Bechtel Associates Professional Corporation
Ann Arbor, Michigan

Appendix L
Spec C-208

TECHNICAL SPECIFICATION

FOR

SUBCONTRACT FOR

CONCRETE UNIT MASONRY

FOR THE

CONSUMERS POWER COMPANY

MIDLAND PLANT, UNITS 1 AND 2

MIDLAND, MICHIGAN

No.	DATE	REVISIONS	BY	CH'K	APP'D
3	12-18-79	Minor revisions as shown	MU	TOM JC	LAC/ADK
2	9-12-77	Incorporated SCN 7005,7006,7007,7008,7009,7010, and minor revisions	JC	GHM JAL	
1	7-8-77	Incorporated SCN 7001, 7002, 7003, 7004	JC	GHM JAL	RLC
0	11-16-76	Issued for Field Use	JC	JAL VH	RLC

ORIGIN

MIDLAND PLANT UNITS 1&2
MIDLAND, MICHIGAN
CONCRETE UNIT MASONRY

JOB No. 7220
SPEC/DES GUIDE No. 7220-A-13
REV 3

SHEET 1 OF 111

AA-C-100373

SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.
1	3												
ii	3												
iii	3												
1	0												
2	2												
3	3												
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5	3												
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7	3												
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9	3												
10	3												
11	3												
12	3												
13	3												
Appendices													
A	3												

NO.	DATE	REVISIONS	BY	CHK'D	APP'D	NO.	DATE	REVISIONS	BY	CHK'D	APP'D
3	12/19/79	Minor revisions A.S.	MU	TJH JC	LHC						
2	9-12-77	Incorporated SCN 7005, 7006, 7007, 7008, 7009, 7010 and minor revs.	JC	GAB JAK							
1	7-8-77	Incorporated SCN 7001, 7002, 7003, 7004	JC	JAK	RLC						
0	11-6-76	Issued for Field Use		JAK	RLC						

BECHTEL

MIDLAND

FACING SHEET

MIDLAND PLANT UNITS 1 & 2

CONCRETE UNIT MASONRY

JOB No. 7220

7220-A-11

REV. 3

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AA-G-110273

TECHNICAL SPECIFICATION

FOR

SUBCONTRACT FOR

CONCRETE UNIT MASONRY

CONTENTS

APPENDICES

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TECHNICAL SPECIFICATION

FOR

FIELD PURCHASE AND INSTALLATION OF

CONCRETE UNIT MASONRY

1.0 WORK INCLUDED

1.1 The work includes but is not limited to the following:

a. Furnishing and installing concrete masonry units, glazed concrete masonry units, wall ties, mortar, grout, and concrete in cavity walls.

b. Installing reinforcement, anchors, inserts, and other masonry accessories furnished by the Contractor.

c. Constructing around preset pipes, ducts and metal frames for openings in concrete unit masonry, including setting anchors, sleeves and inserts furnished by the Contractor.

d. Prepare concrete surfaces to receive masonry.

2.0 RELATED WORK NOT INCLUDED

2.1 The following items of related work are not included:

a. Brick masonry

b. Concrete foundations

c. Furnishing metal frames including anchors, sleeves, and inserts

d. Foundation dowels cast in concrete, welded dowels and welded anchors and anchor slots embedded in concrete

e. Furnishing and installing steel plates and welded studs at tops of walls

f. Furnishing reinforcing steel

3.0 STANDARDS AND CODES

3.1 The following standards are incorporated as a part of this Specification as indicated:

3.1.1 American Society for Testing and Materials (ASTM):

A 36 Structural Steel

A 525 Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process

A 615 Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

C 90 Hollow Load-Bearing Concrete Masonry Units

C 140 Method for Sampling and Testing Concrete Masonry Units

C 270 Mortar for Unit Masonry

C 476 Mortar and Grout for Reinforced Masonry

C 145 Solid Load-Bearing Concrete Masonry Units

3.1.2 American Concrete Institute (ACI):

ACI 318 Building Code Requirements for Reinforced Concrete

3.2 The following code is incorporated as a part of this Specification as indicated:

3.2.1 Uniform Building Code (UBC):

No. 24-22 Field Tests for Grout and Mortar. ASTM-C-780 mortar test may be used as an alternative to the UBC test.

4.0 QUALITY ASSURANCE

4.1 Quality assurance requirements are for installation, inspection, and testing in accordance with Sections 9.0 and 12.0 of this specification for concrete block walls indicated in the architectural drawings as "Q" listed walls.

5.0 SUBMITTALS

5.1 Subcontractor shall maintain the following records in accordance with Form G-321-D:

a. Samples of each type of unit

b. Mortar and grout mix design and materials source

c. Certificates from manufacturer verifying concrete masonry units have been properly cured before shipping to jobsite and that they comply with requirements in 7.1 below

d. Certificate verified by an approved testing laboratory that mortar and grout mix designs conform to this Specification and that concrete masonry units conform to the requirements in 7.1 below

e. Certificate of compliance from the manufacturer verifying that materials called out in Sections 7.5 through 7.10 comply with the requirements as stated in the same sections | 3

6.0 TYPES OF WALLS

Masonry walls shall be constructed of normal-weight concrete masonry units and all cells and spaces between wythes shall be grouted solid with heavy-weight grout or concrete as shown in drawings.

Masonry walls shown "removable" shall be constructed of solid, load-bearing concrete masonry units without reinforcing. Voids and spaces between wythes shall be grouted solid. Units and grout shall be heavy weight.

7.0 MATERIALS

7.1 Concrete masonry units shall be load-bearing hollow units, Grade N-1 as specified in ASTM C 90 with linear shrinkage not to exceed 0.05 percent, and with a normal weight classification of 130 pounds per cubic foot min. density.

7.2 Mortar shall be Type M conforming to ASTM C 270 and shall have a minimum compressive strength of 2500 pounds per square inch at 28 days, unless otherwise shown. Cement shall be Type I or Type II portland cement with masonry cement (no lime or lime putty). Mortar for glazed units shall be integrally colored as approved and shall be sealed as specified in Section 9.4.2.

7.3 Grout shall conform to ASTM C 476; the minimum compressive strength shall be 2500 pounds per square inch at 28 days, unless otherwise shown. Cement shall be Type I or Type II Portland cement. Aggregate size No. 8 shall be used for grout where the least cavity dimension exceeds 2-1/2 inches and aggregate size No. 1 or 2 shall be used where this dimension is less than 2-1/2 inches. Grout shall have a 6-1/2-inch minimum and 9-inch maximum slump, and shall have a cured density of not less than 135 pounds per cubic foot.

7.4 Reinforcing bars shall be Grade 60 deformed type as specified in ASTM A 615.

7.5 As an alternate to dovetail anchors and slots, the following may be used:

Block anchors, No. 186 manufactured by "Heckmann Building Products," secured to concrete walls with Type DN-27P8 pins manufactured by "Hilti Corporation" at 16-inch O.C vertical spacing. Similar products by Hohman & Barnard, Inc., may be used.

7.6 Calking and joint filler shall be in accordance with the latest revised issue of Specification 7220-A-35 and as shown.

7.7 Glazed concrete masonry units shall conform to ASTM C 90, Grade N-1 with linear shrinkage not to exceed 0.05 percent, and shall be factory finished with "Spectra Glaze" as manufactured by the Burns and Russel Company or the Hanley Company. Color will be selected from manufacturer's standard range and as noted in the Finish Schedule.

7.8 Wall ties and masonry accessories shall be zinc coated with ASTM A 525 designation G-90, as manufactured by Hohmann & Barnard, Inc., Dur-O-Wall Products or AA Wire Products Company.

Joint reinforcing may be No. 9 gage ladder type. Wire shall not be galvanized after fabrication. Joint reinforcement is not required and shall not be used in bond beams.

7.9 Control joint gaskets shall be "Dur-O-Wall Rapid" Hohmann & Barnard wide flange control joints, or paper joints sized as shown on design drawings.

7.10 Deformed anchor bars shall be "Nelson Stud Welding Company" as shown on drawings.

8.0 MATERIAL HANDLING AND STORAGE

8.1 Concrete masonry units and cement shall be handled without damage, stored in dry areas for protection from weather, moisture, stain and other physical damages until installation. Storage temperature for cement shall be maintained above 35°F. Storage space shall be provided by Contractor.

8.2 Glazed concrete masonry units shall be protected against weather, moisture, stain, discoloration and other physical damage of the glazed face. Method of protection shall be in accordance with the glazed units manufacturer's printed instructions.

9.0 INSTALLATION

9.1 Masonry Units

9.1.1 Units shall be sound, dry, clean and free from cracks when placed. Units shall be laid plum, true to line with level and accurately spaced courses. Corners and reveals shall be plumb and true. Each unit shall be solidly bedded in mortar. Units that are moved or shifted shall be relaid in fresh mortar. Joints shall be approximately 3/8 inch wide or as required to maintain coursing, and shall extend full depth of face shells for hollow block and full depth of unit for solid block. Anchors, wall plugs, accessories and other items required to be embedded in mansonry shall be built-in as the masonry work progresses. Spaces in metal door frames and around built-in items shall be solidly filled with mortar.

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Vertical cells to be reinforced shall have vertical alignment sufficient to maintain complete grout cover around bars.

9.1.2 The top surface of concrete to receive masonry shall be clean, shall have laitance removed, roughened, and shall be level, aligned within one inch tolerance before installation is begun.

9.1.3 Unless otherwise shown, walls shall be laid up straight uniform courses with regular running bond. Bond beam units shall be used where shown.

9.1.4 When it is necessary to stop off a longitudinal run of masonry, it shall be done by racking back one-half unit length in each course. Toothing is not permitted without Contractors approval. Toothing of interior, solidly grouted walls is allowed.

9.1.5 Concrete masonry units shall not be wetted before laying. Units partially wetted during cutting may be installed.

9.1.6 Masonry wall corners shall have a standard masonry bond by overlapping units and shall be vertically reinforced with bars.

9.2 Reinforcing

9.2.1 Reinforcing bars shall be placed as shown and supported in place.

Nominal dimensions of reinforcing dowels from the outside face of the wall shall be 3-inches minimum and 4-inches maximum. Tolerances for dowel location shall be as follows:

a. 8-inches thick wall - 10% of the dowels may be less than the nominal dimension from the face.

b. 12-inches thick wall with two layers of dowels - one layer may be closer to the face than the nominal dimension, as long as 90% of the other layer is within the nominal dimension.

c. Wall greater than 12-inches thick - 10% of each layer of dowels may be further from the face than the nominal dimension and 100% of each layer may be less.

d. Minimum clear dimension for a, b, and c above shall not be less than 1-inch.

e. Dowels location dimension shall be measured at floor level.

9.2.2 Where existing dowels are not in alignment with cells of masonry units, the dowels may be removed, new dowels of similar size and length may be installed in alignment by drilling concrete and grouting the dowels with flowable nonshrink grout in concrete as noted in drawings. Where existing floor dowels are placed so there is interference with the block, ends and/or webs of block may be cut to allow required grout coverage. Face shell may be shipped to allow required grout coverage. Required grout coverage shall be 1-inch minimum clear.

9.2.3 Before reinforcing is placed, the surfaces of bars, wire, and supports shall be cleaned free of heavy or flaked rust, loose mill scale, dirt, grease, or other deleterious substances. After placing, the reinforcing steel shall be kept clean until it is embedded.

9.2.4 Bending, lapping, splicing, and offsetting of reinforcing bars shall be in accordance with ACI 318 and the latest revised issue of Specification 7220-C-231, unless otherwise shown. Horizontal reinforcement at corners and intersections of walls shall be placed with sufficient clearance to allow full grout fill of cells.

9.2.5 Placement of wall ties and accessories shall be in accordance with the manufacturer's published specifications and as shown.

9.3 Grout Fill

9.3.1 Mortar fins which project more than 3/8-inch from the fin edge of the face shell into the grouted space shall be removed. Mortar droppings in cell spaces which are to be grouted shall be rodded while wet to remove air pockets and bridging. Mortar which could form air pockets and/or bridging which has been allowed to dry without rodding shall be removed.

9.3.2 Grout fill shall be poured in lifts (height of drop) not to exceed four feet. Each pour of grout shall be thoroughly rodded to ensure compaction and bond to the preceding pour. A preceding pour shall be allowed to cure for a minimum of 24 hours prior to the new pour. | 3

9.3.3 When work is stopped for a period of 45 minutes or longer, the pour of grout shall be stopped not higher than 1-1/2 inches below the top of the last course and the surface of the fill shall be left rough.

9.3.4 Concrete for core spaces between wythes of masonry shall be placed and cured in accordance with the latest revised issue of Specification 7220-C-231 and as specified in 9.3.2, and shall be Class B-1, B-2, or PG-B, in accordance with the latest revised issue of Specification 7220-C-230(Q). Grout may be used in lieu of concrete for spaces between wythes and shall be batched as specified in Specification 7220-A-13, Section 7.3.

9.4 Joints

9.4.1 Mortar joints for regular concrete masonry units shall be solidly filled, straight, and uniform in thickness and appearance. Joints shall be flush filled, including nicks and defects on the masonry units, to obtain a uniform flat surface ready to receive surfacer finish, unless shown differently in the architectural drawings.

9.4.2 Mortar joints for glazed concrete masonry units shall be solidly filled, straight, and uniform in thickness and appearance, and shall be raked 1/4-inch and then sealed with integrally colored epoxy grout as American-Orlean No. AAR-11 epoxy or approved equal.

10.0 PROTECTION

10.1 Partially completed masonry walls exposed to weather shall be covered with waterproof sheets at the end of each day's work or beginning of each shutdown period. Covering shall overhang at least two feet on each side of wall and shall be secured against displacement by wind or other agent.

10.2 Masonry shall be maintained at 35F or above for a period of at least 48 hours after being laid. Materials shall be free from ice or snow.

10.3 Masonry erected when the ambient air temperature is more than 90F in the shade and relative humidity is less than 50% shall be protected against rapid drying for at least 48 hours after being laid.

11.0 POINTING AND CLEANING

11.1 During the progress of work, walls which are to be left exposed shall be kept clean. Mortar smears shall be allowed to dry for a short period and then shall be promptly removed by trowel, stiff brush, or both. Care shall be taken to avoid damage to the mortar joint when brushing. Mortar burrs shall be promptly removed.

11.2 Upon completion and before acceptance, holes in joints of exposed masonry surfaces shall be cut out and pointed with mortar and tooled to match adjacent joints.

11.3 Mortar and grout stains on the face of concrete masonry units shall be removed by brushing with a stiff-fiber brush and washing with a 10 percent maximum miriatic acid solution. Immediately after washing, the surfaces which have been acid cleaned shall be thoroughly rinsed with potable water. Effervescent stain shall be removed by whipblasting.

11.4 Glazed units shall be cleaned with a solution specified by the glazed units manufacturer. If there is any evidence of blushing, discoloration, or whiting on the glazed face, the Contractor shall correct such defacement including removal of such defaced units as required.

12.0 INSPECTION AND TESTS

12.1 Sampling and testing concrete masonry units shall be in accordance with ASTM C140. Testing of grout, mortar, and masonry units shall be performed in accordance with the latest revised issue of Specification 7220-C-208, and ASTM C-90, as noted in Section 7.1 of this specification (7220-A-13).

12.2 Subcontractor shall provide the following inspection and tests, except as noted in Section 12.3.

12.2.1 Subcontractor shall examine laying and grouting masonry work including verification of the following with the Contractor.

a. Concrete surfaces are roughened and otherwise prepared to receive masonry work.

b. Proper types and grades of units are used for the respective locations.

c. Reinforcement is securely installed in accordance with this specification.

d. Mortar, grout and fill are prepared and placed in accordance with this specification and as shown.

12.2.2 Field testing of grout and mortar shall be in accordance with UBC Standard No. 24-22, except that physical requirements shall be as specified herein. 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. Additional test samples shall be taken whenever any change in the

materials or job condition occurs, wherever such tests are necessary to determine the quality of the material. Onsite laboratory curing tanks may be used in lieu of fog room specified in UBC Standard No. 24-22. ASTM-C-780 mortar test may be used as alternate to UBC test.

12.2.3 Sampling, testing, and inspection of concrete in accordance with ACI 318 requirements.

12.3 The cost of testing noted in Sections 12.1, 12.2.2, and 12.2.3 will be borne by the Contractor, unless the result indicates negative. Then the cost of testing and retesting shall be borne by the Subcontractor.

12.4 Erection tolerances for plumb, true, and level shall be in accordance with BIA Technical Notes No. 11D, Part III, Section 3.02J, as follows:

PART III - EXECUTION

3.02 GENERAL ERECTION REQUIREMENTS

12.4.1 Construction Tolerances:

a. Maximum variation from plumb in vertical lines and surfaces of columns, walls and arrises:

1. 1/4-inch (6.4 mm) in 10 feet (3 m)

2. 3/8-inch (9.6 mm) in a story height not to exceed 20 feet (6 m)

3. 1/2-inch (12.7 m) in 40 feet (12 m) or more

b. Maximum variation from plumb for external corners, expansion joints, and other conspicuous lines:

1. 1/4-inch (6.4 mm) in any story or 20 feet (6 m) maximum

2. 1/2-inch (12.7 mm) in 40 feet (12 m) or more

c. Maximum variation from level of grades for exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines:

1. 1/4-inch (6.4 mm) in any bay or 20 feet (6 m)

2. 1/2-inch (12.7 mm) in 40 feet (12 m) or more

d. Maximum variation from plan location of related portions of columns, walls, and partitions:

1. 1/2-inch (12.7 mm) in any bay or 20 feet (6 m)

2. 3/4-inch (19 mm) in 40 feet (12 m) or more

e. Maximum variation in cross-sectional dimensions of columns and the thicknesses of walls from dimensions shown on drawings:

1. Minus 1/4-inch (6.4 mm)

2. Plus 1/2-inch (12.7 mm)

13.0 MEASUREMENT FOR PAYMENT

13.1 The work will be measured by the amount that has been accomplished satisfactorily in accordance with the subcontract documents. Where detailed measurement is required to support claim for payment, it shall be as follows:

13.1.1 Concrete unit masonry including nonload-bearing, heavyweight, and removable concrete units will be measured to the nearest square foot of the concrete units installed in place as listed in the schedule of quantities and prices.

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13.1.2 Glazed concrete unit masonry will be measured to the nearest square foot of glazed concrete units installed in place as listed in the schedule of quantities of prices.

13.1.3 No separate measurement for payment will be made for reinforcement, anchors, ties, inserts, other masonry accessories, and installation of frames into concrete masonry. All costs in connection therewith shall be included in the price for each type of concrete unit masonry to which the work pertains.

READ INSTRUCTIONS ON BACK BEFORE FILLING IN FORM

These requirements for Engineering and Quality Verification Documents are to be fulfilled in accordance with the schedule set forth below. Supplier's failure to comply with these requirements may result in order cancellation or withholding of payment until compliance is established.

1. Document Category Number	2. Specification Paragraph Reference	3. Kind of Copies	ENGINEERING DOCUMENTS 4. Quantity Required: Initial	4. Quantity Required: Final	5. Prior Approval Required: Yes	5. Prior Approval Required: No	QUALITY VERIFICATION DOCUMENTS 6. Quantity Required for Release	7. Distribution Code	8. Supplier Conform Check	9. Inspection Release	10. Engineering Review	11. Field QCE Check In	12. Remarks
11.0	5.1.b	Reproducible	1	1	X		N/A	a					
		Microfilm											
17.4	5.1.e	Reproducible					1	C					
		Microfilm											
27.0	12.0	Reproducible	1	1		x	1	C					
		Microfilm											
10.2	5.1.a	Reproducible	1	1		x	a						
		Microfilm											
27.0	5.1.c	Reproducible	1	1		x	1	C					
		Microfilm											
		Reproducible											
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13. Supplier's Order No.	14. Supplier's Part No.	15. Supplier's Part Name	16. Quantity
17. Buyer's Req. Item No.	18. Buyer's Line/Equip., Tag or Code No.	19. Buyer's Part Name	20. Traceability

21. Supplier's Conformance Statement — We certify that the listed work and required documents meet the requirements of the procuring documents.

Supplier _____ (Signature) _____ (Title) _____ (Date)

22. Inspection Release Statement — Work was released based on satisfactory completion of inspection and review of documentation. Authorized Deviations ☐ YES, Noted under 12, Remarks ☐ NONE

Bechtel Inspector _____ (Signature) _____ (Date)

23. Engineering Review Statement — The Quality Verification Documents submitted to Engineering with this form have been reviewed for conformance to the specified requirements and are acceptable.

Engineer _____ (Signature) _____ (Date)

24. QCE Check-in Statement — This form and the Quality Verification Documents referenced hereon have been received and their relationship to the hardware items verified. CONTROL NO. _____ FILE NO. _____

QCE _____ (Signature) _____ (Date)

After QCE Check-in Distribute to: Procurement Manager, Field Office Manager, Material Supervisor

6-321-0
AA REV 2
6/74

MIDLAND PLANT UNITS 1 & 2
Consumers Power Company

JOB NO. 7220
P.O./SPEC. NUMBER 7220-A-13

ENGINEERING AND QUALITY VERIFICATION DOCUMENT REQUIREMENTS

SHEET 1 OF 2 REV. 3

REPRODUCTION OF THIS FORM IS AUTHORIZED

QUALITY VERIFICATION DOCUMENT TRANSMITTAL–REPRODUCE THIS SIDE ONLY

Appendix A

INSTRUCTIONS FOR PREPARING G-321-D

A. **PURPOSE:** This is a multi-purpose form to be used by Buyer/Contractor to specifically identify documents required of the supplier to satisfy specification requirements, and is to be used by the supplier as a cover sheet for Quality Verification Documents when submitting them to the Buyer/Contractor.

B. **GENERAL INFORMATION:** Engineering (E) and Quality Verification (V) Documents are identified by Category number and title in section H. below.

C. **USE:** A copy of the front of this form shall be completed by the supplier and provided to the Buyer's/Contractor's Inspector along with the applicable Quality Verification Documents for his review prior to release of the unit(s).

D. **DISTRIBUTION:** All Engineering (E) Documents are to be sent to the Project Engineer at the address shown below (Code a).

When inspection release is completed, the Verification (V) Documents are to be distributed to the respective addresses shown below in accordance with the distribution code specified in Column 7. A copy of the completed Form G-321-D must accompany each "package" of Verification Documents to its destination. Also, a copy of completed Form G-321-D is to be included with the hardware shipment and a copy sent separately to the Project Field Quality Control Engineer at the jobsite.

Code a. Code b. With hardware shipment Code c.

E. **DEFINITIONS OF TERMS:** (See also Document Category Definitions G-321-SUP A)

Supplier – This is a generic term and is synonymous with the terms seller, vendor, contractor, sub-contractor, sub-supplier, etc.
Reproducible – can be legibly duplicated by either microreproduction or electrostatic dry process.
Microfilm – 35mm microfilm conforming to the requirements of the procurement documents. When not specified, supplier shall submit his standard for approval.
Prior Approval Required – Bechtel approval required prior to use of documents in the design, fabrication, installation, or other work process.
Initial – the first submittal of a document in accordance with the schedule mutually agreed to by the Buyer and the supplier.
Final – the submittal that reflects the resolution of review comments, or the complete submittal required. Both are to be accepted prior to rendering final payment. Drawings submitted as final must be full size reproducibles made from original document. Adjacent to the title block, each drawing must be certified and show Buyer's job title, job number, purchase order number, line, equipment, tag or code number, and the manufacturer's serial number(s).
Certified – the dated Signature and Title of an authorized and responsible employee of the supplier.
N/A – Not applicable – can be used for individual entries, columns and lines by Project engineering, and for individual entries by the supplier.

F. **BECHTEL ENTRY INSTRUCTIONS**

Entry No.	Information Required
1	Enter Document Category Number.
2	Enter Specification paragraph reference.
3	Make no entry. Relates to kind of copies required.
4	Enter the number of each kind of copy for "initial" or "final" submittals of Engineering Documents.
5	Enter approval requirement by X under "Yes" or "No" column.
6	Enter the number of each kind of copy of Quality Verification Documents required for release of the item or installation.
7	Enter Quality Verification Document distribution code letter in accordance with paragraph D above.
8	Make no entry. For supplier use only.
9	Bechtel Inspector to complete upon release. Sign on line 22.
10	Enter Bechtel Engineering review confirmation. Sign on line 23.
11	Bechtel QCE to complete check-in. Sign on line 24.
12	Enter remarks as appropriate.

G. **SUPPLIER ENTRY INSTRUCTIONS**

Entry No.	Information Required
8	Enter number of pages of each type of Quality Verification Documents being submitted for the unit(s) being released. Sign Statement of Conformance on line 21.
12	Enter remarks as appropriate. When a deviation has occurred, reference the deviation(s) and Buyer/Contractor's authorization in this column, and include the authorization document(s) in the Verification Document Package.
13, 14, 15	Enter information as required.
16	Enter the numbers of units covered by the Quality Verification Documents being submitted. For each requisition item no. being released provide a separate copy of this completed form and the supporting Quality Verification Documents.
17, 18, 19	Enter information as required.
20	Enter identification number(s) traceable to the unit(s) being released, e.g. serial no., heat no. of major component, cable reel no. or other unique designator.

H. **DOCUMENT CATEGORY NUMBERS:** Engineering (E) and Quality Verification (V) Document Requirements as entered in Column 1, and defined in G-321-SUP A Document Category Definitions. For details, see specification paragraph(s) referenced in Column 2.

1.0 DRAWINGS (E)
- 1.1 Outline Dimensions, Services and Foundation/Mounting Details
- 1.2 Assembly Drawings
- 1.3 Shop Detail Drawings
- 1.4 Wiring Diagrams
- 1.5 Control Logic Diagrams
- 1.6 P & IDs

2.0 PARTS LIST AND COST (E)
3.0 COMPLETED BECHTEL DATA SHEETS (E)
4.0 INSTRUCTIONS (E)
- 4.1 Erection/Installation
- 4.2 Operating
- 4.3 Maintenance
- 4.4 Site Storage and Handling

5.0 SCHEDULES: ENGINEERING AND FABRICATION/ERECTION(E)
6.0 QUALITY ASSURANCE MANUAL/PROCEDURES (E)
7.0 SEISMIC DATA REPORT (E)
8.0 ANALYSIS AND DESIGN REPORT (E)
9.0 ACOUSTIC DATA REPORT (E)
10.0 SAMPLES (E)
- 10.1 Typical Quality Verification Documents
- 10.2 Typical Material Used

11.0 MATERIAL DESCRIPTION (E)
12.0 WELDING PROCEDURES AND QUALIFICATIONS (E), AND VERIFICATION REPORTS (V)
13.0 WELD ROD CONTROL PROCEDURES (E), AND VERIFICATION REPORTS (V)
14.0 REPAIR PROCEDURES (E), AND MAJOR REPAIR VERIFICATION REPORTS (V)
15.0 CLEANING AND COATING PROCEDURES (E), AND VERIFICATION REPORTS (V)
16.0 HEAT TREATMENT PROCEDURES (E), AND VERIFICATION REPORTS (V)
17.0 CERTIFIED MATERIAL PROPERTY REPORTS (V)
- 17.1 MTR (Certified Material Test Reports)
- 17.2 Impact Test Data
- 17.3 Ferrite Data
- 17.4 Material Certificate of Compliance
- 17.5 Electrical Property Reports

18.0 CODE COMPLIANCE (V)
19.0 UT – ULTRASONIC EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V)
20.0 RT – RADIOGRAPHIC EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V)
21.0 MT – MAGNETIC PARTICLE EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V)
22.0 PT – LIQUID PENETRANT EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V)
23.0 EDDY CURRENT EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V)
24.0 PRESSURE TEST – HYDRO, AIR, LEAK, BUBBLE OR VACUUM TEST PROCEDURE (E), AND VERIFICATION REPORTS (V)
25.0 INSPECTION PROCEDURE (E), AND VERIFICATION REPORTS (V)
26.0 PERFORMANCE TEST PROCEDURES (E), AND VERIFICATION REPORTS (V)
- 26.1 Mechanical Tests
- 26.2 Electrical Tests

27.0 PROTOTYPE TEST REPORT (E & V)
28.0 SUPPLIER SHIPPING PREPARATION PROCEDURE (E)

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DOCUMENT CATEGORY DEFINITIONS

(E) - Engineering Documents. This term comprises procedures, drawings, specifications, QA plans, prototype/qualification test procedures, reports and other similar documents that require Bechtel permission to proceed prior to fabrication, or prior to use of the document in the design, fabrication, installation, or other work process unless otherwise indicated. The term is also applied to price lists, and instructional documents for handling, storage, maintenance, etc., that are of informational interest only to project engineering.

(V) - Quality Verification Documents. This term comprises material test reports, heat treatment charts, welding records, NDE results, performance test reports, etc., which demonstrate or certify conformance to the technical or inspection requirements of the procurement documents.

1.0 DRAWINGS (E)

1.1 Outline Dimensions, Services and Foundation/Mounting Details - Drawings providing external envelope, including lugs, center line(s), location and size for electrical cable, conduit, fluid, and other service connections, isometrics, and details related to foundations and mountings.

1.2 Assembly Drawings - Detailed drawings indicating sufficient information to facilitate assembly of the component parts of an equipment item.

1.3 Shop Detail Drawings - Drawings which provide sufficient detail to facilitate the fabrication or manufacture of the equipment item. This includes but is not limited to, spool drawings, heat exchanger internal details, internal piping and wiring, cross-section details and architectural details.

1.4 Wiring Diagrams - Drawings which show the schematic wiring and connection information for electrical items.

1.5 Control Logic Diagrams - Drawings which show the paths which input signals must follow to accomplish the required responses.

1.6 P&IDs - Piping and Instrumentation Diagrams which show piping system details and the basic control elements.

2.0 PARTS LIST AND COST (E) - Exploded view with identified parts and recommended spare parts for one year's operation with unit cost.

3.0 COMPLETED BECHTEL DATA SHEETS (E) - Information provided by a supplier on data sheets furnished by Bechtel which states serial numbers, operating ranges, etc., of equipment that the supplier intends to deliver to satisfy the specification requirements.

4.0 INSTRUCTIONS (E)

4.1 Erection/Installation - Detailed written procedures, instructions, and drawings required to erect or install material or equipment.

4.2 Operating - Detailed written instructions describing how an item or system should be operated.

4.3 Maintenance - Detailed written instructions required to disassemble, reassemble and maintain items or systems in an operating condition.

4.4 Site Storage and Handling - Detailed written instructions which define the requirements and time period, for lubrication, rotation, heating, lifting or other handling requirements to prevent damage or deterioration during storage and handling at jobsite. This includes return shipping instructions.

5.0 SCHEDULES ENGINEERING AND FABRICATION/ERECTION (E) - Bar charts, critical path methods, etc., which chronologically detail the sequence of activities.

6.0 QUALITY ASSURANCE MANUAL/PROCEDURES (E) - The document(s) which describe(s) the planned and systematic measures that are used to assure that structures, systems, and components will meet the requirements of the procurement documents.

7.0 SEISMIC DATA REPORT (E) - The analytical or test data which provides physical response information on an item, material, component or system in relation to the conditions imposed by the stated seismic criteria.

8.0 ANALYSIS AND DESIGN REPORT (E) - The analytical data, (stress, electrical loading, fluid dynamics, etc.), which assures that an item satisfies specified requirements.

9.0 ACOUSTIC DATA REPORT (E) - The noise, sound and other vibration data required by specification which is in the audible range and above the seismic frequency.

10.0 SAMPLES (E)

10.1 A representative data package which will be submitted for the items purchased as required in the specification.

10.2 A representative example of the material to be used.

11.0 MATERIAL DESCRIPTION (E) - The technical data describing a material which a supplier proposes to use for a specific order. This usually applies to architectural items, e.g., metal siding, decking, doors, paints, coatings.

12.0 WELDING PROCEDURES AND QUALIFICATIONS (E), AND VERIFICATION REPORTS (V) - The welding procedures, specification and supporting qualification records required for welding, hard facing, overlay, brazing and soldering. A verification report of welds performed including the identification of the qualified welder(s), and the procedure(s) used, and certification that the welder(s) were qualified.

13.0 MATERIAL CONTROL PROCEDURES (E) - The procedures for controlling issuance, handling, storage, and traceability of material such as weld rod.

14.0 REPAIR PROCEDURES (E), AND MAJOR REPAIR VERIFICATION REPORTS (V) - The procedures for controlling material removal and replacement by welding, brazing, etc., subsequent thermal treatments and final acceptance inspection. Verification reports may include weld repair locations (maps), material test reports for filler metal, pre-and-post-weld heat treatment records, NDE records, etc. The resolution of whether a repair is major or not is a Bechtel responsibility.

15.0 CLEANING AND COATING PROCEDURES (E), AND VERIFICATION REPORTS (V) - The procedures for removal of dirt, grease or other surface contamination and includes application of protective coatings. Verification reports include certification of visual examination for surface preparation, surface profile, materials, etc., humidity data, temperature data and coating thickness data as required by the procurement documents.

16.0 HEAT TREATMENT PROCEDURES (E), AND VERIFICATION REPORTS (V) - The procedures for controlling temperature, time at temperature as a function of thickness , furnace atmosphere, cooling rate and method, etc. Verification reports normally include furnace charts or similar records which identify and certify the item(s) treated, the procedure used, furnace atmosphere, time at temperature, cooling rate, etc. Verification data may be in either narrative or tabular form.

17.0 CERTIFIED MATERIAL PROPERTY REPORTS (V)

17.1 MTR (Certified Material Test Reports) - These reports include all chemical, physical, mechanical and electrical property test data required by the material specification and applicable codes. This is applicable to cement, concrete, metals, cable jacket materials, rebar, rebar splices, etc. The certified MTR shall include a statement of conformance that the material meets the specification requirements.

17.2 Impact Test Data - Results of all Charpy or drop weight tests including specimen configuration, test temperature and fracture data.

17.3 Ferrite Data - Report of the ferrite percentage for stainless steel materials used, including castings & welding filler metals as deposited.

17.4 Material Certificate of Compliance - Verification document which certifies conformance to the requirements of the applicable material specification.

17.5 Electrical Property Reports - Report of electrical characteristics, e.g., dielectric, impedance, resistance, flame test, corona, etc.

18.0 CODE COMPLIANCE (V) - Verifying documents (such as data Forms U-1, N-2, State, etc.), which are prepared by the manufacturer or installer and certified by the Authorized Code Inspector.

19.0 UT - ULTRASONIC EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V) - Method of detection and examination results of presence and certain characteristics of discontinuities and inclusions in materials by the use of high frequency acoustic energy.

20.0 RT - RADIOGRAPHIC EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V) - Method of detection and examination results of presence and certain characteristics of discontinuities and inclusions in materials by x-ray or gamma-ray exposure of photographic film.

21.0 MT - MAGNETIC PARTICLE EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V) - Method of detection and examination results of surface (or near surface) discontinuities in magnetic materials by distortion of an applied magnetic field.

22.0 PT - LIQUID PENETRANT EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V) - Method of detection and examination of surface discontinuities in materials by application of a penetrating liquid in conjunction with suitable development techniques.

23.0 EDDY CURRENT EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V) - Method for detection and examination results of discontinuities in material by distortion of an applied electromagnetic field.

24.0 PRESSURE TEST - HYDRO, AIR, LEAK, BUBBLE OR VACUUM TEST PROCEDURE (E), AND VERIFICATION REPORTS (V) - Method for evaluating the structural and mechanical adequacy or integrity by application of differential pressures, and report of the test results.

25.0 INSPECTION PROCEDURE (E), AND VERIFICATION REPORTS (V) - Organized process followed for the purpose of determining that specified requirements (dimensions, properties, performance results, etc.) are met. Documented findings resulting from an inspection are included in the verification report.

26.0 PERFORMANCE TEST PROCEDURES (E), AND VERIFICATION REPORTS (V) - Tests performed to demonstrate that functional design and operational parameters are met by each item produced and the report of the test results. Test results performed as verification of compliance to qualification requirements shall be submitted as engineering documents.

26.1 Mechanical Test, e.g., pump curves, valve stroking, load, temperature rise, calibration, environmental, etc.

26.2 Electrical Tests, e.g., load, impulse, overload, continuity, voltage, temperature rise, calibration, saturation, loss, etc.

27.0 PROTOTYPE/QUALIFICATION TEST PROCEDURES AND TEST REPORTS (E) - Report of a test which is performed on a standard or typical example of equipment, material or item, and is not required for each item produced in order to substantiate the acceptability of equal items. This normally includes tests which may, or could be expected to, result in damage to the item(s) tested.

28.0 PERSONNEL QUALIFICATION PROCEDURES (E) - Procedures for qualifying welders, inspectors and other special process personnel.

29.0 SUPPLIER SHIPPING PREPARATION PROCEDURE (E) - The procedure used by a supplier to prepare finished materials or equipment for shipment from his facility to the jobsite.

30.0 (OPEN)
31.0 (OPEN)
32.0 (OPEN)
33.0 (OPEN)
34.0 (OPEN)

Appendix A
Supplement A
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