLEY - CALIFORNIA
EAST MESA TEST SITE
ERDA TEST FACILITIES
COOLING TOWER BASE - SUMP & EQUIPMENT BASE
PLANS - SECTIONS - DETAILS

DESIGNED: LAWRENCE BERKELEY LABORATORY, SUBMITTED: *[Signature]*
DRAWN: B. L. DANIELS, RECOMMENDED: *[Signature]*
CHECKED: M. MOORE, P.E., APPROVED: *[Signature]*
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BOULDER CITY, NEVADA, FEB. 6, 1978
SHEET 2 OF 4

1241-300-224

300C-388



- NOTES:
1. Material is to be stainless steel type 302, 304, 316 or 317.
 2. Welding rod is to be stainless steel to avoid segregating temperatures.

LIST OF MATERIAL		
Item	Description	Qty.
1	Frame, 16 Ga. (.062") Sheet, Stainless Steel	52 L.F.
2	Backing Screen, 2x2 Mesh 14 Ga. Stainless Steel Wire Cloth	57 S.F.
3	Screen, 30 Mesh, .013 Dia. Stainless Steel Wire (applied) *	57 S.F.
4	Handle, 3/8" Ø Bar, Stainless Steel	9 D.L.F.
5	Corner Gusset Plates, 16 Ga. Sheet, Stainless Steel	3.48 S.F.
6	Tube, 1/2" Dia. .049" Wall Thickness, Stainless Steel	12
7	1/8" O.D. "Pop" Rivets, Stainless Steel	94
8	Retainer Strip, 1" Wide, 16 Ga. Stainless Steel	31 L.F.
*	For 36" wide cloth (overlap 3 1/2" ±)	

ALWAYS THINK SAFETY

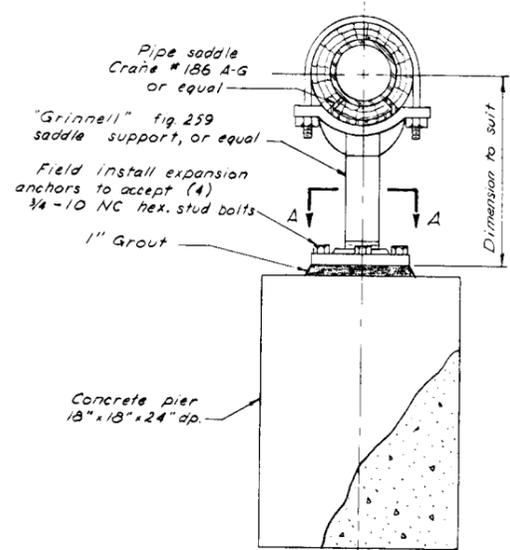
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
GEOTHERMAL RESOURCE INVESTIGATIONS
IMPERIAL VALLEY-CALIFORNIA
EAST MESA TEST SITE
ERDA TEST FACILITIES
COOLING TOWER SCREEN

PLAN - ELEVATION - SECTIONS

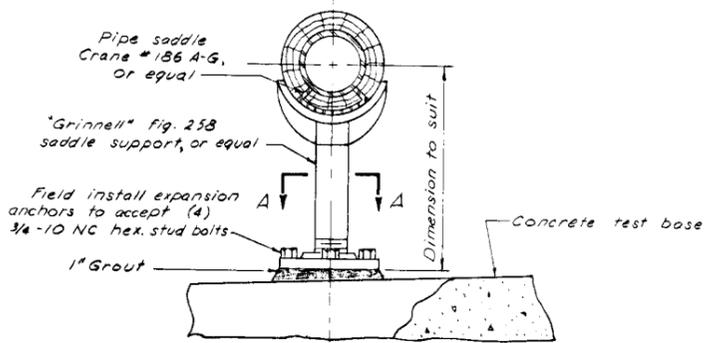
DESIGNED BY LAWRENCE BECKEL, LABORATORY SUBMITTED BY *M. K. Moore*
DRAWN BY *M. K. Moore* RECOMMENDED BY *M. K. Moore*
CHECKED BY *M. MOORE, P.E.* APPROVED BY *M. K. Moore, P.E.*

BOULDER CITY, NEVADA, FEB. 6, 1976
SHEET 3 OF 4

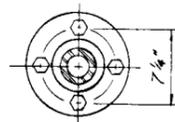
1241-300-225



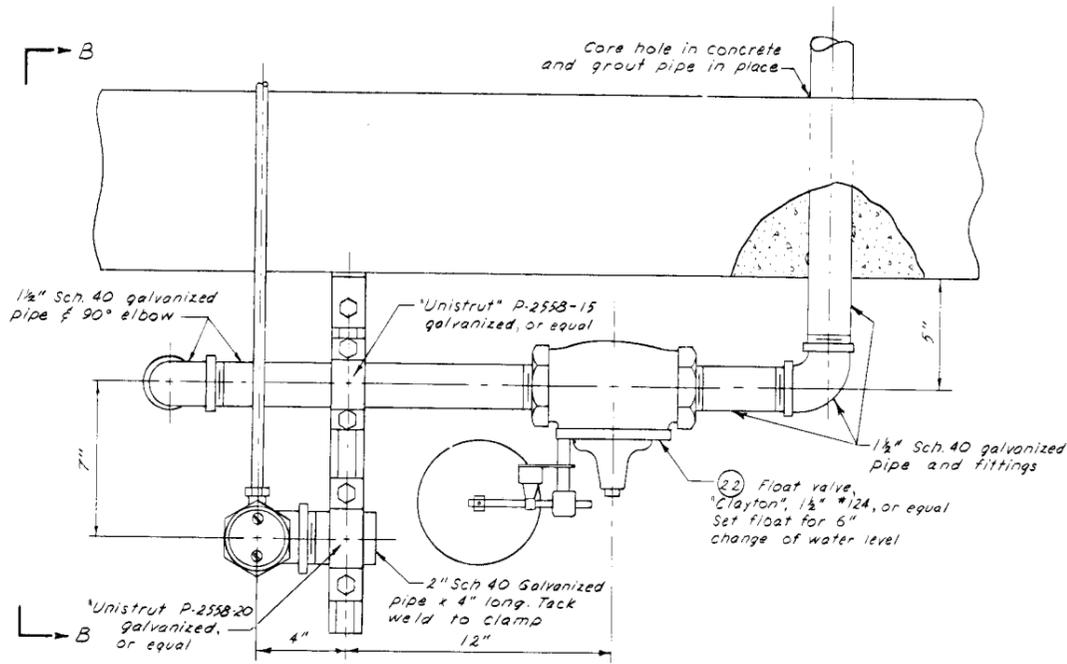
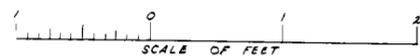
⑬ ELEVATION
PIPE SUPPORT (TYP)



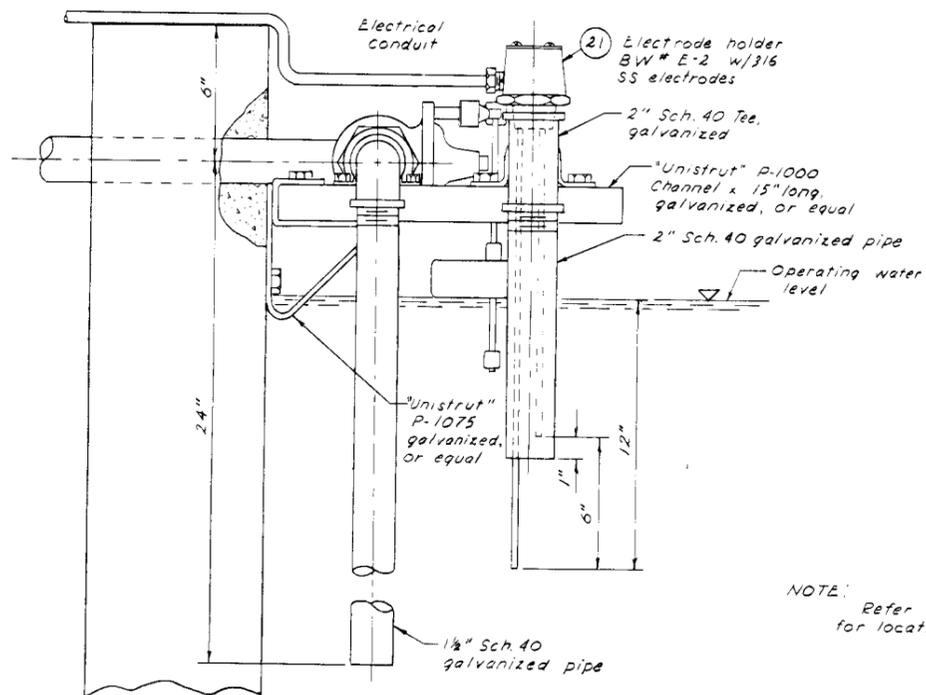
⑭ ELEVATION
PIPE SUPPORT (TYP)



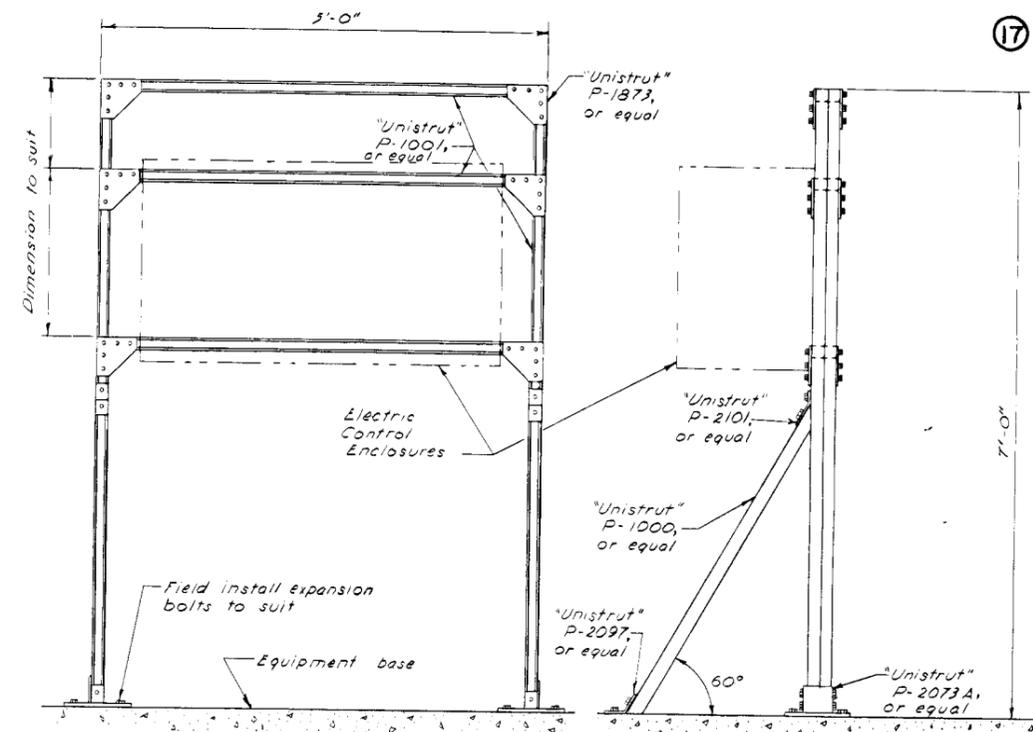
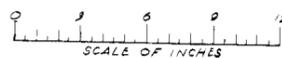
SECTION A-A



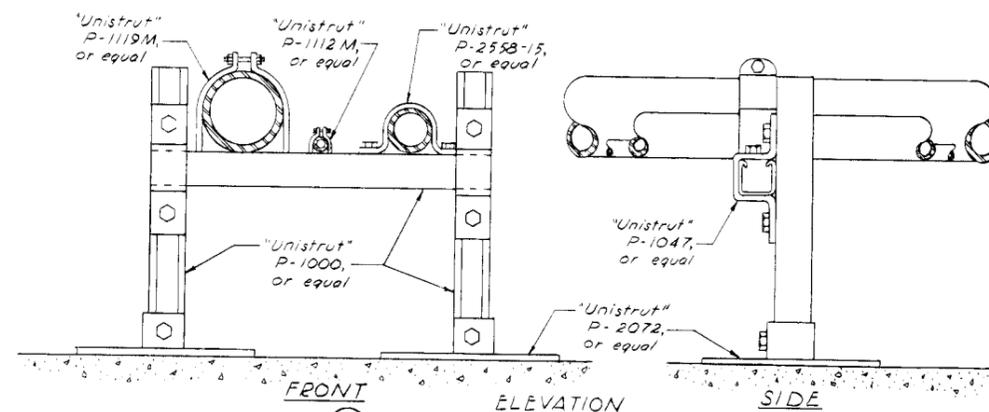
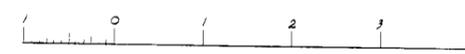
⑳ & ㉒ PLAN
FLOAT VALVE & ELECTRODE



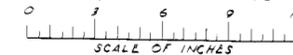
SECTION B-B



FRONT ELEVATIONS
⑳ MOTOR CONTROL CENTER FRAME



FRONT ELEVATION
㉗ AIR LINE OF CONDUIT SUPPORT (TYP)



NOTE: Refer to dwg. 1241-300-224 for location of equipment base.

300K-388

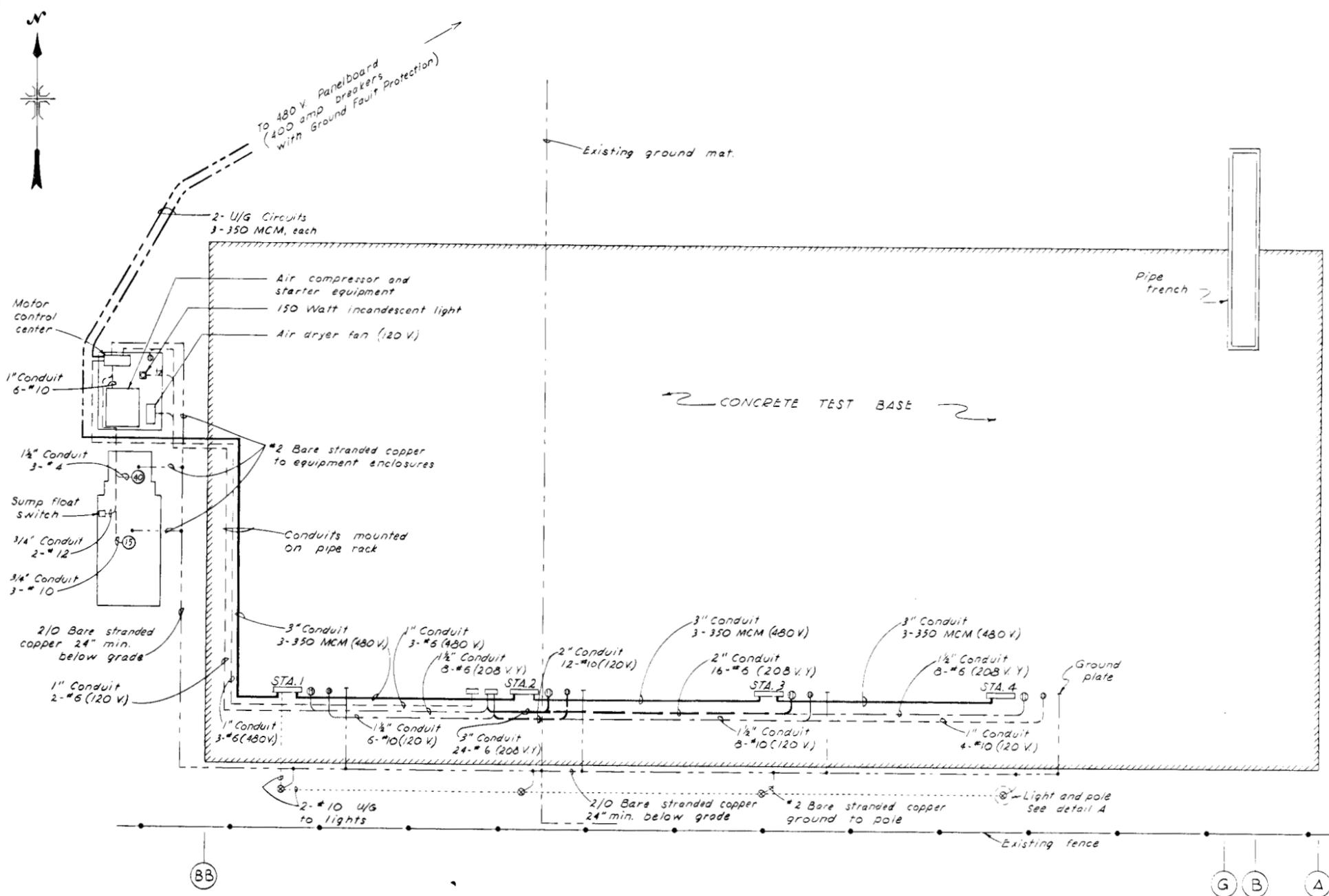
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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
GEOTHERMAL RESOURCE INVESTIGATIONS
IMPERIAL VALLEY - CALIFORNIA
EAST MESA TEST SITE

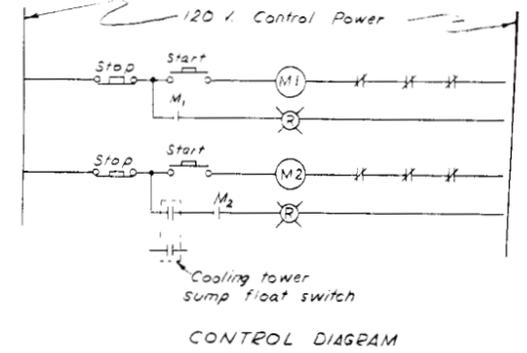
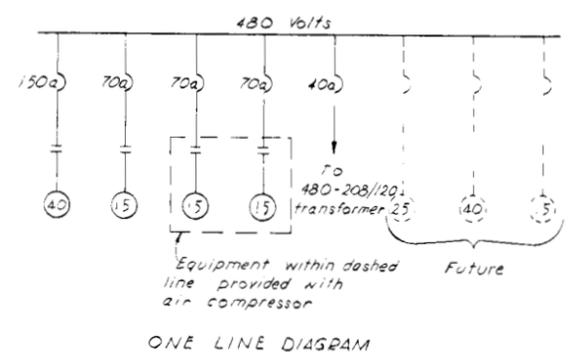
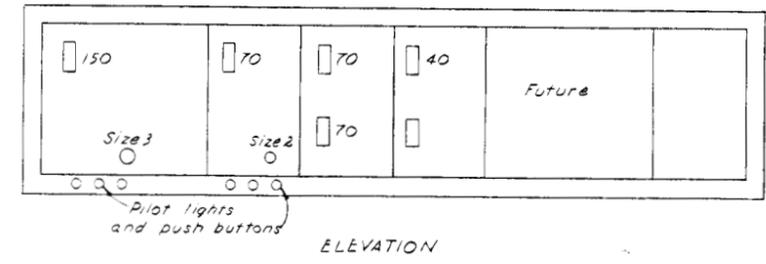
ERDA TEST FACILITIES
COOLING TOWER, PIPING SUPPORTS
AND MOTOR CONTROL CENTER FRAME
PLAN - ELEVATIONS - SECTIONS

DESIGNED: LAWRENCE BERKELEY LABORATORY. SUBMITTED: *[Signature]*
DRAWN: *[Signature]*. RECOMMENDED: *[Signature]*
CHECKED: M. MOORE, P.E. APPROVED: *[Signature]*, P.E.

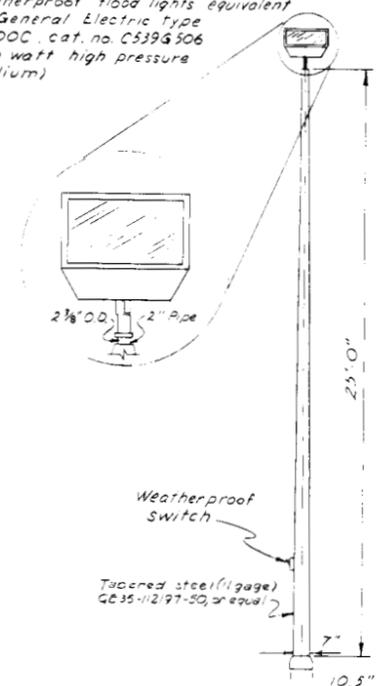
BOULDER CITY, NEVADA FEB. 1976 SHEET 4 OF 4 1241-300-226



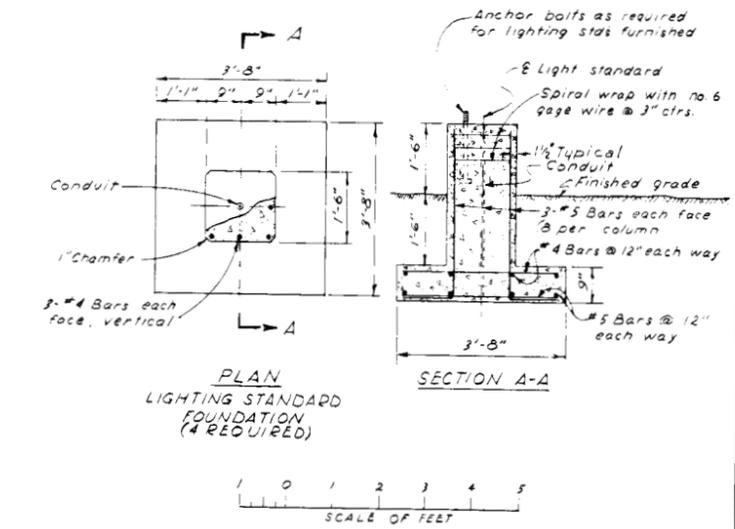
- NOTES**
- Direct buried
 - 3" Conduit
 - 2" Conduit
 - 1 1/2" Conduit
 - 1" Conduit
 - ⊙ 120 V. Receptacle
 - ⊙ 208 V. Y Receptacle



NOTE:
Lamps shall be heavy duty (NEMA) weatherproof flood lights equivalent to General Electric type P-400C, cat. no. C5396506 (100 watt high pressure sodium)



MOTOR CONTROL CENTER



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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
GEOTHERMAL RESOURCE INVESTIGATIONS
IMPERIAL VALLEY - CALIFORNIA
EAST MESA TEST SITE
ERDA TEST FACILITIES
ELECTRICAL

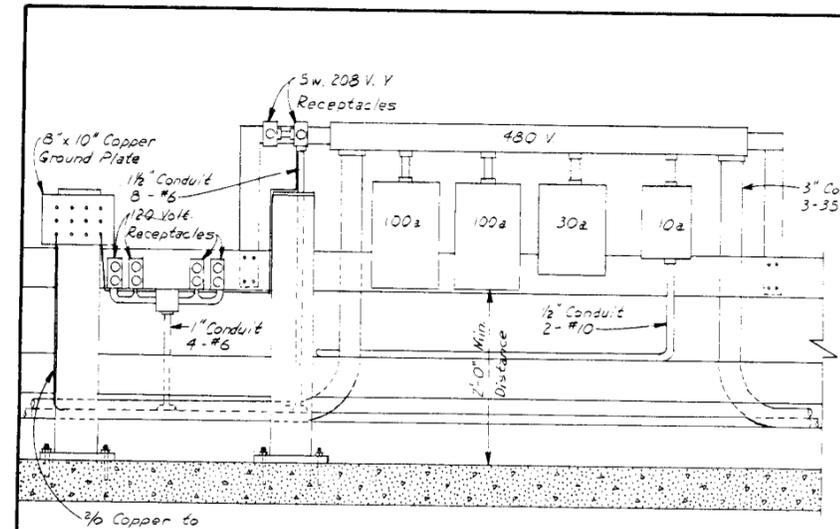
PLANS-SECTION-DETAIL-ELEVATION-DIAGRAMS

DESIGNED: DON MARTIN
DRAWN: [Signature]
CHECKED: [Signature]

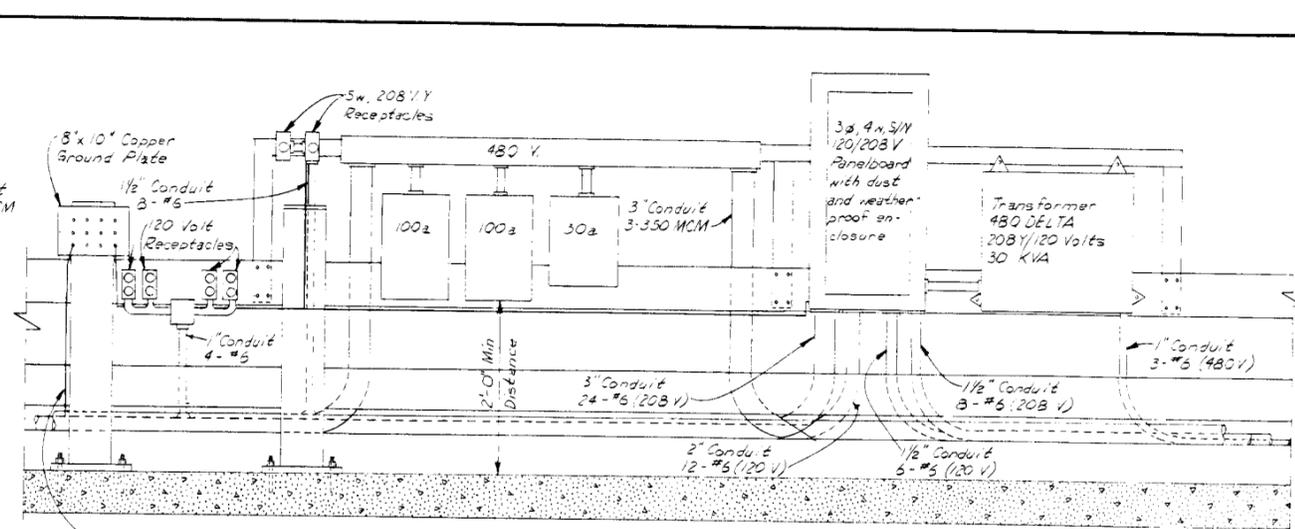
SUBMITTED: [Signature]
RECOMMENDED: [Signature]
APPROVED: [Signature]
REGIONAL ENGINEER

BOLDER CITY, NEVADA FEB, 1976 1241-300-227

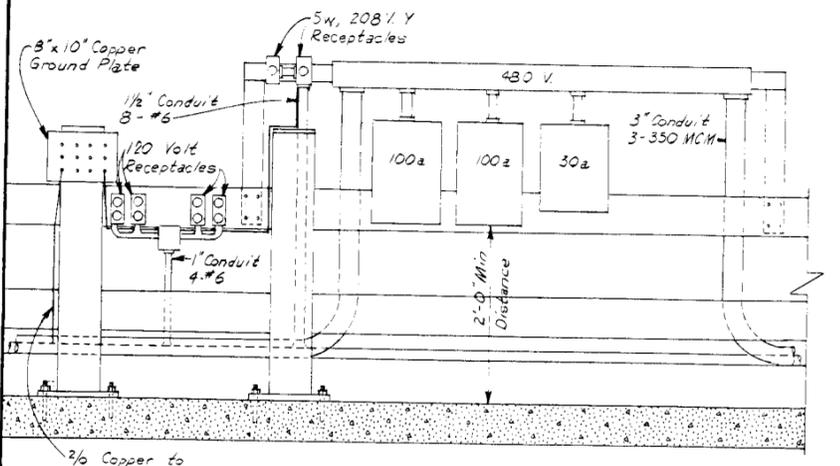
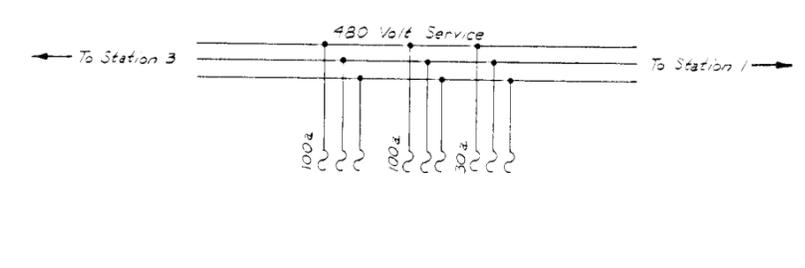
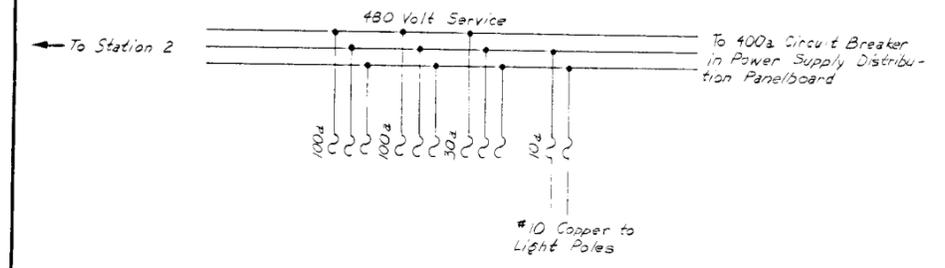
300C-388



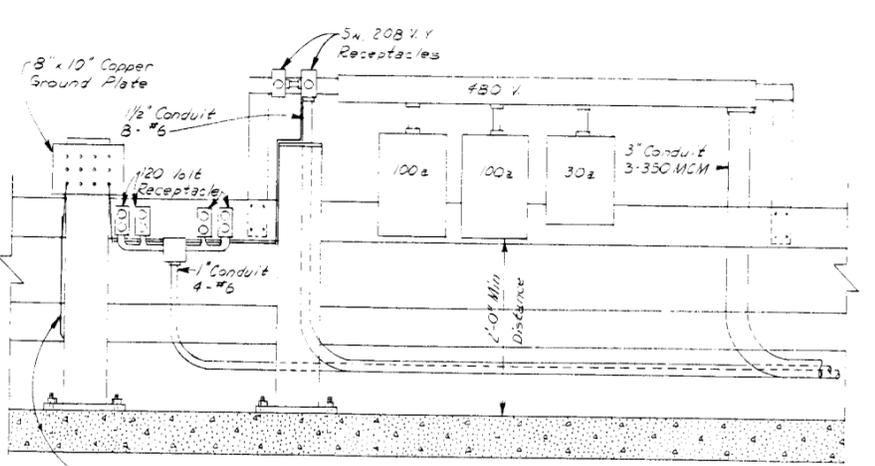
STATION 1 ELEVATION



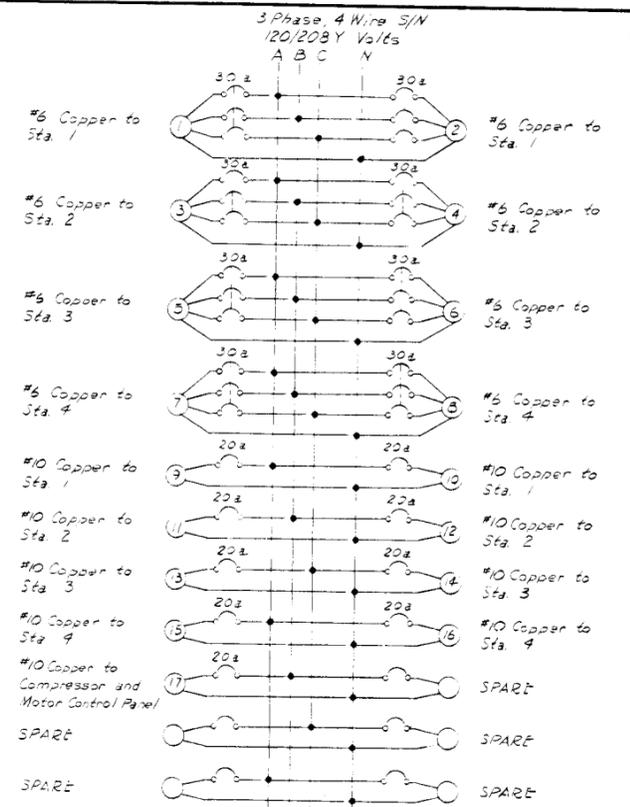
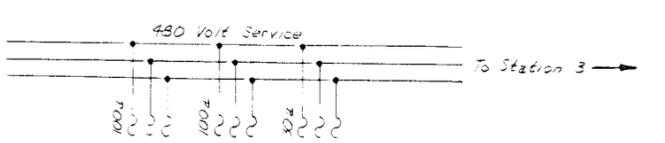
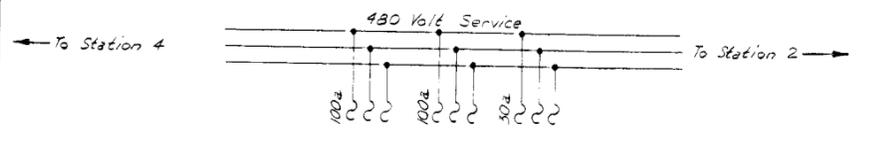
STATION 2 ELEVATION



STATION 3 ELEVATION



STATION 4 ELEVATION

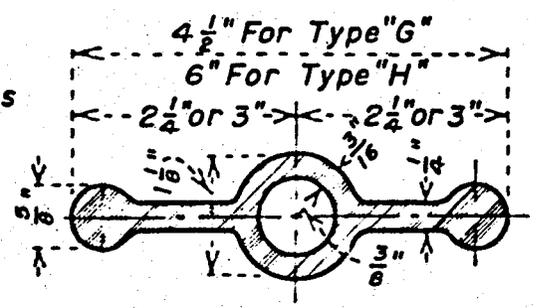
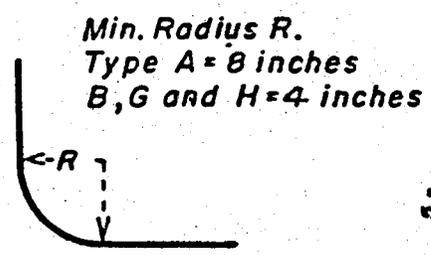


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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
GEOHERMAL RESOURCE INVESTIGATIONS
IMPERIAL VALLEY - CALIFORNIA
EAST MESA TEST SITE
ERDA TEST FACILITIES
ELECTRICAL - STA. 1, 2, 3 & 4
ELEVATIONS - SCHEMATICS

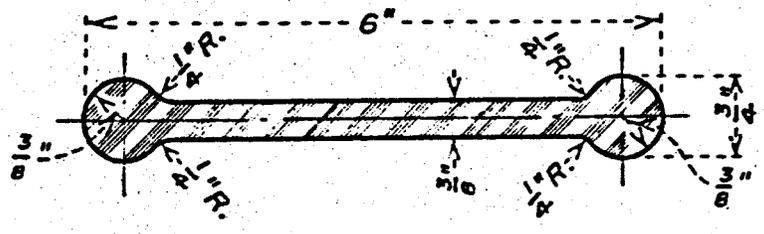
DESIGNED: BOB MARTIN SUBMITTED: [Signature]
DRAWN: [Signature] RECOMMENDED: [Signature]
CHECKED: [Signature] APPROVED: [Signature] REGIONAL ENGINEER

BOLDER CITY, NEVADA JAN 1978 1241-300-228

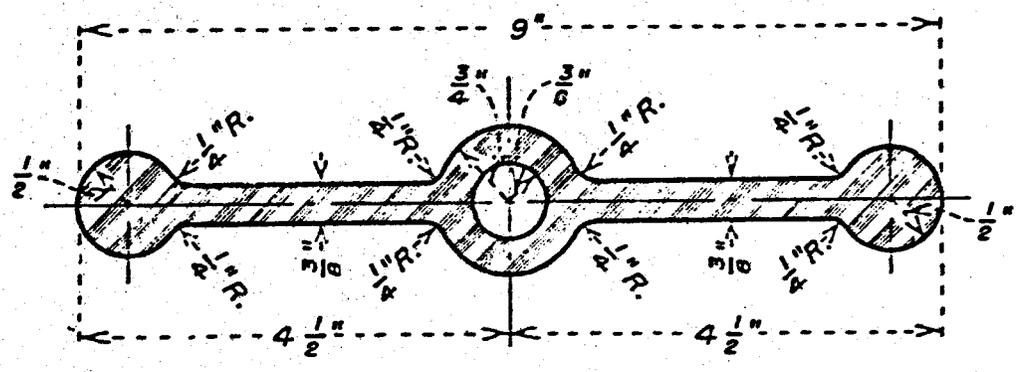


FOR FIELD INSTALLATION

TYPES "G" AND "H"



TYPE "B"



TYPE "A"

TOLERANCES

- ± 1/4" Width, Type A.
- ± 1/8" Width, Type B, G, and H.
- ± 1/32" - 1/32" Web thickness, end bulb diameter, and wall thickness of center bulb all *typ. s.*
- ± 1/8" Diameter of center bulb, both I.D. and O.D., Types A, G, and H.

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12-18-69	REVISED AND RETRACED.
UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION STANDARD DESIGNS RUBBER WATERSTOPS TYPES "A", "B", "G", AND "H"	
DRAWN H.C.C. SUBMITTED H.R. McBirney TRACED E.V.C. RECOMMENDED K.B. Keener CHECKED P.W.T. APPROVED Walker R. Young	
DENVER, COLO. 5-7-41	40-D-2867

300C-388

GOTHIC LETTERING CHART

1" / 4"
 NORMAL (AVG. WIDTH .271")
 ABCDEFGHIJKLMNOPQRS
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
 ABCDEFGHIJKLMNOPQRSTU
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
 CONDENSED (AVG. WIDTH .234")

3" / 16"
 NORMAL (AVG. WIDTH .203")
 ABCDEFGHIJKLMNOPQRS
 ABCDEFGHIJKLMNOPQRSTU
 CONDENSED (AVG. WIDTH .175")

5" / 32"
 NORMAL (AVG. WIDTH .163")
 ABCDEFGHIJKLMNOPQRS
 ABCDEFGHIJKLMNOPQRSTU
 CONDENSED (AVG. WIDTH .140")

1" / 8"
 NORMAL (AVG. WIDTH .135")
 ABCDEFGHIJKLMNOPQRS
 ABCDEFGHIJKLMNOPQRSTU
 CONDENSED (AVG. WIDTH .116")

3" / 32"
 NORMAL (AVG. WIDTH .103")
 ABCDEFGHIJKLMNOPQRS
 ABCDEFGHIJKLMNOPQRSTU
 CONDENSED (AVG. WIDTH .086")

STANDARD NAMEPLATE TABLE

NAMEPLATE SIZE NO.	NAMEPLATE DIMENSIONS			LETTERING SIZE
	A	B	C	
1	1 1/8	7/16	1/16	3/32
2	1 1/2	9/16	1/8	3/32
3	1 3/4	5/8	1/8	1/8
4	2 1/4	3/4	1/8	3/16
5	3	1	7/32	3/16
6	4	1 1/4	1/4	1/4
7	6	1 3/4	1/4	1/2

NAMEPLATE MATERIAL

Type A - Material to be laminated phenol resin sheet 1/16" thick lusterless gray surfaces with black center. The gray color shall match Munsell designation GY5.5/1* Sheets to be cut to size with square edges. Engraving to cut through gray surface to black center lamination.

Type B - Material to be laminated phenol resin sheet 1/16" thick, semi-matte black surfaces, white center. Sheets to be cut to size with square edges. Engraving to cut through black surface to white center lamination.

Type C - Material to be same as Type B except surfaces shall be chinese red # instead of black.

Type D - Material to be 1/16" thick, white translucent plastic material * Engraving to be filled with black lacquer or India ink.

Type E - Material to be same as type B except 3/32" thick. ∅

* Equal to Lamicoid No.7315-Satin finish, manufactured by The Mica Insulator Co, P.O. Box 1076 Schenectady 1, New York.

Δ Equal to Lamicoid No.7025-Satin finish.

Equal to Lamicoid No.7320

* Equal to Insurock manufactured by The Richardson Co, Melrose Park, Ill. c Lamicoid No. E-716-Satin finish.

∅ Equal to Lamicoid No.7025 multiple core.

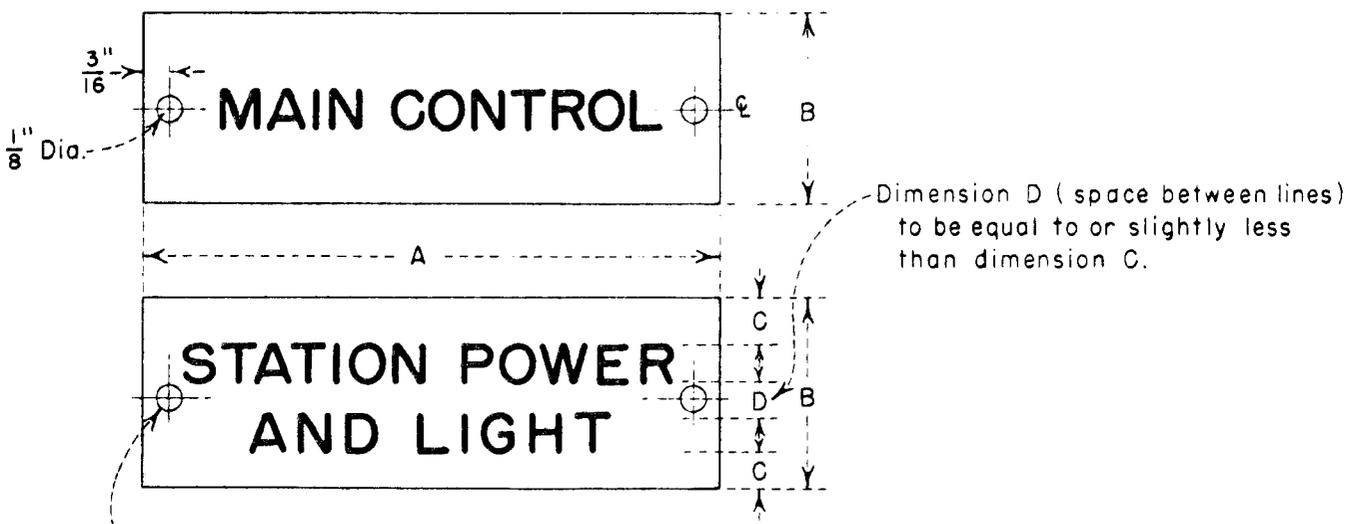
Type-A nameplate material to be used where required for matchup on existing equipment.

Type-B material is standard for all ordinary applications.

Type C nameplate material to be used for special nameplates such as warning signs, fire alarm designations, etc.

Type D nameplate material to be used for annunciator or illuminated symbols. Annunciator window plates to be furnished undrilled.

Type E nameplate material to be used where heavier material is required.



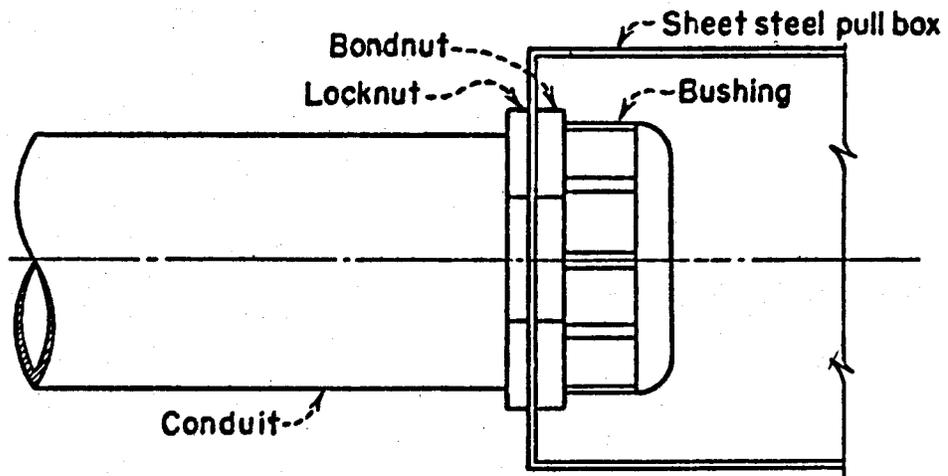
Nameplates to be fastened to panels with black finished round head or fillister head self-threading screws. Mounting screws to be supplied with nameplates. On nameplate sizes larger than 4" x 1 1/4" use 4 mounting screws located 3/16" from each edge.

LETTERING

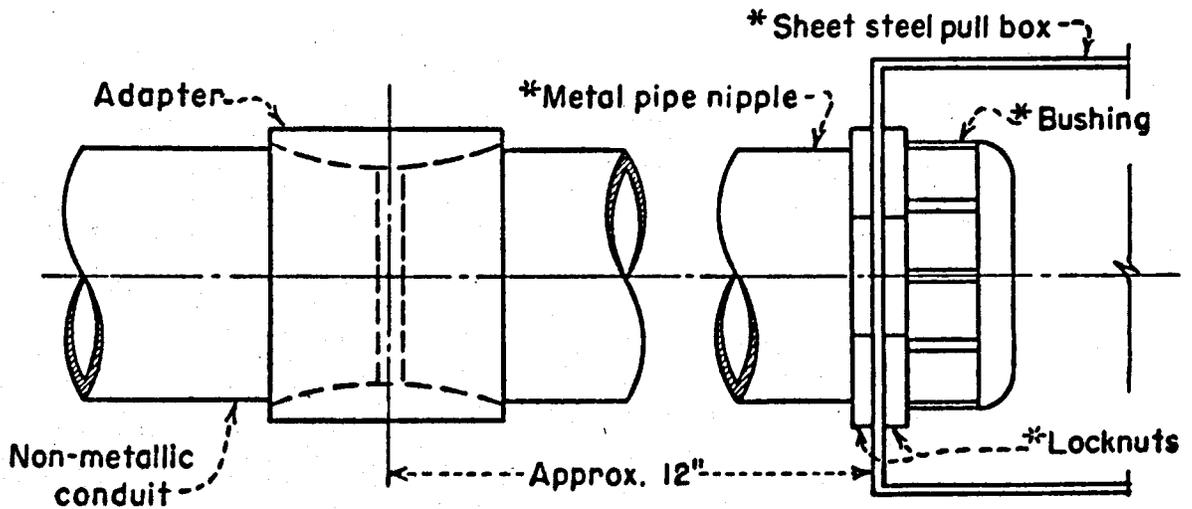
Use letter sizes and types as shown on the Standard Nameplate Table and the lettering chart when possible. Special size lettering may be supplied where necessary.

7-14-66	RETRACED.
D-W.H.C.	
5-25-66	REVISED TYPE A AND B APPLICATION DATA.
D-W.H.C.	
ALWAYS THINK SAFETY	
UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION STANDARD DESIGNS	
STANDARD NAMEPLATES	
DRAWN W.L.N.	SUBMITTED E.C.Schurch
TRACED J.M.H.	RECOMMENDED L.N.McClellan
CHECKED J.E.H.	APPROVED S.O.Harper
DENVER, COLORADO, FEB. 3, 1938	
40-D-2567	

BOX TERMINATION



DETAIL "C"
TERMINATING METAL CONDUIT IN SHEET STEEL PULL BOXES



DETAIL "D"
TERMINATING NON-METALLIC CONDUIT IN SHEET STEEL PULL BOXES

*Use aluminum or brass and slot steel box between knockouts for single phase.

FORMERLY X-D-1523-7

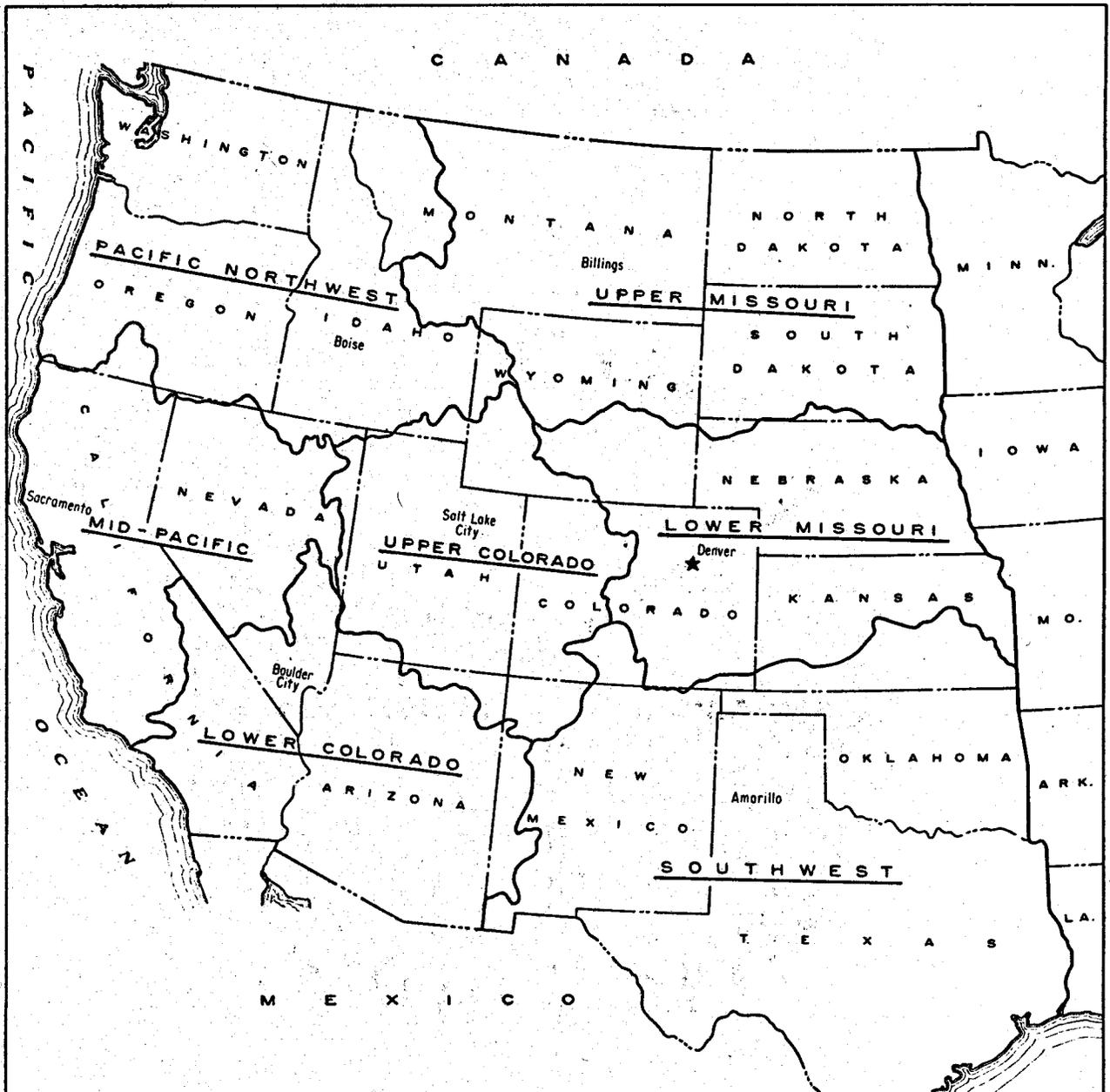
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DENVER OFFICE
ELECTRICAL STANDARDS

REV. 3-25-46
REV. 4-1-42

DENVER, COLO. 6-14-38 104-D-254

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300C-388



COMMISSIONER'S OFFICE, INTERIOR BUILDING, WASHINGTON, D.C. 20240

GILBERT G. STAMM, COMMISSIONER

ENGINEERING AND RESEARCH CENTER
OFFICE OF DESIGN AND CONSTRUCTION
P.O. BOX 25007, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

H.G. ARTHUR, DIRECTOR OF DESIGN AND CONSTRUCTION

PN - R.J. VISSIA, REGIONAL DIRECTOR, FEDERAL BLDG. AND U.S.
COURTHOUSE, BOX 043-550 WEST FORT ST., BOISE, IDAHO 83724

MP - B.E. MARTIN, REGIONAL DIRECTOR, FEDERAL BUILDING,
2800 COTTAGE WAY, SACRAMENTO, CALIFORNIA 95825

LC - M. LOPEZ, JR., REGIONAL DIRECTOR, P.O. BOX 427
ADMINISTRATION BUILDING, BOULDER CITY, NEVADA 89005

UC - DL. CRANDALL, REGIONAL DIRECTOR, P.O. BOX 11568,
125 SO. STATE ST., SALT LAKE CITY, UTAH 84111

SW - J.A. BRADLEY, REGIONAL DIRECTOR, HERRING PLAZA
BOX H-4377, AMARILLO, TEXAS 79101

UM - R.L. McPHAIL, REGIONAL DIRECTOR, P.O. BOX 2553,
FEDERAL BLDG., 316 NO. 26TH ST., BILLINGS, MONT. 59103

LM - J.D. HALL, REGIONAL DIRECTOR, BUILDING 20, DENVER
FEDERAL CENTER, DENVER, COLORADO 80225

**BUREAU OF RECLAMATION OFFICES
AND REGIONAL BOUNDARIES**

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TO PROJECTS IN THE SEVENTEEN WESTERN STATES)

