December 13, 1979
GQL 1541

TMI-2 Support
c/o Three Mile Island Nuclear Station
Attn: John T. Collins
U.S. Nuclear Regulatory Commission
Middletown, Pennsylvania 17057

Dear Sir:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)
License No. DPR-73
Docket No. 50-320
No. 2 Personnel Air Lock Contamination Control Facility Design Descriptions

Enclosed are three (3) sets of No. 2 Personnel Air Lock Contamination Control Facility Design Descriptions with associated drawings for your information and review. These represent the present design for the modifications to the Unit 2 air lock, anteroom and hot instrument shop in support of the Unit 2 Reactor Building Reentry Program.

Sincerely,

/s/ R. F. Wilson
R. F. Wilson
Director, TMI-2

RFW:JRS:hah

Enclosures: 1) Design Description, No. 2 Personnel Air Lock Contamination Control Facility, dated October 26, 1979 (3 copies)

2) Bechtel Drawings:
   2-A-810-1 Rev. 0 (3 copies)
   2-A-810-2 Rev. 0 (3 copies)
   2-E-810-1 Rev. 1 (3 copies)
   2-P-810-1 Rev. 0 (3 copies)
<table>
<thead>
<tr>
<th><strong>BODY</strong></th>
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</tr>
</thead>
<tbody>
<tr>
<td>FLUID</td>
<td>AIR</td>
</tr>
<tr>
<td>MAX. PRESSURE, PSIG</td>
<td>ATM</td>
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<tr>
<td>MAX. TEMPERATURE, °F</td>
<td>120</td>
</tr>
<tr>
<td>VELOCITY IN DUCT, FPM</td>
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</tr>
<tr>
<td>CONNECTION SIZE (TYPE)</td>
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<tr>
<td>NET TEL PARTS MATERIAL</td>
<td>316 SS</td>
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<tr>
<td>CONDUIT CONN. SIZE (TYPE)</td>
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<tr>
<td>POWER REQUIREMENTS</td>
<td>110 VAC, 60HZ</td>
</tr>
<tr>
<td><strong>SWITCH</strong></td>
<td></td>
</tr>
<tr>
<td>TYPE</td>
<td>DPST</td>
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<td>NO. OF SWITCHES</td>
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</tr>
<tr>
<td>SET POINT, FPM</td>
<td>#1 #2</td>
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<td>DIFFERENTIAL TO RESET</td>
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<td><strong>MISC.</strong></td>
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<td>M.R./P.O. NUMBER</td>
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<td>MANUFACTURER</td>
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<td>MODEL NO.</td>
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<td>P. &amp; I.D. NUMBER</td>
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<tr>
<td>SERVICE</td>
<td>AIRLOCK NO. 2</td>
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<tr>
<td>HVAC SYS.</td>
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<tr>
<td>INSTRUMENT TAG NO.</td>
<td>AH-FSL-</td>
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</tbody>
</table>

**GENERAL**

- DATE: 10/9/92
- ISSUE: FOR CONSTRUCTION

**NOTES**

**FLOW SWITCHES - THERMAL**

- GPU SERVICE CORP.
- THREE MILE ISLAND - UNIT 2

**DATA SHEET NUMBER**: DS-J-001 0

**JOB No.**: 13587-005
DESIGN DESCRIPTION

NO. 2 PERSONNEL AIR LOCK
CONTAMINATION CONTROL FACILITY

FOR

THREE MILE ISLAND UNIT 2
GENERAL PUBLIC UTILITIES SERVICES CORPORATION

BECHTEL POWER CORPORATION
Gaithersburg, Maryland
October 26, 1979

Originator R.L. Mays
Group Supervisor T.M. Patterson
Project Engineer R.K. Rider
1.0 FUNCTION

The No. 2 Personnel Air Lock Contamination Control Facility consists of temporary barrier partition walls and ceiling near the No. 2 personnel air lock to provide a controlled access path and to prevent the spread of radioactive contamination when the containment is reentered via the lock. The facility is provided with supporting services including ventilation, electrical power, and lighting required to perform its function.

2.0 DESCRIPTION

2.1 Structure

Temporary barrier walls and ceiling are added to divide the area near the No. 2 personnel air lock into contamination control areas. The barriers are constructed of gypsum panels on steel channel framing to provide rigid, non-flammable partitions. The construction of the barriers is detailed on Bechtel Drawing Nos. 2-A-810-1 and 2-A-810-2. The new barrier partitions are coated with an epoxy paintingsystem to permit ease of decontamination if the need arises, as are the permanent walls, floor, and ceiling in the area. All seams, joints and penetrations in the facility structure are sealed to prevent the uncontrolled flow of contaminated air.

Personnel traffic flow in the facility is controlled using doorways in combination with step-off pads to minimize cross contamination due to foot traffic. Entry to the facility is made via the hot instrument shop, which will be cleaned and, if necessary, decontaminated prior to the reentry operation.

2.2 Ventilation System

The facility is ventilated by the existing HVAC system in the area, rebalanced to provide a positive flow of air from clean areas to areas of progressively higher contamination within the facility. The ventilation system layout and flow diagram are shown on Bechtel Drawing No. 2-P-810-1. Since the total flows into and out of the area have been maintained at the same values as the permanent system design, operation of the system in this facility will not affect the other functions of the permanent ventilation system. To ensure that no potential exists for uncontrolled spread of contamination through the duct system outside the area, tight shutoff dampers are provided in the main supply and exhaust ducts serving the facility. Should exhaust
flow from the area stop, a flow switch in the exhaust duct will close the shutoff dampers in the supply and exhaust ducts, and thereby isolate the ducts from the rest of the building. The switch will also sound an audible alarm in the area to alert the operating personnel. The following evaluation indicates that no spread of contamination will result from ventilation system failure:

<table>
<thead>
<tr>
<th>FAILURE</th>
<th>RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply to facility fails; exhaust from facility continues</td>
<td>Exhaust system will maintain the correct air flow patterns at a reduced air flow rate</td>
</tr>
<tr>
<td>Exhaust from facility fails; supply to facility continues</td>
<td>Automatic shutoff dampers close, isolating facility. Supply system maintains adjacent rooms at positive pressure with respect to facility, thus preventing spread of contamination</td>
</tr>
<tr>
<td>Supply and exhaust to facility both fail</td>
<td>Automatic shutoff dampers close, isolating facility. No significant differential pressure will exist between facility and adjacent areas, and therefore no significant flow of contaminated air from facility will occur</td>
</tr>
</tbody>
</table>

Supporting the above evaluation are two key features of the permanent plant ventilation system being used to serve the facility:

a. The supply and exhaust fans are interlocked such that the supply fan will not operate unless at least one of the exhaust fans is operating. This minimizes the possibility of pressurizing the facility.

b. Redundant exhaust fans are provided, thus minimizing the chance of exhaust system failure.

2.3 Electrical System

Electrical services are provided to the facility for the following purposes:

a. 120 and 208 VAC outlets for plug-in type equipment in the facility.

b. 120 VAC power for the motor-operated dampers in the ventilation equipment (see 2.2 above) and the associated controls and alarm.

c. Modification of the existing lighting system in the personnel air lock ante-room.
d. Provisions for emergency lighting in the ante-room.

Power sources for the electrical systems are:

a. 120 VAC for outlets - from spare circuits in RPS-1A and MPS-1B, located in the service building.

b. 208 VAC for outlets and 120 VAC for dampers - from panel MPS-1B, located in the service building.

c. Emergency lighting supply - from receptacle panel No. RPS-1A, located in the service building.

The existing lighting systems in the facility are used for general area lighting, except for the hot instrument decon room where surface-mounted fixtures are added with a new ceiling. The lighting system in the personnel lock ante-room is modified to permit turning off all but one light fixture in the room just prior to the reentry. The resulting low light level in the room will help the reentry team adjust to the low level expected in the containment building. To guard against complete loss of lighting in the ante-room during the reentry, an emergency lighting pack is mounted in the room.

The electrical systems and the control system for the automatic dampers are shown on Bechtel Drawing No. 2-E-810-1.
1. SYSTEM TO BE BALANCED TO THE FLOWS SHOWN, WITH THE FOLLOWING TOLERANCES:

   SUPPLY:  +0, -10%
   EXHAUST: -0, +10%

2. SYSTEM TO BE BALANCED AFTER NEW PARTITION WALLS ARE INSTALLED BUT BEFORE NEW CEILING IN HOT INSTR. DECON. ROOM (CONTAMINATION CONTROL AREA NO. 2) IS INSTALLED, TO ALLOW ACCESS TO DAMPERS IN OVERHEAD.

3. VAPOR OR VISIBEL SMOKE TESTING SHALL BE PERFORMED TO ENSURE THE PROPER AIRFLOW DIRECTION AT THE FOLLOWING LOCATIONS:

   A) ACROSS THE NEW PARTITION WALL BETWEEN THE SOILED CORRIDOR AND CONTAMINATION CONTROL AREA NO. 2. THERE SHOULD BE NO FLOW. IF ANY FLOW IS NOTED, IT MUST BE INTO CONTAM. CONTR. AREA NO. 2.

   B) ACROSS THE NEW PARTITION WALL BETWEEN CONTAMINATION CONTROL AREA NO. 2 AND THE PERSONNEL LOCK ANTE ROOM. FLOW MUST BE INTO THE ANTE ROOM.

   C) ACROSS THE DOOR BETWEEN THE HOT INSTR. SHCP AND CONTAMINATION CONTROL AREA NO. 2. FLOW MUST BE INTO THE CONTAM. CONTROL AREA.

4. MEASURE AND RECORD THE AIR FLOW RATE IN THE MAIN SUPPLY AND EXHAUST DUCTS TO THE AREA. ANY HOLES MADE IN THE DUCTS TO PERFORM THE MEASUREMENTS SHALL BE SEALED AFTERWARDS.

5. AS SHOWN, FLOW THROUGH LOUVERED DOOR BETWEEN HOT INSTRUMENT SHOP AND CONTAMINATION CONTROL AREA NO. 2 IS TO BE 400 CFM. IF NECESSARY, OPENINGS OF THE LOUVERED OPENING SHALL BE BLOCKED OFF TO ACHIEVE THIS FLOW RATE. AFTER BALANCING, BLOCKING OFF SHALL BE DONE USING GALVANIZED SHEET METAL SECURED TO THE DOOR BY SHEET METAL SCREWS. ANY LOCK-OFF PLATE(S) SHALL BE INSTALLED ON THE HOT INSTRUMENT SHOP SIDE OF THE DOOR.

6. A BALANCING REPORT SHALL BE SUBMITTED TO GPPSC, WITH THE FOLLOWING DATA:

   A) MEASURED FLOW RATES THROUGH ALL REGISTERS AND DIFFUSERS, THROUGH THE DAMPERED OPENING IN THE NEW PARTITION WALL, AND THROUGH THE LOUVERED OPENING IN THE DOOR BETWEEN THE HOT INSTRUMENT SHOP AND CONTAMINATION CONTROL AREA NO. 2, LIST INSTRUMENT(S) USED TO MAKE THE MEASUREMENTS.

   B) MEASURED FLOW RATE IN THE MAIN SUPPLY AND EXHAUST DUCTS TO THE AREA. LIST INSTRUMENT(S) USED TO MAKE THE MEASUREMENTS.
(c) RESULTS OF THE VAPOR OR SMOKE TEST

(c) Measured flow rate in the main supply and exhaust ducts to the area. List measured flow rate.

(b) Used to make the measurements.

(c) Instrument(s) used to make the area. List.

(b) Hot instrument shop and contamination control area no. 2.

6. A balancing report shall be submitted to group.

With the following data:

6. A balancing report shall be submitted to group.

Afterwards.

Afterwards, to perform the intercoms, make the service.
Mr. R. W. Heward, Jr.
Manager - Projects
GPU Service Corporation
260 Cherry Hill Road
Parsippany, New Jersey  07054

Subject: Containment Reentry
Three Mile Island
Containment Engineering
Bechtel Job No. 13587

Dear Mr. Heward:

This will confirm the September 12, 1979, telecons between Jim Langenbach and Ron Mays concerning the initial entry program and in particular the Bechtel scope of work regarding the No. 2 Personnel Air Lock contamination control envelope. Enclosed for your use is a sketch of the controlled area floor plan, and an outline of the engineering tasks in progress for the design of the control envelope and supporting systems/equipment. Per the discussion with Mr. Langenbach, the floor plan shows only two contamination control zones to be constructed for the initial entry, with a third zone to be constructed at a later date, as required, for additional entries. We consider the third zone essential in minimizing the spread of contamination during the period of time when continuing entries through the No. 2 Personnel Air Lock are planned.

As agreed, we will plan the power supply to the initial entry Command Center based on 100 ampere service with the principal outlets at 110 volts AC. If practical, we will also provide a 220 volts AC outlet. As requested, in addition to an engineering design package for the envelope, we will complete the body of the required ECM's and SECM's for procurement and construction. It is our intent to provide the package of design documents with ECM/SECMs by October 5, 1979, for your review. Upon your concurrence, it is our understanding that you may wish to have Bechtel personnel follow through on the ECMs/SECMs to assist in obtaining the various site approvals.
Because of the short time available, we recommend that you take immediate action on the following activities in the control area:

1. Move the step-off pad, presently located in the service building north-south corridor at elevation 305', to the north far enough to provide a clean pathway down the corridor to the double doors into the hot instrument shop. If this is not practical, it will be necessary to either move the initial entry Command Center out of the hot instrument shop, or to accept access to the Center via a contaminated corridor.

2. Seal all large holes/openings in the No. 2 Personnel Air Lock anteroom with a grouting/sealing material that can later be decontaminated, as required. Of particular concern are the openings in the floor and ceiling of the anteroom in the southwest corner, and the pipe penetration in the floor near the center of the south wall of the anteroom. Sealing of these openings is required to enable control of contaminated air flow from the anteroom. The RTV material presently available at the plant will be sufficient for this purpose, and should be installed in a layer 3-4 inches thick. The RTV should be flush with the surface of the hole to give access for decontamination. Also, since the RTV is somewhat porous, we recommend covering it with a hard surface compound for decontamination purposes. Any of the following should be adequate:

   - Flammastic (by Flame Master Corp., 213-982-1650; specify mastic)

   - 3-5000 (by Dow-Corning; obtain from Calbar, Inc. of Philadelphia, 215-739-9141)

   - Sylgard 170A & B (also by Dow-Corning; obtain from Calbar)

3. Locate and seal the crack at the roof line above the Personnel Air Lock. This crack presents a contamination problem due to rain water leaking down onto the anteroom floor, and provides an uncontrolled air flow path to the outdoors. The RTV caulking material available at the plant may be suitable for this purpose, but an inspection of the roofing in the area should be done and any cracks patched.
4. Seal all cracks and seams in the anteroom floor, walls and ceiling to provide a barrier to uncontrolled air flow. The RTV caulking available at the plant should be suitable in some cases. In other cases we suggest using waterproof silicone caulking, which should be available at any local hardware outlet. No sealing should be done to the temporary partition now in place at the entrance to the anteroom, because this wall will be modified or replaced.

5. Paint all exposed surfaces (not including the temporary partition wall presently installed at the entrance to the anteroom) in the anteroom, the chamber just outside the anteroom, and the hot instrument decontamination room using epoxy painting materials which can be decontaminated. It is our understanding that this can be accomplished with paint already available at the plant. All work with RTV and silicone caulking in the area should be complete prior to painting because these materials will not adhere to epoxy-painted surfaces and vice versa.

6. Clear the hot instrument shop and storage room of all loose furniture and materials and decontaminate the area, preparatory to installing initial entry Command Center equipment.

We will gladly provide you with any assistance needed to complete the items outlined above.

In addition to our control envelope design scope, as requested, we will provide our recommendations on which radiation monitoring equipment will be required in the contamination control envelope during the reentry. All such monitors will have remote readout and/or alarm in the initial entry Command Center.

We will remain in close contact with you during our design effort, and suggest Jim Langenbach visit our office late in the week of September 17th to review our completed work. Please let us know if such a visit is convenient.

If you have any questions or comments, please contact us.

Sincerely,

R. L. Rider
Project Engineer

RLR: RLM: TMP: vwc
Enclosures: (1) Sketch No. SK-P-1, Proposed No. 2 Personnel Air Lock Contamination Control Facility

(2) Description of Bechtel engineering tasks for facility design

cc addressees see page 4
Mr. R. W. Heward, Jr.

cc: J. Langenbach, w/l
    R. F. Wilson, w/l
    C. W. Sandford, w/l
    J. W. Thiesing, w/l
DRAWING CHANGE NOTICE

CHANGE REQUESTED BY: 

REASON FOR CHANGE: GYPSUM BOARD WALL INTERPERS WITH ELECTRICAL PANEL

OTHER DOCUMENTS (INCLUDING PURCHASE ORDERS) AFFECTED BY THIS CHANGE: N/A

MATERIAL PROCUREMENT RESPONSIBILITY: BECHTEL BECHTEL FIELD CLIENT SUPPLIER/CONTRACTOR NONE REQUIRED

DISPOSITION OF AFFECTED MATERIAL: Rework Scrap Use AS IS As Noted

DESCRIPTION OF CHANGE:

CONTAM. CONTROL
AREA No. 1
EL. EL 305.0'

EXISTING DUCT ABOVE
GRILL AND DAMPER ABOVE (SEE ELEVATION)

EXISTING ELECT. PANELS

FLOOR PLAN
EL. 305.0'
SCALE 1/4" = 1'-0"

REVIEWED WITHOUT COMMENT
ARCHITECTURAL CIV.
CONTROL SYSTEMS ELECTRICAL
PLANT DESIGN MECHANICAL

ORIGINATOR: [Signature]
CHECKED: [Signature]
GROUP SUPERVISOR: [Signature]
PROJECT ENGINEER: [Signature]
DATE: 12.14.79
REFLECTED CLG. PLAN

SCALE: 1/4" = 1'-0"
REASON FOR CHANGE:

GYPSUM BOARD WALL INTERFERES WITH ELECTRICAL PANEL.

DESCRIPTION OF CHANGE:

BILL OF MATERIALS

1. STEEL FRAMED DRYWALL SYSTEM: BY U.S. GYPSUM SEE SPEC. 2.0

1) SHEETROCK

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<th>DESCRIPTION</th>
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<tr>
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<tr>
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<td>FIRECODE &quot;C&quot; GYPSUM PANELS.</td>
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2) STEEL STUD, STEEL RUNNER, STEEL STIFFENER CHANNEL

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<td>12'-0&quot; LONG 4&quot; U.S.G. ST 5 STEEL STUD, 20GAGE</td>
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<tr>
<td>5</td>
<td>12'-0&quot; LONG 4&quot; U.S.G. RUNNER 20GAGE</td>
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<tr>
<td>3</td>
<td>12'-0&quot; LONG 2 1/2&quot; STIFFENER CHANNEL</td>
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3) FASTENER, TRIM, TAPE & STEEL COMPONENTS TO CONC.

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<th>DESCRIPTION</th>
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<tr>
<td>116</td>
<td>3/16&quot; x 15/8&quot; ACORN SLOTTED HWH TAPCON FASTENER STEEL COMPONENTS TO CONC</td>
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</table>

AS READ:

11/" U.S.G. BRAND SCREWS TYPE S 12" O.C. TO STUDS & JTS. & IN FIELD. 12" O.C. TO RUNNERS.

130'-0" LINEAR FEET U.S.G. METAL TRIM NO. 402

500'-0" LINEAR FEET OF TAPE.
III. DRYWALL BOARD CEILING BY U.S. GYPSUM SEE SPEC. 2.0.

1) NO. 12 WIRE HANGER (VERIFY FIELD DIMENSION LICE EXISTING WIRE HANGER IF EQUAL).

2) SHEETROCK

<table>
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<td>10 SHEETS</td>
<td>4'-0&quot; x 8'-0&quot;, 1/2&quot; THICK SHEETROCK SQUARE CUT FIRECODE &quot;C&quot; GYPSUM BOARD, ONE HOUR FIRE RATED</td>
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3) 1/2" METAL CARRYING CHANNEL (GALVANIZED)

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<td>12'-0&quot; LONG</td>
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<tr>
<td>1</td>
<td>14'-0&quot; LONG</td>
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4) 3/4" METAL FURRING CHANNEL (GALVANIZED)

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<td>10'-0&quot; LONG</td>
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5) FASTENER, TRIM, TAPE, CHANNEL CLIP, WIRE TIE, SPLICE JOINT & DUST MEMBRANE.

<table>
<thead>
<tr>
<th>QTY.</th>
<th>DESCRIPTION</th>
</tr>
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<tbody>
<tr>
<td>AS RES'D</td>
<td>CHANNEL CLIP, WIRE TIE, SPLICE JOINT</td>
</tr>
<tr>
<td>AS RES'D</td>
<td>3/8&quot; U.S.G. PAN HEAD SCREWS</td>
</tr>
<tr>
<td>(100'-0&quot;)</td>
<td>LINEAR FEET U.S.G. METAL TRIM NO. 401</td>
</tr>
<tr>
<td>(100'-0&quot;)</td>
<td>LINEAR FEET OF TAPE</td>
</tr>
<tr>
<td>(100'-0&quot;)</td>
<td>LINEAR FEET DUST MEMBRANE</td>
</tr>
</tbody>
</table>