AEC DISTRIBUTION FOR PART 50 DOCKET MATERIAL
(TEMPORARY FORM)

CONTROL NO: 5535

FILE:

FROM:	DATE OF DOC	DATE REC'D	LTR	TWX	RPT	OTHER
Metropolitan Edison Company Reading, Pennsylvania 19603 R. C. Arnold	6-14-74	6-19-74	X			

TO:	ORIG	CC	OTHER	
Mr. Giambusso	1 signed			SENT AEC PDR X SENT LOCAL PDR X

CLASS	UNCLASS	PROP INFO	INPUT	NO CYS REC'D	DOCKET NO:
	XXXX			1	50-289

DESCRIPTION:
Ltr submitting description of the Reactor Building Atmospheric Clean-Up System.....

DIST PER BERNERO

ENCLOSURES:

Do Not Remove

ACKNOWLEDGED

PLANT NAME: Three Mile Island Unit # 1

FOR ACTION/INFORMATION 6-24-74 AB

BUTLER (L)	✓ SCHWENCER (L)	ZIEMANN (L)	REGAN (E)
W/ CYS	W/ 2 CYS	W/ CYS	W/ CYS
CLARK (L)	STOLZ (L)	DICKER (E)	
W/ CYS	W/ CYS	W/ CYS	W/ CYS
PARR (L)	VASSALLO (L)	KNIGHTON (E)	
W/ CYS	W/ CYS	W/ CYS	W/ CYS
KNIEL (L)	PURPLE (L)	YOUNGBLOOD (E)	
W/ CYS	W/ CYS	W/ CYS	W/ CYS

INTERNAL DISTRIBUTION

REG FILE	TECH REVIEW	DENTON	LIC ASST	A/T IND
✓ AEC PDR	HENDRIE	GRIMES	DIGGS (L)	BRAITMAN
OGC	SCHROEDER	GAMMILL	GEARIN (L)	SALTZMAN
MUNTZING/STAFF	MACCARY	✓ KASTNER	✓ GOULBOURNE (L)	B. HURT
CASE	KNIGHT	BALLARD	KREUTZER (E)	
GIAMBUSSO	PAWLICKI	SPANGLER	LEE (L)	PLANS
BOYD	SHAO		MAIGRET (L)	MCDONALD
✓ MOORE (L)(LWR-2)	STELLO	ENVIRO	REED (E)	CHAPMAN
✓ DEYOUNG (L)(LWR-1)	HOUSTON	MULLER	SERVICE (L)	DUBE w/input
SKOVHOLT (L)	NOVAK	DICKER	SHEPPARD (L)	E. COUPE
✓ GOLLER (L)	ROSS	KNIGHTON	SLATER (E)	
P. COLLINS	IPPOLITO	YOUNGBLOOD	SMITH (L)	D. THOMPSON (2)
DENISE	TEDESCO	✓ REGAN	TEETS (L)	KLECKER
REG OPR	LONG	✓ PROJECT MGR	WILLIAMS (E)	EISENHUT
✓ FILE & REGION (3)	LAINAS	ST. MARY	WILSON (L)	
MORRIS	✓ BENAROYA	HARLESS		
STEELE	VOLLMER			

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EXTERNAL DISTRIBUTION

✓ 1 - LOCAL PDR Harrisburg, Pa.
✓ 1 - TIC (ABERNATHY)
✓ 1 - NSIC (BUCHANAN)
1 - ASLB
✓ 1 - P. R. DAVIS
✓ 16 - ACRS ~~MORRIS~~ SENT TO LIC ASST. E. GOULBOURNE

(1)(2)(10)-NATIONAL LABS
1-ASLBP(E/W Bldg, Rm 529)
1-W. PENNINGTON, Rm E-201 GT
1-B&M SWINEBROAD, Rm E-201 GT
1-CONSULTANTS NEWMARK/BLUME/AGBABIAN

1-PDR-SAN/LA/NY
1-BROOKHAVEN NAT LAB
1-G. ULRIKSON, ORNL
1-AGMED (RUTH GUSSMAN) Rm B-127 GT
1-RD..MUELLER, Rm F-[illegible] GT

7910260530

Regulatory File

METROPOLITAN EDISON COMPANY

POST OFFICE BOX 542 READING, PENNSYLVANIA 19603 TELEPHONE 215 – 929-3601

June 14, 1974
GQL 0080

Mr. A. Giambusso
Deputy Director for Operating Reactors
Directorate of Licensing
Office of Regulation
U. S. Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Giambusso:

THREE MILE ISLAND NUCLEAR STATION
UNIT NO. 1
LICENSE NO. DPR-50
DOCKET NO. 50-289

During Mr. R. Bernero's visit to the Three Mile Island Unit 1 site in January, he requested a description of the Reactor Building Atmospheric Clean-Up System. The description is provided as follows:

The purpose of the Reactor Building Atmospheric Clean-Up System (Kidney System) is to reduce the airborne radioactivity level in the Reactor Building during normal operation and the system performs no safety related function. The kidney system will be completely installed in the Reactor Building during the first refueling shutdown. This kidney system is not safety related and therefore need meet only good standard industrial practices.

The kidney system consists primarily of a filter plenum, a centrifugal fan, and an internal water spray system for fire protection. The filter plenum is located on the Reactor Building's intermediate floor level (elevation 308'-0") near the Reactor Compartment Cooling System fans (AH-E-2A, 2B). The banks of filters in the plenum are arranged as follows: roughing, HEPA, charcoal, HEPA. Each of these banks has an individual externally mounted differential pressure gage that indicates the pressure drop across that bank. The charcoal filter bank also has temperature sensors (RTC's) to monitor the bank temperature. The sensors are connected to a recorder that indicates and continuously records these temperatures. In addition, temperature switches are strategically located in the charcoal bank to start the water spray system pumps in case of excessive charcoal temperature.

The system's fan is located at the outlet from the filter plenum on the intermediate floor level of the Reactor Building. It is belt driven by a 40 H.P. electric motor, and is rated to handle 20,200 A.C.F.M. at 110°F (18,000 SCFM). Electric power for the fan motor is supplied from a non-class IE power source.

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The system air flow pattern is arranged so that air is drawn from the Reactor Building basement, (elevation 281'-0") via the purge supply system inlet duct. The air then flows through the filter plenum before being freely discharged to the intermediate floor level space (elevation 308'-0") through two opposed direction outlets located on the fan discharge connection. The air in this space is in turn drawn into the Reactor Compartment Cooling System and the Reactor Building Recirculation System. The Reactor Compartment Cooling System forces the air that it handles past the Reactor and up to the Reactor Building operating floor. The Reactor Building Recirculation System mixes the air from the intermediate level with return air from other areas in the Reactor Building and discharges it into the basement. Here it is picked up by the Reactor Building supply fans for distribution throughout the building, and by the steam generator compartment cooling system fans for supply to the steam generator compartment. This air flow pattern for the Clean-Up System effectively eliminates possible recirculation around the system which might occur if it were to take its inlet air from the intermediate level and discharge it there also.

The water spray system used with the filter plenum is intended to prevent burning of the charcoal in the plenum's charcoal adsorber bank. The spray system consists of a water storage tank, two pumps (one redundant), spray nozzles in the filter plenum, and interconnecting piping, valves, fittings, etc. It is a closed system in that water from the storage tank will return to the tank by gravity flow from the filter plenum for continuous recirculation. The amount of water vaporized to steam will be small since the system activates at 200°F (maximum) and the charcoal does not burn until an approximate 500°F temperature is reached. Since the system is closed, no dilution of the borated water in the Reactor Building sump will occur.

The storage tank and pumps are located in the Reactor Building basement (floor elevation 281'-0"). The tank is a nominal 1500 gallon capacity horizontal type supported on two saddles. Make-up water for the tank is manually controlled, with the water piped to the tank from the reclaimed water system in the Reactor Building. The tank may be nearly emptied by connecting a temporary line to the pump-out connection provided in the pump discharge piping and operating one of the system's pumps. The residual water remaining in the tank may be drained using drain valves provided in the piping. The water to be disposed of may be routed anywhere the operating personnel desire. If the water is not radioactive, it can be pumped wherever required for normal disposal. If the water is radioactive it must be pumped to the Reactor Building basement sump for appropriate processing.

The spray pumps are vertical inline centrifugals driven by direct-connected 5 H.P. electric motors. Power for the "A" and "B" pump motors is supplied from a non-class IE power source. Under deluge conditions, the charcoal is sprayed at a rate of 0.75 GPM per charcoal tray. For the total 108 trays, this requires a minimum total flow of 81 GPM, resulting in a design water flow for each pump of 90 GPM.

The controls for the kidney system are primarily manually actuated, except for water spray of the charcoal which is automatic (temperature actuated). System operation is from a local control panel located outside the Reactor Building near the personnel access hatch to the Reactor Building.

The system fan (AH-E-101) can be manually started and stopped from the local control panel. Also, it will automatically stop when the water spray pumps are actuated by high temperature in the charcoal bank. The water spray pumps (FS-P-5A, B) can be manually started (for test and storage tank pump-out purposes) and stopped from the panel. However, the pumps are interlocked so that they cannot be manually started when the fan is already running. If running, the fan must be manually stopped. Additionally, the pumps will start automatically in the event any two of the temperature switches located in the charcoal filter bank are actuated by high temperature. The pumps must then be manually stopped.

Resistance Temperature Detectors (RTD's) are installed in the charcoal adsorber bank to allow continuous readout of the temperatures of the bank. The five RTD's installed are monitored by an indicator-recorder mounted in the H&V panel in the main control room. The recorder has an alarm function associated with it that is actuated should the temperature of any one of the RTD's exceed 170°F. This alarm is indicated on the H&V panel in the main control room, and also relayed back to the local panel for indication there. No actuation of the water spray system is done using the RTD's.

Fifteen temperature actuated switches are located in the charcoal adsorber bank. These switches are used to actuate the water spray system for the charcoal in case the temperature in the charcoal continues to rise after the high temperature alarm via the RTD's is given. The set point of the switches is 200°F. The switches are wired so that when any two switches trip, the water spray pumps are started and the filter fan is stopped. It is set up this way because should one switch malfunction and trip the pumps by itself, an unnecessary cleanup expense would be incurred. However, in case of excessive temperature at least two switches would trip in rapid succession.

An air flow switch is located in the inlet duct to the filter plenum. It is used to detect abnormally low air flow rates through the system. If low air flow is detected while the fan is running, an alarm is actuated on the local panel and in the main control room. Low flow could be caused by a malfunction of the fan, fan motor, fan drive, filter elements or ductwork.

The kidney system has several malfunction alarms associated with its operation. These are indicated on the local control panel and/or the main control room H&V panel as described below. The local control panel has warning lights for the following:

a. One light for high charcoal temperature as sensed by the RTD's.

b. One light for high charcoal temperature as sensed by the temperature switches.

c. One light for low air flow.

The H&V panel in the main control room has both visual and audible warnings via the panel's annunciator for the following:

a. One window for high charcoal temperature (actuated by either the RTD's or the temperature switches).

b. One window for low air flow.

In addition, the local control panel has "red-green" running lights for each motor (total of three) in the system.

Very truly yours,

R. C. Arnold
Vice President

asb

cc: R. Bernero
U.S. Atomic Energy Commission
Washington, DC 20545

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