SPECIFICATION

MASONRY

THREE MILE ISLAND NUCLEAR STATION
UNIT 1

SP-5714 AUGUST 8, 1969

METROPOLITAN EDISON COMPANY
READING, PENNSYLVANIA

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525 Lancaster Avenue
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SECTION I

DETAILED SPECIFICATIONS

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1:01 Scope of Work

The CONTRACTOR shall furnish all materials, labor, scaffolding, equipment, and tools necessary to fully complete all masonry and architectural precast concrete WORK as shown on the Drawings and specified herein. The masonry and architectural precast concrete WORK to be furnished, installed, and erected under this Item shall include, but not necessarily be limited to the following:

1. Concrete block walls.
2. Concrete block cavity walls.
3. Precast lintels.
4. Block bed reinforcing.
5. Metal ties and clamps.
6. Control joints:

   Dur-O-Wal wide flange block joint.

7. Splash blocks.
8. Pipe sleeves.
9. Face brick.
10. Precast concrete canopy.
11. Acid-proof Masonry.
12. Synthetic Rubber Coating.
13. Caulking.

1:02 General Requirements

1:02.1 The CONTRACTOR shall carefully unload and stack face brick free of ground on wood planking, spread salt hay between layers, and cover brick piles with waterproof sheet material. Delivery of brick in palletized form is permissible, provided units are stored free of ground and covered.

1:02.2 Concrete block shall be stored in the same manner and in such a fashion as the face brick. All materials shall be stored to prevent damage from mud, rain, sleet, and snow. Units shall be delivered as required to avoid prolonged site storage.

1:02.3 Blockwork shall meet the Portland Cement Association standards

1:02.4 No masonry shall be laid when the temperature of the outside air is below 40 F, unless suitable means are provided to heat the masonry materials and protect the WORK from freezing. Protection shall consist of heating the masonry materials to at least 40 F, and maintaining an air temperature above 40 F on both sides of the masonry for a period of at least 48 hours.

1:02.5 Wall tops shall be covered with waterproof canvas or equal material at the end of each day's work and when WORK is suspended by rain, sleet, or snow. Covers used shall shed water and shall be anchored securely.

1:02.6 Other materials shall be protected from damage. Mortar drops shall be flushed away with water before the mortar hardens or stains other materials.

1:03 Engagement of Other Materials

1:03.1 As the WORK progresses, all materials furnished by other trades shall be built into masonry walls.

1:03.2 Masonry WORK shall be carefully fit around all pipe sleeves, conduits, boxes, etc. Loose steel lintels shall be set and all steel WORK resting on masonry shall be leveled and bedded. The CONTRACTOR shall furnish and install neoprene gaskets between columns and block masonry as detailed. No masonry shall be laid against column steel.

1:03.3 The CONTRACTOR shall install three courses of solid block under all steel beams bearing directly on block walls, or install three courses of hollow block with the cores filled with block masonry mortar.

1:03.4 All non-bearing masonry walls and partitions shall be kept clear of structural steel, steel bar joists, and bridging. Pockets in masonry shall be formed around steel, keeping masonry 3/8 in. away from all steel.

1:03.5 Electrical conduits in masonry walls shall be installed concealed in voids of units to avoid damaging exposed block faces. Where receptacles, switches, or other outlets occur, a true opening shall be provided that will be fully covered by a cover plate. If openings show beyond cover plates, blocks shall be replaced.

1:03.6 All metal wall flashing shall be laid in a bed of mortar. The flashing shall be covered with mortar while placing the next course of masonry. Metal wall flashing shall not be laid dry directly over masonry units.

1:04 Materials

1:04.1 Concrete Masonry Units:

1. Hollow load bearing units conforming to ASTM C 90-66T, Grade A.

2. Solid concrete block units conforming to ASTM C 145-66T, Grade A.

3. Units which will be exposed shall be of fine texture, of medium grain, over sanded, with edges and corners clear and sharp.

4. Units receiving plaster shall have sufficiently rough surface for good bond.

5. All units shall come from the same plant, shall be at least 28 days old before shipping to the job site and at the time of setting shall not exceed 40% moisture content of their total absorptive capacity.

6. Unless noted otherwise on the Drawings all openings in concrete block walls shall be fitted with precast concrete block lintels. Faces which are exposed to view shall be cast to closely match the surface texture of the surrounding block. Aggregates used for lintel concrete shall be the same as used for block. Concrete mix shall be 1:2:3 with 3,000 psi strength. Steel bars shall be 20,000 psi deformed billet steel conforming to ASTM A 615-68. Lintel bearing shall be 6 in. minimum.

1:04.2 Block Wall Reinforcing:

All block masonry walls and partitions shall be reinforced horizontally in the joint using Dur-O-Wal Standard Welded steel No. 9 rod reinforcing or ENGINEER appproved equal, such as Hohmann and Barnard Standard Truss-Mesh-Lock or Keystone Steel and Wire Co. Truss Type Keywall. Reinforcing shall be laid up in proper widths for each wall thickness, laid continuous in horizontal joints every 16 in. oc vertically. The CONTRACTOR shall use prefabricated corner and tee sections. Lap reinforcing at least 6 in. at all running splices. Reinforcing shall be laid over block, and mortar placed over rods to ensure a positive and full bond with rods. The next course of block shall be bedded in this mortar. Do not extend this reinforcing into exterior face brick. Where both wythes of cavity walls are block, they shall be reinforced 16 in. oc vertically with No. 13 standard truss type reinforcing.

1:04.3 Face Brick:

1. Exterior masonry walls, as shown on the Drawings, shall be Random Rock, white split faced masonry units as manufactured by Nitterhause Concrete Products, Inc., Chambersburg, Pa. Masonry units shall be A-10 glacial white consisting of a specially prepared blend of white cement, selected white aggregates, and water proofing admixture to produce a dense unit, uniform in color and white throughout with a minimum compressive strength of 4500 psi, as per sample submitted to the ENGINEER.

2. Units shall be 2-5/8" x 3-5/8" x 23-5/8" and 5-5/8" x 3-5/8" x 23-5/8" and shall be cut as required in the field.

3. White cement shall be Medusa high early strength, meeting the specifications of ASTM and the Portland Cement Association White aggregates shall be a special blend of white calcite as produced by the H. T. Campbell Co., Towson, Maryland. Water proofing admixture shall be added to the concrete mix prior to production of units to ensure dense uniform units with a water absorption of less than 5%.

1:04.4 Face Brick Wall Ties:

All exterior face brick shall be anchored to concrete block through the cavity with hot galvanized box wall ties 3/16 in. diameter wire 2" x 8" without drip feature as made by Hohmann and Barnard Inc., or AA Wire Products Co., or ENGINEER approved equal. Ties shall be installed at 16 in. centers vertically to occur at every second block course. The CONTRACTOR shall locate ties at joints without block reinforcng.

1:04.5 Block Wall Strap Anchors:

1. All interior masonry walls abutting masonry walls shall be anchored at 2 ft oc vertically with 1-1/4" x 1/4" x 8" galvanized metal anchors with ends turned down 2 in. Extensions into walls shall be 4 in. The CONTRACTOR shall fill blocks with mortar where anchors turn into core, and fix all partitions which stop and butt steel columns with strap anchors at 2 ft oc. The CONTRACTOR shall weld straps to columns as the walls go up. All requirements shall be followed as detailed on the Drawings.

2. The CONTRACTOR shall provide and install at all masonry walls abutting concrete walls or where masonry veneer is applied to concrete walls containing dovetail anchors, 1 in wide by 22 gauge galvanized corrugated dovetail anchors, No. 303 as manufactured by Hohman and Barnard, Inc., New York, N.Y., or

ENGINEER approved equal. Anchors extending into block walls shall be 5-1/2 in. long, while those extending into brick walls shall be 3-1/2 in. long. Anchors shall be a minimum of 16 in. oc vertically.

1:04.6 Mortar for concrete masonry units shall conform to ASTM C 270-64T, Type N. The following standards shall be noted:

1. Portland Cement:

   ASTM C 150-68, Type I or II.

2. Masonry Cement:

   ASTM C 91-66, Type II

3. Sand:

   All sand shall be clean masonry sand conforming to ASTM C 144-66T.

4. Use 1:1:6 mix for all walls containing concrete masonry units

1:04.7 Mortar for service building face brick shall consist of the following:

1. Atlas white masonry cement.

2. Atlas white portland cement:

   ASTM C 150-68, Type I.

3. White masonry sand free of injurious amounts of saline, alkaline or organic substances, in accordance with ASTM designation C 144-66T

4. Use 1:1:6 mix for all service building face brick.

1:04.8 Cavity Wall Insulation:

1. All cavity wall insulation shall be "Foamthane" as manufactured by Pittsburgh Corning or ENGINEER approved equal.

2. Where indicated on the Drawings, the Service Building Walls shall be insulated with two layers of 1 in. thick "Foamthane" insulation with joints staggered

3. Cavity walls for miscellaneous related out buildings shall be insulated with 1 layer of 1 in. thick "Foamthane" insulation. "Foamthane" shall have a 0.15 "k" factor, water vapor

transmission of 2.0 perm-in average, non-capillary cell structure, and have a self-extinguishing fire rating

4. Masonry walls shall be plumb, dry, smooth, and clean with full mortar joints.

5. "Foamthane" shall be installed by applying 4 in. diameter x 1/4 in. thick gobs of PC 55 near each corner and midway between the corners and the long dimension of the board, and two equally spaced gobs along the center line of the board. "Foamthane" shall then be applied horizontally to the outer surface of the inner masonry wall with sufficient manual pressure to ensure tight joints and a good contact with the masonry wall. Vertical joints shall be staggered. The outer masonry wall shall be constructed to provide an air space between the masonry and "Foamthane". Weep holes shall be provided at the base of the outer masonry wall by omitting mortar from every third vertical joint

1:04.9 Gaskets at Steel Columns:

As detailed, masonry shall be separated from steel columns with continuous 3/8 in. thick closed cell sponge neoprene expansion strips equal to Williams MWI.

1:04.10 Control Joint Filler in Exterior Walls:

The CONTRACTOR shall furnish and install filler strips at all 3/8 in. wide control joints in exterior face brick at locations noted on the Drawings. Gasket material shall be the same as specified for gaskets at steel columns. Filler strips shall be recessed 1/2 in. behind face of brick to allow for final joint caulking. Face brick ties shall be located at each side of joints and 2 in. away.

1:05 Laying Concrete Block

The CONTRACTOR shall lay all block in 8 in. course height, length 16 in. with all horizontal and vertical joints to be 3/8 in. Joints in cavity side of insulated walls shall be struck flush. Walls shall be built plumb and true to line with straight joints. Required block cutting shall be neat and accurate, cut block arranged in balance and symmetry at wall openings. Exterior wall opening jambs shall be built solid, 8 in. wide. The cavity beyond jambs shall be started as detailed. Neatly tool all block joints exposed to view to a smooth concave surface free of sharp lines and fins. Run all interior partitions up to the roof deck so as to leave no openings for transmission of sound between adjacent rooms or areas. Openings for passage of ducts, pipes, etc., shall be provided as required.

1:06 Sample Brick Panel

Loose brick samples shall be submitted to the CONSTRUCTION MANAGER who in turn shall submit them to the ENGINEER for his approval. A 4 ft wide by 2 ft high sample brick panel shall be constructed at the job site for approval.

1:07 Laying Face Brick

Face brick shall be placed in the wall in a random interrupted coursed ashlar pattern with all joints raked. Brick shall be shipped split to the job site. The manufacturer shall furnish the CONTRACTOR a device for splitting the face brick at the desired length. Open cavities shall be kept clean and free of mortar drops. Fill all brick joints solid with mortar. Neatly rake all brick joints exposed to view approximately 1/4 in. and plug line holes with mortar. Form 5/16 in. weep holes at 4 ft oc at cavities where flashing occurs above lintels or above finished grade. Aluminum insect screening shall be provided at weep holes. Holes shall occur in vertical joints and shall slope to drain.

1:08 Acid-Proof Construction

1:08.1 General:

As shown on the Drawings, the side walls of the sump at the caustic storage tank shall be protected with a lining of acid-proof masonry. The acid-proof materials shall be as specified hereinafter, or ENGINEER approved equal. The installation of the acid-proof masonry shall be performed by workmen experienced in this specialty WORK.

1:08.2 Acid-Proof Masonry:

Acid-proof masonry shall be applied as follows:

1. Concrete Coating:

   One coat of 31 primer shall be applied in accordance with Atlas Mineral Products Data Sheet No. 4-20PI.

2. Membrane (Interliner):

   Over the primed concrete shall be applied 1/4 in. of Atlastic 40 in accordance with Atlas Mineral Products Data Sheet No. 4-20PI.

3. Brickwork:

Acid-proof masonry shall be used in the following locations:

a. Corrosive waste sump adjacent to the caustic storage tank in the turbine building.

b. Acid and caustic unloading area, adjacent to the exterior south turbine building wall.

4. All brick shall conform to "Chemical - Resistant Masonry Units, Spec. for," ASTM C 279-54, Type L (acid proof red shale). The brick sheathing thickness shall be 3-3/4 in.

5. The jointing material for the masonry shall be Carbo-Alkor as specified on Atlas Mineral Products Data sheet No. 5-31PI. A bed and vertical joint of approximately 1/8 in. nominal thickness shall be used for all units. The masonry shall be set in accordance with Atlas Mineral Products Data Sheet No. 2-21CN.

1:08.3 Protection of Adjacent Surfaces:

The concrete surfaces above the acid-proof masonry shall be coated with an application, approximately 1/8 in. thick, of Atlas Maintenance Mastic as specified on Atlas Mineral Products Data Sheet No. 7-72PI.

1:09 Silicone Sealer

After all exterior face brick masonry WORK has been completed, walls have been finally cleaned, and all loose mortar has been removed, silicone sealer shall be applied to all white face brick wall areas. Silicone sealer shall be equal to "Chemseal 777" as produced by Standard Dry Wall Products, Inc. and shall be applied according to the manufacturer's specifications.

1:10 Damaged Masonry

All damaged masonry items shall be removed and replaced with new units prior to the OWNER'S acceptance of the buildings. Replacement shall include repainting all new masonry to match surrounding painted surfaces as they occur. All exterior and interior wall defects occurring during a one year maintenance period shall be corrected immediately upon notice from the CONSTRUCTION MANAGER. The CONTRACTOR shall protect all in-place equipment, furnishings, and other materials against damage. He will be held responsible for all damages incurred and shall pay all cleaning, restoration or replacement costs.

1:11 Architectural Precast Concrete Canopy

1:11.1 The precast architectural concrete canopy shall be furnished by Nitterhause Concrete Products, Inc., P.O. Box N, Chambersburg, Pa. or ENGINEER approved equal. The manufacturer shall supply and install all anchoring devices and plates which are cast in the precast concrete canopy. The manufacturer shall furnish all bearing plates and anchoring devices to the CONTRACTOR for his installation. The canopy shall be designed for a minimum of 50 lbs per sq ft live load.

1:11.2 Sample:

Before proceeding with fabrication the CONTRACTOR shall submit for the ENGINEER'S approval one (1) sample of the precast architectural concrete. Finish shall be light sand blast finish or acid etch finish as per sample which can be seen in the ENGINEER'S office. The sample shall show the range of color and texture and the character of the WORK that the CONTRACTOR proposes to furnish. The approved sample shall serve as a standard for quality, color, and finish.

1:11.3 Materials:

1. Coarse aggregate shall be 3/4 in. in size, light colored limestone such as the rainbow range supplied by Teeters Quarry, Westminister, Maryland.

2. Fine aggregate shall be 20 mesh Calsite Sand as manufactured by Harry T. Campbell, Towson, Maryland. In no case will ordinary building or concrete sands be permitted to be used.

3. Cement shall be White Medusa No. RI 66

4. Reinforcing bars shall be Intermediate Grade New Billet Steel with a minimum yield point of 40,000 psi deformed in accordance with ASTM A 615-68. Size of reinforcing shall be as shown on the Drawing.

1:11.4 Concrete Quality:

All architectural precast concrete shall have a compressive strength of 5,000 psi when cured and tested at 28 days in accordance with the latest ASTM testing methods. Sufficient test cylinders shall be taken at intervals throughout the casting and tested by an independent testing laboratory.

1:11.5 Handling:

The precast concrete canopy shall not be stored at the job site. It shall be erected as soon as delivered to the job site. The CONTRACTOR shall handle and transport the precast concrete canopy in a manner that will avoid undue scrains, staining, or other damage. Precast concrete damaged during transporting or erection shall be cause for rejection.

1:11.6 Erection of Precast Architectural Concrete:

1. The erection of the precast architectural concrete shall be done by the precast manufacturer. Extreme caution shall be taken during erection so as not to chip, spall or damage the architectural precast concrete.

2. After all precast architectural concrete has been erected, it is the responsibility of the CONSTRUCTION MANAGER to check that the precast is plumb and true to line to the ENGINEER'S satisfaction.

1:11.7 Final Cleaning:

After erection is completed the CONTRACTOR shall touch up any chips, spalls, or discoloration. It shall be the CONTRACTOR'S responsibility to protect the precast architectural concrete from being discolored or defaced during the construction of the balance of the WORK.

1:12 Synthetic Rubber Coating

1:12.1 After erection, the precast concrete canopy and concrete roof hatches on the intake screen and pump house shall be coated with monolithic, elastomeric roof coating equal to Hypalon as manufactured by DuPont or ENGINEER approved equal. The CONTRACTOR shall include all labor, material, equipment, and services necessary to completely furnish, deliver, and apply the synthetic rubber coating to the top surface of the precast concrete canopy.

1:12.2 Application:

All surface preparations and priming on the concrete receiving the coating, shall be done by the CONTRACTOR. The application shall be applied in the manufacturer's recommended number of coats, to a total dry film thickness of not less than 20 mils. in strict accordance with the manufacturer's specification. Color shall be as selected by the ENGINEER.

1:13 Caulking

1:13.1 Scope:

The CONTRACTOR shall furnish all labor and materials necessary to fully complete all exterior and interior caulking required at all joints around door frames, sills, thresholds, control joints, louvers, service building windows, and other miscellaneous openings and items, where these items join with masonry or concrete at interior and exterior masonry or concrete openings.

1:13.2 Samples:

Samples of all caulking, sealants, and foam filler material shall be submitted to the ENGINEER for approval. Materials used shall comply with approved samples.

1:13.3 Materials:

1. Masonry expansion joints shall be caulked on the weatherside with Tremco Monolastomeric, General Electric Silicone Sealant or Flexalon as made by Philadelphia Waterproofing Company. Interior joints shall be caulked with Tremco Caulking and Pointing Compound or equal by Pecora.

2. All other caulking shall be Tremco Caulking and Pointing Compound or equal by Pecora or Flexalon.

3. Yarn shall be a neoprene sponge, vegetable fiber or untreated oakum, and shall be free of any material that will stain masonry, stone and other finish materials.

1:13.4 Application:

In applying the caulking, the CONTRACTOR shall follow the following procedures:

1. Joints and spaces to be caulked shall be free from dust, dirt, and dampness. Joints shall not be caulked unless they substantially comply with details and best practices of the trade. Apply masking tape and protect surrounding materials from stains.

2. Joints over 3/4 in. deep shall be packed with yarn, oakum or neoprene to within 3/4 in. of the surface. Surfaces shall be primed as recommended to ensure a high bond.

3. Apply caulking compound above 40 F exterior temperature with a pressure gun having nozzles to fit into the joints. Fill joints solidly and smoothly without thin edges, remove excess compound, and leave adjoining surfaces clean. Make caulking WORK neat and straight.

4. Complete caulking before final coat of paint is applied by Others. Caulking may be applied after all painting is finished provided that caulking is exact color of adjoining surfaces.

5. Joints occurring between gunite covering over metal duct and concrete containment vessel shall be packed with yarn, oakum or sponge neoprene as specified previously and caulked with General Electric silicone sealant.

6. Clean all surfaces stained by caulking. Correct all defects and leaks upon notice by the OWNER during the one year guarantee period.

ENCLOSURE 9

THREE MILE ISLAND UNIT 1

SCHEDULE FOR CONCRETE MASONRY WALL REEVALUATION