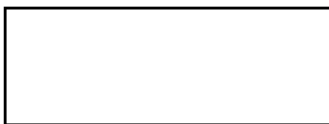


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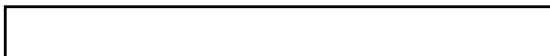
SPECIFICATIONS
FOR CONSTRUCTION OF
FACILITIES REQUIRED FOR THE

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UNITED STATES GOVERNMENT

INDEX

NOTE.--This index is for convenience only. Its accuracy is not guaranteed, and it is not to be considered a part of the specification. In case of discrepancy between the index and the specification, the specification shall govern.

TITLE	SECTION NUMBER
PREBID DOCUMENTS (Separate Booklet)	A
GENERAL CONDITIONS	B
STATEMENT OF WORK	C
WAGE DOCUMENTS	D
GENERAL MECHANICAL REQUIREMENTS	E
GENERAL ELECTRICAL REQUIREMENTS	F

TITLE	ITEM NUMBER
CONCRETE PAVING (East Side)	1
VEHICLE SHED	2
CONCRETE TRUCK DOCK, RAMP AND CANOPY	3
INDUSTRIAL TYPE STEEL BUILDING (Two Thus)	4
STEEL INCINERATOR	5
CONCRETE PAVING (West Side)	6
ASPHALTIC PAVING OF PARKING AREA	7
INSIDE STORAGE AREA INSTALLATIONS	8
SHOP AREA	9
INDUSTRIAL TYPE STEEL BUILDING	10
MEDICAL AND HEALTH ROOM INSTALLATIONS	11
ELECTRICAL WORK, CHANGES IN ALARM AND SAFETY CONTROL SYSTEMS	12

SECTION B

GENERAL CONDITIONS

B.1. GOVERNMENT SUPERVISION.--(a) The work shall be done under the supervision of the Government representative in charge of the work at the site.

(b) The decision of the Contracting Officer or his authorized representative as to the proper interpretation of the drawings and specifications shall be final.

(c) The Contracting Officer is 2430 "E" Street, N. W., Washington 25, D. C.

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B.2. CONDITIONS AT SITE OR BUILDING.--The Contractor shall be responsible for having ascertained pertinent local conditions readily determined by inspection and inquiry, such as the location, accessibility and general character of the site or building, the character and extent of existing work within or adjacent thereto, and any other work being performed thereon at the time of the submission of his bid.

B.3. SUBCONTRACTS.--(a) Nothing contained in the specifications or drawings shall be construed as creating any contractual relationship between any subcontractor and the Government. The divisions or sections of the specifications are not intended to control the Contractor in dividing the work among subcontractors or to limit the work performed by any trade.

(b) The Contractor shall be as fully responsible to the Government for the acts and omissions of subcontractors and of persons employed by them, as he is for the acts and omissions of persons directly employed by him.

(c) The Contractor shall be responsible for the coordination of the trades, subcontractors and material men engaged upon his work.

(d) The Contractor shall, without additional expense to the Government, utilize the services of specialty subcontractors on those parts of the work which are specified to be performed by specialty subcontractors.

(e) The Government will not undertake to settle any differences between the Contractor and his subcontractors or between subcontractors.

B.4. USE OF PREMISES.--(a) The Contractor shall not load or permit the loading of any part of any structure to such an extent as to endanger its safety.

(b) The Contractor shall comply with the regulations governing the operation of premises which are occupied and shall perform his contract in such a manner as not to interrupt or interfere with the conduct of Government business.

(c) Any work necessary to be performed after regular working hours, on Sundays or legal holidays, shall be performed without additional expense to the Government.

B.5. DEBRIS AND CLEANING.--(a) The Contractor shall, during the progress of the work, remove and properly dispose of the resultant dirt and debris and keep the premises clean.

(b) Upon completion of the work, the Contractor shall remove all equipment and unused materials provided for the work (except any materials that are to remain the property of the Government as provided in the specifications) and leave the premises in a neat and clean condition satisfactory to the Government representative at the site.

B.6. SCHEDULE OF ESTIMATES.--Before the first partial payment under the contract becomes due, the Contractor and Government representative shall prepare jointly a schedule of the estimated values of the main branches of the work, totaling the amount of the contract. The values in the schedule will be used only for determining partial payments.

B.7. ENGINEERING AND LAYOUT SERVICES.--(a) The Contractor shall provide competent engineering services to execute the work in accordance with the contract requirements. He shall verify the figures shown on the survey and approach drawings before undertaking any construction work and shall be responsible for the accuracy of the finished work.

(b) The Contracting Officer has established, or will establish, such general reference points as will enable the Contractor to proceed with the work. If the Contractor finds that any previously established reference points have been destroyed or displaced, he shall promptly notify the Contracting Officer.

(c) The Contractor shall protect and preserve the established bench marks and monuments and shall make no changes in locations without the written approval of the Contracting Officer. Any of them which may be lost or destroyed or which require shifting because of necessary changes in grades or locations shall, subject to prior approval by the Contracting Officer, be replaced and accurately located by the Contractor.

B.8. DRAWINGS.--(a) The general character and scope of the work are illustrated by the drawings listed in the specifications. Any additional detail drawings and other information deemed necessary by the Contracting Officer will be furnished to the Contractor when and as required by the work.

(b) In case of differences between small and large scale drawings, the large scale drawing shall govern.

(c) Where on any of the drawings a portion of the work is drawn out and the remainder is indicated in outline, the parts drawn out shall apply also to all other like portions of the work.

(d) Where the word "similar" occurs on the drawings, it shall be interpreted in its general sense and not as meaning identical, and all details shall be worked out in relation to their location and their connection with other parts of the work.

B.9. SHOP DRAWINGS.--(a) The Contractor shall submit for the approval of the Contracting Officer, shop and setting drawings and schedules required by the specifications or that may be requested by the Contracting Officer and no work shall be fabricated by the Contractor, save at his own risk, until such approval has been given.

(b) Drawings and schedules shall be submitted in quadruplicate (unless otherwise specified) accompanied by letter of transmittal which shall give a list of the numbers and dates of the drawings submitted. Drawings shall be complete in every respect and bound in sets.

(c) The Contractor shall submit all drawings and schedules sufficiently in advance of construction requirements to allow ample time for checking, correcting, resubmitting, and rechecking.

(d) The drawings submitted shall be marked with the name of the project, numbered consecutively and bear the stamp of approval of the Contractor as evidence that the drawings have been checked by the Contractor. Any drawings submitted without this stamp of approval will not be considered and will be returned to the Contractor for resubmission. If the shop drawings show variations from the requirements of the contract because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise the Contractor will not be relieved of the responsibility for executing the work in accordance with the contract even though such shop drawings have been approved.

(e) If a drawing as submitted indicates a departure from the contract requirements which the Contracting Officer finds to be in the interest of the Government and to be so minor as not to involve a change in the contract price or time for performance, he may approve the drawing.

(f) The approval of shop and setting drawings will be general and, except as otherwise provided in Paragraph 9(e) above, shall not be construed: (1) as permitting any departure from the contract requirements; (2) as relieving the Contractor of the responsibility for any error in details, dimensions, or otherwise which may exist; (3) as approving departures from full size details furnished by the Contracting Officer.

B.10. MATERIALS AND WORKMANSHIP.--Unless otherwise specified, all materials and equipment incorporated in the work under the contract shall be new. All workmanship shall be first class and by persons qualified in the respective trades.

B.11. STANDARDS.--(a) Any material specified by reference to the number, symbol or title of a specific standard such as a Commercial Standard, a Federal Specification, or other similar standard, and materials and workmanship specified by reference to Standard Specifications of the Public Buildings Administration, shall comply with the requirements in the latest revision thereof and any amendment or supplement thereto, in effect on the date of Invitation for Bids, except as limited to type, class or grade, or modified in such reference.

(b) The standards referred to, except as modified in the specifications shall have full force and effect as though printed in the specifications. Federal specifications, Commercial Standards and Standard Specifications of the Public Buildings Administration are not furnished to bidders for the reason that they are prepared in collaboration with the material producers who are assumed to be familiar with their requirements. The Contracting Officer will furnish upon request information as to how copies of the standards referred to may be obtained.

(c) Reference in the specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalogue number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition, and the Contractor, in such cases, may at his option use any article, device, product, material, fixture, form or type of construction, which in the judgment of the Contracting Officer expressed in writing, is equal to that specified.

B.12. SAMPLES.--(a) The Contractor shall furnish for the approval of the Contracting Officer, any samples required by the specifications, or that may be requested by the Contracting Officer, of any and all materials or equipment he proposes to use, and shall prepay all shipping charges on the samples. No samples are to be submitted with the bids.

(b) No materials or equipment of which samples are required to be submitted for approval shall be used on the work until such approval has been given by the Contracting Officer, save only at the Contractor's risk and expense.

(c) Each sample shall have a label indicating the material represented, its place of origin and the names of the producer, the Contractor and the building of work for which the material is intended. Samples of finished materials shall be so marked as to be identified under the finish schedules.

(d) A letter in duplicate submitting each shipment of samples shall be mailed under separate cover by the Contractor and contain a list of the samples, the name of the building or work for which the materials are intended, and the brands and names of the manufacturers of the materials. Copies of the letters shall be furnished to the Government representative in charge of the work at the site or building.

(e) Samples and letters shall be sent direct to the Contracting Officer, except that where samples are required by the specifications to be approved by Government representatives other than the Contracting Officer they shall be submitted direct to such Government representatives.

(f) The approval of any sample shall be only for the characteristics or for the uses named in such approval and no other. No approval of a sample shall be taken in itself to change or modify any contract requirement. When a material has been approved, no additional sample of that material will be considered and no change in brand or make will be permitted.

(g) Approved samples not destroyed in testing, will be sent to the Government representative in charge of the work at the site or building for reference. Approved samples of hardware in good condition may be suitably marked for identification and used in the work.

(h) Samples not destroyed in testing, and that are not approved, will be returned to the Contractor at his expense if requested within 90 days from the date of rejection.

(i) Failure of any material to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make of that material.

(j) The Government reserves the right to disapprove any material or equipment which previously has proved unsatisfactory in service.

(k) Test Samples, as the Government representatives deem necessary, will be procured from the various materials or equipment delivered by the Contractor for use in the work and will be forwarded to the Contracting Officer for testing. If any of these test samples fail to meet the specification requirements any previous approvals will be withdrawn and such materials or equipment shall be subject to removal and replacement by the Contractor with materials or equipment meeting the specification requirements, or there shall be a proper adjustment of the contract price as determined by the Contracting Officer.

B. 13. HEATING.--The Contractor shall provide heat as necessary to protect all work and materials against injury from dampness and cold and as follows:

(a) At all times during the placing, setting and curing of concrete, provide sufficient heat to insure the heating of the spaces involved to not less than 50 degrees F.

(b) From the beginning of the application of plaster and during the setting and curing period, provide sufficient heat to produce a temperature in the spaces involved of not less than 50 degrees F.

(c) For a period of ten days previous to the placing of interior wood finish and throughout the placing of this and other interior finishing, varnishing, painting, etc., and until the completion of the building, provide sufficient heat to produce a temperature of not less than 70 degrees F.

(d) Payment will be made for the cost of furnishing heat during any period for which such heat is required which extends beyond that stipulated in the contract for the completion of construction, in cases in which such extended period of time results directly from changes made in the drawings or specifications pursuant to the provisions of Article 3, U. S. Standard Form No. 23, Construction Contract; and no payments will be made on account of any other items of cost of delay, whether occasioned by a change in the specification or otherwise.

B.14. CLIMATIC CONDITION.--When so ordered by the Contracting Officer the Contractor shall suspend any work that may be subject to damage by climatic conditions.

B.15. CHANGES IN WORK.--(a) Government representatives shall have no authority to approve or order changes in the work or to alter the terms or conditions of the contract, specifications, or drawings without written authority from the Contracting Officer.

(b) If any part of the work as installed be at variance with the contract requirements, the Contracting Officer may, if he finds it to be in the interest of the Government, allow all or any part of such work to remain in place, subject to a proper adjustment in the contract price.

(c) The Contractor shall, when required by the Contracting Officer, furnish to the Government an itemized breakdown of the quantities and prices used in computing the value of any change that may be ordered.

B.16. FINAL INSPECTION.--When the work is substantially completed the Contractor shall notify the Contracting Officer in writing that the work will be ready for final inspection and test on a definite date which shall be stated in such notice. The notice shall be given at least ten (10) days in advance of said date and shall be forwarded through the Government representative at the site who will attach his endorsement as to whether or not he concurs in the Contractor's statement that the work will be ready for final inspection or test on the date given, but such endorsement shall not relieve the Contractor of his responsibility in the matter.

B.17. GUARANTEE OF WORK.--(a) Unless otherwise provided in the specifications, all work (including materials and equipment) shall be guaranteed by the Contractor for one year from the date of final settlement of the contract.

(b) If, within any guarantee period, the Contracting Officer finds that repairs or changes are required in connection with guaranteed work, which, in the opinion of the Contracting Officer, is rendered necessary as the result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the contract, the Contractor shall, promptly upon receipt of notice from the Contracting Officer (1) place in satisfactory condition in every

particular all of such guaranteed work, correct all defects therein, and (2) make good all damage to the building or site, or equipment or contents thereof which, in the opinion of the Contracting Officer, is the result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the contract; and (3) make good any work or materials, or the equipment and contents of said building or site disturbed in fulfilling any such guarantee.

(c) In any case where in fulfilling the requirements of the contract or of any guarantee, embraced in or required thereby, the Contractor disturbs any work guaranteed under another contract, he shall restore such disturbed work to a condition satisfactory to the Contracting Officer and guarantee such restored work to the same extent as it was guaranteed under such other contract.

(d) Upon the Contractor's failure so to proceed promptly to comply with the terms of any guarantee under the contract or still running upon work originally executed by other Contractors, the Government may (1) either have such work performed as the Contracting Officer deems necessary to fulfill such guarantee, or (2) allow such damaged or defective work or portion of the building or site or contents or equipment of the building, or work disturbed in fulfilling guarantees or guaranteed work, which shows such a condition as to make any such guarantee operative, to remain in such unsatisfactory condition; provided, that the Contractor shall promptly pay the Government the sum expended by the Government under the provisions of (1) above or, at the election of the Government, the sum estimated by the Contracting Officer under the provision of (2) above to represent the amount which would have been necessary to expend to fulfill such guarantee. Everything done in the fulfillment of any guarantee shall be without additional expense to the Government.

(e) All special guarantees that may be stipulated in the specifications or other papers forming a part of the contract shall be subject to the terms of this paragraph insofar as they do not conflict with the provisions of the specifications, or such other papers, with reference to such special guarantees.

B.18. ACCIDENT PREVENTION.--The Contractor shall comply with the applicable provisions of the "Specification for Accident Prevention" issued by the General Services Administration and approved July 1, 1939, and shall take any other precautions necessary to protect against injury all persons engaged at the site of the work in the performance of the contract.

B.19. BONDS AND CONTRACT.--Provisions for Bid Guaranty, Performance and Payment Bonds and the provisions of the Construction Contract, as contained in the Prebid Documents of the Invitation to Bid are incorporated in these general conditions by reference and are made a part hereof to the same extent as though fully set forth herein.

SECTION C

Approved For Release 2002/05/01 : CIA-RDP78-05327A000300050001-7

STATEMENT OF WORK

C.1.--The work in the project consists of furnishing all plant, labor and materials, and performing all work in strict accordance with these specifications and drawings forming parts thereof for construction and completion of "Additional Facilities for the [REDACTED], all complete with interior and exterior utilities and ready for service as shown on the drawings and as specified.

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C.2.--In general, the main items of work will consist of the following:

- a. Concrete work on east side of Building "B".
 - (1) Thirteen-foot strip of paving for main roadway.
 - (2) Vehicle shed paving, concrete shed walls, footings.
 - (3) Paving of storage area.
 - (4) Paving in front of loading dock.
 - (5) Paving approach to ramp.
- b. Steel vehicle shed structure.
- c. Concrete truck dock, ramp and metal canopy.
- d. Two metal buildings (west side of Building "B").
- e. Metal incinerator structure.
- f. Paving work with floor slabs of Items 4 and 10 (west side of Building "B").
- g. Macadam parking area paving (south side of building "B").
- h. Inside storage area installations:
 - (1) In refrigerator area.
 - (2) In Depot Service Office.
- i. T.S.S. shop area construction.
- j. New communications shop (west side).
- k. Medical and health room installations.
- l. Electrical work, changes in alarm and sprinkler control systems.

C.3.--The above general outline of principal features does not, in any way, limit the responsibility of the Contractor to perform all work and furnish all plant, labor and materials required by the specifications and the five (5) drawings referred to therein.

C.4.--Under Item No. 2, there are two alternate items requested, covering the enlargement of the steel vehicle shed structure. These alternate items shall include the costs of the additional low concrete walls and footings necessary to make such enlargements, as specified under Item No. 1.

C.5.--Contractors shall avail themselves of the opportunity of visiting the site before bidding to acquaint themselves of all facilities and locations.

C.6.--The location of the work called for in these specifications is located at

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APPLICABLE MINIMUM HOURLY RATES OF WAGES

1. The following schedule gives the minimum hourly rates of wages which shall be paid to the laborers and mechanics employed directly upon the site of the work embraced by this specification, the rates having been determined by the Secretary of Labor in accordance with the provisions of the Davis-Bacon Law as amended (Act of August 30, 1935, 49 Stat. 1011, U. S. C. title 40, sec. 276 (a)) and as further amended by Act of June 15, 1940, Public No. 633, 76th Congress, 3d Session, to be the prevailing rates for the corresponding classes of laborers and mechanics in the locality where this work is to be performed. THESE MINIMUM HOURLY RATES OF WAGES SHALL APPLY ONLY IF THE CONTRACT IS IN EXCESS OF \$2,000.00 IN AMOUNT.

2. While the wage rates given 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 and prospective changes or adjustments of wage rates. The Contractor shall abide by and conform to all applicable laws, Executive Orders, and rules, regulations and orders of Federal agencies authorized to pass upon and determine wage rates. No increase in the contract price shall be allowed or authorized on account of the payment of wage rates in excess of those listed herein.

3. Any class of laborers and mechanics (including apprentices) not scheduled herein, which will be employed on this contract, shall be classified or reclassified, conformably to the schedule. In the event the interested parties cannot agree on the proper classification or reclassification of a particular class of laborers and mechanics to be used, the question, accompanied by the recommendation of the Contracting Officer, shall be referred to the Secretary of Labor for final determination.

4. The wage rates listed herein are straight hourly wage rates. In some areas management and labor organizations in the construction industry have collectively bargained for health and welfare fund contributions. Such contributions are not included in wage rates determined by the Secretary of Labor for construction projects.

5. Apprentices will be permitted to work only under a bona fide apprenticeship program registered with a State Apprenticeship Council which is recognized by the Federal Committee on Apprenticeship, U. S. Department of Labor; or if no such recognized Council exists in a State, under a program registered with the Bureau of Apprenticeship, U. S. Department of Labor.

OCCUPATIONS	MINIMUM HOURLY RATES
Air tool operator (Jackhammermen, vibrator)	\$1.94
Asbestos workers	3.025
Asbestos workers' improvers:	
1st year	1.65
2nd year	1.95
3rd year	2.25
4th year	2.50
Boilermakers	3.00
Boilermakers' helpers	2.75
Bricklayers	3.30
Carpenters	2.875
Carpenters (wiredrivermen)	2.875
Electricians	3.00
Elevator constructors	3.29
Elevator constructors' helpers	2.30
Glaziers	2.60
Ironworkers, structural	3.35
Ironworkers, ornamental (chainlink fence erector)	3.35
Ironworkers, reinforcing	3.00
Laborers	1.80
Lathers	3.45
Marble setters	3.30
Marble setters' helpers	2.20
Mortar men	1.94
Painters, brush	2.67
Painters, structural steel	3.00
Painters, swing	3.00
Painters, spray (applicable only to spraying with water base paints on masonry or similar surfaces)	2.67
Sand blasters	2.85
Pipe layers (concrete & clay)	1.94
Plasterers	3.425
Plasterers' tenders	2.15
Plumbers	3.12
Plumbers' laborers	1.90
<u>Power equipment operators:</u>	
Backhoes	3.05
Cableways	3.05
Cranes or derricks	3.05
Draglines	3.05
Elevating graders	3.05
Hoists	3.05
Pile driving engine	3.05
Power shovels	3.05
Tunnel shovels	3.05
Tunnel mucking machines	3.05
boilers (skeleton)	2.79
Concrete pumps	2.79
Elevators (permanent)	2.79

OCCUPATIONS (CONTINUED)	MINIMUM HOURLY RATES
Power equipment operators: (contd)	
Tugboat	\$2.67
Locomotive-standard (narrow gauge)	2.79
Trenching machines	2.79
Well drilling machines	2.79
Front end loaders (hi-lift)	2.65
Air compressors	2.62
Concrete mixers	2.62
Mechanic and maintenance man	2.62
Pumps	2.62
Tunnel mechanics	2.62
Welding machines	2.62
Well points	2.62
Power driven wheel scoops & scrapers	2.60
Blade graders	2.60
Batch plant	3.05
Bulldozers	2.40
Motor graders	2.60
Rollers	2.40
Asphalt spreaders	2.23
Bull fleets, finishing machines	2.23
Concrete finishing machines	2.23
Concrete spreaders	2.23
Fine graders	2.23
Form graders	2.23
Apprentice engineers:	
Firemen	2.13
Truck crane oilers	2.01
Oilers	1.96
Paving mixers	3.05
Tunnel motormen	2.62
Riggers--receive rate prescribed for craft performing operation to which rigging is incidental.	
Roofers, composition	2.25
Roofers, composition helper	1.80
Mop men, waterproofer, sprayer, spondrel, ironite	2.65
Cement masons	2.80
Cement masons machine operators	2.925
Cement masons swinging and suspended scaffold	2.925
Kettlemen	2.25
Scaffold builders	1.915
Sheet metal workers	3.025
Soft floor layers	2.875
Sprinkler fitters	2.79
Steam fitters	3.12
Stone masons	3.30
Terrazzo workers	3.125
Terrazzo workers' helpers	2.20
Tile setters	3.125
Tile setters' helpers	2.20

OCCUPATIONS (CONTINUED)

MINIMUM
HOURLY RATES

Truck drivers:

Dump trucks:

Up to and including 8 wheels	\$1.52
Over 8 wheels	1.79
Flat trucks up to and including 8 wheels	1.68
Flat trucks over 8 wheels	1.79
Tractor-trailer trucks	1.75
Water sprinkle tank trucks	1.63
Grease and oil trucks	1.63
Tractor pulls	1.79
Euclids	1.79
Ross carrier	1.79
Buggymobile	1.79
Dumpsters	1.79
Helpers	1.41

Welders--receive rate prescribed for craft performing operation to which welding is incidental.

Apprentice Schedule

Craft	Interval	Period and Rate*									
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Bricklayers	6 mos.	\$1.25	1.50	1.75	2.00	2.40	2.80				
Carpenters	6 mos.	51%	56	61	65	70	75	81	87		
Cement finishers	6 mos.	50	60	70	80	90	95				
Electricians	6 mos.	40	45	50	55	60	65	70	75		
Glaziers	6 mos.	37	46	56	65	74	83				
Ironworkers, structural & ornamental	6 mos.	50	60	66-2/3	75						
Ironworkers, reinforcing	6 mos.	\$2.00	2.25	2.50	2.75						
Lathers	6 mos.	45	45	55	60	65	70				
Painters	6 mos.	40	45	50	60	70	85	100			
Plasterers	6 mos.	\$1.00	1.25	1.50	1.80	2.05	2.35	2.50	2.50		
Roofers	6 mos.	\$1.69	1.82	1.95	2.08	2.20					
Sheet metal workers	6 mos.	40	45	50	55	60	65	70	80		
Soft floor layers	6 mos.	45	51	57	62	68	75	81	87		
Steamfitters	year	\$1.20	1.40	1.60	1.80	2.05					
Plumbers	year	35	40	60	75	80					

* The apprentice rate is by percentage of the journeymen's rate unless otherwise indicated.

OCCUPATIONS (CONTINUED)	MINIMUM HOURLY RATES
SEWER AND WATER LINES	
Bricklayers	\$3.30
Carpenter	2.875
Cement finisher	2.80
Electricians	3.00
Plumbers	2.90
Plumbers' laborers	1.90
Ironworkers, reinforcing	3.00
Bottom men	1.75
Timbermen	2.00
Shoring	1.85
Caulker (concrete & non-metalic)	1.75
Rock driller	1.70
Jackhammerman, concrete busters, rammers, spaders, etc.	1.70
Laborers	1.66
Miners	2.40
Muckers	1.90
Pipe layers (concrete & non-metalic)	1.80
Sheeting men	1.90
Wagon drillers	2.10
Power equipment operators:	
Backhoes	2.95
Cableways	2.95
Cranes or derricks (mounted on wheels or crawler tracks)	2.95
Draglines	2.95
Elevating graders	2.95
Hoists	2.95
Paving mixers	2.95
Pile driving engines	2.95
Power shovels	2.95
Tunnel shovels	2.95
Tunnel mucking machines	2.95
Trenching machines (for small trenches, 8' cutting depth or less, mfr's rated capacity)..	2.65
Boilers, skeleton	2.65
Concrete pumps	2.65
Elevators (permanent)	2.65
Batch plant	2.95
Locomotives - standard, narrow gauge	2.65
Well drilling machines	2.65
Tugboat operators	2.65
Front end loader (hi-lift)	2.60
Concrete mixers	2.50
Mechanics and maintenance man	2.50
Form graders	2.10

OCCUPATIONS (CONTINUED)	MINIMUM HOURLY RATES
Power equipment operators: (contd)	
Power driven wheel scoops and scrapers	\$2.50
Tunnel mechanic	2.50
Tunnel motorman	2.50
Air compressors	2.30
Pumps	2.30
Welding machines	2.30
Well points	2.30
Blade graders	2.50
Bulldozers	2.30
Motor graders	2.50
Rollers	2.30
Asphalt spreader	2.10
Bull float finishing machines	2.10
Trenching machines	2.70
Concrete finishing machines	2.10
Concrete spreaders	2.10
Fine graders	2.10
Apprentice engineers:	
Firemen	2.05
Truck crane oilers	1.90
Oilers	1.85
Truck drivers:	
Dump:	
Up to and including 8 wheels	1.52
Over 8 wheels	1.79
Flat:	
Up to and including 8 wheels	1.68
Over 8 wheels	1.79
Tractor-trailer	1.75
Water sprinkler tank trucks	1.63
Dumpster	1.79
Truck driver helper	1.41
Chuck tenders	1.90

OCCUPATIONS (CONTINUED)	ROAD WORK	MINIMUM HOURLY RATES
Asphalt plant engineer		\$1.90
Carpenter		1.90
Crane operator (paving)		2.05
Drill dress		1.65
Head mechanic		2.05
Hoisting engineer		1.90
Master finisher conc. pavement		2.05
Paver operator		2.05
Power shovel operator		2.15
Stone cutter		2.15
Blacksmith		1.90
Asphalt plant mixer		1.65
Air compressor operator		1.65
Asphalt raker		1.65
Asphalt tamper		1.55
Blade grade operator		1.90
Curb setter		1.90
Engineer assistant		1.40
Finisher (concrete pavement)		1.90
Finishing machine operator (concrete)		1.65
Roller operator (finisher high type pavement surfaces)		1.90
Roller operator (other than finish high type pavement surfaces)		1.65
Floatman		1.70
Form setter		1.90
Jackhammer operator		1.60
Paver block		1.90
Tractor operator		1.75
Spreader operator, asphalt		1.75
Truck driver, over 2 tons cap.		1.40
Vibrator operator		1.40
Mechanic		1.65
Asphalt loader and shoveler		1.40
Asphalt plant, misc. labor		1.40
Finisher helper, conc. pave't.		1.50
Spader, concrete work		1.40
Shoveler, concrete		1.55
Labor, unskilled		1.40
Truck driver, 2 tons or less		1.35
Blacksmith helper		1.40
Firemen (steam shovel or head firemen on asphalt plant)		1.40
Oiler (power shovel, cranes, draglines)		1.50

SECTION E

GENERAL REQUIREMENTS FOR MECHANICAL WORK

E.1. General requirements shall apply to all items and parts of the mechanical work where applicable whether or not specifically mentioned therein. References to General Requirements in the other parts of the specifications is made for the convenience of the Contractor in referring to the General Requirements which are binding upon all of the work indicated on the drawings.

E.2. Kind of Quality of Material.--Equipment, fixtures, and materials furnished must be in accordance with the specification requirements in each case and of the best quality and grade.

E.3. Approval of Materials, etc.--Within thirty (30) days after receipt of notice to proceed, the Contractor must submit to the Contracting Officer in triplicate for approval, subject to the latter's discretion, a complete list of the following equipment, etc., that he proposes to use in the project, giving the name of manufacturer, the trade name, catalog number, and technical description with standard catalog capacity date when specified:

See the individual items for list of equipment to be submitted.

E.4. Plumbing fixtures must be the standard output, one manufacturer of established reputation who assumes responsibility for outfits as a whole for products in said outfits which are not manufactured by them.

E.5. Plumbing Fixtures.--Plumbing fixtures shall be installed where indicated on the drawings, and unless otherwise specified shall comply with Federal Specification WW-P-541a. The Contractor will be held responsible for the actual number of fixtures to be installed as indicated on the drawings.

E.6. Electric water heaters shall be in accordance with Federal Specification W-H-196a where applicable, and be provided with double heating elements to operate on 120-volts, single-phase, 60-cycle current. Controls shall operate either the lower or upper heating element as required to maintain the set temperature. Provide all electrical safety devices and a 1/2" combined pressure and thermostatic relief valve of the automatic reset type. Pipe overflow drain to floor.

E.7. All equipment, fixtures, appliances, etc., submitted for approval must be in successful commercial use and operation for approximately one year previous to date of submittal.

E.8. Inspection and Tests.--All equipment, fixtures and appliances, etc., installed under this specification shall be operated by the Contractor in the presence of a representative of the Contracting Officer to demonstrate its proper operation.

E.9. The Contractor must furnish all necessary labor and appliances to demonstrate and test as specified the various items installed and must meet all expenses therefor.

E.10. Defective work or equipment, etc., which does not meet specification and test requirements shall be immediately corrected or replaced to the satisfaction of the Contracting Officer, or the right is reserved to have the defects remedied or changes made and the cost thereof charged to the Contractor, or deducted from his account.

E.11. Installation of Equipment.--All equipment, fixtures, appliances, etc., must be installed and connected in accordance with the best engineering practice. Unless otherwise shown on the drawings or specified, manufacturer's instructions and recommendations are to be followed and all auxiliary accessories, piping valves, etc., and electrical connections and controls, etc., must be furnished and installed complete.

E.12. Setting of Fixtures.--Connection between soil pipe and water closet shall be made with a heavy cast iron floor flange. Floor flange shall slip over the pipe and be calked in position. Connection between fixture and soil pipe shall be made gas-tight and water-tight with an approved asbestos gasket or with plumbing-fixture setting compound. No fixture shall be set in place until the Construction Engineer has examined and approved the setting of the flange.

E.13. Lavatories, sinks, and other wall hung fixtures shall be provided with solid substantial oak wood backing securely attached to the structural wall of the building for attaching fixture hanger or bracket. It shall be the responsibility of this Contractor to see that backing is installed, inspected and approved, before the wall is enclosed.

E.14. Sewer Connections.--Before any sewer work is done, the existing sewer shall be uncovered at the point where connection is to be made and the elevation obtained by the Contractor. Should the actual elevation be at variance with the connection requirements as specified or indicated on the drawings, the matter shall be referred to the Construction Engineer for decision.

E.15. Sanitary drain lines from a point 5 feet beyond the building line shall be vitreous clay pipe in accordance with Federal Specification SS-P-361a. Pipe shall be bell and spigot type, salt glazed of standard strength. Standard fittings shall be used for changes in direction.

E.16. Joints in vitreous clay pipe shall be made with cement mortar mixed in the proportion of one part Portland Cement and two parts clean sharp sand. Packing material shall be twisted jute, tarred, Federal Specification HH-P-117, Type II. Clay pipe will not be tested but joints must not be concealed until inspected and approved by the Construction Engineer.

E.17. Excavation and backfill of trenches shall be done as required for installation of the piping. Trenches shall be of sufficient width for properly making joints in piping and bottom of trench shall have a uniform grade. Excavate for bells so that barrel of pipe will have a solid bearing for the full length of the pipe section. Refill cuts below grade, if made unavoidably, with compacted sand and gravel to the required uniform grade.

E.18. After joints in piping have been inspected and approved, backfill the trench with clean fine material tamped to a depth of 6 inches over the pipe before general backfill tamped in 2' layers is made.

E.19. Trenches across roadways or paving shall be neatly cut out and new surfacing replaced to correspond with the original surface. Backfill under roadways or paving shall be compacted in layers of not more than 6 inches. Any settlement within the guarantee period after laying of finish surface shall be corrected as directed by the Construction Engineer.

E.20. Clearouts in outside sewer and drain lines where indicated on the drawings shall be brought up to grade with cast iron soil pipe as hereinafter specified and finished with a 4" heavy brass plug in a cast iron ferrule calked into the end of the soil pipe. Provide a 12"x12"x8" deep concrete block around the clean out, top of block to be 2 inches above finished grade.

E.21. Water Service.--Water service for street connection to inside the building shall be commercial standard weight galvanized steel pipe of the size indicated on the drawings. The street connections shall be made with flexible offset joints to provide for settlement and expansion. Connection to steel water mains shall be made with fittings installed in the line, and to cast iron mains by tapping. Either or both types of connections shall be provided with corporation cock at the take-off connection.

E.22. Building Service.--Water service shall be extended to inside the building where indicated on the drawings and provided with a brass gate valve with 3/4" hose valve above the gate valve. Building service shall be extended as hereinafter specified.

E.23. Soil, Waste, Drain and Vent Piping.--Piping below ground floor or below ground to a point 5 feet beyond building line shall be extra heavy cast iron soil pipe in accordance with Federal Specification WW-P-401(3), Class "A". All fittings, including clean-outs outside of building shall be of similar weight and type. Waste and vent piping above floor shall be standard weight galvanized steel pipe, except where acid-resisting sinks are indicated on the drawings. Wastes from acid-resisting sinks shall be of heavy lead pipe and all waste piping below the sink connection shall be extra heavy cast iron.

E.24. Waste pipes from fixtures shall generally be of chromium plated brass pipe or may be 17 gage C.P. brass tubing unless otherwise specified.

E.25. Floor drains shall have grate 10" in diameter with 3" outlet and "P" trap. Drain shall be of extra heavy construction similar to Josam No. 533-A.

E.26. Water piping inside the buildings shall generally be standard weight galvanized steel pipe of the size specified or indicated on drawings or may be Type "K" copper tubing one pipe size smaller than required for steel pipe. Fixture connections shall be as hereinafter specified.

E.27. Water supply piping to plumbing fixtures and equipment shall be of the following sizes:

<u>Fixture</u>	<u>Pipe Size</u>
Laboratory	1/2"
Sinks	3/4"
Shower	3/4"
Water Closet	1-1/4"
Water Heater	3/4"
Hose Faucets	3/4"

Branches supplying two or more fixtures shall have an inside area of the combined supplies.

E.28. Valves shall be provided in the cold and hot water lines to control individual fixtures and pieces of equipment, unless valves are provided with or built-in the units. Line valves generally shall be gate valves provided in accordance with Federal Specification WW-V-54. Where globe valves are required they shall be in accordance with Federal Specification WW-V-51a. Check valves shall be similar to globe valve requirements unless swing or ball type is specified. Provide gate valves at all new branch connections to existing lines and at main branches on new lines.

E.29. Pipe Covering.-- All cold and hot water piping shall be insulated with non-conducting covering as hereinafter specified. Cold and hot water piping shall be covered with one of the following materials:

a. First-class sectional removable, solid or crepe type wool felt covering not less than 3/4" thick, lined with a fire retardent and water-proofed material, Federal Specification HH-J-567.

b. First-class sectional removable, mineral wool moulded pipe insulation, Federal Specification HH-P-387, Type I, Class "A".

E.30. All fittings and valves on the cold water lines shall be wrapped with hair felt and coated with insulating cement with a smooth hard finish. On hot water lines cover with insulating cement only, not less than two coats with a smooth hard finish. Covering must be neatly fitted at joints and pipe hangers.

E.31. Sectional pipe covering shall have cotton jackets weighing not less than 3-1/2 ounces per square yard. Provide brass lacquered or black japanned steel bands not less than 3/4" wide, and not less than 0.005" thick. Bands shall be spaced not more than 18" apart, and at each side of each fitting.

E.32. Piping, Ducts, and Hangers, etc.--All piping and ducts shall generally be run parallel with the lines of the building unless otherwise indicated on the drawings. Except as otherwise specified, pipe hangers must be spaced not more than 10 feet apart, and those on different service lines running parallel with each other and near together must be in line with each other. Exact locations of piping and ducts, etc., shall be coordinated between

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fixtures, piping, ducts., etc. The plans are generally diagrammatic and the Contractor must harmonize the work of the different trades so that interferences between piping, ducts, equipment, etc., and architectural and structural work will be avoided. In case interference develops, the Construction Engineer shall decide which equipment shall be relocated regardless of which was first installed.

E.33. All necessary offsets in piping and ducts and all fittings required to properly install the work must be furnished complete in place. No unions in piping shall be placed in a location which will be inaccessible after completion of the work unless so shown on drawings or specified. Unions must be installed on each side of all special valves, regulators, traps, etc., and all pieces of equipment. Provide access panels not smaller than 12'x16' for access to concealed valves, unions, traps, cleanouts, dampers, etc.

E.34. Provide all necessary pipe hangers and supports, pipe sleeve through floors and walls, and chrome plated wall and ceiling plates. Chain or wire shall not be used for pipe hangers.

E.35. Painting.--All piping, hangers, and unfinished equipment, etc., except chrome plated, exposed in rooms shall be painted to match existing finish of room.

E.36. Testing.--All piping shall be tested drop-tight to the satisfaction of the Construction Engineer. All equipment and fixtures shall be operated to prove workability to the satisfaction of the Construction Engineer.

E.37. Guaranties.--All work under the Mechanical Section of this specification shall be guaranteed for one (1) year from date of final settlement under this contract as required under the articles of the General Sections.

E.38. Instruction of Government Employees.--Competent instructors shall be provided to train employees of the Government, who will have charge of the apparatus and equipment, in the operation, adjustment and care of the units installed. The instruction period shall be available during the regular working hours for a period of five (5) days after completion and acceptance of the work under this contract.

E.39. Motors, generally shall have sufficient capacity to start and operate the machine it drives without exceeding the motor rating at any speed specified or which may be obtained by the drive actually furnished. Motors shall be suitable for across the line starting, and for belt drives shall have adjustable sheaves and bases.

E.40. Motors shall be designed in accordance with Federal Specifications CC-M-641 or CC-M-636. Single-phase motors shall be of the open, capacitor type, except small fraction horsepower motor of less than 1/8 H.P.

E.41. Motor starters, generally shall be provided with each piece of motor driven equipment. Starters shall provide thermal overload protection unless such a device is built into the motor. A suitable reset device shall be provided. Starters shall be general purpose type mounted in steel cases with hinged doors. Provide magnetic type starters for all equipment requiring automatic controls, except for small fractional horsepower motors of not over 1/4 H.P. Provide three (3) position hand-off automatic transfer switches mounted on starter case for all magnetic starters. Transfer switch shall not supercede any safety device or any interlock. Starters and other electrical equipment shall be selected in accordance with the requirements of the National Electric Code.

E.42. Disconnect switches and final terminal connections to motors and mechanical equipment, etc., is specified to be done under the electrical work, except low voltage wiring for controls, etc.

E.43. Belt drives, generally shall be V-belt type of endless reinforced cord or rubber construction, and multiple drives shall have matched belts. Belt drives shall have a manufacturer's rating of not less than 1.4 times the name plate rating of the motor. Belt drives shall be selected in accordance with the manufacturer's recommendations.

E.44. Adjustable sheaves where specified shall be selected so that the required r.p.m. will be obtained with the sheave set approximately in mid-position, with an allowance for not less than 15 per cent adjustment above and below the mid-position.

E.45. Belt guards shall be provided for all open drives. Guards shall be constructed of 3/4" diamond mesh wire screen on angle iron frame, or may be of sheet metal if provided with the equipment. Guards shall be rigidly secured to prevent vibration and shall be provided with opening for oiling and speed counters.

E.46. Foundations shall be provided for all equipment. Foundations, generally shall be built-up from the structural floor slab and shall be made of Class "A" concrete. Top of foundation shall be from 2" to 4" above the finished floor.

E.47. Insulation units shall be provided for moving machinery and shall be factory made types selected in accordance with the manufacturer's recommendations. Units for installations with floor slabs on ground shall absorb not less than 60 per cent of the machine vibration. All other installations shall be selected on a basis of absorbing 85% of the vibrations. Base for motor must be integral with base for driven equipment.

E.48. All mechanical work indicated on the drawings, not specifically omitted, shall be done as indicated thereon.

SECTION F
GENERAL REQUIREMENTS FOR ELECTRICAL WORK

F.1. General requirements shall apply to all electrical work where applicable.

F.2. Quality.--All fixtures, devices, material, etc., shall be in accordance with specification requirements in each case and of best quality and grade and new.

F.3. Approval of Materials, etc.--Within 30 days after receipt of notice to proceed, the Contractor shall furnish to the Contracting Officer for prior approval, a complete list in triplicate of the items which he proposes to use under this contract, giving manufacturer's name, trade name, catalog number, type, style, etc., and technical description. This list shall include, but is not necessarily limited to, the following items

- Circuit-Breakers
- Circuit-Breaker Panels
- Lighting Fixtures
- Power Receptacles
- Magnetic Contactor
- Outdoor Weatherproof Disconnect Switches
- Sprinkler Alarm Panel
- Fire Gongs
- Transformers
- Secondary Conductors and Connectors for Transformer bank.

All equipment and material submitted for approval shall have been in successful commercial use and operation for at least one (1) year.

F.4. Inspection and Tests.--All fixtures, devices, wiring, conduit, etc., installed under this specification shall be operated by the Contractor in the presence of a representative of the Contracting Officer to demonstrate its proper operation. Contractor shall furnish all labor, equipment, material, etc., to demonstrate and test as specified above.

F.5. Defects.--Work, material and equipment not meeting contract requirements shall be corrected or replaced immediately to the satisfaction of the Contracting Officer. Should the Contractor fail in this regard, the Contracting Officer shall cause such corrections to be made and shall charge the cost thereof to the Contractor or deduct it from his account.

F.6. Workmanship.--All requirements of this contract shall be fulfilled in accordance with the best engineering practices. The following established standards (insofar as they apply) shall apply the same as if they were fully written herein:

The Standard Rules of the American Institute of Electrical Engineers; and the rules and regulations of The National Board of Fire Underwriters (National Electrical Code), the National Electrical Manufacturer's Association; The Insulated Power Cable Engineers Association; The National Bureau of Standards, and The National Electrical Safety Code.

The foregoing rules and regulations shall be followed by the Contractor as minimum requirements. They shall not relieve the Contractor from finishing and installing higher grades of materials and workmanship which are herein specified.

F.7. Conduit.--Rigid conduit shall be zinc-coated steel, Federal Specification WW-C-581a; using fittings, Federal Specification W-F-406, Electrical metallic tubing shall be in accordance with Federal Specification WW-T-806a. So far as practicable, all conduits shall be run without traps. Where dips are unavoidable, a suitable box or fitting shall be placed at each low point, to provide means of escape for any moisture which may tend to collect in the conduit. Conduits shall be continuous from outlet to outlet, junction box, etc., and shall enter and be secured in such a manner as to be electrically continuous from point of service to all outlets. Terminals of all conduits shall be furnished with locknuts and bushings.

F.8. Armored Cable.--Type AC or ACT flexible armored cable may be used in dry locations except where rigid steel conduit or electrical metallic tubing is specifically called for. Also permitted for mechanical equipment connections in lieu of flexible conduit. Armored shall have a grounding bond, connected at both ends of each run.

F.9. Outlet Boxes.--(a) Outlet boxes shall be in accordance with Federal Specification W-0-821a or W-0-806. Boxes for ceiling and interior bracket lighting fixtures (except drop cords) shall have 3/8 inch malleable iron fixture studs. Studs shall be in center of boxes and shall be secured by not less than three (3) stove bolts, or other construction equivalent in strength. Nuts shall be drawn up tight and threads upset. Boxes shall have only the holes necessary to accommodate the conduits at point of installation and shall have lugs or ears inside same to secure covers, etc.

(b) Outlet boxes for switches and duplex convenience outlets shall be one-piece standard gang boxes 4x4x1-1/2 inches deep for one (1) device; 6-7/8x4x1-1/2 inches deep for two (2) devices.

(c) Outlet boxes for power receptacles shall be the cast type, with threaded conduit entrance, usually furnished by the receptacle manufacturer for use with the receptacle.

(d) Outlet boxes for switches and power receptacles shall be 48 inches above finished floor. Outlet boxes for duplex convenience outlets shall be 18 inches above finished floor. Clock outlets shall be 8 feet 6 inches above floor.

F.10. Weatherproof Entrance Fittings.--Weatherproof entrance fittings shall be in accordance with Federal Specification W-F-406.

F.11. Switches.--Switches, generally shall be 10-ampere, 125-volts, flush tumbler type, in accordance with Federal Specification W-S-896 and shall have the T-rating of the National Board of Fire Underwriters.

F.12. Plug Receptacles.--Unless otherwise specified, these shall be flush-type, 10-ampere, 250-volt, Federal Specification W-R-151a, Type II, duplex, Style No. 112 or 113, T-slot.

F.13. Disconnect Switches.--Safety type disconnect switches shall be Type D, slow-make, quick-break, 230-volt of suitable rating and number of poles. They shall be non-fusible unless the Contractor should elect to incorporate equipment overload protection in the disconnect switch, or unless the contract plans and specifications should specify fusing for any given application.

F.14. Connections to Equipment.--Electrical Contractor shall furnish all disconnect switches for mechanical equipment, except when furnished with such equipment, and shall furnish and install all wiring and connect from above switches to terminal boxes or points of service connection provided on the equipment. Interior wiring of equipment and low-voltage control wiring are not covered by this contract but the electrical Contractor shall, where necessary, furnish and install all necessary wiring and connections to blower and fan motors and separately enclosed control units operating at service voltage. Such control units shall be construed to include stack safety and temperature control switches, magnetic switches and similar items operating at service voltage, which are mounted separately or on the exterior of mechanical equipment and normally would not be connected by the manufacturer or his authorized representative.

F.15. Conductors.--Except lighting fixture wiring, all conductors shall be RH-RW insulated copper unless otherwise specified. Approved wire nuts may be used, in lieu of soldering, on taps or splices in solid conductors, No. 10 or smaller. All other taps or splices and all terminations shall be effected by approved solderless pressure wire connectors, Federal Specification W- C-601a. Unless properly insulated by the connector, all joints shall be taped with rubber and friction tape in a manner which shall make their insulation equal to the insulation of the conductors. Fixtures shall be wired with Type AF rubber-insulated conductors.

F.16. Fuses.--Fuses shall be of the time-delay type similar and equal to Buss "Fusetron". Cartridge fuses shall conform to Federal Specification W-F-791a and plug fuses to Federal Specification W-F-831.

ITEM 1

CONCRETE PAVING
(East Side)

1.1. SCOPE.--The work covered by this item of the specifications includes all labor, materials, equipment and services required or necessary to furnish and place concrete paving, walls and catch basin in areas listed below, in accordance with the applicable drawings and this item of the specifications, subject to the terms and conditions of the contract.

1.2. GENERAL.--The work in general includes the following:

(a) 13'-0" width of paving and approximately 558 feet long and catch basin as indicated on Drawings No. 1 and No. 4.

(b) 65'-0" width of paving and approximately 242 feet long with low walls and footings around proposed vehicle shed as indicated on Drawings No. 1 and No. 3.

(c) Storage Area paving, approximately 99'-0" wide and 242'-0" long as shown and detailed on Drawings No. 1 and No. 4.

(d) 14'-0" width paving, 152'-0" long in front of loading dock as shown on Drawing No. 1.

(e) 30'-0" width paving, 20'-0" long at end of ramp as shown on Drawing No. 1.

1.3. EXCAVATION.--Material in place shall be removed as necessary for the performance of the work. Excess material can be disposed of within 1/4 mile of site. Sufficient working space shall be provided to permit the placing, inspection and completion of all contract work below grade. Banks, slopes and adjacent structures, piping, etc., if any, shall be fully protected against damage and hand excavation may be required, if necessary. The excavations shall be kept free from surplus water while concrete, masonry, piping, etc., are being placed and until the backfilling is done.

1.4. CONCRETE AND CEMENT WORK.--(a) Cement shall be a standard commercial brand of Portland cement. Only fresh cement shall be used; it shall be delivered in original containers and stored in a dry place until used.

(b) Sand shall be well graded, free from organic matter, shall pass a No. 4 sieve, and at least 10 per cent shall be retained on a No. 12 sieve.

(c) Aggregate shall be clean hard gravel or broken stone that will pass a 3/4 inch sieve and be retained on a 1/4 inch sieve.

(d) Concrete shall be composed of one part Portland cement, 2-1/2 parts sand and 3-1/2 parts aggregate. Proportions are equal parts by volume. One sack of Portland cement (94 pounds net) shall be considered equal to one cubic foot. All concrete shall be of a compressive design strength of 2500 pounds per square inch based on 28 days test.

(e) Water shall be fresh, clean and free from alkali.

(f) Materials for each batch shall be accurately measured and thoroughly mixed, using as little water as practicable, to form a concrete of plastic consistency which can be readily worked into place. Concrete may be transit-mixed.

1.5. SUB-GRADE.--(a) The sub-grade for driveway, walks, curbs, etc., shall be accurately shaped to the required depth and parallel to the finished grades. Soft or spongy places in the sub-grade shall be refilled and tamped to a satisfactory compactness.

(b) The entire sub-grade shall be compacted to the required grade by rolling. Sub-grade shall be satisfactory to the Contracting Officer before placing concrete.

1.6. METAL REINFORCEMENTS.--Metal fabric shall be of steel wire, and may be zinc-coated of size 6"x6" by #6x#6. Metal shall be clean and free from scale or flake rust or any coating, except zinc. Metal shall be kept clean until used, or shall be cleaned with wire brushes before placing. Reinforcement shall be accurately placed and securely fastened and supported to prevent displacement before or during the pouring of the concrete.

1.7. FORMS.--(a) Forms shall be tight and rigid to sustain the concrete without leakage or distortion and shall be clean inside when the concrete is poured. Forms shall be left in place until the concrete is safely self-supporting and shall be removed without damage to the concrete.

(b) Forms shall be properly wetted down and inspected by the Contracting Officer for strength and condition prior to receiving concrete pour.

(c) Forms for concrete exposed as a finished surface shall have smooth faces with tight, flush joints and shall be accurately shaped and set to the required lines and levels.

1.8. PROTECTION FROM COLD.--No concrete work shall be done in freezing weather unless suitable means are used to heat the materials before placing and to protect the concrete after placing, so that no damage from frost or freezing shall occur. Protection after placing shall include the use of temporary heat and covering, if necessary. No anti-freeze ingredient shall be used without prior approval of the Contracting Officer.

1.9. PLACING CONCRETE.--Concrete shall be so handled as to maintain its consistency and not permit the ingredients to separate. It shall be placed immediately after mixing, and shall be so rodded, tamped, vibrated, or worked into place that no voids or segregation of the aggregate shall show when the forms are removed. Cold joints or sets between pours other than at expansion joints shall be avoided.

1.10. FINISHING.--(a) Concrete shall be finished to true, even lines and surfaces and left free from defects. Joints and edges shall be straight and true and finished with a jointing and edging tool, respectively. Concrete that is poured in place shall be finished the same day.

(b) The cement finish at grade lines shall extend 2 inches below grade. Horizontal surfaces shall be floated or screeded to the grades indicated.

(c) Finish shall be produced without a separate topping or finish coat. After the concrete has been struck off to true, level surfaces at the proper elevations and as soon as any excess water has disappeared from the surface, the concrete shall be thoroughly floated and then finished with a rough surface, similar to adjacent work. The work shall proceed without interruption so that all concrete will be finished the same day that it is poured.

(d) Concrete shall be of the thickness 6" minimum and shape indicated and shall have a uniformly smooth floated finish.

(e) Imperfections showing in exposed surfaces of concrete shall be corrected to the satisfaction of the Contracting Officer.

1.11. CURING.--All concrete shall be protected against rapid drying; concrete work shall be covered with clean burlap or tarpaulins and kept wet not less than 6 days by placing straw on top of burlap or tarpaulins and sprinkling with clean water at such intervals that will insure keeping the concrete surface constantly moist or other approved methods of curing, acceptable to the Contracting Officer. The covering shall be placed as soon as possible, without marring the surface, in no case more than 3 hours after finishing.

1.12. JOINT FILLER.--Specially prepared premoulded strips of rubber, cork, waterproof elastic fiber or bituminous compound that will not flow or crumble at extremes of outside temperature shall be used in all expansion joints. The strips shall be so formed that they will not pull out or work loose. When the strips are placed, the top edges shall be 3/8 inch below the finished surface of the concrete. The 3/8" expansion joints shall extend through the concrete and be not over 20'-0" in either direction and between new paving and abutting existing paving or structures.

1.13. CATCH BASIN.--The concrete catch basin detailed on Drawing No. 4 shall be constructed as shown on drawing and to the grades as indicated on Drawing No. 1. A cast iron grating and frame shall be furnished and installed in the top of said catch basin. The grating and frame shall be similar to that noted in the Catalog of "Contractor's Foundry," Oaks, Pennsylvania, Patent 976, for a 30" grating and 48" long or its equal.

VEHICLE SHED

2.1. SCOPE.--The work covered by this item of the specifications includes all labor and materials, equipment and services required or necessary to furnish and erect a prefabricated industrial-type steel building 35'-0" wide and 158'-0" long, with alternate items increasing this length by Alternate "A" - 48'-0" and Alternate "B" - 84'-0". This work to be done in accordance with the applicable drawings and this item of the specifications, subject to the terms and conditions of the contract.

2.2. GENERAL.--The work in general includes the following:

(a) Submit to Contracting Officer for approval shop and erection drawings showing the complete design indicating the proposed materials with their sizes and gages.

(b) All structural steel framing.

(c) All metal panels for side and rear walls, and roof construction.

(d) All roofing and flashing materials.

(e) All bolts, nuts, washers, clips, anchors, etc., and other items of rough hardware required or necessary to completely assemble the building.

(f) All painting of building.

(g) Concrete floor, walls and foundations included under Item No. 1.

2.3. MATERIALS AND ERECTION.--(a) General.--All materials shall be new, of standard manufacture and of standard commercial grade, free from defects and imperfections and shall be in accordance with these specifications and approved shop drawings.

(b) Steel Frame.--Prefabricated structural steel frame composed of its various components including an adequate system of roof and lateral bracing shall be made up of standard size structural steel to fit the requirements of the Armco Drainage and Metal Products, Inc., Middleton, Ohio; Butler Manufacturing Co., Kansas City, Missouri, or other approved manufacturers of a steel building. Bottom angles of frame shall be anchored to the concrete wall with approved size and spacing of bolts. Sidewalls and roof shall be of prefabricated materials of the same company listed above and shall be not less than 24 gage, galvanized steel.

(c) Design.--The structural steel design including the columns, roof trussing, lateral bracing and roof bracing shall be submitted to the Contracting Officer for approval before fabrication or shipment.

(d) The structural design including windows and doors shall conform to wind loading of 20 pounds per square foot on vertical projected areas.

2.4. PAINTING.--All structural members and exterior walls and roof, which are not galvanized shall be painted. All work to receive three (3) coats of paint, one coat being the prime coat. All metal work may have the prime coat applied before erection. Where the surfaces of two structural members abut or are placed against one another, such surfaces in contact shall receive one coat of Red Lead or equivalent in addition to the prime coat. Field rivets or bolts shall be Red Leaded or equal before the finish coat is applied. Exterior paint shall be used on the inside face of walls and roof as well as on the exterior. Exterior paint to be oil based Federal Specification TT-P-40, Type 1, Class C.

2.5. DRAWINGS.--This vehicle shed is located and detailed on Drawings No. 1 and 3.

CONCRETE TRUCK DOCK, RAMP AND CANOPY

3.1. SCOPE.--The work covered by this item of the specifications includes all labor and materials, equipment and services required or necessary to furnish and erect a concrete truck loading dock, concrete ramp and a metal and wood canopy over the dock with drainage, in accordance with the applicable Drawings No. 1 and 3 and this item of the specifications, subject to the terms and conditions of the contract.

3.2. GENERAL.--The work in general includes the following:

(a) All concrete work including floors, walls and footings for the dock and the ramp.

(b) Submit to the Contracting Officer for approval complete design, shop and erection drawings for the structural steel work.

(c) All structural steel framing for canopy.

(d) All metal roofing, wood rafters, flashing, guttering and downspouts on the canopy.

(e) Extension of two existing roof downspout drains through the new loading dock.

(f) Painting of structure.

(g) All material shall be new, of standard manufacture and of standard commercial grade, free from defects and imperfections and shall be in accordance with these specifications and approved shop drawings by the Contracting Officer.

3.3. EXCAVATION AND EARTHFILL.--Material in place shall be removed as necessary for the performance of the work. Excess material can be disposed of within 1/4 mile of site. Sufficient working space shall be provided to permit the placing, inspection and completion of all contract work below grade. Banks, slopes and adjacent structures shall be fully protected against damage, and hand excavation may be required if necessary. The excavations shall be kept free from surplus water while concrete, piping, etc., are being placed and until the backfilling is done. Earth fill under the 8" floor slab of the dock and ramp shall be thoroughly tamped and settled into place to the satisfaction of the Contracting Officer before concrete is placed upon it.

3.4. CONCRETE WORK.--Cement shall be a standard commercial brand of Portland cement. Only fresh cement shall be used; it shall be delivered in original containers and stored in a dry place until used.

(a) Sand shall be well graded, free from organic matter, shall pass a No. 4 sieve, and at least 10 per cent shall be retained on a No. 12 sieve.

(b) Aggregate shall be clean hard gravel or broken stone that will pass a 3/4 inch sieve and be retained on a 1/4 inch sieve.

(c) Concrete shall be composed of one part Portland cement, 2-1/2 parts sand, 3-1/2 parts aggregate. Proportions are equal parts by volume. One sack of Portland cement (94 pounds net) shall be considered equal to one cubic foot. All concrete shall be of a compressive design strength of 2500 pounds per square inch based on 28 days test.

(d) Water shall be fresh, clean and free from alkali.

(e) Materials for each batch shall be accurately measured and thoroughly mixed, using as little water as practicable to form a concrete of plastic consistency which can be readily worked into place. Concrete may be transit-mixed.

3.5. METAL REINFORCEMENTS.--Metal fabric shall be of steel wire, and may be zinc-coated, of size 6"x6" by #6x#6. Reinforcing bars shall be of steel and of stock deformed shapes. Metal shall be clean and free from scale or flake rust or any coating, except zinc. Metal shall be kept clean until used, or shall be cleaned with wire brushes before placing. Reinforcement shall be accurately placed and securely fastened and supported to prevent displacement before or during the pouring of the concrete.

3.6. FORMS.--(a) Forms shall be tight and rigid to sustain the concrete without leakage or distortion and shall be clean inside when the concrete is poured. Forms shall be left in place until the concrete is safely self-supporting and shall be removed without damage to the concrete.

(b) Forms shall be properly wetted down and inspected by the Contracting Officer for strength and condition prior to receiving concrete pour.

(c) Forms for concrete exposed as a finished surface shall have smooth faces with tight, flush joints and shall be accurately shaped and set to the required lines and levels.

3.7. PROTECTION FROM COLD.--No concrete work shall be done in freezing weather unless suitable means are used to heat the materials before placing and to protect the concrete after placing, so that no damage from frost or freezing shall occur. Protection after placing shall include the use of temporary heat and covering, if necessary. No anti-freeze ingredient shall be used without prior approval of the Contracting Officer.

3.8. PLACING CONCRETE.--Concrete shall be so handled as to maintain its consistency and not permit the ingredients to separate. It shall be placed immediately after mixing, and shall be so rodded, vibrated, tamped or worked into place that no voids or segregation of the aggregate shall show when the forms are removed. Cold joints or sets between pours other than at expansion joints shall be avoided.

3.9. FINISHING.--Concrete shall be finished to true, even lines and surfaces and left free from defects. Joints and edges shall be straight and true and finished with a jointing tool and edging tool, respectively. Concrete that is poured in place shall be finished the same day.

(a) The cement finish at grade lines shall extend 2 inches below grade. Horizontal surfaces shall be floated or screeded to the grades indicated.

(b) Finish shall be produced without a separate topping or finish coat. After the concrete has been struck off to true, level surfaces at the proper elevations and as soon as any excess water has disappeared from the surface, the concrete shall be thoroughly floated and then finished with a rough surface, similar to adjacent work. The work shall proceed without interruption so that all concrete will be finished the same day that it is poured.

(c) Concrete shall be of the thickness and shape indicated and shall have a uniformly smooth floated finish.

(d) Imperfections showing in exposed surfaces of concrete shall be corrected to the satisfaction of the Contracting Officer.

(e) An approved integral hardner shall be placed on the surface of the dock floor and the ramp floor to prevent flaking and dusting of its surface.

3.10. CURING.--All concrete shall be protected against rapid drying; concrete work shall be covered with clean burlap or tarpaulins and kept wet not less than 6 days by placing straw on top of burlap or tarpaulins and sprinkling with clean water at such intervals that will insure keeping the concrete surface constantly moist or other approved methods of curing, acceptable to the Contracting Officer. The covering shall be placed as soon as possible, without marring the surface, in no case more than 3 hours after finishing.

3.11. JOINT FILLER.--Specially prepared premoulded strips of rubber, cork, waterproof elastic fiber or bituminous compound that will not flow or crumble at extremes of outside temperature shall be used in all expansion joints. The strips shall be so formed that they will not pull out or work loose. When the strips are placed, the top edges shall be 3/8 inch below the finished surface of the concrete. The 3/8" expansion joints shall extend through the concrete and be not over 20'-0" in either direction, and along the edge adjacent to the existing building.

3.12. STRUCTURAL STEEL.--The structural steel frame composed of its various components shall be made up of standard size structural members of sizes noted to fit the requirements in accordance with ALSC Standards and as shown on Drawing No. 3. All connections may be either bolted with 3/4" diameter machine bolts, riveted with 3/4" diameter rivets or welded. Connections to develop strength of members connected. A shop coat of red or blue lead shall be placed upon all steel before erection.

3.13. WOOD CONSTRUCTION.--All roof joists of canopy shall be No. 1 Douglas Fir in accordance with standard grading of the West Coast Lumberman's Association, and of the sizes and spacing noted on the drawings. The bumper shall be of seasoned straight grained red oak or gum. Other wood used may be structurally sound No. 2 Virginia pine. All wood work shall be placed in a workmanlike manner, structurally secure and according to the applicable drawings.

3.14. ROOFING, GUTTERING AND DOWNSPOUTS.--All roofing shall be not less than 20 gage corrugated, galvanized sheet metal. Twenty-four gage aluminum corrugated metal may be substituted in lieu of the galvanized sheet metal. All flashing and counter flashing shall be of the same material as the roofing or as specified on the drawings.

(a) The guttering and downspouts shall be 20 gage galvanized sheet metal or at option of Contractor, 24 gage aluminum. The lower section of downspouting shall be 6" extra heavy cast iron pipe as shown on the drawings. The size, shape, design and locations shall be as shown on the drawings. All guttering and downspouting shall be securely connected structurally to the structure. Provide expansion heads in gutters as noted on the drawings.

(b) Provide specified bolts, nuts, washers, etc., necessary to accomplish all work on the canopy as shown on the drawings.

3.15. MAIN ROOF DOWNSPOUTS.--There are two existing 8" I.D. cast iron pipe downspouts on the new location. Properly flash, counter-flash and calk on new canopy roof where these pipes pass through the new roof.

(a) Extend new pipe from the existing downspout pipes through the dock fill and through the face of the dock wall below the bumper. The new extension shall be the same size and material as the existing pipe. Securely and tightly calk all new jointings.

3.16. PAINTING.--(a) Concrete work shall not be painted.

(b) All structural steel shall have a shop coat of red or blue paint before erection. Two additional coats shall be applied after erection.

(c) No galvanized metal or aluminum shall be painted.

(d) All work not specified shall have three coats of paint. Under side of canopy shall be included in the painting, except sheet metal surfaces.

(e) All paint shall be exterior paint of an oil based type meeting the Federal Specification TP-P-40, Type 1, Class C.

INDUSTRIAL TYPE STEEL BUILDINGS
(TWO THUS)

4.1. SCOPE.--The work covered by this item of the specifications includes all labor and materials, equipment and services required or necessary to furnish and erect two (2) prefabricated industrial-type steel buildings 20' wide and 40'-0" long with utilities, in accordance with the applicable drawings and this item of the specifications, subject to the terms and conditions of the contract.

4.2. GENERAL.--The work in general includes the following:

- (a) Submit to the Contracting Officer for approval shop and erection drawings showing the complete design indicating the proposed materials with their sizes and gages.
- (b) All structural steel framing.
- (c) All metal panels for side walls, and roof construction.
- (d) All doors, frames, hardware, etc., complete for all door openings.
- (e) All roofing and flashing materials.
- (f) All bolts, nuts, washers, clips, etc., and other items of rough hardware required or necessary to completely assemble the building.
- (g) All steel framing, doors, ventilators, etc., shall be shop painted and sufficient paint shall be furnished to paint items requiring paint after erection, including such other items as are necessary or which may be required by reason of the work herein described and shown on the drawings.
- (h) All galvanized iron ventilators with damper controller pull chain.
- (i) Concrete floor included under Item No. 6.
- (j) All electrical work and fixtures.
- (k) Cinder block partition wall.
- (l) Painting.

4.3. MATERIALS AND ERECTION.--(a) General.--All material shall be new, of standard manufacture and of standard commercial grade, free from defects and imperfections and shall be in accordance with these specifications and approved shop drawings.

(b) Steel Frame.--Prefabricated structural steel frame composed of its various components shall be made up of standard size structural steel to fit the requirements of the Armco Drainage and Metal Products, Inc., Middleton, Ohio; Butler Manufacturing Co., Kansas City, Missouri; or other approved manufacturers for two (2) steel buildings 20'-0" x 40'-0". Bottom angles of frame shall be anchored to the concrete floor foundation with approved size and spacing of bolts. Structural design including doors shall conform to wind loading of 20 pounds per square foot on vertical projected areas.

(c) Walls.--Walls and roof shall be by the same manufacturer as listed above and not less than 24 gage, galvanized steel.

(d) Doors.--All doors shall be steel and of the sizes noted on the drawings, and shall be similar and equal to the two panel doors (top and bottom panels of steel) as shown in the Armco Products' Catalog. Frames shall be secured to the sill and head according to the manufacturer's specifications and as approved by the Contracting Officer. Complete hardware shall be provided by the manufacturer and approved by the Contracting Officer. Doors shall have mortise latch sets with cylinder locks.

(e) Louvers.--There shall be one louver of the fixed type at each end of the gable end panels of the building above the ceiling line. They are to have a welded back-up plate on each louver. Louvers are to be stock items as indicated in the Armco Products' Catalog.

(f) Ventilators.--There shall be provided two standard revolving type roof ventilators. They are to be adjustable, damper type with 14 inch throat diameter. They are to be located approximately 10'-0" from each gable end of the building near the ridge of the building.

(g) In one of these buildings (building to the North) provide one 8" cinder block wall as shown on the drawings. This partition wall shall bear upon the concrete slab and extend up to and against the roof steel sheathing, and shall extend from the front wall to the rear wall. Provide a door, a steel buck and one solid steel, two-panel door 3'-4" wide by 6'-8" high, Class A, Underwriter's Labeled, Door and Buck, as located on the drawings. Cinder blocks to be laid up in cement mortar with fully flushed and filled joints. All cracks and joints between masonry and steel around the periphery of the masonry and around the door frame to be calked with elastic mastic compound.

4.4. PAINTING.--All structural members, walls and roofing not galvanized shall be painted inside and outside. All work to receive three (3) coats of paint, one coat being the prime coat. All non-galvanized metal work may have prime coat applied before erection. Exterior paint to be oil based, Federal Specification TT-P-40, Type 1, Class C. Interior flat paint shall be egg-shell, Federal Specification TT-P-641. Cinder block wall not to be painted.

ELECTRICAL

4.5. GENERAL.--This work consists of providing lighting in the buildings marked Item 4.

(a) Fixtures.--150-watt incandescent industrial standard RLM reflectors, attached to porcelain lampholders mounted on standard outlet boxes.

(b) Wiring.--Electrical metallic tubing and BX cable. Use No. 12 conductors.

(c) Switching.--In each building, all fixtures shall be switched simultaneously from one enclosed circuit-breaker which shall be SP-SN, 25-ampere frame, 20-ampere trip, 120-volt, similar and equal to Westinghouse Type MO.

(d) Feeder.--This shall be 4-wire, 3-phase, to supply above lighting and provide for future expansion. Four No. 8 WPTB conductors, supported by bushing racks, shall run from the transformers to the first of the Item 4 buildings and shall connect to four No. 8 RH-RW conductors. These shall run in 1-inch conduit, inside the building, to a junction box adjacent to the circuit-breaker specified above. One phase shall be connected to the lighting circuit-breaker. From the junction box, the feeder shall be continued, using four No. 8 Type USE insulated conductors in a 1-1/2" galvanized rigid steel conduit, running underground at a depth of 24" to a junction box in the second Item 4 building. Junction box in that building also shall be located adjacent to the lighting circuit-breaker and one phase (other than the one used in the first building) shall be connected to the breaker. Ends of all unconnected conductors shall be suitably taped and the conductors neatly coiled in the junction boxes. Boxes shall be steel, 12x12x4" deep with screw-type covers.

STEEL INCINERATOR

5.1. SCOPE.--The work covered by this item of the specifications includes all labor and materials, equipment and services required or necessary to furnish and erect a steel incinerator 15'-0" x 15'-0", in accordance with the applicable drawings and this item of the specifications, subject to the terms and conditions of the contract.

5.2. GENERAL.--The work in general includes the following:

(a) Submit complete shop and erection drawings to the Contracting Officer for approval.

(b) All structural steel framing.

(c) All expanded metal grating for sides and roof.

(d) Two (2) doors and complete hardware.

(e) All bolts, nuts, washers, clips, etc., and other items of rough hardware required or necessary to completely assemble the building.

(f) Concrete piers.

(g) Painting.

5.3. MATERIALS AND ERECTION.--(a) General.--All material shall be new, of standard manufacture and of standard commercial grade, free from defects and imperfections and shall be in accordance with these specifications and approved shop drawings.

(b) Steel Frame.--The structural steel frame composed of its various component parts shall be made up of standard size structural steel of the sizes noted on the drawings. All joints are to be accurately cut to fit together and welded. All welds to be not less than 1/4 inch fillet welds continuous around each joint.

The structure shall be built in two (2) sections, the roof section and the lower section. Each section shall be completely welded together within itself. The two (2) sections shall be joined together by bolting with 3/4" diameter bolts not over 4'-4" o.c., through the flanges of each adjacent 5 inch beam.

(c) Expanded Metal Grating.--The entire exterior of both the lower and roof sections and doors shall be covered with expanded metal grating. This grating to be not less than 1/8 inch thick and with 1/4 inch metal divisions between. This metal shall extend to the edge at each of the corners, top and bottom.

The expanded metal shall be welded to the structural frame not more than 6" o.c. each way and on all edges 4" o.c. Welds to be spot welds not less than 1/4 inch fillet welds. Contractor at his option may furnish and install a woven wire grating in lieu of the expanded metal grating. Woven wire grating shall be equivalent in size, weight and openings to the specified expanded metal and shall be approved by the Contracting Officer.

(d) Doors.--Provide 2 doors 2'-2 $\frac{1}{2}$ " wide by 7'-1 $\frac{1}{2}$ " with 4"x4"x3/8"L frames and expanded metal grating covering. Each door shall have three (3) extra heavy fixed pin hinges welded to door and to the door frame with 1/4 inch fillet welds continuous around hinges. One door shall have a bolt through its top angle flange and into the 5" beam above. These bolts to be 3/4" diameter and easily removable and securable into a locked position. The other door to have an extra heavy hasp which, when the two doors are closed, will fit over an extra heavy eye on the other door. This is for locking purposes. Both the hasp and the eye shall be securely welded to the 4" angle frame of their respective door.

(e) Concrete Piers.--Provide 12 solid concrete piers 8"x8"x1'-6". Place one of these piers under and in line with each column above and tops to be approximately 6" above the earth grade. The tops of all these piers must be in alignment and level one with the other. The steel incinerator shall set squarely upon these piers.

5.4. PAINTING.--All metal work on this incinerator to be painted.

(a) All old scale, rust, oil surfaces and dirt be removed from surfaces before painting.

(b) Only one coat of paint is required to insure a film which is not too thick, as a thick coat would have a tendency to blister and peel off.

(c) Apply one coat of Pittsburgh Ironhide Heat Resisting Gray metal paint or its equal on all metal surfaces inside and outside according to the directions on the package after fabrication of structure. This paint shall be flame resistant and heat resistant.

ITEM 6

CONCRETE PAVING
(West Side)

6.1. SCOPE.--The work covered by this item of the specifications includes all labor, materials, equipment and services required or necessary to furnish and place concrete paving, wall and floors in areas listed below, in accordance with the applicable drawings and this item of the specifications subject to the terms and conditions of the contract.

6.2. GENERAL.--The work in general includes the following:

(a) Concrete paving as floor slabs under new buildings noted as Items No. 4 (two buildings) and Item No. 10.

(b) Concrete paving between existing driveway paving and each floor slab under Items No. 4 and 10.

(c) Concrete paving between existing driveway paving and the west fence line between the two buildings under Item 4, a width of 30 feet.

(d) Concrete paving from the existing driveway paving westward 26'-0" and between building noted as Items No. 4 and No. 10 a width of 50 feet.

(e) Concrete paving from the existing driveway paving westward 26'-0" and between building noted as Item No. 10 and front fence line.

(f) Concrete paving 15'-0" wide and 20'-0" long extending from the new incinerator eastward to the present fence location.

(g) Concrete walk (4" thick) 4'-0" wide, parallel and adjacent to building under Item 10 on its south side. See plan.

6.3. EXCAVATION.--Same as specified under Item 1, Paragraph 1.3.

6.4. CONCRETE AND CEMENT WORK.--Same as specified under Item 1, Paragraph 1.4.

6.5. SUB-GRADE.--Same as specified under Item 1, Paragraph 1.5.

6.6. METAL REINFORCEMENTS.--Same as specified under Item 1, Paragraph 1.6.

6.7. FORMS.--Same as specified under Item 1, Paragraph 1.7.

6.8. PROTECTION FROM COLD.--Same as specified under Item 1, Paragraph 1.8.

6.9. PLACING CONCRETE.--Same as specified under Item 1, Paragraph 1.9.

- 6.10. FINISHING.--Same as specified under Item 1, Paragraph 1.10.
- 6.11. CURING.--Same as specified under Item 1, Paragraph 1.11.
- 6.12. JOINT FILLER.--Same as specified under Item 1, Paragraph 1.12.
- 6.13. WALLS.--There shall be provided a 6" wide and 12" depth concrete wall (without reinforcement) continuous around the edge of the floor slabs under the buildings of Items No. 4 and 10. This wall shall be placed before the floor slab is placed over and on top.
- 6.14. DRAWINGS.--This is located on Drawing No. 1.

ASPHALT PAVING OF PARKING AREA

7.1. SCOPE.--The work covered by this item of the specifications includes all labor and materials, equipment and services required or necessary to furnish and place a 15'-0" wide by 700'-0" plus or minus long asphalt strip of paving, parallel and adjacent to the present concrete roadway on the south side of Building "B", in accordance with the applicable drawing of this item of the specifications, subject to the terms and conditions of the contract.

7.2. PREPARATION OF SUB-GRADE.--The sub-grade for pavement shall be graded and thoroughly compacted by rolling with a power roller to the required depth below and parallel to the finished grades of the pavement. Existing site is partly packed and shall be used as a base as is, except occasional soft or unstable places and low spots shall be consolidated by rolling in bank-run gravel conforming with either size 2 or 3. Any added gravel shall be spread in layers not over 4 inches thick and rolled in until the sub-grade is thoroughly consolidated and at the required grades.

FORMS -- Temporary side forms of steel or wood at the depth of the new pavement work shall be set accurately to grade and line and rigidly braced and staked. Forms shall be left in place until completion of the rolling operations, then removed and the space filled at once with gravel. Forms shall be cleaned each time they are used.

7.3. CLIMATIC CONDITIONS.--No work shall be done when the sub-grade or base course is wet or frozen, or when the air temperature is below freezing. No work involving the use of water or bituminous materials shall be done when the air temperature is below 40 degrees F.

7.4. PRIME COAT.--The prime coat shall be applied hot over the previously prepared base. The prime or seal coat shall be a bituminous material conforming to the Federal Specification R-T-143, Grade RT-2. The temperature at the time of application shall be between 60-125 degrees F. The bituminous material for the prime coat shall be applied in quantities of not less than 0.40 gallon per square yard of treated surface. The exact quantities may be varied to suit field conditions, subject to the approval of the Contracting Officer. Following the application of the prime material, the surfaces shall be allowed to dry for a period of not less than 48 hours without being disturbed, or for such additional period of time as may be necessary to attain penetration. The Contractor shall furnish and spread sufficient approved sand on all areas which show an excess of bituminous material to effectively blot up and cure the excess.

7.5. ASPHALTIC CONCRETE SURFACE.--(Hot Mix) This course shall be composed of coarse and fine aggregates and mineral filler, machine mixed with asphalt to a uniform consistency at a suitable mixing plant. The coarse and fine aggregates and mineral filler shall be so proportioned by weight

that, when blended, they will produce a mix of maximum density within the following limits of percentages, by weight:

Passing a 3/4 inch sieve	90 - 100 per cent.
Passing a 1/2 inch sieve	50 - 75 per cent.
Passing a No. 4 sieve	35 - 45 per cent.
Passing a No. 10 sieve	25 - 35 per cent.
Passing a No. 200 sieve	5 - 10 per cent.

(a) The proportions of asphalt to total aggregates and mineral filler shall be 5 to 8% by weight.

(b) The hot-laid mixtures shall be delivered to the work in tight vehicles and laid on cleaned surfaces. The temperature of the mix shall be between 225° F. and 325° F. and to be spread immediately to the proper cross section and rolled completed before the mix cools. When spread by hand, the mix shall be dumped outside the area on steel dumping boards and distributed into place with hot shovels and spread with hot rakes in a layer of uniform density and correct depth.

(c) The course shall be rolled with one or more power rollers weighing not less than 7 tons. Where inaccessible to the roller, it shall be compacted by thorough tamping.

(d) This course shall be a layer compacted to 2 inches. The aggregate to conform to the Federal Specification 33-C-731a and of graded sizes #6 and #7 with mineral filler. The bituminous material to be asphalt meeting the Federal Specification 55-A-706b, AT-6 or AP-6.

(e) The laying of the course shall be as nearly continuous as possible. The roller shall not pass over the unprotected end of the freshly laid mixture, except when the laying is discontinued for such length of time as to permit the cold mixture to "set" or the hot mixture to become chilled. Joints shall be formed by cutting back the edge of the previous run far enough to expose the full depth of the course. When laying is resumed, apply a prime coat (hot) of bitumen to the exposed edge, rake the fresh mixture against the joint, then tamp thoroughly and roll.

7.6. FINAL OR SEAL COAT.--This coat is a finishing coat applied as soon as practicable after completion of the asphaltic concrete surface. Bitumen of the same kind and type as used in the asphaltic concrete shall be applied over the entire surface at the rate of 1/4 to 1/3 gallon per square yard. This seal shall be immediately covered with small crushed gravel #7 Type, broomed on in sufficient quantity to cover the entire surface uniformly and to take up all excess of bitumen. The surface shall then be rolled until thoroughly bonded to the pavement. A second coat of the same type gravel shall then be broomed on and rerolled again.

(a) The earth shoulder around the new paving shall be well filled and compacted by rolling or tamping leaving the shoulder level with the new paving.

INSIDE STORAGE AREA INSTALLATIONS

8.1. SCOPE.--The work covered by this item of the specifications includes all labor and materials, equipment and services required or necessary to furnish and install the following work: lower and extend the sprinkler system and lights in two (2) areas and connect an air-conditioning unit, in accordance with the applicable drawings and this item of the specifications, subject to the terms and conditions of the contract.

8.2. GENERAL.--The work in general includes the following:

- a. In the Film Storage Vault, connect up electrically and mechanically a 2-ton air-conditioning unit. This unit will be furnished by the Government. A water supply line to the unit (Approximately 200'-3/4" copper pipe) and a waste line (approximately 60'-3/4" copper pipe) from the unit shall be provided in this contract.
- b. In the Film Storage Vault, four (4) fluorescent ceiling fixtures (furnished by the Government) and associated wall switch shall be installed and connected to the air-conditioner electric feeder. Location of fixtures as directed on the job.
- c. In the Film Storage Vault, the sprinkler supply line shall be extended down from the existing sprinkler system main above the new ceiling and ten (10) new sprinkler heads installed below the new furred ceiling.
- d. In the Depot Service Office, the electric lines shall be extended from above to below the new furred down ceiling and six (6) fluorescent fixtures (furnished by the Government) shall be connected with three (3) new wall switches. Location of fixtures and their switches as directed on the job.
- e. In the Depct Service Office, the sprinkler supply line shall be extended down from the existing sprinkler main above the new ceiling, and twelve (12) new sprinkler heads installed below the new furred ceiling.
- f. All material shall be new, unused, of recent manufacture and of the highest grade, free from defects and imperfections and shall be in accordance with these specifications.

PLUMBING WORK

8.3. SCOPE OF WORK.--This part of the specifications includes the extension of the existing sprinkler system to provide for the addition of a total of twenty-two (22) sprinkler heads in the areas indicated on the drawings.

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- 8.4. Detailed specifications for the work will be inserted later.

AIR-CONDITIONING

8.5. SCOPE OF WORK.--This part of the specifications includes the installation complete of a two-ton water cooled package type air-conditioning unit in the area indicated on the drawing. Water supply and drainage is to be provided for the unit. The unit will be provided by the Government.

- 8.6. Detailed specifications for the work will be inserted later.

ELECTRICAL (8A)

8.7. GENERAL.--This work consists of making electrical connections to an air-conditioner and providing fluorescent lighting, all to be for the Film Storage Room, indicated as Item 8A on Contract Drawings.

8.8. AIR-CONDITIONER.--Two-ton capacity - to be furnished by the Government.

8.9. LIGHTING FIXTURES.--Four (4) industrial type, 2-tube, 48-inch, fluorescent - to be furnished by the Government. Location of fixtures shall be as directed.

8.10. FEEDER.--As shown on Contract Drawings, this room and the adjacent medical supply room (Item 11) shall be supplied by the same feeder. This feeder is controlled by a 60-ampere safety switch mounted on the warehouse wall, as shown. Loads on this feeder shall be balanced as nearly as possible.

8.11. CIRCUITS.--The air-conditioner shall be supplied with 3-phase power from the load side of the 30-ampere safety switch which is shown on the drawing. Air-conditioner also shall have its own disconnect switch. Lighting fixtures shall be switched as a group from one (1) tumbler switch located outside the room adjacent to the 30-ampere safety switch. Power for lighting shall be obtained from one (1) phase on the load side of the disconnect switch. A pilot light for the lighting circuit shall be mounted over the doorway and shall consist of a 25-watt red lamp and porcelain keyless socket mounted on a 4-inch outlet box.

8.12. CONDUCTORS.--No. 12 AWG, RH-RW insulated.

8.13. CONDUIT.--Electrical metallic tubing may be used for all branch circuits. Feeder conduit shall be rigid steel. Use of BX armored cable shall not be permitted for Item 8A.

8.14. TUMBLER SWITCH FOR LIGHTS.--Shall be mercury type, 125-volts, 10-amperes, T-rated, double-pole, in suitable surface-mounted box.

ELECTRICAL (8B)

8.15. This work consists of removing the existing four fluorescent lighting fixtures from their present mounting and installing them plus two (2) more on a new ceiling which will be furnished by others. Fixtures shall be connected to the same feeders as at present and shall be switched in pairs by three (3) switches on the inside wall next to the entrance. BX armored cable, 2-wire, No. 12, may be used throughout.

ITEM 9

SHOP AREA

9.1. SCOPE.--This shop area has a portion of the work already accomplished. The intent of this section of the specifications is to complete these shops including all labor and materials, equipment and services required or necessary to furnish and install wall covering, floor covering, ceiling covering, electrical, heating and air conditioning, with utilities, in accordance with the applicable drawings and this section of the specifications, subject to the terms and conditions of the contract.

9.2. GENERAL.--The work in general includes the following:

- a. Install acoustical ceiling and walls on specified areas.
- b. Install ceramic tile on walls and floor of Room "A".
- c. Install asphalt tile floors in specified areas.
- d. Install plastered walls and ceilings on specified areas.
- e. Widen and install an additional door in opening "C" with hardware.
- f. Install an alberene stone sink, hot and cold water with acid-proof plumbing and hot water heater and tank.
- g. Install an air condition unit and system connected to the existing heating duct for winter use.
- h. Install additional electric power outlets.
- i. Extend power lines to this area and connect with appropriate switches, etc.
- j. Install additional electric power outlets in adjacent shop area.
- k. Remove existing work in way of new work and reinstallation of former work to create a complete job.
- l. The exterior concrete walls in Rooms "C" and "D" shall not have any wall treatment or wood finish, other than paint.
- m. All materials shall be new, of standard manufacture and of standard commercial grade, free from defects and imperfections and shall be in accordance with these specifications.

9.3. ASPHALT TILE.-- Asphalt floor tile and base shall be installed in rooms "B" and "C". Floor tile and base shall be laid when the room temperature is not less than 75° F. Tile and base to be laid in strict accordance with the manufacturer's recommendations.

a. Asphalt tile and base shall conform to the requirements of Federal Specification SS-T-306a. Thickness shall be 1/8 inch thick. Colors will be selected from marbled "B" color groups, exact color to be selected from submitted samples. The sizes of the tile shall be 9"x9" to lay the center pattern and a 9" border around. Base shall be sufficiently flexible to allow for slight irregularities in walls and partitions. One-piece internal and external corner sections shall be provided for all right angle corners. The color of the base shall match the border tile. Base shall be a butt-type cove 4 inches high.

b. A primer on the floors and behind the base shall be applied first. After primer has thoroughly dried the cement coat shall be applied and allowed to set up until the surface is tacky (30 minutes to 3 hours) before laying the tile. Tiles shall be tightly fitted and in alignment. The base shall be tight and in alignment top and bottom.

c. The tile and base shall be thoroughly cleaned of cement spots, dirt, etc., ready for waxing. After cleaning, the tile and base shall be protected by heavy paper and board walks.

d. At discontinuous edges of asphalt tile floors at doorways provide a stainless steel edging strip securely attached to the concrete floor.

9.4. CERAMIC TILE.-- Ceramic tile and base shall be installed on the entire floor and walls of Room "A". Tile and base shall be laid when the room temperature is not less than 40° F.

a. Ceramic tile and base on the walls shall be glazed interior tile, 6"x6"x3/8" thick and of a green color, shades to be selected later. Base to be a darker shade of green. Wall tile to be on all four walls of room from top of tile base to ceiling. Return the tile at the window (top, sides, bottom) into the concrete wall 1/2" back from the edge of the concrete opening. Tile to terminate against 1"x3" wood door casing with a bull-nosed return at top and sides of opening. Provide a sample of each shade of tile.

b. Ceramic tile on the floor shall be 9"x9"x1/2", unglazed quarry tile of same shade green as the wall tile except the 9" border around to be the same shade green as the base tile. Provide sample of both shades of color.

c. The concrete south wall shall be stripped with 2"x2" stripping 16" O.C. vertically. Stripping to be structurally secured to the wall by nails or bolts not over 3'-0" O.C. Method of attachment to be approved by the Contracting Officer. On this stripping and the studding of the three other walls apply metal 1/8" rib lath horizontally. This metal lath shall be grounded electrically.

d. Apply a heavy 1/4" thick scratch coat of Portland cement plaster (one part Portland cement, 3 parts sand, 1/5 part lime putty) to wall metal lath. While still plastic scratch and cross-scratch by scoring. Provide a 3/4" bed of mortar (same proportions as for wall scratch coat) over the existing concrete floor. A second or float coat of plaster shall be applied (one part cement, 3 1/2 parts sand and one part of hydrated lime) over the wall scratch coat. This float coat shall be brought flush with guide strips.

e. Apply tile to the wall float coat and floor sitting bed according to the recommended methods prescribed by the tile companies.

f. All walls and floors to be thoroughly cleaned in a manner not to affect the glazed surfaces. Approved protection shall be made for the tile walls and tile floor against damage after their installation.

9.5. ACOUSTICAL TILE.--Acoustical tile shall be installed on the entire outside face (west side) of walls No. 2, 5, and 6; all walls and ceilings of Room "B"; east side of walls No. 4 and 7, also over entire doors in Rooms No. A and B both sides.

a. All acoustical tile shall be as manufactured by the Johns-Manville Co. of New York, N. Y., or its equal in all respects. The tile shall conform to the Johns-Manville's Permacoustic with textured surface and of rock wool, non-combustible mineral fibers. Units shall be squared edges, 12"x12"x3/4" thick, factory painted white.

b. As a base for the acoustical tile, furnish and install 4'-0"x12'-0"x3/8" gypsum boards on all walls and ceiling of Room "B"; walls 4, 7 and 9 of Room "C", and all doors both sides. All joints shall be taped and then cemented over with gypsum plaster insuring a continuous even smooth surface.

c. Sece all acoustical tile to (1) new plaster work over metal lath on west side of walls No. 2, 5, and 6; and to new installed gypsum board called for in (b) above. Tile to be cemented to gypsum board with adhesive cement of a special waterproof adhesive product recommended by the manufacturer of the acoustical units.

9.6. PLASTER WORK.--Gypsum lath and 2 coats of plaster shall be installed in the following locations: ceilings in Rooms "A", "C", and "D"; wall 9 in Room "C"; and walls 6, 7, 8, 9, and 10 in Room "D", and over new expanded metal placed on existing walls No. 2, 5, and 6.

a. Gypsum lath, also known as gypsum plasterboard shall conform to the requirements of Federal Specifications SS-P-431, 3/8" thick, either solid sheets or perforated with 3/4" holes 4" on centers in each direction. Apply lath on all areas requiring plaster. Provide metal corner beads and corner grounds where necessary. Beads and grounds may be expansion or perforated not less than 26 gage galvanized steel, beads 3/16" and flanges 2 1/2" minimum width.

b. Plaster work shall consist of two coat work: (1) The base coat shall be applied with sufficient material pressure to form a good bond with the plasterboard, and to cover well, and then shall be doubled back to bring the plaster out to grounds, straightened to a true surface with rod and darby, and left rough, ready to receive the second or finish coat. Base course gypsum plaster shall be proportioned by weight to one part gypsum plaster to two parts sand. (2) A smooth white finish coat shall be applied. Finish coat to be proportioned by weight to one part dry hydrated lime to 1/2 part calcined gypsum. Finish coat to be smooth 1/16" to 1/8" thick and free from blemishes.

9.7. WOOD AND MILLWORK.—Provide 1"x3" square edged, butt jointed casing on both sides of all doors, on top of wall finishes except Room "A" where casing is placed against gypsum board and tile work bull nosed against the casing. Build out existing door jambs to fit the required widths of wall and its finishes. Casing to extend to the floor in all cases.

a. Provide a 1"x5" square edged base with a 3/4" quarter round shoe on all walls in Rooms "B", "C", and "D" except the concrete walls and northwest side of walls No. 2, 5, and 6.

b. Door opening "C" shall be widened from a single door (now in place) to a two (double) door opening, accommodating 2'-2 1/2" x 6'-8" x 1 3/4" doors. The east door of this pair shall have a 10" by 10" inspection port with 1/4" thick wire glass, located 5'-0" from the floor to bottom of glass and on center line of door. Furnish and install new doors hardware (cylinder locks), jambs, casing, and reframing of opening.

c. Existing door No. "A" shall have a 20" x 20" clear double strength glass window cut into it, 5'-0" from floor to bottom of glass and on the center line of the door.

d. Existing door No. "D" shall have a 10" x 10" - 1/4" thick wire glassed window cut into it, 5'-0" from floor to bottom of glass and on the center line of the door.

e. Furnish and install a 3'-0" x 3'-0" access door with jamb, casing and hardware into the space above Room "D" from the warehouse area side. Exact location to be determined in field. Door to be a solid two-thickness of 1" T & G material, one diagonal. Door to be hinged out with two butts hinges and an eye and 3" hasp galvanized for locking purposes.

9.8. PAINTING.-- All plastered walls and exposed concrete walls in rooms "C" and "D", ceilings of rooms "A", "C", and "D" shall be given two coats of paint. Color to be white. All woodwork to be painted 3 coats, color to be selected later of oil paint.

a. Primer paint shall conform to Federal Specification TT-P-56a.

b. Interior Flat Oil paint shall conform to Federal Specification TT-P-51b.

c. Cement-water paint (for use on concrete walls) shall conform to Federal Specification TT-P-21 Type I, Class A.

d. Concrete walls shall receive two coats of cement-water paint. Plastered walls and ceiling shall receive one coat of Primer oil paint and one coat of Interior flat oil paint. All woodwork shall receive one coat of Primer oil paint and two coats of Interior flat oil paint. All woodwork shall be thoroughly sanded and smooth before application of paint.

9.9. EXPANDED METAL.--The entire northwest face of walls #2, #5, and #6 from floor to ceiling shall be covered with expanded metal. Expanded metal shall be placed continuously and securely against the existing wallboard. The expanded metal shall be 24 or 26 gage flat, expanded metal lath not lighter than 3.4 pounds and shall comply with Federal Specification QQ-B101C. Expanded metal shall be grounded every ten feet horizontally with a #10 solid medium hard or soft drawn copper wire conductor. Conductors shall start at ceiling line extending down and over to a ground rod. Ground rod shall be outside building and of one inch diameter, ten feet long copperweld. Apply a scratch coat and a brown coat of plaster over expanded metal. Provide a smooth even surface on brown coat to receive acoustical tile. Plaster work to conform to section 9.6 of this specification.

PLUMBING WORK

9.10. SCOPE OF WORK.--This part of the specification includes the installation of complete sink, electric water heater, and water supply and waste lines for air conditioning equipment.

9.11. Sink fixture shall be of Alberene Stone with back and double drainboard. Sink compartment shall be approximately 24"x20" and 8" deep. Drainboards shall each be approximately 24"x22", overall size approximately 72"x24", with back not less than 8" high. Sink shall be similar to Laboratory Furniture Company's Catalog No. 6081. Provide chromium plated double sink faucet and 2" tellurian lead "P" trap and waste connection.

9.12. Electric Water Heater shall be of 20 gallon capacity. For details, see Paragraph E.6. of the specifications.

(Where Paragraphs Numbered E ____ are given, they refer to paragraph numbers under Section E of the specification.)

9.13. Building drain line and sewer connection shall be installed as indicated on the drawings and herein specified. For details, see Paragraphs E.14 to E.20 inclusive of the specifications.

9.14. Building soil, waste, drain, and vent lines to a point 5 feet beyond the building line shall be acid-resisting cast iron pipe or tellurium lead pipe properly protected against damage. Installation of piping and joints in piping shall be as recommended by the manufacturer. For details, see Paragraph E.23 of the specifications which shall apply where applicable.

9.15. Water service pipe and connections shall be installed as indicated on the drawings and herein specified. See Paragraphs E.21 and E.22 of the specifications.

9.16. Building water supply piping shall be installed as indicated on the drawings and herein specified. See Paragraphs E.26 and E.27 of the specifications.

9.17. Valves, see Paragraph E.28 of the specifications.

9.18. For Erection of fixtures, see Paragraphs E.12 and E.13 of the specifications.

9.19. For pipe hangers and supports, see Paragraph E.32 of the specifications.

9.20. For pipe covering, see Paragraphs E.29, E.30, and E.31 of the specifications. All cold and hot water piping shall be covered.

9.21. For painting, see Paragraph E.35 of the specifications.

9.22. For testing see Paragraph E.8 of the specifications in addition to the following requirements: All waste, vent, and drainage piping in the building shall be filled with water to a point not less than 18 feet above the highest connection or joint and the water allowed to stand for not less than 30 minutes without a noticeable drop in water level. After all fixtures are set and connected, a smoke test with a pressure of one (1) inch of water shall be applied to the sanitary piping and the entire system proven gastight to the satisfaction of the Construction Engineer.

The water supply system shall be tested to a hydrostatic pressure of 100 pounds per square inch.

9.23. For Guaranties, see Paragraph E.37 of the specifications.

9.24. SCOPE OF WORK.--This part of the specifications includes the installation complete of an air conditioning system with warm air supply connection for year round heating and cooling.

9.25. Air Conditioning Unit shall be a factory-built type consisting of a casing enclosing a direct expansion cooling coil, blower and motor, filters, refrigeration compressor and motor, and automatic controls. The unit shall have standard catalog air volume of not less than 3000 c.f.m. of standard air with a refrigeration capacity of not less than 7-1/2 tons. Any modification of the unit required to meet the foregoing conditions shall be based on providing a standard unit of the air volume specified. The unit generally shall be designed and constructed in accordance with the requirements of Federal Specification OO-A-372. Cooling coil shall be selected for operating conditions of 78° DB and 45% R.H. with 90% sensible heat.

9.26. Evaporative Condenser shall be provided for operation in conjunction with the refrigeration compressor of the air conditioning unit. The E.C. unit shall have an equivalent capacity as recommended by the manufacturer for stable operation with the A.C. unit. The capacity of the E.C. unit shall be based on standard operating conditions with an 80° W.B. temperature. Casing of unit shall generally be constructed as required for the A.C. unit.

9.27. The Compressor unit shall be modified as recommended by the manufacturer and required for satisfactory and stable operation with the E.C. unit.

9.28. In lieu of a combined A.C. unit of cooling coil, etc., and compressor; separate units may be provided, subject to the operating and space requirements, as determined and approved by the Contracting Officer.

9.29. In lieu of the above described units, a factory assembled package type unit combining all specified facilities may be submitted for approval subject to determination of the operating conditions specified and the economics of the factors involved.

9.30. Bases shall be provided under the units unless suitable approved legs or supports are built-in. All units shall be provided with approved anti-vibration elements built-in or be provided with bases with vibration eliminators of approved construction. The vibration eliminators shall reduce transmission not less than 80%.

9.31. For duct work, see Item 10 of the specifications.

9.32. Provide canvas connections in supply and return duct to each unit.

9.33. Duct lining for sound absorbing material where indicated on the drawings shall be fire resistant, shall impart no odor to the air stream, and shall have no loose material on the surface. Sound absorbing material shall be not less than 1" thick and the sound absorbing efficiency shall be approximate, as follows:

Frequency (C.P.S.)	256	512	10 24
Per cent absorption	40	65	80

9.34. Lining shall be installed as recommended by the manufacturer. Duct dimensions shall be increased allowing for installation of lining.

9.35. Duct insulation shall be applied to all supply and return ducts, including the newwarm air supply duct, and the cold air intake to the air conditioning unit, except the drop return ducts exposed in the rooms. The supply and return ducts above the ceiling may be insulated together as one duct provided sound absorbing lining is applied on inner surface of supply duct in contact with return duct.

9.36. Insulation for air conditioning ducts and cold air intake shall consist of one of the following materials, not less than 1" thick:

- a. Impregnated mineral-wool moulded blocks, Federal Specification HH-M-371a, Type I.
- b. Mineral-wool blocks, Federal Specification HH-I-564, Class "A".
- c. Natural cork board, Federal Specification HH-C-561b.

9.37. Insulation for the warm air supply duct shall consist of one of the following materials, not less than 1" thick:

- a. Magnesia blocks, Federal Specification HH-M-61a, Type III.
- b. Mineral-wool blocks, Federal Specification HH-I-564, Class "B".
- c. Asbestos or sponge felt blocks, Federal Specification HH-I-561b, Class "A", Type I.

9.38. Insulation shall be applied as recommended by the manufacturer and all joints and shipped edges shall be filled with approved insulating cement. Exposed insulated ducts shall have the edges protected by metal corner strips and the surface plastered with 1/2" of insulating cement. Plastered surfaces shall be given two (2) coats of paint of a color selected by the Construction Engineer.

9.39. Ceiling diffuser generally shall be of the circular type designed to deliver air radially and at a slight downward angle. Diffusers shall be sized in accordance with the manufacturer's recommendations and shall deliver the air quantities indicated on the drawings without causing air motion in excess of 35 feet per minute. Diffusers shall be rigidly constructed and all exposed edges rolled, rounded or otherwise stiffened. Provide volume adjusting device and straightener vanes. Diffusers shall be constructed of aluminum or steel and all exposed parts factory finished with aluminum paint.

9.40. Return grilles shall be horizontal bar type constructed of sheet metal and painted to match diffusers.

9.41. Automatic controls shall be provided to maintain the specified operating conditions within the limits of the specified equipment. The controls generally shall be as regularly provided with the A.C. units furnished plus any additional controls necessary to provide satisfactory uniform operating conditions.

9.42. REHEAT ELEMENTS.-- Electric reheat elements shall be provided if necessary to maintain the temperature and humidity specified which cannot normally be maintained by the A.C. unit alone.

9.43. Water supply, waste, and overflow shall be provided complete as required under the plumbing specifications, generally.

9.44. Motor starters and electrical connections shall be provided and made complete. See Paragraphs E.41 and E.42 of the specifications.

9.45. PLUMBING TESTS.--See Item 10 of the specifications.

9.46. AIR CONDITIONING TESTS.--All refrigerant piping and apparatus shall be tested with dry carbon dioxide, unless such piping is built into an assembled machine or unit. All refrigerant equipment shall be tested under vacuum or pressure as required to demonstrate tightness.

9.47. Air quantities may be measured by anemometer, velometer or pitot tube depending upon the velocity and other conditions of flow. All instruments shall have recently been tested for accuracy.

9.48. All instruments and appliances required for tests shall be furnished by the Contractor, including gauges, thermometers, etc.

9.49. Capacities of the units shall be determined during an operating period of not less than four (4) hours duration. Capacities shall be based on temperatures and quantities measured during the test taken in accordance with applicable section of the A.S.M.E. and other generally recognized test codes.

9.50. GUARANTEE.--Contractor shall guarantee that the entire installation will operate without objectionable drafts, noise or vibrations as determined by the Contracting Officer.

9.51. The loudness level of noises due to the air conditioning equipment entering rooms through air outlets, return grilles, or through floors and walls shall not exceed 40 decibels, except at a distance of 6 feet or less from such outlets or surfaces, etc. Sufficient sound absorbing lining shall be installed, whether or not indicated on the drawings, to reduce the equipment and air borne noise to, at, or below the noise limit specified.

ELECTRIC WORK

9.52. GENERAL.--This work consists of the following:

a. Increase capacity of roof-mounted transformer bank from 300 KVA to 500 KVA. This bank is located at the center of the warehouse roof.

b. Install secondary feeder from above bank to Rooms, "A", "B", "C", and "D" of area marked Item 9, as shown on contract plans.

c. Install load center and power and lighting system in Rooms "A", "B", "C", and "D" of Item 9 area.

d. In other rooms of Item 9 area, install power panel and receptacles and connect two machines.

e. Grounding of expanded metal in walls Numbered 2, 5, and 6.

9.53. TRANSFORMER BANK.--The three existing 100 KVA transformers shall be replaced with three 167 KVA transformers and the secondary conductors shall be replaced by correspondingly heavier conductors or bus work. New transformers shall be equivalent to the existing units in type, class, insulation, cooling fluid, method of cooling, voltage ratings, bushing arrangement, impedance, polarity, and all other respects except for the difference in KVA rating. (The existing transformers are General Electric Company distribution type, "Pyvanol" filled.) The new secondary conductors or bus work shall have at least 1-1/2 square inches of copper cross sectional area in each line and at least 1 square inch in the neutral. Work shall include all labor and material necessary to completely install the new transformers and connections, including connections to the adjacent roof-mounted circuit-breaker cabinet. Fuses in the high-voltage cutouts shall be correspondingly increased. The Contractor shall furnish, for prior approval of the Contracting Officer, a drawing showing all new work to be performed at the transformer bank. Existing transformers shall be delivered to the custody of the Contracting Officer or his duly authorized representative at the warehouse. Change-over to the larger transformers shall be accomplished outside of regular working hours, at least in so far as power outage is concerned. Advance notice of twenty-four hours shall be given by the Contractor to the Construction Engineer for any anticipated outage, in order that proper arrangements may be made.

9.54. SECONDARY FEEDER.--A four-wire three-phase feeder shall be installed as shown on the contract drawing. This feeder shall be connected to the spare circuit-breaker in the roof-mounted breaker cabinet and shall extend to the load center of Rooms "A", "B", "C", and "D" in the Item 9 area, with a single-phase tap to the outdoor guard station as indicated on the drawings. The feeder is oversize to allow for future expansion.

9.55. LOAD CENTER AND WIRING FOR ROOMS "A", "B", "C", and "D".--A complete wiring system shall be provided for this area. Work shall consist of installing a load center and branch circuits to all lights, receptacles and installed equipment. Lights, duplex convenience outlets, and two (2) single-phase, 208-volt outlets are already installed and fed by branch circuits out of existing panel B. Contractor shall remove such circuits from panel B and reroute to the above load center. In addition, the Contractor shall run branch circuits to power receptacles, hot water heater, air conditioning plant, and special motor generator set, also a circuit from that generator to two special receptacles. Details of load center follow:

a. MAIN CIRCUIT BREAKER.--Shall be enclosed, surface-mounted, with interchangeable thermal overload trip, NEMA Type 1A enclosure, pilot light and external handle, 225-ampere frame, 125-ampere trip, solid neutral, 250-volt for four-wire, three-phase, 120/208-volts A.C., similar and equal to Westinghouse Type AB-1 for grounded neutral system.

b. BREAKERS FOR POWER RECEPTACLE BRANCHES.--Same as a. except 50-ampere frame, 30-ampere trip.

c. BREAKER FOR AIR CONDITIONING PLANT BRANCH.--Same as a. except 100-ampere frame, 70-ampere trip.

d. MOTOR-GENERATOR BRANCH BREAKER.--Same as a. except 50-ampere frame, 20-ampere trip.

e. CIRCUIT-BREAKER PANEL FOR LIGHTS, DUPLEX CONVENIENCE OUTLETS, 208-VOLT, SINGLE-PHASE OUTLETS, AND HOT-WATER HEATER.--Shall be enclosed branch-circuit panel board of the dead-front safety type, surface-mounted, equipped with Class 1 branch circuit-breakers, quick-made and quick-break, in accordance with Federal Specification WP-131a, similar and equal to Westinghouse Type NALB4 with main lugs at bottom, neutral block at top, for 100-ampere, 4-wire, 3-phase, solid neutral, 120/208-volt service. There shall be twelve (12) single-pole breakers and two (2) two-pole breakers, all with 20-ampere trip.

f. CONSTRUCTION.--All load-center equipment shall be mounted on a sheet of 3/4 inch plywood. Common wiring trough shall be employed.

Power receptacles shall be four-pole, four-wire, twist-lock, 20-ampere, 250-volts, Bryant 7410 or equal, with four-wire, twenty-ampere, 250-volt cap with rubber cord guys, Bryant 9967 or equal.

9.56. POWER PANELS AND WIRING IN OTHER ROOMS OF ITEM 9 AREA.--
Power panels, receptacles and machine connections are to be provided as shown on the contract plans. Details are as follows:

a. NEW PANEL C.--This shall be a three-phase power distribution circuit-breaker panel, surface-mounted and connected by four No. 1/0 conductors to the line side of existing panel A; Panel C shall be similar and equal to Westinghouse Type ABH with breakers as follows:

- (1) Main - 225-ampere Frame, 100-ampere trip.
- (2) 60-ampere receptacle branches (one breaker per receptacle) - 100-ampere frame, 60-ampere trip.
- (3) 30-ampere receptacle branches (one breaker feeds both receptacles) - 50-ampere frame, 30-ampere trip.
- (4) Air compressor - 30-ampere receptacle branches (one breaker feeds both receptacles) - 50-ampere frame, 30-ampere trip
- (5) Spares - two - 30-ampere receptacle branches (one breaker feeds both receptacles) - 50-ampere frame, 30-ampere trip

All breakers shall be 3-pole. Total number of branch circuit-breakers is six (6).

b. POWER RECEPTACLES.--30-and 60-ampere receptacles shall be 4-wire, 4-pole, grounded through shell, 600-volts, AC service, similar and equal to Westinghouse Type ARE, angle-mounted with spring door. One plug shall be furnished with each receptacle.

c. NEW PANEL D.--This shall be same as the circuit-breaker panel specified for Rooms A, B, C and D, except it shall have eight (8) single pole, 15-ampere breakers. This panel shall be controlled by a main circuit-breaker mounted immediately adjacent. Main breaker shall be same as the main circuit-breaker for Rooms A, B, C and D, except it shall be 100-ampere frame, 70-ampere trip.

ITEM 10

INDUSTRIAL TYPE STEEL BUILDING

10.1. SCOPE.--The work covered by this item of the specifications includes all labor and materials, equipment and services required or necessary to furnish and erect a prefabricated industrial type steel building, size 40' wide and 42'-8" long, with utilities, in accordance with the applicable drawings and this item of the specifications, subject to the terms and conditions of the contract.

10.2. GENERAL.--The work in general includes the following:

a. Submit complete design, shop and erection drawings to the Contracting Officer for approval.

b. All structural steel framing.

c. All metal panels for side walls, partitions, ceilings, and roof construction.

d. All insulation materials, wood framing and hardware for side walls, partitions and ceilings of buildings.

e. All doors, frames, sash, glass and hardware complete for all door and window openings.

f. All roofing and flashing materials.

g. All bolts, nuts, washers, clips, etc., and other items of rough hardware required or necessary to completely assemble the building.

h. All steel framing, sash, doors and grills shall be shop painted and sufficient paint shall be furnished to paint items requiring paint after erection, including such other items as are necessary or which may be required by reason of the work herein described and shown on the drawings.

i. All galvanized iron ventilators with damper controller pull chain.

j. Concrete floor covered under Item No. 6.

k. All plumbing and heating with fixtures and an oil tank with its distribution system.

l. All electrical work including power input and poles.

m. Fencing.

10.3. MATERIALS AND ERECTION.--(a) GENERAL.--All material shall be new of standard manufacture and of standard commercial grade, free from defects and imperfections and shall be in accordance with these specifications and approved shop drawings, unless noted otherwise in this item of the specifications.

(b) Steel Frame.--Prefabricated structural steel frame composed of its various components shall be made up of standard size structural steel to fit the requirements of the: Armco Drainage and Metal Products, Inc., Middleton, Ohio; Butler Manufacturing Co., Kansas City, Missouri or other approved manufacturers for a steel building 40'x42'-8". Bottom angles of frame shall be anchored to the concrete floor foundation with approved size and spacing of bolts. Structural design including doors shall conform to wind loading of 20 pounds per square foot on vertical projected areas.

(c) Sidewalls, roof, ceiling and partitions shall not be less than 24 gage, galvanized steel, and of the same manufacturers as listed above.

(d) Windows shall be the horizontally pivoted steel sash, similar to and equal to No. B-22140 HP and B-24141 HP as furnished by Armco Products. Sizes and location of sash shall be as indicated on the drawings. Hardware shall be provided by the manufacturer and as approved by the Contracting Officer.

(e) Doors.--All doors shall be steel and of the sizes noted on the drawings, and shall be similar and equal to the three glass panel doors as shown in the Armco Products' Catalog. Frames shall be secured to the sill and head according to the manufacturer's specifications and as approved by the Contracting Officer. Complete hardware shall be provided by the manufacturer and approved by the Contracting Officer. (Provide cylinder locks)

(f) Double Sliding Doors.--Double sliding doors with complete frame and hardware assembly of size noted on drawings shall be provided. They are to be similar and equal to doors shown in Armco Products' Catalog. They shall be equipped with easy-sliding track, hangers (manually operated). A #16 gage galvanized metal hood shall be installed over track mechanism for protection as indicated on the drawings.

(g) Louvers.--There shall be two louvers of the fixed type at each end of the gable end panels of the building above the ceiling. They are to have a welded back-up plate on each louver. Provide panel or shutter for closing off louver when desired. Louvers are to be stock items as indicated in the Armco Products' catalog.

(h) Ventilators.--There shall be provided four standard revolving type roof ventilators. They are to be adjustable, damper type with 14-inch throat diameter. They are to be located symmetrically near the ridge of the building. Provide duct below ventilator extending through hung ceiling with collar.

(i) Toilet Enclosure.--Location of toilet walls, and floors shall be as indicated on the drawings. The enclosure walls around the toilet shall be 8'-0" high from floor. The entrance door to shower and the toilet door to be 2'-4" x 6'-8". These walls to be of 16 gage pressed metal with V-shaped moulding at top and bottom of panels, similar to the panel compartments manufactured by Henry Weiss Manufacturing Co., Elkhart, Maryland. Corner post and hand rails to be 2"x2", 16 gage pressed metal. The interior partition to be same as exterior toilet walls. Both doors to be 1 inch thick, made of two sheets of steel spaced and insulated with laminated corrugated fiber board filler. Edges interlocked with moulding and welded at corners. Complete hardware for toilet and shower to be furnished including hinges, slide bar latches, hooks, toilet paper holder, etc. Provide 1/2" fir plywood 8'-0" high against inside face wall studs in area behind toilet fixtures and slop sink. See drawings.

10.4. INTERIOR.--(a) In front of the paint shop, provide a 2" steel curtain pole, connecting rings and one heavy canvas curtain with metal grommets across the top and sides 6" o.c. Curtains to have a 2" returned sewn edge on all 4 sides. Curtain to extend to within 2" of floor. Curtain pole to set within 1 inch of opening head (7'-0" above floor) and be securely supported at each end, non-removable. Canvas shall be 10.7 ounces per square yard minimum weight, U.S. Army Duck, Fire Resistant treated. Canvas to meet the approval of the Contracting Officer.

(b) In front of the storage room, provide a metal diamond lattice type folding gate with Jackknife stiffener and ball-bearing center. Gates are made of 3/4x3/8x1/8 inch channels riveted back to back with 1/4 inch rivets, approximately 6" o.c.; channels to have rounded edges. Vertical end members are No. 14 gage C.R. tubing 1 1/2" square and slotted at one side to engage lattice. Jackknife stiffener to be made of 12x12x3/16 inch angle. Gate to be a single unit, similar to Style No. 3 of the Western Wire & Iron Works, Inc., Chicago, Illinois or its equal. Gates to be 7 foot height, to reach head of opening and to begin 2" off the floor. Manufacturer and type of gate to be approved by the Contracting Officer.

(c) In front of the welding shop provide two heavy asbestos curtains, hung from a 2" round steel pipe rod. Curtains to be supported from the rod by steel rings 6" o.c. Grommets to be placed in the top and sides of each curtain 6" o.c. Curtains to be hung from the top and each curtain secured to the side of the opening. Curtains to over-lap 6" o.c. at the mid-meeting point. Curtain rod to be securely placed 1" clear of opening head (7 feet off the floor). Asbestos curtains shall be approved by the Contracting Officer.

(d) The work bench will be furnished and erected by others.

(e) Insulation shall be furnished and installed in the following areas:

- (1) Between ribs on top of entire area of high and low ceiling.
- (2) On under side of exposed roof.
- (3) On inside faces of all exterior walls from floor to ceilings (or roof where no ceilings occur).
- (4) On inside faces of interior walls of office room.
- (5) On inside face of large sliding doors.
- (6) On inside face of interior walls between ceiling levels.
- (7) On inside face of interior wall between high ceiling and roof construction.

(f) Details of Insulation.--

(1) The area noted under (1) shall have 2" thick all mineral insulation enclosed Batts (vapor barrier one side, breather cover 3 sides) laid between steel ribs of ceiling. Insulation as manufactured by the National Gypsum Co. or their equal. (2) The areas noted under (3) and (4) shall have 2" all mineral insulation enclosed Batts (vapor barrier one side, breather cover 3 sides) secured between steel ribs of walls. Insulation as manufactured by the National Gypsum Co. or their equal. These walls shall be stripped with 1x2-12" o.c. horizontally across the wall ribs inside face. Apply Gypsum Board on the stripping. Gypsum board shall be 4'x9'x3/8" sheets as manufactured by the U.S. Gypsum Co. or their equal. All joints and corners to be taped and cemented. (3) The areas noted under (2), (6), and (7) shall have 1"x2" wood stripping secured 12" o.c. in place horizontally on walls and under side of roof. To this stripping attach by nailing 1-1/2" Celotex Insulation Boards or their equal. (4) The area noted under (5) shall have 1-1/2" Celotex insulation boards or their equal placed between the steel ribs of the doors. Place a mop coat of hot asphalt emulsion on steel before placing insulation boards against them. Protect insulation by placing 1/8" hardboard as presswood or equal on top. Secure presswood and insulation in place by placing vertically No. 10 gage. Continuous 1/2"x1/2" formed metal angles on sides of each panel. Secure into ribs with sheet metal screws. (5) Provide 1-5/8" wood cove moulding around ceiling and 1"x3" wood base around office room.

10.5. PAINTING.--All structural members and exterior walls, roof, interior walls, ceiling, partitions which are not galvanized, also doors, windows, curtains, toilet enclosures, etc., shall be painted. All work to receive 3 coats of paint, one coat being the prime coat. All metal work may have prime coat applied before erection. Exterior paint to be oil based, Federal Specification TT-P-40, Type I, Class "C". Interior flat paint shall be egg-shell, Federal Specification TT-P-641. Colors to be selected by Contracting Officer.

10.6. FENCING.--

The existing fencing on the west side of the structure of Item 10 shall be removed and replaced 12'-0" farther west, and a new fence connecting the ends of the old and the new to be installed. Also a section of the existing fence 15'-0" wide centered on and opposite to the Item 5 structure to be removed. A new fence shall be installed on each side of this opening extending 20'-0" connecting the corners of the incinerator to the ends of the existing fence. See plan.

Existing fencing and posts that are removed shall be reused to the best advantage possible. New fencing and posts shall match and be equal to the existing fence and posts in quality, size and strength. Relocated posts and new posts to be spaced the same distance apart as the existing posts and shall extend into the earth the same distance and be equally stable laterally.

Unused existing fencing and posts shall remain the property of the Government.

PLUMBING WORK

10.7. SCOPE OF WORK.--This part of the specification includes the installation complete of the plumbing, water supply, waste and drainage systems, and plumbing, fixtures, and equipment as noted and specified hereinafter or indicated on the drawings and the compressed air piping and outlets likewise indicated on the drawings.

10.8. Plumbing fixtures shall be provided as listed below, complete with accessories, trimmings and hangers unless otherwise specified:

- | | |
|---------------|---|
| Water Closet: | No. E46F Federal Specifications with No. CEW white seat, without check hinge in lieu of No. CER seat. Provide seat bumper. |
| Utility Sink: | Vitreous glazed, 24"x22"x8" deep, similar to Crane Co. No. 54-236. Complete with trimmings and wall bracket and 1-1/2" Talluriam lead sink plug and "P" trap. |
| Shower Stall: | Size 32"x32", galvanized steel, bonderized, baked on white enamel finish. Standard trim: Chrome plated valves and shower head, soap dish, curtain, hooks, similar to Fiat-Pilot Model No. 36. |

10.9. See Paragraph #.4 for Federal Specifications requirements.

Where Paragraphs Nos. E ___ are given, they refer to paragraph numbers under Section E of the specifications.

10.10. Electric Water Heater.--Furnish and install where indicated on the drawings an electric water heater of 30 gallon capacity. See Paragraph E.6. of the specifications.

10.11. For setting of fixtures, see Paragraphs E.12. and E.13. of the specifications.

10.12. Building drain line and sewer connections shall be installed as indicated on the drawings and herein specified. See Paragraphs E.14. and E.20., inclusive, of the specifications.

10.13. Water service pipe and connections shall be installed as indicated on the drawings and herein specified. See Paragraphs E.21. and E.22. of the specifications.

10.14. Building soil, waste and vent piping shall be installed as indicated on the drawings and herein specified. See Paragraphs E.23., E.24., and E.25. of the specifications.

10.15. Building water supply piping shall be installed as indicated on the drawings and herein specified. See Paragraphs E.26., E.27. and E.28. of the specifications.

10.16. Compressed Air System.--Provide and install an air-tight compressed air pipe distribution system including valves as indicated on the drawings. Horizontal distribution pipe shall be placed near ceiling with drops to valves where indicated. Outlet valves shall be 4'-0" above the floor. Install one (1) outlet with valve in each of the following rooms: paint shop, storage room, welding shop; and five (5) outlets with valves above the work bench, equally distributed along the bench. Piping main shall be 3/4" galvanized steel pipe with 1/2" drops to outlets. Valves shall be heavy duty type especially designed for air line duty, and shall be installed perpendicularly from the wall. Securely attach outlets to building wall. Air piping shall be tested to 100 psi with no drop in pressure for a period of one (1) hour. Provide 3/4" valve at lower end of main for connection to compressor. Compressor will be provided and installed by the Government.

10.17. For pipe hangers and supports, see Paragraph E.32. of the specifications.

10.18. For pipe covering, see Paragraphs E.29., E.30. and E.31. of the specifications. All cold and hot water piping shall be covered.

10.19. For painting, see Paragraph E.35. of the specifications.

10.19a. For testing, see Paragraph E.36. of the specifications.

10.20. For guaranties, see Paragraph E.37. of the specifications.

HEATING WORK

10.21. SCOPE OF WORK.--This part of the specification includes the installation complete of a heating system, exhaust piping, and a fuel oil storage tank and piping.

10.22. Heating unit shall be an oil fired forced warm air furnace, horizontal type, to be suspended about 8 feet above the floor from the roof members.

10.23. The unit shall have an output capacity of not less than 112,000 B.T.U. when burning No. 2 fuel oil or local diesel fuel, and shall have a blower capacity of not less than 1200 C.F.M. when operating against an external resistance of .25" of water.

10.24. Heater unit shall be constructed of not less than 12 gage steel welded gas-tight. Combustion changer shall be constructed of stainless steel or lined with refractory blocks. Radiator shall be of sufficient size with baffles or flues to produce an over-all efficiency of not less than 75 per cent.

10.25. Cabinet shall be constructed of heavy gage steel backed with not less than 1/2" of approved insulating material. The exterior finish shall be baked on enamel over bonderized surface. Frame shall be rigidly constructed and braced.

10.26. Blower shall be a heavy duty multi-blade centrifugal type, statically and dynamically balanced, and mounted in resilient mountings. Shaft bearings shall be self-aligning wick-packed bronze bearings or lubricated ball bearings. Drive shall be V-belt type.

10.27. Blower motor shall be continuous duty type designed for belt-driven operation, and provided with built-in thermally operated automatically reset overload protector or approved equivalent. Motor shall be rubber mounted and selected for operation on 120-volt, single-phase, 60-cycle current,

10.28. Drive shall be by silent rubberized V-belt, with cast iron fan pulley and adjustable motor pulley allowing approximately 35% adjustment.

10.29. Oil burner shall be designed for operation on No. 2 fuel oil or local diesel fuel and have a built-in oil pump capable of lifting not less than 17-1/2 feet or be provided with an approved automatic oil lifting device. If fuel oil return line is required for operation of the unit, same shall be provided without additional cost to the Government.

10.30. Automatic controls shall be provided for uniform safe automatic heating. Control generally shall consist of a stack safety switch, combination high and low limit fan control, room thermostat, and emergency cut-off switch.

10.31. Filters shall be provided either built-in unit or in return duct plenum with a surface area of not less than 600 square inches. Filters shall be of the throw-away type not less than 1" thick.

10.32. Flue Pipe.--Provide flue connection from combustion unit with balanced draft damper or approved design. Flue pipe above unit shall be covered with 1" thickness of approved fire resistant insulation. Flue pipe through roof shall be provided with an approved ventilated collar and rain hood. Pipe, collar and hood shall be constructed of not less than No. 20 gage galvanized sheet steel.

10.33. Ductwork shall be fabricated of galvanized sheet steel of not less than 24 gage and generally constructed in accordance with the requirements of the American Society of Heating & Ventilating Engineers as published in the latest "ASHVE Guide."

10.34. Elbows with throat radius of less than one-half (1/2) the depth of duct in direction of the turn shall be provided with duct turns or splitters as recommended by the "ASHVE."

10.35. Duct supports shall be substantial and rigid and constructed and spaced as recommended by the "ASHVE."

10.36. Canvas connections shall be provided at inlet and discharge side of heating unit constructed as recommended by the "ASHVE."

10.37. Grilles shall be of the adjustable 2-way directional type for both horizontal and vertical deflection. Grille frames shall be made of stamped or rolled steel sections, welded and ground flush at the corners or provided with neat trim. Exhaust grille shall be similar in appearance to supply grilles but without directional adjustment.

10.38. Provide volume adjustment and straightener vanes in back of each supply grille.

10.39. Suspension of heating unit shall be by means of not less than 5/8" dia rods or 1x1x1/4 angle iron securely attached to roof members and diagonally cross braced at sides and ends. The unit shall be free from vibration when in operation.

10.40. Fuel Oil Tank.--A 2,000 gallon fuel oil tank, 64" in diameter by 144" long or of equivalent size and capacity shall be installed where indicated on the drawings. Tank shall be constructed as required by the Underwriter's Laboratory and have label attached. Paint tank with one (1) coat of heavy asphaltum paint before installing.

10.41. Installation.--Tank shall be installed in accordance with recommendations by N.B.F.U. as minimum requirement: Drawings and specifications amplifying the foregoing recommendations shall govern where applicable.

10.42. Setting.--Tank shall be set with top not less than 2 feet below finished grade with bottom resting on firm earth or packed sand and gravel for the entire length. Precautions shall be taken to prevent rolling or rising of the tank before being filled with oil. The Contractor will be held responsible for maintaining tank setting until accepted.

10.43. Vent pipe shall be of 2" galvanized steel with swing joints at both ends and an approved vent hood. Securely attach pipe to building wall at a point approximately 5 feet above the ground. Pipe shall have not less than 18" of cover and be graded to drain back into tank.

10.44. Fill pipe shall be of 3" galvanized steel and be provided with a lock type waterproof cap. Provide a 12"x12"x12" block of concrete around cap with top 2" above finished grade.

10.45. Oil lines shall be of Type "K" copper tubing with flared type fittings. Suction lines shall extend through top of tank through a double tapped tank bushing with 1/2" brass pipe inside tank extending to within 3" of bottom of tank. Provide ball type foot valve at bottom of oil lines to stubbed connections and ball check valve inside building above finished floor in line to oil burning heating unit.

10.46. Oil lines through building foundation or wall shall be provided with metal sleeves packed with jute to prevent abrasion. Extend oil lines to stubbed outlets and connect to oil burning heating unit. Provide shut-off valve close to oil burner. Oil lines shall be attached to wall and supported overhead to oil burner in an approved manner.

10.47. Fuel Oil Gage.--Provide oil gage of the static pressure type inside building on wall adjacent to oil tank location. Gage shall be of standard size and designed for distant reading with the fuel oil specified.

10.48. Fuel Oil Filter.--Provide an approved filter in oil line ahead of oil burner connection.

10.49. Provide an Underwriter's labeled gasoline storage tank of not less than 265 gallon capacity. Tank shall be located in the general location of the fuel oil tank where indicated on the drawings. Setting details generally shall be as specified for the fuel oil tank.

10.50. Provide standard fill and vent pipe in accordance with N.B.F.U. requirements. Vent pipe shall be offset to building wall and be provided with approved gasoline type vent hood. Fill pipe outlet shall be provided with waterproof, lock type cap set in 8"x8"x8" concrete block.

10.51. Provide a 1" suction pipe through top of tank stubbed up 1 foot above finished grade and capped for future connection of hand operated free standing gasoline pump.

10.52. Exhaust Fans.--Provide heavy duty type propeller exhaust fans in the outside walls of the Painting Booth and Welding Shop where indicated on the drawings. Fans shall have a free capacity of not less than 800 c.f.m. of not more than 1150 r.p.m. Provide starter and overload protection for motors. Each fan shall be provided with a guaranty type outboard louver. Fans shall operate on 120-volt, single-phase, 60-cycle current. Provide pull switch and louver operator, and plug-in cord.

10.53. Exhaust Pipes.--Provide 4" exhaust pipes where indicated on the drawings. Pipe shall start approximately 6 feet above the floor and extend through and above roof approximately 3 feet.

Provide colliar through roof and weatherproof nood above. Pipe shall be 4" standard galvanized wrought steel pipe. Pipes shall be secured in place by metal brackets placed horizontally between wall ribs to hold piping midway between ribs and clear of face of wall. Provide a counter balanced flap cover on top of pipe above roof, similar to that manufactured by Alban Tractor Co.

10.54. Ductwork, unfinished surfaces of equipment and fuel oil lines shall be given two coats of best quality oil paint of color as selected by the Construction Engineer.

10.55. Testing.--The heating unit shall be tested to determine the output capacity in the presence of the Construction Engineer. All necessary testing instruments shall be provided by the Contractor.

10.56. Balancing of system shall be done previously to testing system. Air outlets shall be set for the volumes indicated on the drawings and the regulating dampers, etc., fixed in position.

10.57. Oil burner shall be tested for efficient operation with not more than 10% carbon dioxide in the flue gas. Stack temperature at the heater outlet shall not be more than 600 degrees F. or as permitted by approved testing code.

ELECTRICAL WORK

10.58. GENERAL.--(a) This work consists of installing overhead lines, transformers and a complete wiring system for the building shown as Item 10. Available power line voltage is 12.5/7.2 KV., 4-wire, 3-phase and the voltage for the building shall be 208/120-volts, 4-wire, 3-phase.

(b) Transformer Sub-station and Overhead Lines.--Electrical energy shall be provided by a bank of three (3) 37-1/2 KVA transformers to be mounted on a new pole adjacent to the building, located as shown on contract drawings. Secondary conductors, No. 3/0 AWG, WPTE, shall be strung from the above pole to a 4-wire bushing rack mounted adjacent to the service entrance fitting on the building, and shall be connected to the service conductors.

(1) Transformers and Associated Equipment.--Three (3) transformers and all necessary appurtenances are presently mounted and connected on a nearby power line pole, approximately 200 feet distance. The Contractor shall transfer the above equipment from present location to the new pole adjacent to the building and shall mount the equipment on that pole and connect same, ready for service. Transformers shall be mounted on the easterly side of the pole.

(2) Pole.--This shall be a creosoted Class 2 pole, 40 feet long, set 8 feet in the ground.

(3) Guy.--A guy and suitable guy anchor shall be provided, making an angle of not less than 30° with the pole and located so as to be in line with the span of high-voltage line described in (4) below.

(4) High-voltage Span.--A span, approximately 80 feet long, shall be provided between the new pole and an existing power pole, which is located adjacent to an existing transformer bank as indicated on contract drawings. Conductors shall be same material, size and construction as existing line and shall be connected so as to extend that line to the

transformer bank specified in (1) above. Crossarms, insulators and hardware shall be similar and equal to like items already in use on the existing high-voltage line. Line-to-ground clearance shall be as much as can be obtained and the maximum sag shall be not greater than 18 inches. Line voltage is 12.5/7.2 KV, 4-wire, 3-phase.

(c) Service Entrance.--A 2-1/2-inch conduit shall be furnished, starting at the load center and terminating in a suitable weatherproof fitting, as shown on contract drawings.

(d) Circuit-Breakers.--

(1) Main Service.--An enclosed, surface-mounted circuit-breaker, with thermal overload trip shall be furnished and installed. This breaker shall have a dust-resisting sheet steel NEMA Type 1A enclosure with pilot light and external operating handle. Rating shall be 225-amperes, with 200-ampere interchangeable type of thermal overload trip and solid neutral, for 4-wire, 3-phase, 120/208-volts, AC service, similar and equal to Westinghouse, Type AB-1, K-frame for grounded neutral systems.

(2) Power Receptacle Circuits.--Two (2) breakers similar to (1) above shall be furnished and installed for controlling the two (2) power receptacle circuits. Rating shall be 100-amperes, with 70-ampere interchangeable type of thermal overload trip and solid neutral, similar and equal to Westinghouse, Type AB-1, F-frame.

(3) Plug Receptacle, Furnace and Lighting Circuits.--An enclosed branch-circuit panel board of the dead-front safety type shall be furnished and shall be equipped with twenty (20) Class 1 branch circuit-breakers, in accordance with Federal Specification W-P-131a, similar and equal to Westinghouse, Type NALB-4. Rating shall be 150-amperes, with main lugs at bottom and neutral bus bar at top of panel, for 4-wire, 3-phase, 120/208-volt service. Branch circuit-breakers shall be quick-make and quick-break, single-pole, with 20-ampere trip.

(4) Emergency Lights.--An enclosed, surface-mounted circuit-breaker with thermal overload trip shall be furnished and installed. This breaker shall have a dust-resisting sheet steel NEMA, Type 1A enclosure and external operating handle. Rating shall be 2-pole, 125-volts, 50-amperes, with 20-ampere trip unit, similar and equal to Westinghouse, Type AB-1, E-frame.

(5) Water Heater Circuit.--An enclosed circuit-breaker shall be furnished and installed and shall be similar to the breaker specified in sub-paragraph d. above, except that the rating shall be 2-pole with solid neutral, 125/250-volts, 50-amperes, with 30-ampere trip unit, for 3-wire, 120/208-volt service.

(6) Construction.--Main service and load center equipment shall be mounted on a sheet of 3/4 inch plywood, secured to the wall of the building at the location indicated on the contract drawings. A horizontal arrangement of the equipment shall be used, with the bottoms of all enclosures at same height, except that the two (2) 100-ampere breakers may be one above the other and similarly for the two (2) 50-ampere breakers. Largest enclosure shall be 6'-6" above finished floor. A common wiring trough shall be used for feeder connections.

e. Conduit.--Service entrance and power receptacle wiring shall be in exposed rigid conduit and all other wiring shall be in exposed electrical metallic tubing. Minimum size shall be 3/4 inch.

(1) Plug receptacles (duplex convenience outlets) shall be 15-amperes, 125-volts, T-slot, grounding type, similar and equal to Dryant Catalog No. 5262. Two grounding-type, 3-pole plugs shall be furnished with each receptacle. Receptacles shall be capable of accommodating standard 2-pole appliance plugs as well as the grounding-type specified above.

(2) Power Receptacles.--These shall be for 4-pole, 4-wire, 100-ampere, 600-volts, AC service, grounded through shell and extra pole, similar and equal to Westinghouse "Arktite", Type AREA, Style 2, angle-mounted, with spring door. One plug shall be furnished with each receptacle.

f. Wire and cables.--

(1) Service conductors shall be No. 4/0 AWG with a No. 2/0 AWG neutral. Conductors for power receptacle circuits shall be No. 1 AWG and No. 10 AWG for the water heater. Conductors for lighting and plug receptacle circuits shall be No. 12 AWG. Minimum conductor size is No. 12 AWG, except fixtures.

(2) Grounding connections shall be made by connecting the neutral service conductor to the cold water supply pipe. Conductor shall be routed in conduit and shall be securely bonded to the conduit at entrance and exit. Conduit shall be fitted with an approved bolted clamp to secure same to water pipe. Clamp shall be of cast bronze or brass.

(3) Plug receptacle circuits shall carry a bare No. 12 AWG grounding conductor which shall connect the system ground (mentioned in b. above) to the grounding contacts of all plug receptacles. The circuit feeding the three (3) junction boxes on the wall in the work bench area shall include a No. 12 AWG bare grounding conductor brought out at each box.

(4) All splices in the ground conductors shall be brazed or soldered. Splices in all other conductors may be made with approved solderless connectors or wire nuts.

g. Lighting.--

(1) Illumination at working level shall be not less than 50-foot candles in individual rooms and in general shop area and not less than 75-foot candles over work benches.

(2) Unless otherwise specified, all lighting fixtures shall be industrial type, open end fluorescent, for two or three 40-watt or two 85-watt fluorescent lamps, for individual or continuous mounting on channel to be of die-formed steel not less than 0.032 inch thickness after fabrication designed to increase reflector strength and house ballast. Channel shall be arranged for either chain, pipe, stem or messenger cable hangers. Provide cord outlets and knockouts to facilitate electrical connections. Sockets shall be spaced approximately 5" o.c. Reflector to be open end type, die-formed steel of not less than 0.032" thickness after fabrication. Shielding angle for 40-watt units shall be 13° below horizontal on the average but not less than $11-1/2^{\circ}$ for any individual unit. Average and minimum shielding angle for 85-watt units shall be 14° and $12-1/2^{\circ}$, respectively. All metal to be treated with an approved method to prevent oxidation before finishing. Finish of channel to be hot-bonded aluminum grey enamel. Outside of reflector to have grey finish, inside to be a white vitreous porcelain or baked synthetic white enamel with a mean reflection factor of not less than 82%. The minimum reflection factor of any individual unit shall be not less than 79%. The average efficiencies of the 40-watt units shall be not less than 79% for two (2) tubes or 72% for three (3) tubes, with the minimum for any unit being not less than 77% and 70%, respectively. The average efficiency of the 85-watt units shall be not less than 71% with the minimum for any unit being not less than 69%. Candlepower at an angle 55° from vertical shall be not less than 55% of that if vertical (0°). Each unit to be completely wired and equipped with all auxiliaries, conforming to Federal Specifications W-L-131. Starters shall be of the lock-out type, manually reset. Ballasts shall be of the multi-lamp high power factor type. Provide suitable hanger or mounting accessories.

(3) Single fluorescent fixtures are required in the office, supply room and welding room.

(4) Illumination in the paint room shall be provided by means of a ceiling-mounted explosion-proof incandescent fixture, similar and equal to Russell & Stoll Catalog No. 4528, for 200-watt lamp.

(5) Fluorescent fixtures in the shop area shall be high enough to provide a 14-foot clearance above the floor in the area between the two (2) large doors. A 10-foot clearance is sufficient elsewhere in the shop area, except that the bench lighting fixtures shall be 8 feet above the floor.

(6) Shop area fixtures shall be switched in appropriate rows or groups directly from the circuit-breaker panel and bench lighting fixtures shall have individual pull cord switching. Lights in individual rooms shall be separately switched as shown on contract plans. Switch in paint room shall be explosive-proof.

(7) Emergency lights shall be located as shown on contract plans. Conduit connecting these lights to the emergency switch shall carry only the emergency lighting circuit. Switching shall be provided by the circuit-breaker specified in d(4).

(8) A bracket light shall be provided on the outside of the building adjacent to the office door. Location and switching as shown on contract plans. Fixture shall be weatherproof, with screw-type glass globe, for 100-watt lamp, Crouse-Hinds Company, No. VRB110 or approved equal.

(9) Wall bracket fixture in water closet and shower enclosure shall consist of glazed white porcelain base, keyless socket and white glass shade. Shade holder screws to be of brass. Fixture shall be suitable for mounting on either a 3-1/4-inch or 4-inch outlet box.

h. Circuits.---

(1) Power Receptacles.---One of the breakers specified in Paragraph d(2) shall feed the welding room receptacle exclusively. The other breaker shall feed the shop area receptacles.

(2) Plug Receptacles.---There shall be separate circuits for the office, supply room, welding room and paint room. There shall be a minimum of two (2) circuits for the shop area.

(3) Water Heater Circuit.---A 3-wire, 120/208-volt circuit shall be provided and connected to the breaker specified in Paragraph d(5). Circuit is designed to energize a 2-element heater, where each element will operate at the line-to-neutral voltage of 120-volts.

(4) Bench Circuits.---There shall be three junction boxes on the wall in the bench area, located 18 inches above the floor. Each box shall contain a 2-wire, 120-volt circuit fed exclusively through a 20-ampere circuit-breaker at the load center. Adequate conductor length shall be left in the junction boxes for future connections by others. Junction boxes will also contain the ground circuit specified in Paragraph f(3).

(5) Lighting.---Shop area lighting circuits shall be as specified in Paragraph g(6). Bench lighting shall be on one (1) circuit. Emergency lighting on separate circuit as specified in Paragraph g(7). Room lighting shall be one (1) circuit, including the water closet, shower and outside bracket lights.

(6) Furnace.---There shall be a separate 120-volt circuit for the heating plant.

(7) Exhaust Fans.---Junction boxes for fans shall be connected to nearest plug receptacle circuit.

MEDICAL AND HEALTH ROOM INSTALLATIONS

11.1. SCOPE.--The work covered by this item of the specifications includes all labor and materials, equipment and services required or necessary to furnish and install (a) a sink and running water in the medical supply area and (b) partition off a health room and install toilet facilities therein, in accordance with the applicable drawings and this item of the specification, subject to the terms and conditions of the contract.

11.2. GENERAL.--The work in general includes the following:

- (a) Erect partitions as per Drawing No. 4.
- (b) Install a sink (with connecting sewer and water) in the medical supply area. Sink will be furnished by the Government.
- (c) Provide and install a sink, lavatory and water closet (with connecting sewer and water) in the/partitioned off health room.
new
- (d) All work shall be new, of standard manufacture and of standard commercial grade, free from defects and imperfections and shall be in accordance with these specifications.

11.3. PARTITIONS.--Install partitions as specified and shown on the Drawing No. 4. Install 1" diameter pipe curtain rods where shown on the drawings. In new partition around toilet, provide and install a 2'-6" x 6'6" x 1 3/8", two-panel, ponderosa pine door with frame, casing both sides and complete hardware. Secure all partitions to abutting walls and window mullion.

11.4. EXTERIOR DOOR.--Cut through 6" concrete wall to install a metal frame and metal door where indicated on the drawings. Metal door to be 3'-6" wide by 7'-0" high by 1 3/4" thick. This door with its metal frame shall be a fire resistant door meeting the requirements of the Class "A" Fire Underwriter's Code and carrying their label. Metal door shall be a two-solid panel type. Complete hardware including three butt hinges and a cylinder type lock shall be installed. The metal frame shall be securely connected into the freshly cut opening through a concrete wall and elastic compound calking pressed into abutting joint on all sides.

11.5. PLUMBING.--Specifications for plumbing work to be inserted later.

ELECTRICAL

11.6. GENERAL.--This work consists of providing electric power for a water heater, a refrigerator and a deep-freeze unit in the Medical Supply Room marked Item 11, immediately adjacent to the Film Storage Room marked Item 8A.

11.7. WATER HEATER.--1,000-watt, 120-volt, single-phase, automatic storage type. Furnished under this contract.

11.8. REFRIGERATOR.--Furnished by Government. Now operating at desired location, using temporary wiring. Contractor shall remove such wiring. This unit is a walk-in type and is equipped with a load center, to which all electrical items are connected. These consist of a 1.5 H.P., 230-volt, single-phase compressor motor, 1/8 H.P., 115-volt fan motor, 115-volt interior light and 115-volt control devices.

11.9. DEEP-FREEZE.--Furnished by Government. This is the regular domestic type, approximately 15 cubic feet, 120-volt, single-phase, with usual appliance cord and plug.

11.10. FEEDER.--As shown on Contract Drawings, this room and the Film Storage Room (Item 8A) shall be supplied by the same 4-wire, 3-phase feeder. This feeder is over-size to allow for future expansion.

11.11. CIRCUITS.--Two-wire, single-phase power shall be supplied to the water heater by two No. 12 conductors in a 3/4-inch conduit running from the load side of the 30-ampere safety switch to the heater disconnect switch. A 4-wire, 3-phase feeder shall be carried to the refrigerator by four No. 12 conductors in a 3/4-inch conduit running from the load side of the 30-ampere safety switch to the refrigerator disconnect switch. From this point, two No. 12 conductors in a 3/4-inch conduit shall run to a standard duplex-convenience receptacle located so as to provide 120-volt, single-phase power for the deep-freeze unit. The load connections shall be as follows:

Refrigerator compressor motor	- Lines 1 and 2
Refrigerator fan motor	- Line 1 and neutral
Refrigerator light and control	- Line 2 and neutral
Deep-freeze receptacle	- Line 3 and neutral
Water heater	- Line 3 and neutral

ITEM 12

CHANGES IN ALARM AND SAFETY CONTROL SYSTEMS

ELECTRICAL WORK

12.1. SCOPE.--The work covered by this item of the specifications includes all labor and materials, equipment and services required or necessary to furnish and install the following electrical work: sprinkler alarm system, fire gongs, night light switch, and power lines to guard booths, in accordance with this item of the specifications and applicable drawing, subject to the terms and conditions of the contract.

12.2. GENERAL.--The work in general includes the following:

a. Permanent sprinkler alarm system shall be installed in guard office of Building "B", replacing the temporary alarm system in place.

b. Fire gongs on inside of Building "B", in addition to existing fire gongs on outside of building.

c. Separate switch be installed in Building "B" guard room to control the exterior flood lights of Building "B".

d. Electric lines shall be extended to two (2) outside guard gate booths, to supply electricity for lighting.

ELECTRICAL

12.3. GENERAL.--This work consists of the following:

a. Providing electric service to two (2) outdoor guard stations.

b. Installing a sprinkler alarm panel and associated wiring.

c. Installing four (4) interior fire gongs.

d. Installing centralized control of outside building lights.

12.4. GUARD STATIONS.--Electric service shall be provided as shown on the contract plans. Feeder for the west guard station shall be energized from the line side of the 60-ampere safety switch. Feeder for the east guard station shall be energized from a pull box located above the ceiling of the area marked Item 9. Weatherproof switches shown on outside of warehouse shall be centered 60 inches above ground level. Rigid steel conduit shall be used throughout.

12.5. SPRINKLER ALARM PANEL.--Existing temporary alarm panel and wiring shall be replaced by permanent panel and wiring in the same location, as shown on contract plans. Panel shall be Edwards Company No. 806 Annunciator, Service Type, 8 or 12 drop, 208-volt, 60-cycle, Ac., single-phase, complete with 6-inch alarm bell. Electrical metallic tubing may be used.

12.6. FIRE GONGS.--Four (4) fire gongs shall be furnished and installed inside the building, at the same locations as four (4) existing fire gongs which are mounted on the exterior of the building. Gongs shall be wall-mounted similar to existing gongs and shall be Autocall Company Type RVG, 30-watts, 210-volts, 60-cycle, Ac., 0.14-ampere. They shall be connected to the existing wiring and shall be mounted at the same elevation as the existing gongs, except the gong in Section 22 B which shall be mounted above the level of the office ceilings, in order to be more effective. Electrical metallic tubing may be used.

12.7. CONTROL OF OUTSIDE LIGHTS.--All branch circuits for outside building lights shall be withdrawn from distribution panels to which they are now connected and shall be connected to a new, remote-controlled magnetic contactor located as shown on the contract plans. This contactor and associated safety switch shall be mounted on the wall immediately adjacent to the existing distribution panel in Section 22 B. From this point, a control circuit shall be run to a switch in the guard room, for remote control.

12.8. FEEDER.--Four No. 8 conductors shall be run from the line side of the existing distribution panel to the line side of the safety switch, through a short 1-inch conduit.

12.9. SAFETY SWITCH.--Shall be Type C, 4-pole, solid neutral, 30-ampere, 230-volts, fused 20-ampere, for 120/208-volts, 4-wire, 3-phase service.

12.10. MAGNETIC CONTACTOR.--Shall be size 1, 3-pole, 20-amperes minimum 8-hour enclosed rating, with arc quencher devices, for 120/208-volt, 4-wire, 3-phase service, with 208-volt holding coil and standard NEMA, Type I enclosure, similar and equal to Westinghouse Class 15-825.

12.11. CONTROL SWITCH.--Shall be located on wall in guard room as directed. Switch shall be standard flush-type tumbler switch, single-pole, in accordance with general electric requirements of this specification. Switch may be surface-mounted in suitable outlet box.

12.12. CIRCUITS.--Four No. 8 conductors shall be run from load side of safety switch to line side of contactor. All lighting circuits shall be connected on load side of contactor and shall be suitably distributed around the three (3) phases. Holding coil circuit shall provide for straight manual control with no interlock.

12.13. CONDUIT.--Electrical metallic tubing may be used.