

BALTIMORE GAS AND ELECTRIC COMPANY

GAS AND ELECTRIC BUILDING  
BALTIMORE, MARYLAND 21203

ARTHUR E. LUNOVALL, JR.  
VICE PRESIDENT  
SUPPLY

August 6, 1979

Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Attention: Mr. Robert W. Reid, Chief  
Operating Reactors Branch #4  
Division of Operating Reactors

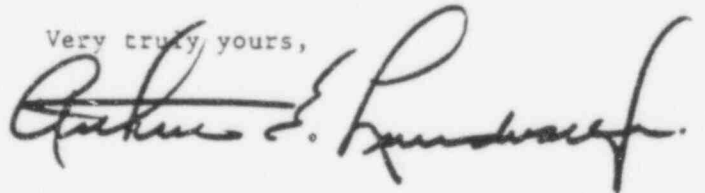
Subject: Calvert Cliffs Nuclear Power Plant  
Unit No. 1 & 2, Docket No. 50-317 & 50-318  
Fire Protection Program, NRC Review  
File: 013-261-O, L-037-F

Reference: Draft Safety Evaluation Report by the Office  
of Nuclear Reactor Regulation, Staff/Licensee  
Discussions held July 11, 24 & 31, 1979

Gentlemen:

The enclosures attached are submitted in response to a request to furnish information and data, and to furnish commitments relative to staff positions identified in Section 3.3 of the Draft Safety Evaluation Report (DSER). Enclosure 1, entitled "Responses", addresses Section 3.3 that contains 47 positions. Some positions were mutually resolved during discussions held in July and are indicated as completed in the enclosure attached. Enclosure 2 provides, in tabular form, commitment dates for implementation of the various positions.

Very truly yours,



cc: J. A. Biddison, Esquire  
G. F. Trowbridge, Esquire  
Messrs. E. L. Conner, Jr. - NRC  
J. W. Brothers, Bechtel

790810-410

611 217

Enclosure 1

Calvert Cliffs Nuclear Power Plant  
Fire Protection Review

RESPONSES TO STAFF POSITIONS IDENTIFIED IN  
SECTION 3.3 OF THE DRAFT SAFETY EVALUATION REPORT

611 218

3.3.1 Fire Hazards Analysis (4.1, 5.3, 5.5, 5.6, 5.12, 5.15, 5.23, 5.24, 5.28, 5.30)

We will require the licensee to provide the results of an analysis to:

- (1) identify the minimum separation between the redundant cables (in trays or in conduits)/equipment required for safe shutdown in each fire area,
- (2) identify the largest fire than can be expected in each fire area based on the fixed combustibles in the area and transient combustibles which may be introduced into or moved through the area,
- (3) identify the worst damage that could result from such fire, and
- (4) demonstrate that such damage will not have an adverse effect on safe shutdown or cause excessive radioactive release to the environment.

Response

In our April 19 letter, we committed to a fire hazards analysis in our responses to positions 8, 9 and 11. This analysis is underway, and will address the Staff's concerns expressed in 3.3.1, 3.3.32, 3.3.37, 3.3.38 and 3.3.42. The intent of the analysis is to verify safe shutdown/cooldown capabilities following any single maximum exposure fire. Where this capability is not verified by the analysis, modifications will be provided as necessary. These modifications may take the form of additional barriers or fire suppression systems, or even modifications to or additions of shutdown/cooldown equipment. Where necessary to support the analysis, we will conduct tests of equipment, cable or barriers; for example, we will conduct a fire test on silicone rubber insulated asbestos jacketed cable in conduit to demonstrate that it will continue to perform its function following the maximum exposure fire (see response to 3.3.32).

Our approach was discussed with the Staff on July 31. Using equipment in the charging pump rooms as an example, we defined safe shutdown equipment and cable locations and routing and proposed modifications, which in this case consisted of curbs at doorways and automatic sprinkler protection at the ceiling; in this case, our analysis shows that these planned modifications preclude the need for additional barriers between equipment, fire doors for the room, or detection in addition to that built into the automatic sprinkler system. The corridors containing redundant cable for charging pumps will be provided with early warning fire detection at the ceiling and sprinklers below the trays to eliminate the transient fire hazard. Criteria for cables will be derived from our cable separation work (described in 3.3.32), which will prove adequacy of our existing separation or provide adequate protection where needed.

611 219

3.3.2

Alarm Power Supply (4.2)

We will require the licensee to verify that those fire protection alarms annunciated on the separate panel in the Control Room are provided with back-up power from the on-site emergency power system and are designed and installed in accordance with Article 240 of NFPA 72D.

Response

The Alarm Power Supply for the fire protection alarms annunciated on the separate panel IC17B is from the 125V DC stationary battery. The battery is backed up by Class IE primary chargers which are supplied from Class IE buses and therefore can be considered as a plant emergency power supply.

Electrical supervision, in accordance with NFPA 72D, Article 240, is provided on panel IC24B which is a Pyrotronics U/L approved panel. Panel IC17B although not U/L approved specifically for fire protection use, serves as a remote annunciator. The signal indication provided on annunciator panel IC17B includes the following fire protection conditions: (1) fire, (2) fire extinguishing system trouble, (3) electrical fire pump operation, (4) diesel fire pump operation, (5) fire pump trouble, and (6) pressurized fire protection system tank trouble. Signal indication of conditions identified by (1) through (4) above is provided with electrical supervision by panel IC24B which is in the Control Room. Audible and visual alarm and supervision indication is provided for conditions (1) and (2). Visual alarm and supervision indication is provided for the running alarm for the electrical and diesel fire pumps, conditions (3) and (4) identified above. Conditions (5) and (6) identified above are trouble signal circuits which do not require electrical supervision as detailed in Section 243 of Article 240 of NFPA, Standard 72D.

611 220



3.3.3

Fire Detection in Safety-Related Areas

We will require the licensee to install appropriate fire detection devices in all safety-related areas which contain fire hazard.

Response

Many of the safety-related areas containing redundant divisions of safety-related cables and components are currently provided with automatic fire detection. The fire hazard analysis described in Section 3.3.1 will identify those additional areas which contain necessary cables and components for shutdown/cool down and radio-activity release controls. We will provide additional automatic fire detection in those rooms identified by the analysis. For example, we will provide automatic fire detection systems in the Charging Pump Rooms and adjacent corridors and similar areas containing redundant divisions of safety-related cables and components. Automatic fire detection systems may consist of automatic sprinkler protection, fixed temperature, rate of rise, products of combustion or flame type detection as may be required by the Fire Hazards Analysis.

611 221

3.3.4 Adequacy of Detector Installations (4.2)

We will require the licensee to provide the results of a study or tests to verify that proper consideration has been given to such factors as ceiling height and configuration, ventilation air flow rate and pattern, location and arrangement of plant equipment and combustibles, etc., in determining the type, number and location of the existing and the proposed fire detector installations.

RESPONSE:

BG&E will provide results of the study or test to verify that proper consideration has been given to such factors as ceiling height and configuration, ventilation air flow rate and pattern, location and arrangement of plant equipment and combustibles, etc., in determining the type, number and location of existing fire detector installations.

For detection systems installed to meet requirements of other sections, the job specification will require the successful bidder to provide this verification.

611 222

3.3.5 Fire Water Storage (4.3.1.1)

We will require the licensee to increase the amount of water that is reserved for fire protection in the storage tank to provide the amount of water required for 2 hour operation of the combination of the largest sprinkler system with an additional 1,000 gallons per minute for the manual hose application.

RESPONSE:

The largest sprinkler system protecting a safety related area is in the "Solid Waste Handling Room" (Rm. 418). This system is designed as "ordinary hazard" as defined in the National Fire Protection Association's "NFPA 13, Standard for the Installation of Sprinkler Systems". Table 2-2.1(B) of that Standard requires a minimum water supply of 750 gpm for ordinary hazard - Group 3. BTP 9.5.1 requires an additional 1,000 gpm for hose streams for a total requirements of 1,750 gpm. A one hundred and twenty minute duration corresponds to a total demand of 210,000 gallons.

As described in previous submittals, fire water is supplied from either of two independent 500,000 gallon capacity storage tanks. Each tank has 300,000 gallons reserved for fire protection.

611 223

3.3.6 Fire Water System Valves (4.3.1.1, 4.3.1.3)

We will require the licensee to electrically supervise the fire water tank discharge valves and to check the positions of all locked valves at least monthly. We will also require the licensee to keep the valve in the fire water tank interconnection locked closed except when the interconnection is necessary in case of fire.

RESPONSE:

The fire water discharge valves are locked open. The fire water tank interconnection valve will be locked closed. All locked valves in the fire protection system are checked monthly to verify their position.

611 224

3.3.7 Fire Water Freeze Protection (4.3.1.1)

We will require the licensee to verify that adequate measures are provided to prevent freezing in the fire water tanks.

RESPONSE

Table 6 in NFPA 22 shows a loss of 1,093,000 Btus per hour from a 500,000 gallon capacity water storage tank when an atmospheric temperature is 0°F and the water temperature is 42°F. Specification No. 6750-M24, Specification for Pretreated Water Storage Tank Heat Exchangers and Miscellaneous Waste Processing System Heat Exchanger Calvert Cliffs Nuclear Power Plant Units Nos. 1 & 2" calls for a heat exchanger "capable of maintaining the tank contents at a minimum temperature of 45°F with a minimum ambient temperature of +5°F when supplied with 75 gpm of 200°F plant heating water". The specification suggests that this requires 1,500,000 Btu per hour which is well in excess of the actual heat loss. This figure is conservative as it allows no reduction due to expected plant water usage which would be made up by well water which would be introduced at 55°F.

611 225

3.3.8 MISCELLANEOUS USAGE OF FIRE WATER (4.3.1.1)

We will require the licensee to discontinue usage of fire water for purposes other than fire protection or to provide the results of a detailed analysis to demonstrate that such uses will have no adverse effects on the availability of adequate fire water supply.

RESPONSE

In addition to those measures previously described in Reference 1, (P-20), BG&E will implement administrative controls to ensure that fire system usage for purposes other than fire fighting will be limited to a single (1½") hose stream at any time. These administrative controls were discussed with and found acceptable by the staff at the July 24 meeting.

611 226

3.3.9 Fire Pump Flow Test (4.3.1.2)

We will require the licensee to submit recent fire pump flow test reports which include the full range of pump output from shut-off to 150% of rated capacity.

RESPONSE:

The most recent full-scale fire pump tests were made on 11/22/77. See enclosed test results. Loop tests were performed satisfactorily on 5/30/78 to verify the condition of underground piping as well as pump capacity. Full scale pump tests are scheduled to be performed in August of 1979. Results of these tests will be furnished.

611 221







3.3.10 Fire Water Demand (4.3.1.2)

We will require that the licensee provide the results of an analysis which demonstrates that a single fire pump is capable of meeting the combined demand (flow and pressure) for any fixed water fire suppression system plus 1,000 gpm for hose streams, taking into account the pressure drop between pump discharge and the suppression system, and minimum pressures required for effective sprinkler discharge and manual hose application.

RESPONSE:

The largest sprinkler system protecting a safety related area is in the "Solid Waste Handling Room" (Room 418). This system is designed as an ordinary hazard as defined by NFPA Standard 13, Table 2-2.1 (B). This standard requires a minimum water supply of 750 gpm for "Ordinary Hazard - Group 3". BTP 9.5.1 requires an additional 1,000 gpm for hose streams. Therefore, the total requirements are 1,750 gpm at 65 psi at PIV #11.

As described in previous submittals, fire water is supplied from either of two independent 500,000 gallon capacity storage tanks by two 100 percent capacity fire pumps rated at 2,500 gpm at 125 psi.

611 230

3.3.11 LOW WATER TANK LEVEL INTERLOCK (4.3.1.2)

Fire pumps are interlocked to shut off when the water level in both fire water tanks is 12 inches above the bottom. This is in violation of the provision of NFPA 20. We will require the licensee to replace the interlock with alarms which sound in the control room and in the fire pump house.

RESPONSE

BG&E will rewire each fire pump controller in such a manner as to effectively remove the pretreated water storage tank level interlock from the control logic. In addition, BG&E will provide pretreated water tank low level alarms which will annunciate in both the control room and the fire pump house.

611 231

3.3.12 Single Isolation in Fire Water Piping System (4.3.1.3, 5.18, 5.30)

We will require the licensee to provide modifications necessary to preclude a single isolation in the fire water piping system from causing the loss of fire water supply to both fixed water suppression system and the backup hose stations in any single safety-related area.

RESPONSE:

The ordinary hazard automatic sprinklers in the Diesel Generator Room No. 21 could be valved out of service simultaneously with hydrants No. 6 and 7 in the event of a break in the underground piping in the west loop. BG&E plans to modify Calvert Cliffs Instruction (CCI) No. 113 which will require a 2½" hose be preconnected to hydrant No. 5 and run to the exterior door of Diesel Generator Room No. 21 in the event of an impairment as described above. This pre-laid hose will be available for manual fire fighting through the duration of the impairment. In addition, interior standpipe hose systems are designed for Class III service and are provided with both 2½" and 1½" connections. Hose Station 45-10 is located immediately adjacent to the overhead roll up door in the west wall of Room 419 and can be isolated from the west loop to be available for backup hose stream protection west of the structures.

3.3.13 Hose Reach Tests (4.3.1.4, 5.6, 5.12, 5.17, 5.19, 5.21, 5.24, 5.25, 5.26, 5.28)

We will require the licensee to perform hose reach tests, and provide additional hose stations as necessary to assure that all points in safety-related areas and other plant areas which contain major fire hazards can be effectively reached by at least one hose stream.

RESPONSE:

As indicated in our previous submittal on Staff Position 13, hose stretch tests have been performed. Additional 1½" fire hose has been added to existing hose stations at Elevation 45'-0" and 27'-0" so as not to exceed 100 feet at each station. Eight additional hose stations are proposed for the Auxiliary Building, Elevation 69'-0", 45'-0" and 27'-0". Two additional stations are proposed for the Intake Structure, Elevation 12'-0". Hose station design and installation will be as shown on Figure E-1 of the Fire Protection Program Evaluation (see the detail of Type "C" Hose Station).

Preliminary engineering and design is being performed now to provide hose stream protection in those areas containing safety-related equipment and areas containing large fire hazards.

611 233

3.3.14 Halon System Backup Power (4.3.2)

We will require the licensee to verify that the Halon suppression systems are provided with backup power from the onsite emergency power system.

RESPONSE:

Halon 1301 Fire Suppression Systems are supplied with power from dedicated breakers on 120 VAC distribution panels at 480 V MCC (#103 WP). These systems are electrically supervised by the fire protection control panel 1C24B located in the constantly attended Control Room. Loss of power to the Halon 1301 control panels would be immediately alarmed visually and audibly as required by NFPA Standard 12A Section 1-8. Backup power is not provided as it is not required by NFPA Standard 12A.

3.3.15 SMOKE REMOVAL CAPACITY (4.4.1)

We will require the licensee to demonstrate that the capacity of the smoke removal systems complies with the provision of Appendix A to BTP 9.5-1, which specifies at least 300 CFM for every 200 square feet of floor area, or is adequate for the service in the area they are provided; especially in the cable spreading rooms.

3.3.16 VENTILATION SYSTEM POWER AND CONTROL (4.4.1)

We will require the licensee to verify that power supply and controls for those ventilation systems providing smoke removal capability are run outside the fire areas served by the system. We will require the licensee to justify, or modify, the placement of any ventilation system power supply or controls in the fire area which they serve.

3.3.18 PORTABLE SMOKE EJECTORS (4.4.1)

We will require the licensee to provide three portable smoke ejectors and associated portable ducting to aid in manual smoke removal. The ejectors should be of the explosion-proof type that are used for fire fighting and have a minimum combined capacity of 17,500 CFM.

RESPONSE

BG&E will provide three (3) explosion-proof portable smoke ejectors with a minimum combined capacity of 17,500 CFM and will provide associated portable ducting to aid in manual smoke removal. BG&E will not demonstrate that the capacity of the smoke removal systems complies with the provisions of Appendix A to BTP 9.5-1, as referenced in 3.3.15. BG&E will not verify that power supply and controls for those ventilation systems providing smoke removal capability are run outside fire areas as referenced in 3.3.16. The preceding two items (3.3.15, 3.3.16) were deleted from consideration during the July 24 meeting between staff and BG&E, since staff agreed that portable smoke removal equipment would provide a suitable equipment substitute to installed ventilation hardware for the purposes of fire protection.

611 235

3.3.17 Ventilation Duct Penetrations (4.4.1, 4.9.2, 5.4, 5.5, 5.6, 5.9)

We will require the licensee to verify that all ventilation duct penetrations of fire barriers are protected with 3-hour rated (or lower rating if justified by the amount of combustibles) UL or FM listed fire door dampers which will close automatically in event of a fire, and the gaps between the ducts and the barriers are sealed. Additional modifications will be required as necessary.

RESPONSE:

Ventilation duct penetrations through rated fire barriers are equipped with U/L or FM listed fire dampers which close automatically in the event of fire and the gaps between the ducts and barriers are sealed. Fire ratings of fire dampers will be evaluated and appropriate modifications made as a result of the Fire Hazards Analysis (3.3.1).



3.3.19 Separation of Ventilation Air Intake from Exhaust (4.4.1)

We will require the licensee to provide additional information which will enable the staff to evaluate the adequacy of separation between the intake and exhaust of ventilation air.

RESPONSE:

The Staff Review Team requested and under separate cover will receive BG&E Drawings 60-319-E, Sheets 1 and 2 which clearly identifies the relative locations of the smoke removal system intake and exhaust relative to the normal outside air intake for the Control and Cable Spreading Rooms H.V.A.C. system. Attention is directed to "Responses" for items 3.3.15, 3.3.16 and 3.3.18 relative to smoke removal capability.

611 237

3.3.20 Fire Water Piping Overpressurization (4.3.1.3)

We will require the licensee to demonstrate that the fire water system overpressurization has not inflicted any permanent damage to the fire water piping.

RESPONSE:

As indicated in the April 19 response, the cause of the overpressurization has been identified. This is to be corrected by installation of  $\frac{1}{2}$ " pressure relief valves on the 13 automatic sprinkler systems which trap pressure surges. As identified in Position No. 22, pressures trapped on the system side of the alarm check valve are now observed to be up to 275 psi. Any test to verify that no damage has been done would require hydrostatic tests to 50 psi in excess of normal operating pressure, as specified in Section 1-11.3 of NFPA Standard 13. The fact that no leakage has been observed at the 275 psi pressurization in fact proves that the system has not been damaged. During the July 31 meeting this discussion satisfied the Staff Review Team's concern and no further action is contemplated.

611 238

3.3.21 Battery Room Ventilation Air Flow Monitor (4.4.4, 5.11)

We will require the licensee to install a ventilation flow monitor in each battery room to alarm and annunciate in the control room the loss of ventilation air flow in any battery room.

RESPONSE:

Information previously submitted April 19 in response to Position P-7 and additional clarification furnished during July discussions has satisfied the Staff Review Team's concern.

611 239

3.3.22 Fire Water Drainage (4.5)

We will require the licensee to perform an additional study, following the completion of hose reach tests and addition of interior hose stations, to verify that fire water drainage in all safety-related areas is adequate and possible fire water accumulation in any safety-related area will be acceptable.

RESPONSE:

BG&E will perform an additional study to verify that fire water drainage in all safety-related areas is adequate or that any accumulation in a safety-related area is acceptable as a result of modifications requiring installation of additional standpipe or suppression systems.

611 240

3.3.23 Backflow Protection (4.5, 5.2)

We will require the licensee to provide the results of an analysis, including drawings or sketches of the drain systems as necessary, to demonstrate that the design of existing drain systems can prevent the backflow of combustible liquids to other safety-related areas, or to provide additional modifications to prevent such possibilities.

RESPONSE:

BG&E will perform an analysis and furnish drawings and sketches, if necessary, to demonstrate that backflow of combustible liquids is prevented from communicating fire from one safety-related area to another.

611 241

3.3.24 ECCS ROOM SUMPS (4.5, 5.1)

We will require the licensee to demonstrate that oil drainage from a failed reactor coolant pump could only affect one ECCS room and that concurrent fires at the reactor coolant pump area and at the affected ECCS room will not prevent safe shutdown.

RESPONSE

Two motor operated valves (normally shut) exist in line between the containment and ECCS Pump Room sump piping and therefore preclude the possibility of a fire spreading to the ECCS Pump Room. In addition, containment sump drains are piped such that oil drains from a failed Reactor Coolant Pump may only drain into one ECCS Pump Room (Room 12 for Unit 1 and Room 22 for Unit 2). In the unlikely event that a fire were to spread to an ECCS Pump Room, safety equipment redundancy between each ECCS Pump Room precludes the possibility of preventing safe shutdown.

611 242

3.3.25 EMERGENCY LIGHTING (4.6)

We will require that each fixed, sealed beam emergency lighting unit be provided with battery power rated at least 8 hours, and that they be provided in all safety-related areas and their access to facilitate fire fighting and emergency operation of equipment.

RESPONSE

BG&E will provide in sufficient quantity, enough portable lighting of a battery power rating not less than eight hours to facilitate fire fighting and emergency operation of equipment for all safety-related areas. Further, as a result of the July 24 meeting, it is understood that the presently installed fixed emergency lighting is acceptable for the purposes of access to and egress from all safety-related areas during fire fighting and emergency operating conditions. The portable equipment will be of such a type that the operator is unencumbered in performing his fire fighting or emergency operating duties. The number of portable emergency lighting units available shall match the total number of emergency breathing units stored on site. (See accompanying literature).

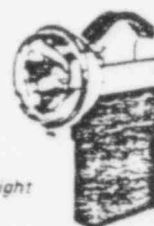
611 243

# LIGHTS

**LIFE SAVING DEPENDABILITY**  
HANDS-FREE USE, VEHICLE MOUNTED CONVENIENCE

BATTERIES RECHARGE 500 TIMES  
AUTOMATIC CHARGING  
LESS THAN 6 POUNDS  
NON-FADING BEAM  
ECONOMICAL - RUGGED

#130 HAND LIGHT - 25,000 beam candlepower, 1/4 mile beam with 2 amp bulb, adjustable focus. 6 hours light per charge, 3000 hours battery use life. Recharge 2 hours for each hour of use. Polished Stainless Steel construction, waterproof toggle switch and battery top, shockproof leather handle. Carry hands free on a shoulder strap. Use 120 volt chargers #125, #126, or 12 volt vehicle mounted chargers #5500 and #5520.



130 Light



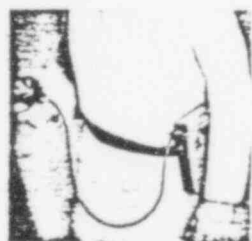
175 Light

\* #175 SAFETY HAND LIGHT - Similar to #130. Approved by U.S. Bureau of Mines for methane atmosphere; U.S. Coast Guard Listing #CG293 for Class 1, -Group D use. 15,000 beam candlepower, one amp bulb, 12 hours light per charge, 6000 hours battery use life. Recharge 1 hour for each hour of use. Use 120 volt chargers #125, #126.

\* #5100 or #5200 CAP LIGHT - 15,000 beam candlepower, 12 hours light per charge, 6000 hours battery use life. Recharge 1 hour for each hour of use. Powerhead weighs only 5 1/2 ounces, is made of high impact resistant polycarbonate. Has a single Krypton filled bulb with two filaments, both can be easily focused to a perfect spot. Each filament is designed for 275 hours providing 550 hours useful bulb life, 15% more light than competitive products, and greater safety. A single knob switches and focuses both filaments, gives positive fingertip adjustment. Headpiece is carried on a hat, battery on a belt. Approved by the U.S. Bureau of Mines, the Canadian Bureau of Energy, Mines, and Resources; U.S. Coast Guard Listing #CG293 for Class 1, Group D use. May be used with 120 and 220 volt chargers.



Cap Light



5280 belt light

5280 BELT LIGHT - Same powerhead, bulb, and battery as cap light. The powerhead and battery attach to belt freeing both hands. Belt clip gives light correct tilt for walking, makes positive attachment yet is easily removed to use as a hand held spotlight, 12 hours light per charge, 6000 hours battery use life. Charge 1 hour for each hour of use. Use 120 volt chargers #125, #126, or 12 volt vehicle mounted chargers #5500 and #5520.

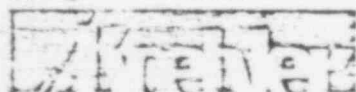
THESE LIGHTS COMPLY WITH  
**O.S.H.A.**  
REGULATIONS

ALL SHOULDER STRAPS,  
BELTS AND HARD HATS  
SHOWN IN ILLUSTRATIONS  
ARE AVAILABLE ON AN  
"OPTIONAL EXTRA"  
BASIS.

**BATTERY** - Heavy duty 4-volt, 15 amp hour rechargeable lead-acid battery is the "heart" of Koehler lights. They are rechargeable 500 complete cycles. The smoothly contoured battery case is made of tough, high impact resistant polycarbonate with belt loops moulded into the case, reinforced corners for extra wear. Patented spillproof traps insure easy maintenance and leakproof use.

**LIFE SAVING DEPENDABILITY** - Koehler rechargeable portable lights are designed and built to be so dependable they are life saving tools. They provide long lasting, nonfading light; are always ready at full power, like having a new battery for each use. Proven by years of hard use and abuse by miners, fire, police, utilities, sportsmen, construction workers industry, railroads, airlines, Armed Forces, Government, and others.

**ECONOMICAL** - Koehler rechargeable lights provide better maintained light at lower cost. The rechargeable battery also eliminates the cost of 500 replacement batteries.



Made in U.S.A.

611 244  
**MANUFACTURING COMPANY**

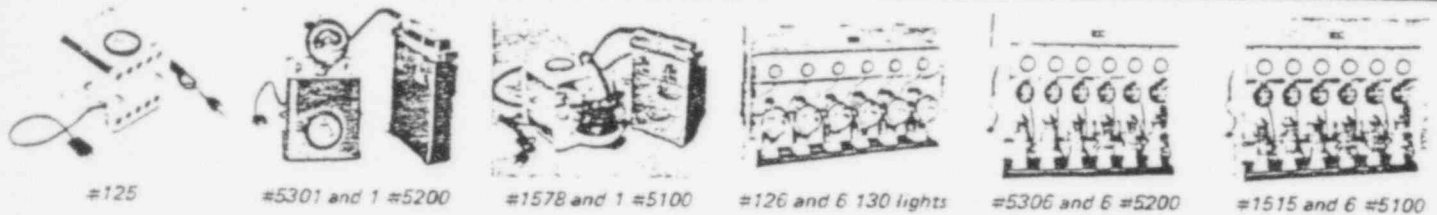
MARLBOROUGH, MASSACHUSETTS 01752

Printed in U.S.A.



Thoroughly proven in years of unequal performance, Behler Automatic Chargers are the "brains" of the Behler system. They are simple and safe, merely plug in the equipment, low voltage charging power can be left on at all times without need for manual adjustment or timing devices. Lamps in any stages of discharge can

be placed on charge at any time. Lamp may be removed when the charge is completed, as indicated by the meter, or be left connected in a fully charged condition; won't overcharge. Each lamp takes only the current needed to keep it charged. All chargers are built for long life and trouble-free service.

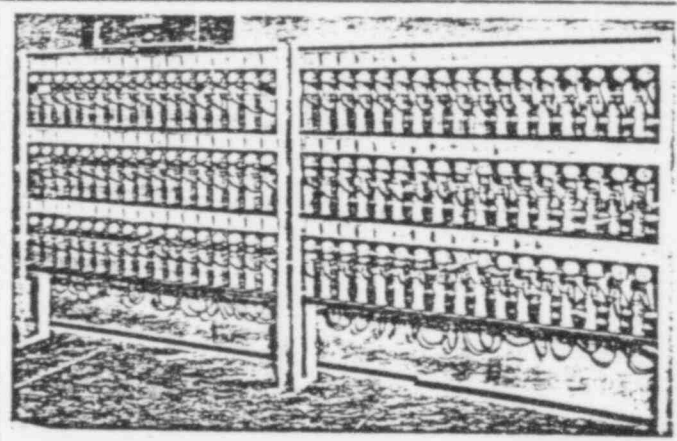


- |       |                                      |             |       |                                    |
|-------|--------------------------------------|-------------|-------|------------------------------------|
| #125  | Single Light for #130, #175, & #5280 | 120 VOLT    | #126  | Six Light for #130, #175, & #5280. |
| #5301 | Single Light for #5200 Cap Light.    | 50/60 CYCLE | #5306 | Six Light for #5200 Cap Light.     |
| #1578 | Single Light for #5100 Cap Light.    | CHARGERS    | #1515 | Six Light for #5100 Cap Light.     |



VEHICLE MOUNTED CHARGERS #5500 and #5520 - Lights and chargers mount on vehicle. Between uses the light is automatically recharged from the vehicle's power system, eliminating maintenance. Maximum battery drain is 1.2 amps, and tapers to 20 milliamps. Chargers are solid state, printed circuit, fully automatic. Lights in any condition may be placed on charge. Charger automatically monitors the current necessary to recharge the battery, won't overcharge. Chargers operate on 12-14 volts. Charges #130 Hand Lights and #5280 Belt Lights. Charger and light holder are one compact unit, 8 1/2" tall, 4 1/2 x 5"; double unit is 8 1/2" x 6". Installation is easy.

- Model 5500 12 volt vehicle mounted single light charger unit
- Model 5520 12 volt vehicle mounted two light charger unit



- 50 and 100 LAMP CHARGERS  
230 VOLT - 50/60 CYCLE
- #5400 CHARGER +1 #1561 Rack for 50 #5100 Cap Lamps.
  - #5400 CHARGER +2 #1561 Racks for 100 #5100 Cap Lamps.
  - #5400 CHARGER +1 #5351 Rack for 50 #5200 Cap Lamps.
  - #5400 CHARGER +2 #5351 Racks for 100 #5200 Cap Lamps.

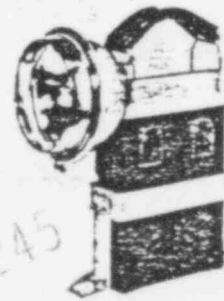


#W56 Leather Shoulder Strap for carrying hand lights.

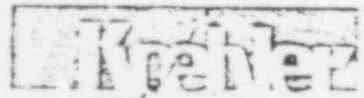
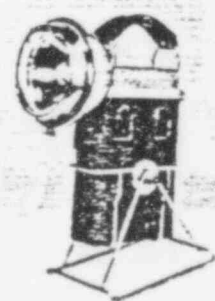


#MS-2 Leather Belt for carrying battery and Belt Light

#240 Floor Mounting Bracket



#245 Adjustable Stand



**MANUFACTURING COMPANY**  
MARLBOROUGH, MASSACHUSETTS 01752

Made in U.S.A.

Printed in U.S.A.

POOR ORIGINAL

611 245

3.3.26 PORTABLE RADIO COMMUNICATION (4.7)

We will require the licensee to provide signal repeaters as necessary to ensure that all plant areas, including the containment, can be reached by the portable radio communication. We will also require that a sufficient number of portable radios be provided to coordinate fire fighting, a worst emergency operation, and a physical security emergency, if the radios are also shared by the security force.

RESPONSE

BG&E will provide communications equipment to facilitate communications between the Control Room and all areas of the plant including the interior of containment.

611 246

3.3.27 Unprotected Doorways (4.9.1, 5.1, 5.2, 5.4, 5.5, 5.7, 5.18, 5.22)

We will require the licensee to install UL or FM listed fire doors of appropriate ratings at the unprotected doorways in fire barriers separating various safety-related areas of the plant.

RESPONSE:

A commitment for installation of fire doors or other appropriate protection for the above rooms has been incorporated in the response to 3.3.1.

611 247

3.3.28 Bullet-Proof Doors (4.9.1, 5.16)

We will require the licensee to replace five bullet-proof doors without fire resistance ratings that have been installed in the computer rooms, control room and stair tower in the control room area with UL listed 3-hour rated bullet-proof fire doors.

RESPONSE:

As part of the Fire Hazards Analysis as required by 3.3.1, the adequacy of the bullet-proof doors to withstand fire exposure is being evaluated.

611 248

3.3.29 Fire Door Supervision (4.9.1)

We will require the licensee to identify those fire doors which are not presently locked or electrically supervised. We will require the licensee to keep these doors locked closed or electrically supervised, or to justify the lack of locks or electric supervision.

RESPONSE:

Information previously submitted April 19 in response to Position P-1 and additional clarification furnished during July discussions is being evaluated by the Staff Review Team.

611 249

3.3.30 Electrical Penetration Fire Resistance (4.9.3, 5.4, 5.5, 5.6, 5.9)

We will require the licensee to provide the results of those tests conducted to demonstrate the adequacy of fire resistance of the Calvert Cliffs electrical penetrations. Additional tests, or upgrading of the penetrations, will be required if these test results fail to establish the adequacy of the penetrations.

RESPONSE:

BG&E will perform a standard ASTM E119 Fire Test to demonstrate the adequacy of the fire resistance of cable tray and conduit penetrations fire stops in rated fire barriers as defined by the Fire Hazards Analysis (3.3.1). We propose to include in this test representative piping penetration fire stops consisting of pipe in sleeves with the annular space closed by rope packing as requested in item 3.3.31. Test specifications will be developed to provide the necessary documentation for the NRC staff review.

611 250

3.3.31 Piping Penetration Fire Resistance (4.9.4, 5.4, 5.5, 5.6, 5.9)

We will require the licensee to provide test results or other evidence to demonstrate that piping penetrations have fire resistance ratings commensurate with fire hazards on both sides of the barriers. If the adequacy of fire resistance for such penetrations cannot be established, upgrading of these penetrations will be required.

RESPONSE:

BG&E will perform tests as identified in Item 3.3.30.

3.3.32 Cable Separation (4.10, 5.1, 5.2, 5.4, 5.5, 5.7, 5.8, 5.14, 5.17, 5.21, 5.28)

We will require the licensee to provide the results of additional tests or analyses which demonstrate that separation of electrical cables in the Calvert Cliffs facilities is adequate to preserve the plant's safe shutdown capability, postulating a fire in any one plant area.

The size of the postulated fire in each area should be the largest possible fire as discussed in Section 4.1 of this report. These tests/analyses should also establish the effectiveness of the fire barrier design or the steel conduit/wireway in preventing the spread of fire damage if a credit were taken for such.

If it cannot be demonstrated that the plant's safe shutdown capability can be preserved under fire emergency situations, additional modification(s) will be required.

Response

The criteria for cable separation or the application of protective materials to conduit and cable trays will be established based on the results of the fire hazards analysis (3.3.1) and the results of our test and evaluation program, described as follows:

- (1) We will provide the results of tests to demonstrate that silicone rubber cables which are installed in steel conduit are adequate to preserve the plant's safe shutdown capability.
- (2) Cables other than silicone rubber which are installed in conduit will be protected where shown to be necessary by the fire hazards analysis by materials which have been proven by test to provide adequate protection to preserve the plant's safe shutdown capability.
- (3) Where shown to be necessary by the fire hazards analysis, cables which are installed in cable trays will be protected by materials which have been proven by test to provide adequate protection to preserve the plant's safe shutdown capability.

611 252



3.3.33 Unprotected Structural Steel (4.11, 5.28)

We will require the licensee to identify those areas in which barriers are supported by unprotected structural steel, and provide appropriate protection for this steel unless it can be verified that postulated fires in these areas would not adversely affect these supports, or that failure of these supports could not impair the safe shutdown or cause excessive release of radioactive materials.

RESPONSE:

There are no fire walls supported by unprotected structural steel at Calvert Cliffs Nuclear Power Plant.

611 253

3.3.34 Safety-Related Areas (4.14, 5.5, 5.6, 5.20)

We will require the licensee to provide a list identifying those plant areas which contain systems, components and structures important to safety and major safety-related system/components contained therein.

Response

The attachment lists rooms/areas which contain safety-related equipment, and the major equipment in each room. Equipment such as piping, valves, instruments and cable are not listed. Room and equipment numbers in parentheses refer to Unit 2.

<u>Room</u>	<u>Major Safety-Related Equipment</u>
100	
103	
104	
115(105)	Charging Pumps 11, 12, 13 (21, 22, 23)
117	
118(102)	CS Pump 12 (22) HPSI Pump 13 (23) LPSI Pump 12 (22) West ECCS Pump Rm. Fans & Cover SDC HX 12 (22)
119(101)	CS Pump 11 (21) HPSI Pumps 11, 12 (21, 22) LPSI Pump 11 (21) East ECCS Pump Rm. Fans & Cover SDC HX 11 (21)
122	
200	
202	
207	Waste Gas Decay Tanks
208	
209	
210	
212	
216(216A)	Heat Tracing Equip.
217(215)	Boric Acid Tanks 11, 12 (21, 22) Boric Acid Pumps 11, 12 (21, 22)
218(214)	
220(213)	
221(211)	
222	
223	



<u>Room</u>	<u>Major Safety-Related Equipment (cont.)</u>
405	Control Room Equipment
410	
416	DG 21, Air Comp., Vent Fan, FO Xfr. Pp.
419	
421	DG 12, Air Comp., Vent Fan, FO Xfr. Pp.
422	DG 11, Air Comp., Vent Fan, FO Xfr. Pp.
423(414)	MCC's Recombiner 12 (22) Panel
427(411)	
428(408)	MSIV Hydraulics 12 (22) Atmos Dumps
429(409)	Recombiner 11 (21) Panel
430(407)	Breakers, Switchgear
439(440)	Refueling Wtr. Recirc. Pp. 11 (21) Refueling Wtr. HX 11 (21)
Cable Chase 1C (2C)	
512	Control Rm. & CSR HVAC Equip. Post-LOCI Filters
520	Fuel Pool Vent Equip.
524(526)	Swgr. Rm. HVAC Equip.
525(527)	CCW Head Tank 11 (21)
529(532)	MCC's
533	New Fuel Racks
Horizontal Chase E1 82'9"	
603(605)	Aux. Feed Pp. 11, 12 (21, 22)
Intake Structure	Salt Water Pps.
Containments	NSSS & Support Systems

3.3.35 Radiological Consequences of Fire (4.14, 5.3, 5.7, 5.9, 5.20, 5.24, 5.25)

We will require the licensee to supplement his fire hazards analysis with a study of radiological consequences of a fire in areas containing radioactive materials (including a fire in a charcoal or a HEPA filter), or other areas where a fire could cause the release of radioactive materials. Additional modifications will be required in areas where a fire could cause the release of radioactive materials that could preclude the normal usage or occupancy of area surrounding the plant.

Response

An analysis of the radiological consequence of fire will be provided as required by the staff. Modifications will be provided if necessary to prevent fire-caused releases that exceed our safety related criteria.

3.3.36 Control Air (4.15)

We will require the licensee to:

- (1) provide a detailed information which supports the statement that the operation of the charging system valves are required only following a LOCA, and
- (2) provide the results of an analysis which demonstrate that the transient caused by the loss of control air to the saltwater valves would not have a detrimental effect on the salt water pumps, or any adverse effect on the plant safety. The analysis should take into account a possible delay in the operator's action.

RESPONSE:

BG&E is currently evaluating and will provide information relative to the independent control air systems identified in this item by August 17, 1979.

3.3.37 Separation of Redundant Equipment (4.1, 5.2, 5.4, 5.5, 5.27)

We will require the licensee to separate, by fire barriers of appropriate fire resistance, one division of equipment (pump, valve, control, instrumentation, etc.) required for safe shutdown from its redundant counterpart(s) to preserve the functions of such systems during and following fire emergency situations, or provide alternate means of performing such functions. Systems to be so protected include but not be limited to: (1) the component cooling water system, (2) the charging system, (3) the service water system, and (4) the auxiliary feedwater system.

Response

Refer to the response to 3.3.1.



3.3.38 Separation of Plant Areas (5.4, 5.6, 4.9)

We will require the licensee to separate each of the following areas from adjoining plant areas by installing fire doors and upgrading penetrations of barriers to fire resistance ratings required of the barriers:

- (1) Each of the component cooling pump rooms
- (2) Each of the piping areas Nos. 203 and 224
- (3) The hot machine shop and the hot instrument shop.

Response

Refer to the response to 3.3.1.

3.3. / Rerouting Hydrogen Piping (5.4, 5.8, 5.9)

We will require the hydrogen piping in the referenced plant areas out of the areas and other safety-related plant areas, or provide other additional protection.

RESPONSE:

BG&E is currently evaluating and will provide information relative to the hydrogen piping by August 17, 1979.

611 262

3.3.40 Addition of Curbs (5.9)

We will require the licensee to provide curbs at the doorways to the hot machine shop and the hot instrument shop to contain a possible oil/solvent spillage.

RESPONSE:

B. G. & E. will provide means to curb or contain possible oil/solvent spillage to the Hot Machine Shop and the Hot Instrument Shop.

611 263

3.3.41 CONTROL OF COMBUSTIBLES (5.9, 5.24, 5.26)

We will require the licensee to remove all combustibles that are not required for the routine operation and maintenance of the plant from all safety-related plant areas and prohibit open storage of combustible materials near or under the safety-related cables/equipment. Storage of combustible materials necessary for the routine operation or maintenance of the plant should be limited to approximately one week's supply. Appropriate facilities should be provided for such storage.

RESPONSE

BG&E will remove and prohibit storage of all combustibles not required for routine plant operation and maintenance from all safety-related areas. In addition, BG&E will provide metal storage cabinets removed from the vicinity of any safety-related cables/equipment for the storage of a one week's supply of combustible materials necessary for the routine operation and maintenance of the plant.

3.3.42 Alternate Shutdown Capability (5.10, 5.13, 5.16)

We will require the licensee to verify the existence of, or provide if it cannot be verified, the capability to safely shutdown both units independent of cables and equipment in any one of the following rooms or chases:

- (1) The control room
- (2) Two cable spreading rooms
- (3) Six cable chases (1A, 1B, 2A, 2B, U1 and U2)

Response

Refer to the response to 3.3.1.

3.3.43 DEDICATED LADDERS (5.10)

We will require the licensee to provide a dedicated ladder of noncombustible construction in each cable spreading room to provide access to the areas above the battery rooms and the overhead cable chases.

RESPONSE

BG&E has provided fiberglass construction dedicated ladders for each cable spreading room. Fiberglass was selected so as to meet OSHA standards for electrical shock hazards in these areas.

611 266

3.3.44 Fire Suppression System in Cable Chases (5.13)

We will require the licensee to provide an automatic water suppression system in each of the six cable chases (1A, 1B, 2A, 2B, U1 and U2).

RESPONSE:

BG&E will perform a fire hazards analysis (3.3.1) for the six cable chases identified and modifications will be provided as necessary.

611 267

3.3.45 Miscellaneous Protection for Control Room (5.16)

We will require the licensee to:

- (1) provide a fog nozzle for the manual hose protecting the room,
- (2) replace wooden furniture and shelves with those of metal, and
- (3) provide metal partitions to separate the adjoining panels from the computer terminal in the middle of the main panel.

RESPONSE:

- (1) A fog nozzle is provided for the standpipe hose station protecting the room.
- (2) All wooden furniture will be removed from the control room complex except for work benches in the Log and Test Instrument Room (Room 435).

The metal work benches with wooden tops are required to reduce potential electric shocks from injuring technicians. This room is separated from the constantly attended Control Room by a metal bullet-proof door. The room is equipped with an early warning fire detection system.

- (3) Metal partitions will be provided to separate the adjoining panels from the computer terminal in the middle of the main panel.

611 268



3.3.46 RC Pump Lube Oil Collection System (5.19)

We will require the licensee to provide a description of design bases of the lube oil collection system for the reactor coolant pumps, and the drawings or sketches showing its arrangement.

RESPONSE:

Information previously submitted April 19 in response to Position P-5, new information, photographs, and additional clarification furnished during the July discussions is being evaluated by the Staff Review Team.

611 269

3.3.47 Effects of Fire on Radiation Monitors

We will require the licensee to provide the results of a study to demonstrate that the radiation monitors will remain operational when exposed to smoke or heat of a potential fire.

RESPONSE:

We will provide the results of a study to demonstrate the capability to effectively monitor radiation levels in the plant.

611 270

Enclosure 2

Calvert Cliffs Nuclear Power Plant  
Fire Protection Review

IMPLEMENTATION DATES FOR ANALYSIS,  
ADDITIONAL DATA AND MODIFICATIONS

611 271

Implementation Table

	<u>Item</u>	<u>Analysis/Data</u>	<u>Modification</u>
3.3.1	Fire Hazards Analysis	Nov 1979 <sup>(4)</sup>	Oct 1980
3.3.2	Alarm System	Aug 1979 <sup>(2)</sup>	N/A
3.3.3	Fire Detection	Nov 1979 <sup>(4)</sup>	Oct 1980
3.3.4	Adequacy of Detector Installation	Nov 1979	N/A
3.3.5	Fire Water Storage	Aug 1979 <sup>(2)</sup>	N/A
3.3.6	Fire Water System Valves	Aug 1979 <sup>(2)</sup>	N/A
3.3.7	Fire Water Freeze Protection	Aug 1979 <sup>(2)</sup>	N/A
3.3.8	Miscellaneous Use of Fire Water	Aug 1979 <sup>(2)</sup>	N/A
3.3.9	Fire Pump Flow Test	Aug 1979 <sup>(2)</sup>	N/A
3.3.10	Fire Water Demand	Aug 1979 <sup>(2)</sup>	N/A
3.3.11	Low Water Level Interlock	Aug 1979 <sup>(2)</sup>	Nov 1979
3.3.12	Single Isolation in Fire Water Piping	Aug 1979 <sup>(2)</sup>	Aug 1979
3.3.13	Hose Reach Tests	Nov 1979 <sup>(4)</sup>	Oct 1980
3.3.14	Halon System Backup Power	Aug 1979 <sup>(2)</sup>	N/A
3.3.15	Smoke Removal Capacity	Aug 1979 <sup>(2)</sup>	N/A
3.3.16	Ventilation System Power	Aug 1979 <sup>(2)</sup>	N/A
3.3.17	Ventilation Duct Penetrations	Nov 1979 <sup>(4)</sup>	Oct 1980
3.3.18	Portable Smoke Ejectors	Aug 1979 <sup>(2)</sup>	N/A
3.3.19	Separation of Ventilation Intake and Exhaust	Aug 1979 <sup>(2)</sup>	N/A
3.3.20	Fire Water Overpressure	Aug 1979 <sup>(2)</sup>	N/A
3.3.21	Battery Room Vent Air Flow	Aug 1979 <sup>(1)</sup>	N/A
3.3.22	Fire Water Drainage	Nov 1979	Oct 1980
3.3.23	Back Flow Prevention	Nov 1979	Oct 1980
3.3.24	ECCS Sumps	Aug 1979 <sup>(2)</sup>	N/A
3.3.25	Emergency Lighting	Aug 1979 <sup>(2)</sup>	Oct 1979
3.3.26	Fire Protection Communications	Nov 1979 <sup>(4)</sup>	June 1980
3.3.27	Unprotected Doorways	Nov 1979 <sup>(4)</sup>	Oct 1980
3.3.28	Bullet-Proof Doors	Nov 1979 <sup>(4)</sup>	Oct 1980
3.3.29	Fire Door Supervision	Aug 1979 <sup>(1)</sup>	N/A
3.3.30	Electrical Penetration Test	Nov 1979	Feb 1980
3.3.31	Piping Penetration Test	Nov 1979	Feb 1980
3.3.32	Cable Separation	Nov 1979 <sup>(4)</sup>	Oct 1980
3.3.33	Unprotected Steel	Aug 1979 <sup>(2)</sup>	N/A
3.3.34	Safety Related Area Listing	Aug 1979 <sup>(2)</sup>	N/A

01-272

Implementation Table (Continued)

	<u>Item</u>	<u>Analysis/Data</u>	<u>Modification</u>
3.3.35	Radiological Consequences	Nov 1979	Oct 1980
3.3.36	Control Air	Aug 1979 <sup>(3)</sup>	N/A
3.3.37	Separation of Redundant Equipment	Nov 1979 <sup>(4)</sup>	Oct 1980
3.3.38	Separation of Plant Areas	Nov 1979 <sup>(4)</sup>	Oct 1980
3.3.39	Hydrogen Piping	Aug 1979 <sup>(3)</sup>	N/A
3.3.40	Additional Curbs	Nov 1979	June 1980
3.3.41	Control of Combustibles	Aug 1979 <sup>(2)</sup>	N/A
3.3.42	Alternate Shutdown Capability	Nov 1979 <sup>(4)</sup>	Oct 1980
3.3.43	Dedicated Ladders	Aug 1979 <sup>(2)</sup>	N/A
3.3.44	Fire Suppression in Cable Chases	Nov 1979 <sup>(4)</sup>	Oct 1980
3.3.45	Miscellaneous Protection for Control Room	Aug 1979 <sup>(2)</sup>	Oct 1980
3.3.46	RCP Lube Oil Collection	Aug 1979 <sup>(1)</sup>	N/A
3.3.47	Effects of Fire on Radiation Monitors	Nov 1979	N/A

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(1) Data furnished prior to this submittal.

(2) Data furnished with this submittal.

(3) Additional data to be furnished by August 17, 1979.

(4) Items common to fire hazards analysis of safe shutdown systems, Item 3.3.1.

611 273