

Bechtel Associates Professional Corporation  
Ann Arbor, Michigan

*Bechtel*

TECHNICAL SPECIFICATION  
FOR  
SUBCONTRACT FOR  
MATERIALS TESTING SERVICES  
FOR THE  
CONSUMERS POWER COMPANY

MICROFILMED  
MAY 21 1980

MIDLAND PLANT  
MIDLAND, MICHIGAN

Consisting of:

1. Technical Specification
2. Appendixes A through Q
3. Bechtel Sketch SK-C-312

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No	DATE	REVISIONS	BY	CHK	APPR
15		Revised as noted on facing sht. Incorp SCN 10001	MBS	df	LHC/ME
8		Revised as noted on facing sht. Incorp SCN 9010, 9011	MBS	df	LHC/ME
7		Revised as noted. Incorp. SCN 9006, 9007, 9008, 9009	MBS	df	LHC/ME
16		Revised as noted. Inc. SCNs 9002, 9003, 9004, 9005	MBS	df	LHC/ME
15		Revised as noted. Inc. SCNs 8008, 8009, 8010, 9001	MBS	df	LHC/ME
14		Revised as noted on Facing Sheet, Inc. SCNs 8003, 8004, 8005, 8006, and 8007.	MBS	df	LHC/ME
13		Revised as noted on Facing Sheet, Inc. SCNs 7008, 8001, & 8002	MBS	df	LHC/ME
12		Revised as noted on Facing Sheet	MBS	df	LHC/ME
11		Revised as noted on Facing Sheet. Incorporated SCNs 7005, 7006, 7007	MBS	df	LHC/ME
10		Revised as noted on Facing Sheet, Inc. SCNs 7002, 7003, 7004	MBS	df	LHC/ME
9		Revised as noted on Facing Sheet Inc. SCN 7001	MBS	df	LHC/ME
8		Revised as noted on Facing Sheet, Inc. SCN 6003	MBS	df	LHC/ME
7		Revised as noted on Facing Sheet, Inc. SCNs 6001, 6002	MBS	df	LHC/ME
6		Revised as noted on Facing Sheet, Incl. SCN 5002, 5003	MBS	df	LHC/ME
5		Revised as noted on Facing Sheet. Inc. SCN 5001	MBS	df	LHC/ME
4		Revised as noted on Facing Sheet, Inc. SCNs 4005-4008	MBS	df	LHC/ME
3	7/10/77	Revised as noted on facing sheet incorporated SCNs 4001, 4002, 4003, 4004	MBS	df	LHC/ME
2		Issued for Subcontract			
1		Issued for bids			
0	3/27/77	Issued for Client Review			

A 1" SIZE

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PDR FOIA  
RICEB4-96  
PDR



Consumers Power Company  
Midland Plant-Units 1&2  
Midland, Michigan

JOB No. 7220	
SPEC/DES GUIDE No.	REV
C-208 (Q)	19

SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.
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13	17	34	18			19	5/6/80	Rev shts. i, ii, 7, 27, 28					
14	17	35	18			18	1/23/78	Rev shts. i, ii, iii, iv, 29, 31, 32, 33, 34, 35, Add sht 36					
15	17	36	18			17	11/2/78	(Add 34-35) i-iii iv Rev Shts. 4, 7-33					
16	17					16	8/24/77	Rev sht i, ii, 4-10, 12-21, 25-27, 29-30					
17	17					15	N/A	No facing sht used					
18	17					14	6/7/78	Revised Sheets 1, 3, 4, 4a, 8, 12, & 13D					
19	17					13	3/22/78	Revised sheets 1, 14a, 11a, 13D and 14. Added sheets 11B and 14B.					
7		Rev. Sh. 1, 3, 5, 6, 8,				12	11/21/77	Revised shts i thru 9					
6	1/4/73	Rev. Sh. 1, 8 added	13A			11	9/21/77	Rev. shts. i, iii, 8, 14, 13A, 13C					
5	2/27/73	Rev. Shts. 1, 2, 11, 12, Added Sht 11A				10	5/10/77	Rev. Sh. 1, iii, 1, 3, 4a, 5, 10-13D, 16, 17 add sh 17A, rev sh 11 to read iii in rev 9					
4	1/27/73	Rev. Shts. 1, 3, 6, 7, 9, 10, 11, 16 & App A. Add Sht 6A				9	3/15/77	Rev. Shs. i, iii, 2, 3, 4, 4A, 6A, 7, 8, 9, 10, 11, 11A, 12, 13, 13A, 16, 18. Added 13B, 13C, 13D					
3	1/27/73	Revised shts. 1, 2, 7, 12, 13, 14				8	11/3/76	Rev. sh 1, 12					
2	1/20/73	i, iii, 5-14, 15											
1		Issued for Bids											
0	5/27/73	Issued for Cl. Review											


NO	DATE	REVISIONS	BY	CHK'D	APP'D	NO	DATE	REVISIONS	BY	CHK'D	APP'D
<b>FACING SHEET</b>											
 <b>MATERIAL TESTING SERVICES CONSUMERS POWER COMPANY MIDLAND PLANT, UNITS 1 &amp; 2 MIDLAND, MICHIGAN</b>								<b>JOB No. 7220</b>			
<b>Specification 7220-C-208(Q) sheet 11</b>								<b>REV. 19 2</b>			

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SUBCONTRACT FOR  
MATERIALS TESTING SERVICES  
FOR THE  
CONSUMERS POWER COMPANY  
MIDLAND PLANT  
MIDLAND, MICHIGAN

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TECHNICAL SPECIFICATIONS  
FOR  
SUBCONTRACT FOR  
MATERIALS TESTING SERVICES

1.0 WORK INCLUDED

The work includes the furnishing of a field laboratory and providing materials testing services under the Contractor's direction as follows:

- 1.1 Renovating existing laboratory buildings, and/or constructing additional laboratory buildings.
- 1.2 Furnishing, maintaining, and operating on the jobsite a field laboratory complete with equipment and accessories necessary, including curing facilities, to perform tests on concrete materials, concrete, and soils.
- 1.3 Furnishing experienced personnel, including inspectors and technicians familiar with mass concrete construction and soils technology, to perform sampling, inspecting and testing.
- 1.4 Assistance as required in the design and adjustment of concrete mixes.
- 1.5 Testing of concrete materials and concrete samples.
- 1.6 Testing reinforcing steel samples and mechanical splices.
- 1.7 Performing various tests on embankment, fills, and structural backfill.
- 1.8 Packaging and shipping any samples requiring off-site testing.
- 1.9 Dismantling and removing from jobsite all laboratory building, equipment and accessories at completion of the work.
- 1.10 Testing of prestressing sheathing filler material.

- 11 Testing of masonry group and mortar and masonry units.
- 12 Testing of dewatering system to determine amount of fines pumped.

2.0 RELATED WORK NOT INCLUDED

- 2.1 Inspecting form work.
- 2.2 Inspecting reinforcing steel and concrete placement.
- 2.3 Welding procedure and performance qualification.
- 2.4 Checking of lines and grades.
- 2.5 Batch plant inspection

3.0 ABBREVIATIONS

AASHO--American Association of State Highway Officials  
ACI---American Concrete Institute  
APHA--American Public Health Association  
ASTM--American Society for Testing and Materials  
ASME--American Society of Mechanical Engineers  
AWS---American Welding Society  
USBR--United States Bureau of Reclamation

4.0 CODES AND STANDARDS

Notwithstanding the provisions of Article 8 of Exhibit A, General Terms and Conditions, and unless otherwise specified or shown, materials, sampling, inspection, and testing procedures shall conform to the following codes and standards to the extent indicated by references herein. The date of issue (or revision) indicated shall apply.

AASHO T26-70	Standard Method of Test for Quality of Water to be Used in Concrete.
ACI SP-2, 1967	Manual of Concrete Inspection.
ACI 211.1-70	Recommended Practice for Selecting Proportions for Normal Weight Concrete.
ACI 214-65	Compression Test Evaluation.
ACI 301-72	Specifications for Structural Concrete for Buildings. Chapters 3, 7, 16, 17, and 18.4.

ACI 311-64	Recommended Practice for Concrete Inspection.
ACI-318-71	Building Code Requirements for Reinforced Concrete.
ACI 614-59(304)	Recommended Practice for Measuring, Mixing & Placing Concrete.
APHA 428	Test for Sulfide Ion in Water
ASME	Boiler and Pressure Vessel Code, Section IX, 1971 and Addenda of Summer 1971, Winter 1971, and Summer 1972.
ASTM A 370-72	Standard Methods and Definitions for Mechanical Testing of Steel Products.
ASTM A 615-68	Standard Specification for Deformed Billet-Steel Bars for Concrete Reinforcement.
ASTM A 615-72	Standard Specification for Deformed and Plain Billet - Steel Bars for Concrete Reinforcement.
ASTM C 31-69	Standard Method of Making and Curing Concrete Compressive and Flexural Strength Test Specimens in the Field.
ASTM C 33-71a	Standard Specification for Concrete Aggregates.
ASTM C 39-71	Standard Method for Test for Compressive Strength of Cylindrical Concrete Specimens.
ASTM C 40-66	Standard Method of Test for Organic Impurities in Sands for Concrete.
ASTM C 70-73	Standard Test Method for Surface Moisture in Fine Aggregate
ASTM C 87-69	Standard Method of Test for Effect of Organic Impurities in Fine Aggregate on Strength of Mortar.
ASTM C 88-71a	Standard Method of Test for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
ASTM C 109-75	Standard Method of Test for Compressive Strength of Hydraulic Cement Mortars

ASTM C 117-69	Standard Method of Test for Materials Finer than No. 200 Sieve in Mineral Aggregates by Washing.
ASTM C 123-69	Standard Test Method for Lightweight Pieces in Aggregate
ASTM C 127-68	Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate.
ASTM C 128-68	Standard Method of Test for Specific Gravity and Absorption of Fine Aggregate.
ASTM C 131-69	Standard Method of Test for Resistance to Abrasion by Use of the Los Angeles Machine.
ASTM C 136-71	Standard Method of Test for Sieve or Screen Analysis of Fine and Coarse Aggregates.
ASTM C 138-74	Standard Method of Test for Unit Weight, and Air Content (Gravimetric) of Concrete
ASTM C 140-75	Sampling and Testing Concrete Masonry Units
ASTM C 142-71	Standard Method of Test for Clay Lumps and Friable Particles in Aggregates.
ASTM C 143-74	Slump of Portland Cement Concrete.
ASTM C 150-72(78A)	Standard Specification for Portland Cement.
ASTM C 151-74	Standard Method of Test for Autoclave Expansion of Portland Cement
ASTM C 172-71	Standard Method of Sampling Fresh Concrete.
ASTM C 183-76	Standard Methods of Sampling Hydraulic Cement
ASTM C 191-74	Standard Method of Test for Time of Setting of Hydraulic Cement by Vicant Needle
ASTM C 227-71	Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method)



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ASTM C 231-75	Standard Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 235-68	Scratch Hardness of Coarse Aggregate Particles
ASTM C 260-69	Standard Specification for Air-Entraining Admixture for Concrete. Section 1, 2, 3.2, 8.3 and 9.
ASTM C 289-71	Standard Method of Test for Potential Reactivity of Aggregates (Chemical Method)
ASTM C 295-65	Standard Recommended Practice for Petrographic Examination of Aggregates for Concrete
ASTM C 311-68	Standard Methods of Sampling and Testing Fly Ash for Use as an Admixture in Portland Cement Concrete
ASTM C 396-76	Test for Compressive Strength of Chemically Setting Silicate and Silica Chemical-Resistant Mortars
ASTM C 494-71	Standard Specification for Chemical Admixtures for Concrete. Sections 1, 2, 3, 4.1, 4.3, 6, 7 and 9.3
ASTM C 567-71	Standard Method of Test for Unit Weight of Structural Lightweight Concrete
ASTM C 566-67(72)	Standard Method of Test for Total Moisture Content of Aggregate by Drying
ASTM C 618-72	Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolans for Use in Portland Cement Concrete
ASTM D 422-63	Standard Method for Particle-Size Analysis of Soils
ASTM D 423-66	Standard Method of Test for Liquid Limit of Soils
ASTM D 424-59 (1971)	Standard Method of Test for Plastic Limit and Plasticity Index of Soils
ASTM D 512-67	Standard Method of Test for Chloride Ion in Water and Waste Water

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ASTM D 854-58 (1972)	Standard Method of Test for Specific Gravity of Soils
ASTM D 992-71	Test for Nitrate Ion in Water
ASTM D 1556-64	Standard Method of Test for Density of Soil in Place by the Sand Cone Method
ASTM D 1557-70	Standard Methods of Test for Moisture-Density Relations of Soils Using 10-lb. Rammer and 18-in. Drop
ASTM D 1883-67	Standard Method of Test for Bearing Ratio of Laboratory-Compacted Soils
ASTM D 2049-69	Standard Method of Test for Relative Density of Cohesionless Soils.
ASTM D 2166-66 (1972)	Standard Methods of Test for Unconfined Compressive Strength of Cohesive Soil
ASTM D 2216-71	Standard Method of Laboratory Determination of Moisture Content of Soil
ASTM D 2434-68	Standard Method of Test for Permeability of Granular Soils (Constant Head)
ASTM D 2435-70	Standard Method of Test for One-Dimensional Consolidation of Properties of Soils
ASTM D 2487-69	Standard Method for Classification of Soils for Engineering Purposes
ASTM D 2488-69	Recommended Practice for Description of Soils (Visual Manual Procedure)
ASTM D 3017-72	Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods
CRD C 79-77	Method of Flow Tests for Flow at Grout Mixtures (Flow Cone Method)
CRD C-119-53	US Army, Corps of Engineers, Methods of Test for Flat and Elongated Particles in Coarse Aggregate
CRD C-588-78A	US Army, Corps of Engineers, Specification for Non-Shrink Grout
Calif. Division of Highways Test Method No. 217	Method of Test for Sand Equivalent



Soil-Testing for Engineers by T. William Lambe

UBC Standard No. 24-22, 1976	Uniform Building Code Standards Field Tests for Grout and Mortar
USBR E-24	United States Bureau of Reclamation Field Density Tests for Sands, Gravel, and Fine Materials
USBR DES E-11	United States Bureau of Reclamation Zero-Air Voids Curve, Paragraph 7
ANSI N45.2.5 1974	American National Standard, Supplementary Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants



5.0 JOBSITE LABORATORY

5.1 Laboratory Building

The Contractor will make available to the Subcontractor, for the duration of the job and at no charge, an existing building formerly used for materials testing work. If the building is used, the Subcontractor shall renovate the building and any equipment therein, to meet the requirements of this specification, provided that the Contractor shall approve such work before renovation commences. Removal of this building at the conclusion of these testing work is not required.

The Subcontractor shall also furnish and construct any additional laboratory buildings (complete with the building foundations, slabs, equipment supports, etc.) as required to meet the work load, or to be used as an alternate to the existing building; such buildings shall be approved by the Contractor before construction. At the conclusion of the project, the Subcontractor furnished buildings, including all foundations both for the building and the equipment, shall be removed by the Subcontractor.

The location of the building(s) shall be as shown on Bechtel sketch SK-C-312.



5.2 Laboratory Equipment

The Subcontractor shall equip the laboratory with the necessary equipment to perform the onsite testing specified. The major items of equipment shall include, but not be limited to, the following:

- 5.2.1 300,000 pound automatic portable compression testing machine.
- 5.2.2 Temperature controlled cylinder curing tanks or fog room including thermometers and humidity controls. (Capacity of 800 cylinders stored at one time.)
- 5.2.3 Fine and coarse aggregate sieves for performing gradation of aggregates including equipment required for grain size distribution analysis by hydrometer.
- 5.2.4 Concrete air meter, slump cones, and cylinder molds.
- 5.2.5 Sieve shaker for both fine and coarse aggregate with nest of sieves in accordance with ASTM-D-422.
- 5.2.6 Gram scale for determining fineness modulus of sand and moisture tests.
- 5.2.7 Pond scale for determining gradation of coarse aggregate.
- 5.2.8 Chapman flasks for determining moisture of sand and specific gravity.
- 5.2.9 All other appurtenant equipment required for concrete field control.
- 5.2.10 All equipment required for the soil compaction tests in accordance with ASTM-D-1557 in the field laboratory.
- 5.2.11 Vehicle for laboratory personnel to obtain and pick up samples.

- 5.2.12 A backup inventory of equipment susceptible to damage shall be provided, including but not limited to: air meters, scales, flasks, and slump cone equipment.
- 5.2.13 All equipment required for relative density of sand in accordance with ASTM-D-2049.
- 5.2.14 All equipment necessary for performing Atterberg Limit test in accordance with ASTM-D-423 and ASTM-D-424.
- 5.2.15 All equipment for CBR tests in accordance with ASTM-D-1883.
- 5.2.16 All equipment necessary for unconfined compression test in soil ASTM-D-2166.

### 5.3 Requirements for Equipment

The laboratory equipment furnished by the Subcontractor shall be subject to approval by the Contractor.

### 5.4 Laboratory Operations

The Subcontractor shall assume all responsibility to provide necessary utilities, including a telephone, at the laboratory buildings. Report forms shall be provided by the Subcontractor unless specifically directed otherwise by the Contractor. Test materials, including concrete cylinder molds, and all packing and crating materials for off-site testing shall be furnished by the Subcontractor.

## 6.0 TESTING AND CERTIFICATION OF CONCRETE MATERIALS

All tests performed shall be documented and the reports submitted to the Contractor.

- 6.1 Cement, Pozzolan, Air Entraining Admixture and Water Reducing Admixture.
  - 6.1.1 Prior to commencing of any concrete work, cement from the source selected by the concrete supplier shall be given an initial Acceptance Test consisting of a complete chemical and physical analysis by the Subcontractor in

accordance with Paragraph 7 of ASTM C 150 with the fineness to be determined by ASTM C 115.

In addition, as directed by the Contractor, the Subcontractor shall perform an acceptance test consisting of a complete chemical and physical analysis on a grab sample weighing, approximately 15 pounds, taken from a new cement put into the silos at the mill.

Also, for every 1200 tons of cement used, and at other times as directed by the Contractor, the Subcontractor shall obtain, from cement delivered to the jobsite, grab samples weighing approximately 15 pounds for making a User's Test consisting of a complete chemical and physical analysis, as specified in Table 1.

The Subcontractor shall check that cement delivered to the site does not exceed a temperature of 150°F., and shall also review for completeness the mill test reports received with each load as delivered to the Batch Plant.

- 6.1.2 Pozzolan shall be sampled and tested per Table 1 for each 200 tons received. Tests for cement alkalies are not required.
- 6.1.3 Deleted
- 6.1.4 Deleted
- 6.1.5 Upon selection and approval of the air entraining admixture and the water reducing admixture, the manufacturer shall furnish certification for every delivery stating that the materials originally approved have not been changed. The Subcontractor shall review the certifications supplied by the concrete supplier at the same time.

The water reducing and air entraining admixtures are delivered to the Batch Plant.

6.2 Aggregate Acceptability Tests.

Aggregate samples submitted by the concrete supplier from his proposed source shall be tested by the Subcontractor.

Aggregate shall conform to ASTM C 33 and Technical specification 7220-C-230.

The following tests shall be performed:

Test	ASTM Designation
L.A. Rattler	C-131
Friable Particles	C-142
Material Finer than No. 200 Sieve	C-117
Scratch Hardness of Coarse Aggregate Particles	C-235
Organic Impurities in Mortar	C--87
Organic Impurities in Concrete	C--40
Potential Reactivity of Aggregates (Chemical)	C-289
Potential Reactivity (Mortar Bar)	C-227 (If necessary after C-289)
Soundness of Aggregates	C--88
Specific Gravity and Absorption- Coarse Aggregate	C-127
Specific Gravity and Absorption- Fine Aggregate	C-128
Petrographic Examination	C-295
Sieve Analysis	C-136

6.3 Water and Ice for Mixing

At the beginning of the job, the Subcontractor shall test the mixing water in accordance with AASHTO T-26. The tests shall include determination of the pH range, and the amounts of chlorides, sulphates, iron, and organic matter. Water and ice for mixing concrete shall be in accordance with Specification 7220-C-230 and shall be tested in accordance with Table 1.

6.4 Mix Design

Based on the concrete supplier's proposed cement, aggregate, and additives, the Subcontractor shall assist in the design and adjustment of the design mixes in accordance with ACI Standard 211.1, the requirements of the Contractor's Technical Specifications No. 7220-C-230, and as directed by the Contractor. No gap graded concrete shall be

allowed. Concrete mixes shall contain all aggregate size groups up to and including the maximum size to be used in the concrete.

Representatives from both the Contractor's construction and engineering staff shall be present during the design program to ascertain workability and placing characteristics. The Contractor shall approve the mix designs before production of concrete is allowed to proceed.

#### 6.5 Non-Shrink Grout

Each non-shrink grout test batch shall be proportioned and mixed in accordance with the manufacturer's instructions. Compressive strength and shrinkage tests shall be performed as specified in Table 1, and shall be made for each lot of non-shrink grout received. However, Saverieson #72 grout need not be tested for shrinkage. The word "lot" for non-shrink grout shall be equal to each shipment received or 50,000 pounds, whichever is smaller. Requirements for minimum compressive strength are as follows (unless noted otherwise):

6.5.1 At 3 days: 3000 psi

6.5.2 At 7 days: 5000 psi

6.5.3 At or before 28 days: 6000 psi (for 6000 psi applications only)

### 7.0 INSPECTION AND TESTING OF CONCRETE

#### 7.1 General

Inspection of concrete shall be performed in accordance with the ACI Manual of Concrete Inspection, the "Recommended Practice for Concrete Inspection" (ACI Standard 311-64) and as specified herein.

#### 7.2 Inspection

The measuring, batching, and mixing of all concrete shall be inspected by the Contractor's Batch Plant Inspector.



7.2.1 Deleted

7.2.2 Duties of the Subcontractor

The following Batch Plant duties shall be performed by the Subcontractor. Reports of tests shall be submitted to the Contractor.

- a. Cast, cure, and test concrete cylinders from samples obtained from discharge of stationary mixer at Batch Plant or, when applicable, from the discharge chute of the truck mixer. On occasion, the Contractor will require concrete samples at point of placement to ascertain slump, air content, temperature, and strength.
- b. Any associated duties as directed by the Contractor.
- c. Concrete specimens shall be prepared from the mixers used in the work and tested to determine the adequacy of control of the materials entering into the concrete mix. All materials shall be tested during the progress of the work in accordance with the ACI Manual of Concrete Inspection and as specified herein.

7.3 In-Process Testing

The Subcontractor shall obtain samples and conduct tests at the frequency specified in Table 1 and as directed by the Contractor. Reports of these tests shall be submitted to the Contractor. After the nonconformance, the next lot or lots will be tested until the nonconforming item has been corrected.

7.3.1 Aggregate Testing

- a. The following in-process tests shall be performed:
  1. gradation
  2. moisture content

3. material finer than no. 200 sieve
  4. organic impurities
  5. friable particles
  6. lightweight pieces
  7. soft fragments
  8. Los Angeles abrasion
  9. flat and elongated particles
  10. potential reactivity
  11. soundness
- b. Samples shall be taken as aggregate drops from the bins or weigh-hoppers in the Batch Plant, from conveyor belts feeding the weigh hoppers, or from other designated locations, as directed by the Contractor.
- c. Gradation
1. One sand sample and one coarse aggregate sample shall be taken from each nominal size group used, for gradation.

Required Tests - When the required gradation tests are performed and a test fails by 2% or less on any one sieve and the moving average remains within specification, the aggregate will be accepted and no retests will be taken. If the test fails by more than 2% on any one sieve, two retests will be taken regardless of the moving average.

Retests - If both retests pass, the aggregate will be accepted or

- If either or both retests fail by 2% or less on any one sieve and the moving average is within specification, the aggregate will be accepted.

- If either retest fails by more than 2% on any one sieve the material it represents shall be rejected, and the procedure outlined for "Required Tests" will be re-initiated.

Moving Average - The ten most recent tests (required tests and retests) will be used in calculating the moving average. If the moving average goes out of the specification range, the material shall be rejected as specified above, and an evaluation of the test results will be made by the Contractor's field personnel to determine what corrective action will be taken. Evaluation will be made using results of the "Required Tests, and "Retests" specified above, with incoming aggregate tests (section 7.3.1.4) used for comparison.

2. In the determination of material finer than No. 200 sieve, if the test fails to meet the specification requirements, two retests shall be taken. If both retests pass, the material represented shall be accepted. If either or both retests fail, the material represented shall be rejected.

d. Flat and Elongated Particles

A ratio of three to one shall be employed in determining the number of flat and elongated particles. Maximum allowable flat and elongated particles shall not exceed 15% unless approved by the Contractor.

e. Additional Aggregate Testing

As directed by the Contractor, concrete aggregates (coarse and fine), when delivered to the on-site Batch Plant, shall be tested in accordance with ASTM C-136 for gradation as specified in Specification 7220-C-230, Section 7.2.2.

In addition, as directed by the Contractor, a wash test, ASTM C-117, shall be performed on aggregate delivered.

If an aggregate sample fails to meet these requirements, the Subcontractor shall immediately report the failure to the Contractor.

The results of these tests shall be used as a "leading indicator" of changes in aggregate gradation and as described in section 7.3.1.2.

f. Moisture Content

The free moisture content of aggregates shall be determined in accordance with ASTM C-566 once daily during production for proportioning the amount of mixing water. To account for moisture changes in the fine aggregate, ASTM C-70 may be used for quick adjustments to the amount of mixing water in the concrete mix.

### 7.3.2 Compressive Strength Cylinders

Compressive strength cylinders shall be cast from representative samples taken from the discharge of the Batch Plant stationary mixer or, when applicable, from the chute of the truck mixers. For purposes of correlation and strength verification, when concrete receives its final mix from a central batch plant, additional compressive strength cylinders shall be cast from samples taken at the transport discharge (pump line discharge, or, if no pump is used, chute of truck) of the same batch from which a sample was taken at the stationary mixer. Similarly, when concrete receives its final mix from a truck mixer, additional compressive strength cylinders shall be cast from samples taken at the transport discharge (i.e., pump line discharge) of the same batch from which a sample was taken from the chute of the truck mixer. After correlation has been established, correlation cylinders shall be continued to verify the correlation at a frequency not to exceed once every 300 cu yd or once a week for each mix used during production. Cylinder sampling procedures shall be in accordance with ASTM C-172. Slump, air content, temperature and unit weight of the concrete shall be recorded when cylinders are being cast.

All cylinders shall be made, cured, and tested in accordance with ASTM C-31 and C-39, except field cylinders may be cured adjacent to the concrete placement in insulated boxes prior to stripping.

Compressive strength and slump shall be as specified in Technical Specification 7220-C-230.

The number, frequency and test age of cylinders shall be as specified in Table 1.

All concrete cylinders shall be marked and stored in the curing room or tank until the designated date for testing. Cause for concrete rejection shall in accordance with Paragraph 4.3.3, ACI Standard 318.

#### 7.3.3 Grout Testing

Grout mixes with a higher cement-sand ratio than the concrete with which it is used that are approved by the Contractor shall be tested daily during production to the requirements of ASTM C-109.

Compressive strength shall be as specified in Specification 7220-C-230.

#### 7.3.4 Slump, Air Content and Temperature

The specified limits for slump, air content and placing temperatures are to be at the point of placement. Slump, air content and temperature shall be measured and recorded at the frequency and method specified in Table 1. The sampling point for final acceptance of air content, slump and temperature is at the truck discharge except for concrete conveyed by pump. The location of testing for pumped concrete shall be as follows:

- a. If a correlation program is developed in accordance with Section 7.4; slump, air content and temperature shall be recorded, at the batch plant stationary mixer when cylinders are cast and at the truck discharge at the frequency specified in Table 1. Each batch shall visually be checked by the Subcontractor at the truck discharge for slump consistency. Any concrete in question shall be tested for compliance with specification requirements. Additional testing may be required at the point of placement as directed by the Contractor.

- b. If no correlation program is developed in accordance with Section 7.4, slump, air content, and temperature shall be measured at the Batch Plant Stationary mixer (or at truck discharge for a dry mix batch plant) when compressive strength cylinders are being cast and at the point of final placement at the frequency specified in Table 1. Each batch shall be visually checked by the Subcontractor at the truck discharge for slump consistency. Any concrete in questions shall be tested for compliance with specification requirements. Additional testing may be required at the truck discharge as directed by the Contractor.

#### 7.3.5 Unit Weight

Unit weight of the concrete shall be measured and recorded in accordance with Table 1.

#### 7.4 Correlation

A correlation program may be developed by the Contractor for determining and controlling slump, air content, and temperature changes between the batch plant stationary mixer or, when applicable, the truck mixer discharge and the final point of placement in accordance with ACI 304.

The correlation program description shall contain the following as a minimum.

- 7.4.1 frequency and locations of testing
- 7.4.2 method of establishing correlation from test results
- 7.4.3 compensation for weather changes or methods of conveying concrete.

7.5 Test Results

7.5.1 Statistical Analysis

Standard deviation data shall be developed in accordance with ACI 214 and shall be submitted for evaluation as directed by the Contractor.

7.5.2 Materials

Materials which fail to meet the requirements of the tests shall be rejected by the Contractor. The Subcontractor shall immediately report any deviations from these Specifications to the Contractor.

7.5.3 Rejection

If the slump, air content, or temperature at the point of placement is found to be or is estimated by correlation to be greater or less than the limits specified, a check test shall be made. In the event of a failure, the Contractor shall be immediately notified and the failing concrete shall be rejected by the Contractor.

7.6 Testing of Masonry

Concrete masonry units and masonry grout and mortar shall be as specified in Specification 7220-A-13. The following onsite field and laboratory tests shall be performed:

7.6.1 Concrete masonry units shall be sampled and tested in accordance with ASTM C 140.

7.6.2 Masonry grout and mortar shall be field tested in accordance with UBC Standard No. 24-22 except that the following physical requirements shall apply:

a. . At least one test sample of the mortar and grout shall be taken every third successive working day beginning with the first day of masonry work.



- b. Additional test samples shall be taken whenever any change in materials or job condition occurs, whenever such tests are necessary to determine the quality of the material.
- c. Curing of test specimens by immersion in saturated lime water may be used in lieu of a fog room. Specimens shall not be exposed to dripping or running water.

## 8.0 TESTING OF REINFORCING STEEL AND MECHANICAL SPLICES

### 8.1 Reinforcing Steel

Reinforcing steel shall conform to ASTM A 615, Grade 60. The tensile and bend tests shall be in accordance with ASTM A615. Bar sizes 14 and 18 shall be tested to the requirements of ASTM A 615, supplemental requirement S-1 with full sized test specimens for bars shipped after May 15, 1977. Bar numbers 11, 14, and 18 shall have a minimum elongation of 7% in an 8 inch specimen. At least one full diameter specimen from each bar size shall be tested in accordance with Table 1. The Subcontractor shall make the necessary arrangements for the offsite testing. Reports shall be submitted to the Contractor within 7 days after the tests samples are furnished, with copies forwarded concurrently to Consumers Power Company personnel. Test specimens that have been tested and are documented shall be stockpiled by the subcontractor for disposal by the contractor. As an alternate to offsite testing, the Contractor may request onsite testing of the rebar.

#### 8.1.1 Acceptance Standards for User's Tests

The acceptance standards shall be in conformance with the tensile or bend test requirements of ASTM A 615 and supplementary requirements S-1. If a test specimen fails to meet the tensile or bend test requirements of ASTM A 615 and supplementary requirements S-1, two additional specimens from the same heat and of the same bar size shall be tested. If either of the two

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Revision 17

additional specimens fails to meet the tensile or bend test requirements, the material represented by the tests shall not be accepted.

TABLE 1  
INSPECTION AND TESTING OF CONCRETE

<u>Material and Requirement</u>	<u>Test Method</u>	<u>Test Frequency</u>
<u>Concrete</u>		
Sampling method	ASTM C 172	
Compression cylinders	ASTM C 31	
Compressive strength	ASTM C 39	4 cylinders (1 set from each 100 cu yd, or a minimum of one set per day for each class of concrete. (1, 2)
Slump	ASTM C 143	First batch produced each day and every 50 cu yd placed (1)
Air content	ASTM C 231	First batch produced each day and every 50 cu yd placed (1)
Temperature		First batch produced each day and every 50 cu yd placed (1)
Unit weight/yield	ASTM C 138	When cylinders are cast from samples attained from the batch plant stationary mixer or, when applicable, from the discharge chute of the truck mixers
<u>Grout (Nonshrink)</u>		
Compressive strength	ASTM C-109	Test each lot received before use
Shrinkage	CRD C-568	Test each lot received before use

Aggregate

Gradation	ASTM C 136	Daily during production  Twice daily during production when 3/4-inch aggregate is crushed from 1-1/2-inch aggregate
Moisture content	ASTM C 566 ASTM C 70	Daily during production When needed per Section 7.3.1.5
Material finer than No. 200 sieve	ASTM C 117	Daily during production
Organic impurities	ASTM C 40	Weekly during production
Friable particles	ASTM C 142	Monthly during production
Lightweight pieces	ASTM C 123	Monthly during production
Soft fragments	ASTM C 235	Monthly during production
Los Angeles abrasion	ASTM C 131	Every 6 months
Flat and elongated	CRD C 119	Every 6 months  Daily during production when 3/4-inch aggregate is crushed from 1-1/2-inch aggregate
Potential reactivity	ASTM C 289	Every 6 months
Soundness	ASTM C 88	Every 6 months
<u>Water and Ice</u>		
Compliance with Specification 7220-C-230		
Compressive strength	ASTM C 109	Every 6 months
Setting time	ASTM C 191	Every 6 months
Soundness	ASTM C 151	Every 6 months
Chlorides	ASTM D 512	Monthly

Fly Ash and  
Pozzolans

Chemical and physical properties per ASTM C 618	ASTM C 311 ASTM C 618	Each 200 tons (1)
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Cement

Standard physical and chemical pro- perties	ASTM C 150	Each 1200 tons ASTM C-183 (1)
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Cement temperature		Each load
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Reinforcing Steel

Physical proper- ties of full test specimen per ASTM A 615(3)	ASTM A 370	One full section test for each bar size for each 50 tons or fraction thereof from each heat (3)
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Lightweight Concrete (non-Q material and workmanship)

Unit weight	Section 5 of ASTM C 567	First batch produced each day and every 50 cu yds thereafter (1)
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Compressive strength	ASTM C 39	Two cylinders (1 set) from each 100 cu yd or fraction thereof. to be broken at 28 days (1)
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Compressive cylinders	ASTM C 31	
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(1) For testing frequency; the words "each" and "every" may be met by obtaining an average of one test for the specified frequency. (e.g., If the specified frequency is "every 50 cubic yard" and if the first test occurs at 6 cubic yard it is preferable, but not necessary, that the second test occur at or before 56 cubic yard. Instead, tests should average out as one test for every 50 cubic yard placed for each mix used on a daily basis but not to exceed twice the specified frequency.)

For fly ash, tests should average out as one test for every 200 tons used but not to exceed the specified frequency by more than one (1) truckload. For cement, tests should average out as one test for every 1,200 tons used, but not to exceed the specified frequency by more than one (1) truckload.

- (2) Compressive strength cylinders shall be tested as follows:
- Concrete containing pozzolans: 2 cylinders at 28 days  
2 cylinders at 90 $\pm$ 1 days
- Concrete not containing pozzolans: 2 cylinders at 7 days  
2 cylinders at 28 days
- Additional cylinders may be made and tested as directed by the Contractor.
- (3) Reduced section test specimen may be used for determination of the percentage of elongation.

### 8.2 Mechanical Splices

Samples of mechanical splices shall be taken and tested as specified in Technical Specification 7220-C-255. Samples of the splices, including a length of reinforcing bar on each side of the splice, will be removed from the work by the Contractor for testing. The samples shall be tested to failure and reports of the tensile strengths submitted to the Contractor within 7 days after the test samples are furnished. Tensile tests shall meet the requirements specified in Technical Specification 7220-C-39. Arrangements for the off-site testing shall be made by the Subcontractor. Test specimens shall be kept by the Subcontractor.

### 9.0 TESTING OF SUBGRADE, EMBANKMENTS, AND STRUCTURAL BACKFILL

The following tests on embankments and subgrade fills and structural backfill shall be made by the Subcontractor; frequencies shall be in accordance with Table 9-1 attached.

#### 9.1 On-Site Field and Laboratory Test

- 9.1.1 Compaction tests in accordance with ASTM Test Designation D 1557, Method D.
- 9.1.2 Relative density of cohesionless materials in accordance with ASTM D2049.

- 9.1.3 Field Density Tests for sands and fine material in accordance with ASTM D1556, and on gravels with the above as modified by USBR DES E-24 as described in USBR Earth Manual. The nuclear density devices shall not be used to determine density.

All field density tests on cohesive soils shall be checked against a zero-air-voids (ZAV) curve according to USBR DES E-11 (Paragraph 7) based on an assumed specific gravity of 2.75. The density tests are acceptable when plotted to the left of the ZAV curve. If the field density tests fall on or to the right of the ZAV curve, the following steps shall be followed.

- a. Report the tests to the quality control engineer and the onsite geotechnical soils engineer.
  - b. Recheck the calculations of the tests concerned. If calculations are found in error, compare the corrected density tests against the ZAV curve.
  - c. If the corrected density tests plot on or to the right of the ZAV curve, those tests shall be either rejected and different density tests shall be performed or the density tests shall be checked against the ZAV curve using the actual specific gravity of the sample.
- 9.1.4 Atterberg Limit Tests for Liquid and Plastic Limits in accordance with ASTM D423 and 424.
- 9.1.5 Grain Size Analysis in accordance with ASTM Designation D422, except that the hydrometer test is not required
- 9.1.6 California Bearing Ratio Tests in accordance with ASTM Designation D1883 shall be made by the Subcontractor on embankment and subgrade fills to determine the relative bearing values



required for the design of asphalt concrete pavement.

9.1.7 Moisture Content:

The method of determining moisture content at the time of density testing (i.e., point of acceptance) shall be in accordance with ASTM D 2216.

Determination of moisture content for information purposes (i.e., before and during compaction) may be made using rapid determination methods, provided procedure complies with the following.

- a. The code and/or manufacturer's instructions shall be followed.
- b. The results using rapid determination methods shall be compatible with those obtained using ASTM D 2216.
- c. Compatibility of the methods shall be determined by the onsite geotechnical soils engineer.
- d. Nuclear density devices shall not be used to determine moisture content.





TABLE 9-1

FREQUENCY OF TEST PROCEDURES

<u>Test</u>	<u>Approximate Frequency</u>
Equipment Calibration	Frequency to be based on Bechtel Field Inspection Manual, or, if not otherwise stated, upon manufacturer's suggested frequency; frequency for each item to be submitted by Subcontractor for Contractor's approval.
Field Densities, Moisture Content	One per every 500 cubic yards of fill
Compaction, Grain Size, Specific Gravity	As directed by the onsite geotechnical soils engineer.
Atterberg Limits, Shear Strength, CBR, Permeability, and Petrographic	As requested by the Contractor.
Zero-Air-Voids Curve Check	Check required with each field density test on cohesive soil



9.1.8 Specific Gravity;

ASTM Designation D 854.

9.1.9 Unconfined compression shear strength tests shall be made in accordance with ASTM D2166.

9.2 Off-Site Laboratory Tests

9.2.1 Permeability shall be determined off-site in accordance with ASTM Designation D2434.

9.2.2 Shear Strength

Unconsolidated undrained, consolidated undrained, and consolidated drained shear strength tests shall be made in accordance with the test procedures for these types of tests given in "Soils Testing for Engineers", by T. William Lambe.

9.2.3 One Dimensional Consolidation Properties shall be made in accordance with ASTM D2435.

10.0 TESTING OF PRESTRESSING SHEATHING FILLER MATERIAL

10.1 Sampling

One 4 oz. sample of filler material shall be selected from each 100 drums or each tank trunk. If shipment contains material from more than one batch, then a sample shall be taken from each batch. If the filler is shipped in bulk, a sample shall be taken from each shipment.

10.2 Test Procedure

The inside (bottom and sides) of a one liter beaker shall be thoroughly coated with the sample material. The coated beaker shall be filled with distilled water and placed in an oven at 100°F for 4 hours. The separated water shall then be tested for the following compounds in accordance with the indicated codes and standards:

Compound	Allowable Maximum In Water	Applicable Standard
Water Soluble Chlorides (Cl )	2.0 ppm	ASTM Designation D-512 (limit of accuracy 0.5 ppm)
Water Soluble Nitrates (NO )	4.0 ppm	ASTM Designation D-992 (limit of accuracy 0.5 ppm)
Water Soluble Sulfides (S )	2.0 ppm	APHA Designation 428   (limit of accuracy 1.0 ppm)

11.0 MONITORING OF FINES

The monitoring of fines for the dewatering system as identified in Specification 7220-C-88(Q) shall be performed in accordance with the subcontractor's approved procedure.

12.0 REPORTS

The results of all tests shall be submitted to the Contractor by the third day following completion of the test. Test report forms shall be submitted to the Contractor for his approval prior to the beginning of testing, with copies forwarded concurrently to Consumers Power Company personnel. Forms are furnished in Attachment A for guidance. Each report shall identify the item to which it applies including the procedures or instructions followed in performing the test. Reports shall include and identify all nonconforming conditions. The Subcontractor shall immediately report failing tests and any deviations from the Specifications to the Contractor who will either reject the material or evaluate it to assess its acceptability.

13.0 NUMBER OF TECHNICIANS AND INSPECTORS

The number and class of technicians and inspectors shall be approved by the Contractor. Upon 10 calendar days notice by the Contractor, the Subcontractor shall increase or decrease the number of technicians and inspectors as may be required by the workload.

14.0 QUALITY ASSURANCE

- 14.1 Within 30 days after award of the Subcontract, the Subcontractor shall submit a quality assurance program in accordance with Specification 7220-G-23 which will assure that all work performed by the Subcontractor conforms to these Specifications.
- 14.2 The program shall include, but not necessarily be limited to the following:
- 14.2.1 Procedure for calibration control of test equipment and tools.
- 14.2.2 Procedure for preparing and curing concrete test cylinders.
- 14.2.3 Procedure for identification of all test specimens taken by the Subcontractor and procedure for control of all test specimens whether furnished by the Contractor or Subcontractor.
- 14.3 The Subcontractor shall submit a detailed resume of all personnel proposed for assignment to this testing work; no personnel shall be assigned to this work without the written approval of the Contractor. (Resumes to be submitted with bid proposal.) Personnel performing tests and inspections required in this specification shall be qualified in accordance with ANSI N45.2.5, Section 2.4.
- 14.4 The Contractor shall have free access to all work and shall have the authority to stop or reject work if the specification requirements including those for documentation, have not been fulfilled.
- 14.5 The Subcontractor shall furnish documentation to the Contractor in accordance with Form G-321-D.
- 14.6 Prior to start of work, the Subcontractor shall submit the documentation that will satisfy the requirements of Form G-321-D. Upon approval by the Contractor, the documents will be returned to the Subcontractor. The Subcontractor shall then submit the detailed documentation in accordance with the approved forms. While in the supplier's facilities these and other records required by applicable

codes and standards which are necessary to verify activities affecting quality, shall be maintained in facilities to protect contents from possible destruction by causes such as fire, flooding, tornadoes, insects, rodents, and from possible deterioration by a combination of extreme variations in temperature and humidity conditions. Storage systems shall provide for the accurate retrieval of information without undue delay. (Compliance to ANSI N45.2.9, "Requirements for Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants" fulfills these requirements.) Quality assurance records are those records which furnish documentary evidence of the quality of items and of activities affecting quality. Records become quality assurance records upon issuance for use.

14.7 In areas, facilities and environments where installation, inspection and testing are performed in accordance with this specification, the housekeeping requirements shall be in accordance with ANSI N45.2.5, Section 2.6.

14.8 Procedures and instructions shall be in accordance with ANSI N45.2.5, Section 2.2.

15.0 MEASUREMENT AND PAYMENT

15.1 Jobsite Laboratory Building and Equipment

Furnishing of the complete Jobsite Laboratory Building and Equipment will be measured as a unit and paid as a lump sum item. This item includes renovation of the existing buildings, and/or furnishing additional buildings, if any.

Seventy-five percent (75%) of payment will be made under this Subcontractor item when the building(s) and all equipment required to perform the specified jobsite testing have been installed. Twenty-five percent (25%) of payment will be made under this Subcontractor item when the equipment and all Subcontractor furnished buildings (including foundations) have been removed upon completion of the work, and cleanup of the work area is finished.

15.2 Rental for Laboratory Building and Equipment

Rental of Laboratory Building and all equipment required to perform the specified jobsite testing will be measured and paid for by the month to the nearest 5 calendar days for the number of months that such building and equipment are satisfactorily furnished. This item shall also include compensation for all incidental costs borne by the Subcontractor in the operation of the laboratory, including but not limited to:

15.2.1 Costs to supply utilities, including telephone, to the laboratory.

15.2.2 Furnishing all office supplies, except that a) Contractor forms when required will be provided to the Subcontractor, at no cost and b) a duplicating machine is available in the Contractor's office, and the Subcontractor may use this machine in preparing test result copies.

15.2.3 Gasoline, lubricants, and upkeep of the Subcontractor's vehicle(s) and equipment.

15.2.4 All materials expended in the performance of this jobsite testing - i.e. concrete cylinder molds.

15.3 Non-Technical Personnel

Services of non-technical personnel (i.e. clerks) who are assigned to the job on a long term basis (greater than 30 calendar days) and whose assignment has been authorized by the Contractor in writing, will be measured and paid for by the month, provided that for any absences occurring during the month, an adjustment computed on the basis of days absent divided by the number of regular working days in that month will be deducted from the monthly payment.

15.4 Laboratory Chief, Laboratory Technicians and Assistant Technicians and Inspectors

Services of each class of technician and inspector who are assigned to the job on a long term basis (greater than 30 calendar

days) and whose assignment has been authorized by the Contractor in writing, will be measured and paid for by the month, subject to the same deduction for partial months as described in paragraph 14.3 above.

15.5 Short Term Personnel

When authorized by the Contractor in writing, short term personnel services (30 days or less) shall be provided. Such services will be measured and paid for on the basis of the number of days the employee is on the job. The daily rate will be established by dividing the appropriate monthly rate of Item 3 through 8 by the number of regular working days in that month. Additionally, a travel time allowance to reach the jobsite initially and to later return home after the short term work assignment is completed will be allowed up to a maximum of 8 hours per employee per assignment. Travel and living expenses of the employee incurred during the short term assignment will be reimbursed at cost upon presentation of receipts with the billing, except that a daily meals allowance will be paid, and no receipts are required.

15.6 Overtime

Overtime for each class of personnel authorized by the Contractor to remain on-site for more than 8 working hours per day, or to work a non-regular day, will be measured and paid for to the nearest hour for the number of hours of such overtime satisfactorily performed. Overtime work will normally be authorized in writing in advance of the work, and in no event later than the morning following the day worked.

15.7 Off-site Test

Off-site tests, of the various kinds, will be measured and paid for as the number of such tests requested by the Contractor and satisfactorily performed. This payment item will also include any incidental costs for off-site testing, including but not limited to:

15.7.1 Packing and crating of materials.

15.7.2 Shipment costs.



Bechtel Associates Professional Corporation  
Ann Arbor, Michigan

Appendix A  
Spec C-208

TECHNICAL SPECIFICATIONS  
FOR  
SUBCONTRACT  
FOR  
OPERATING ON-SITE BATCH PLANT AND  
FURNISHING CONCRETE  
FOR THE  
CONSUMERS POWER COMPANY  
OPERATING MIDLAND PLANT  
MIDLAND, MICHIGAN  
FURNISHING CONCRETE

- Consisting of:
1. Technical Specifications
  2. Appendices A through E

CONSUMERS POWER COMPANY

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No.	DATE	REVISIONS	BY	CHK	APPR
16	10-22-79	Rev. as noted on facing sht. Inc. SCN 9004	BRM	BRM	LHC
15	5-14-79	Rev. as noted on facing sht, Inc SCN 9001, 9002, 9003	DAE	DAE	RLC/low
14	12-26-78	Rev as noted on facing sht, Inc SCN 8004	DAE	DAE	RLC/low
13	6-20-78	Revised as noted on Facing Sht, Inc. SCN 8001, 8002, 8003	DAE	DAE	RLC/low
12	2-7-78	Revised as Noted on Facing Sheet, Incorporated SCNs 7007, 7008, 7009, and 7010	DAE	DAE	RLC/low
11	10-21-77	Revised as Noted on Facing Sheet. Incorporated SCNs 7003, 7004, 7005, and 7006	DAE	DAE	RLC/low
10	5-10-77	Revised as noted on Facing Sheet, Incorporated SCN 7001, 7002	DAE	DAE	RLC/low
9	3-15-77	Revised as noted on Facing Sheet	DAE	DAE	RLC/low
8	11/8/76	Revised Facing Sheet as noted; incorporated. SCN 6003, 6004, 6005, and 6006	DAE	DAE	RLC/low
7	7/2/76	Revised as noted on Facing Sheet, Incorporated SCN 6002	DAE	DAE	RLC/low
6	2/12/76	Revised as noted on Facing Sheet; Incorporated SCN 5001, 5002, 6001	DAE	DAE	RLC/low
5	11/22/74	Revised as noted on Facing Sheet; incorporated SCNs 4008 through 4012; SCN 4003 superceded by SCN 4004	DAE	DAE	RLC/low
4	7/10/74	Revised as noted on facing sheet Incorporated SCNs 4004, 4005, 4006, 4007	DAE	DAE	RLC/low
3	3/12/74	Incorporated SCN No. C-230-7001, 4002 and made Minor Revisions as noted on Facing Sheet	DAE	DAE	RLC/low
2	10/5/73	Issued for Subcontract	DAE	DAE	RLC/low
1	7/17/73	Issued for Bids & for Interim Batch Plant Operation	DAE	DAE	RLC/low
0	6/8/73	Issued for Client Approval	DAE	DAE	RLC/low

-A-1" SIZE



Consumers Power Company  
Midland Plant Units 1 & 2

JOB No. 7220-  
SPEC/DES GUIDE No. 16  
C-230 (0)

SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.
1	16	21	11										
11	16	18a	11										
111	11	14a	11										
iv	11	Form G-321D											
v	13	1	1										
1	11	8b	14										
2	11	10a	15										
3	15	10b	15										
4	11												
4a	13	10c	15										
5	11												
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19	11												
20	11												

16	10/22/79	Rev. sht. 8a, 1, 11.											
15	5/14/79	Rev sht 1, 11, 3, 10a, 11, 12; Added sht 10b, 10c											
14	1/22/78	Rev shts 1, 11 & 8b											
13	4/26/78	Revised shts 1, 11, 4a, 6, v											
12	2-7-78	Revised Shts 1, 11, 7, 8a, 10. Added 8B and 10.											
11	10/21/77	Rev. shts. 1 through 14a.											
10	5/16/77	Rev. sh 1, 11, v. 4, 5, 7, 10, 14, 17, 18, 18a add 1											
9	3-15-77	revised shts 1, 11, iv, v, 2, 4, 5, 9, 10, 11, 13, 14, 17, 18, and added 4a, 18a											
8	11/10/76	Rev. sh 1, 11, 6, 8, 9, 10, 11, 13; add sh 8a											
7	7/2/76	Rev. pgs 1, 11, Form G-321-D											
6	2/12/76	Rev. pgs. 1, 11, 4, 13											
5	11/1/75	rev. pgs. 1, 11, 6-8, 12-16											
4	7/10/74	Revised sheets 1, 11, 4, 5, 8											
3	3/2/72	rev. pgs. 1, 11, 3-8, 17, 18											
2	10/5/73	rev. pgs. 1, 11, 8, 14, 20											
1	5/12/75	rev. pgs. 1, 11, 4, 5, 9, 11, 12, 13, 14, 17, 19, 20, 7, 8. Deleted pgs. 22 & 23											
0	6/8/75	Issued for Client Approval											



FACING SHEET  
 OPERATING ON-SITE BATCH PLANT AND  
 FURNISHING CONCRETE  
 CONSUMERS POWER CO.  
 MIDLAND PLANT, UNITS 1 & 2  
 MIDLAND, MICHIGAN

JOB No 722C

Specification  
 7220-C-230(Q)

REV.

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