Florida
Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302

**April 30, 1996**
3F0496-32

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Subject: Revised Response to a Notice of Deviation

References A. FPC to NRC letter, 3F1195-14, dated November 9, 1995
B. FPC to NRC letter, 3F0296-04, dated February 7, 1996
C. FPC to NRC letter, 3F0396-27, dated March 29, 1996

Dear Sir:

In References A and B, Florida Power Corporation (FPC) provided responses to Notice of Deviation 50-302/95-16-05 concerning the Technical Support Center (TSC) ventilation system. In Reference C, FPC informed the NRC that modifications were being made to the TSC ventilation system which would correct the identified problems. The purpose of this letter is to revise our earlier responses and provide details of the TSC ventilation system modifications.

The modifications have been completed and the system has been balanced according to design calculations. The ventilation system will function as required to ensure that the TSC remains habitable for postulated radiologocal emergencies. Accordingly, the TSC has been determined to be operable and fully qualified.

Sincerely,

070047

P. M. Beard, Jr.
Senior Vice President
Nuclear Operations



PMB/RLM

cc: Regional Administrator, Region II
NRR Project Manager
Senior Resident Inspector



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**FLORIDA POWER CORPORATION**
**NRC INSPECTION REPORT NO. 50-302/95-16**
**REPLY TO A NOTICE OF DEVIATION**

**DEVIATION 50-302/95-16-05**

NUREG-0737, Clarification of TMI Action Plan Requirements, Supplement 1, item III.A.1.2, Upgrade Emergency Support Facilities, requires (in part) that each facility shall have a Technical Support Center (TSC) which will be habitable to the same degree as the control room for postulated accident conditions.

In response to item III.A.1.2. in a letter to the NRC dated January 11, 1980, the licensee committed to providing protection from radiological hazards, including direct radiation and airborne contaminants as per General Design Criterion (GDC) 19 and Standard Review Plan (SRP) 6.4 for the technical support center.

In response to Generic Letter 81-10, Post-TMI Requirements for the Emergency Operations Facility, the licensee's letter to the NRC, dated April 14, 1981, stated that the TSC would be functional per the guidance of NUREG-0696 and NUREG-0737 (Item III.A.1.2).

NUREG-0696, Functional Criteria for Emergency Response Facilities, Section 2.6, Habitability, states (in part) the following:

> Since the TSC is to provide direct management and technical support to the control room during an accident, it shall have the same radiological habitability as the control room under accident conditions. TSC personnel shall be protected from radiological hazards, including direct radiation and airborne radioactivity from in plant sources under accident conditions, to the same degree as the control room personnel.
>
> The TSC ventilation system shall function in a manner comparable to the control room ventilation system. The TSC ventilation system need not be seismic category I qualified, redundant, instrumented in the control room, or automatically activated to fulfill its role. A TSC ventilation system that includes high-efficiency particulate air (HEPA) and charcoal filters is needed, at a minimum.

Acceptance Criteria in SRP 6.4 includes meeting the requirements of GDC 19, as it relates to maintaining the control room in a safe, habitable condition under accident conditions by providing adequate protection against radiation. The "Licensee Enhanced Design Basis Document" states, in part, "The TSC air handling system emergency filter fan AHF-62 design flow requirement is 3000 cfm."

Contrary to the above, on August 18, 1995, the licensee determined that the TSC ventilation system had not been properly maintained per their commitments. Specifically, the proper flow balance was not maintained on the system, resulting in a high flow rate of 4600 cfm in the emergency (recirculation) mode of operation versus the design flow rate of 3000 cfm, degrading the performance of the ventilation filtration system. This caused the TSC ventilation system to be operating outside its design basis since July 1994.

**ADMISSION OR DENIAL OF THE ALLEGED DEVIATION**

FPC agrees with the deviation.

## REASON FOR THE DEVIATION

Three mechanical factors have been identified which adversely affected the system flows:

1. Fan performance substantially exceeded design flow requirements. This required throttling of system dampers to a point where slight changes had significant affects on system flows.

2. Motorized dampers were used to balance system flows. In conjunction with the excessive fan performance, repeatability of damper position when the system was cycled could have affected flows.

3. System operation relies on a positive building pressure to prevent in leakage and assumes zero leakage past the normal make-up damper (AHD-116) and relief air damper (AHD-115). These were found to be leaking. See Figures 1 and 2 for flow diagrams of the original TSC Ventilation system.

Another contributing factor to the deviation was a lack of proper identification of design requirements. Design Change Notice (DCN) 92-534 was issued to provide setpoints for damper flow balancing. The design drawing incorrectly indicated an outside air requirement of 500 CFM (instead of the calculation range of 375 to 509 CFM) and recirculation flow of 2,500 CFM. Unless otherwise stated on the design drawing, the flow balancing procedure MP-217 provides a flow tolerance of +/- 10% of the design number. This tolerance was used to balance the system, causing the 509 CFM maximum outside air limit specified in the dose calculation to be exceeded. Balancing the system at 500 CFM +/-10% did however, satisfy the minimum outside air requirement of 375 CFM specified in the design calculations.

The DCN failed to adequately specify the required flow range.

## CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

1. Fan speed has been reduced to facilitate balancing. Power has been removed from motorized balance dampers and they have been set to fixed positions.

2. Modifications were made to eliminate system leakage and to improve flow measurement capability and repeatability. See Figures 3 and 4 for flow diagrams of the modified TSC Ventilation system. The modifications are as follows:

   The system has been modified to eliminate leakage through AHD-115 and AHD-116. This was accomplished by providing positive closure at the inlet paths using custom fit metal covers. These will be installed when the emergency filters are placed in service.

   Potential wind affects on make-up air flow measurement were eliminated by relocating the intake into the equipment room.

   Improved flow measurement was provided by reducing the size of the make-up and recirculation air duct, thereby increasing the measured air velocity.

   Air flow monitors were installed with local indicators which display outside make-up air flow and return air flow.

All insulation on the suction side of the fans was removed, duct joints were inspected and sealed, and the insulation was replaced.

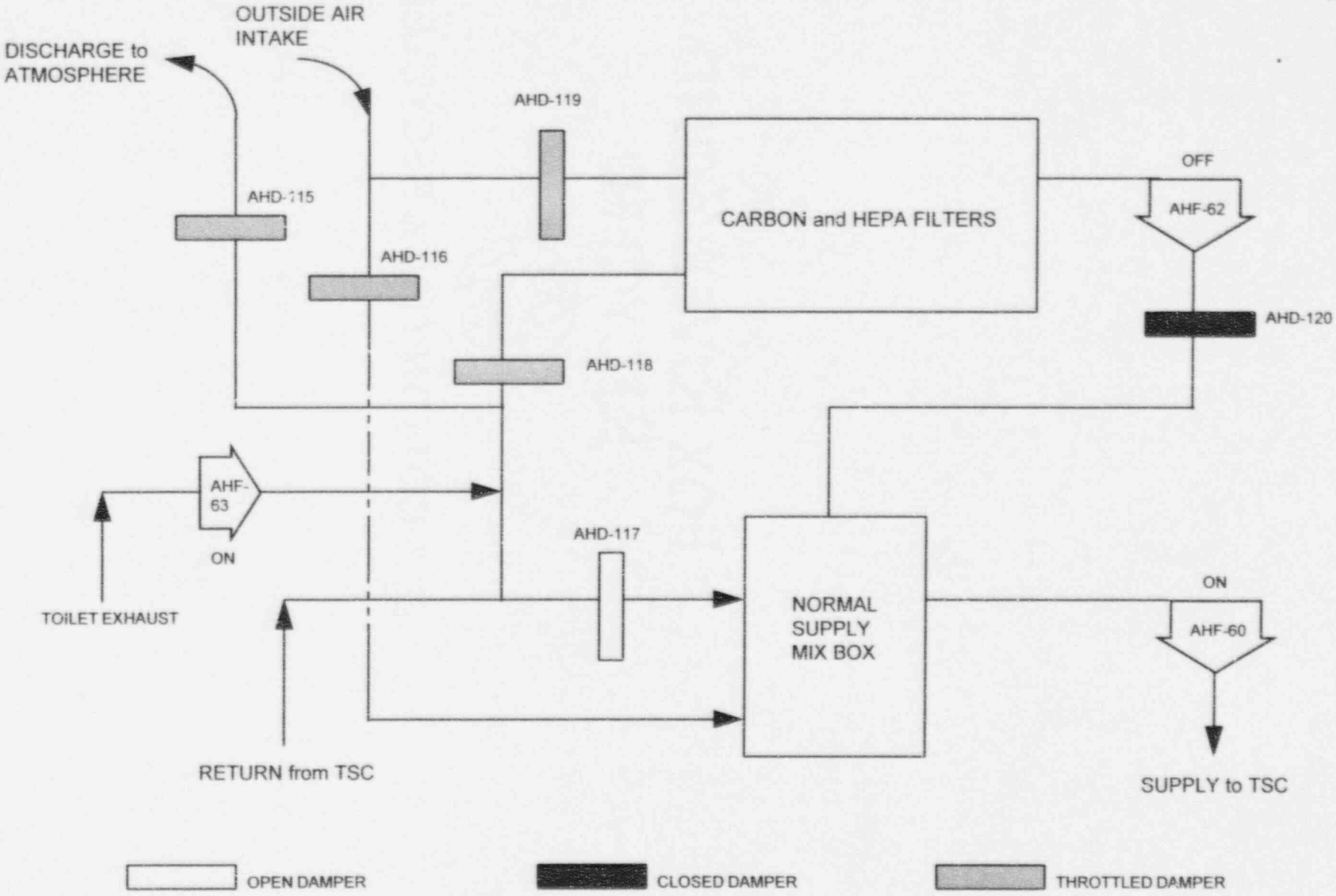
3. Dose calculations for post accident conditions were revised. The revised calculation determined that there could be increased outside air intake during emergency operation while maintaining occupant dose below General Design Criteria 19 limits. A maximum of 635 CFM of outside air is acceptable. The revised dose calcualtion uses parameters from International Commission on Radiological Protection Publication No. 30 (ICRP-30) for calculating organ doses from radionuclide intakes. This is consistent with guidance in the Statements of Consideration for the Final Rule on Standards for Protection Against Radiation (10 CFR 20) published in Federal Register Notice 56 FR 23360, May 21, 1991.

4. The TSC ventilation system has been balanced at a measured flow of 420 CFM of outside air. Factoring in measurement errors results in a maximum of approximately 460 CFM. The calculation allows minimum recirculation air flow of 1750 CFM, and a maximum flow of 2540 CFM to prevent exceeding the filter package limit of 3,000 CFM total. The design of the TSC includes a minimum breathing air requirement of 250 CFM of outside air to to support 50 occupants while maintaining acceptable $O_2/CO_2$ levels. A measured value of 420 CFM assures that this will be more than satisfied, and includes margin to account for items such as dirty filter conditions, repeatability and measurement accuracy. Emergency Plan implementing procedures will provide guidance should staffing levels exceed 50 occupants.

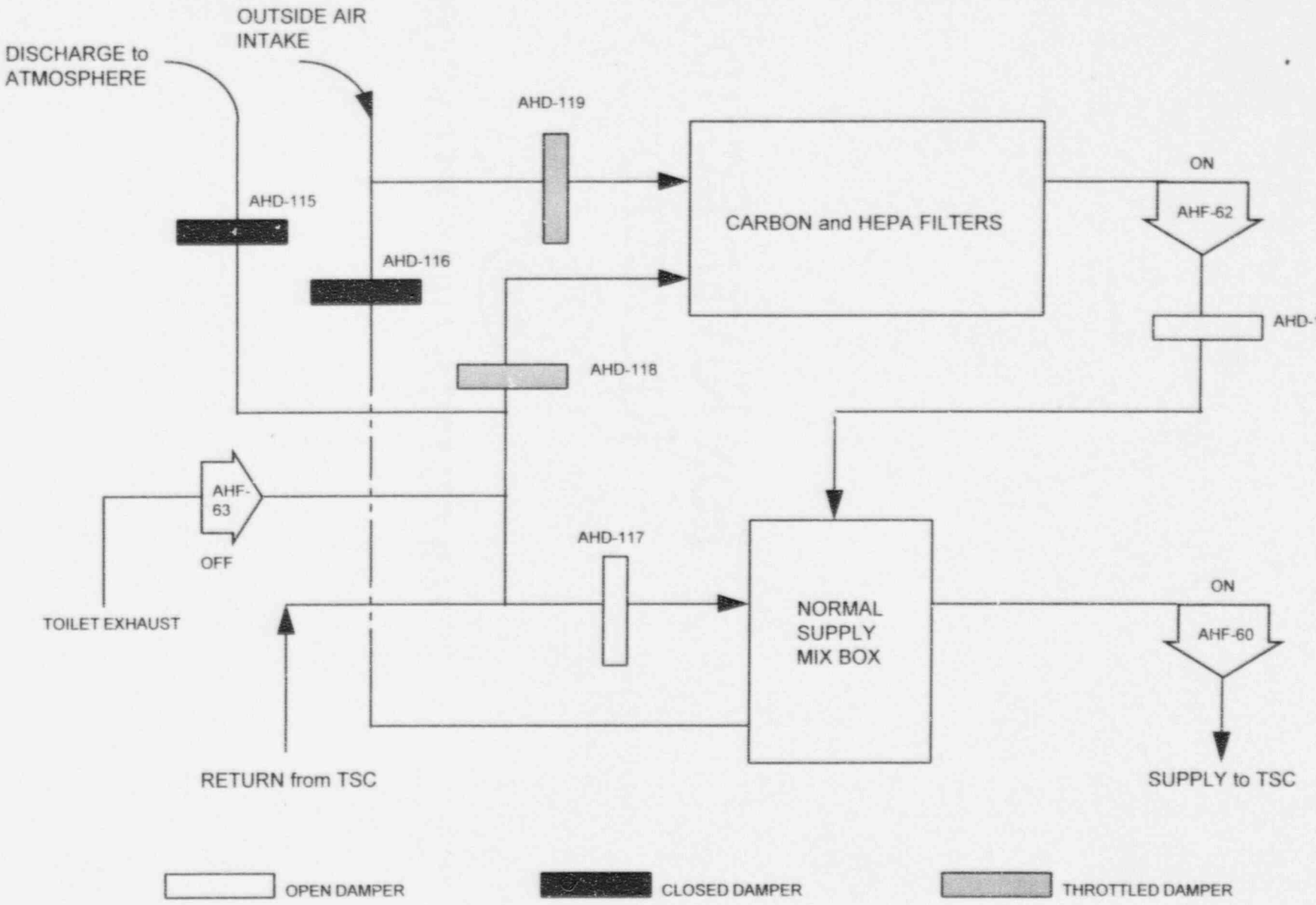
5. Calculations determined that during a very limited set of environmental conditions, if the TSC ventilation system emergency mode was initiated, that humidity entering the carbon filters could reach 72%. The environmental conditions required are saturated air at 60 to 65°F. The highest humidity condition would occur only if the heat load in the TSC were at its minimum assumed value, which is 75% of the nominal fan motor rating, with no lights on, no personnel in the TSC, and no other equipment operating. However even in this limited set of conditions humidity would be reduced to less than 70% within a few minutes. Based on the conservatisms in the calculation, and on the improbability of this combined set of circumstances occurring, FPC considers this to be acceptable.

# Figure 1

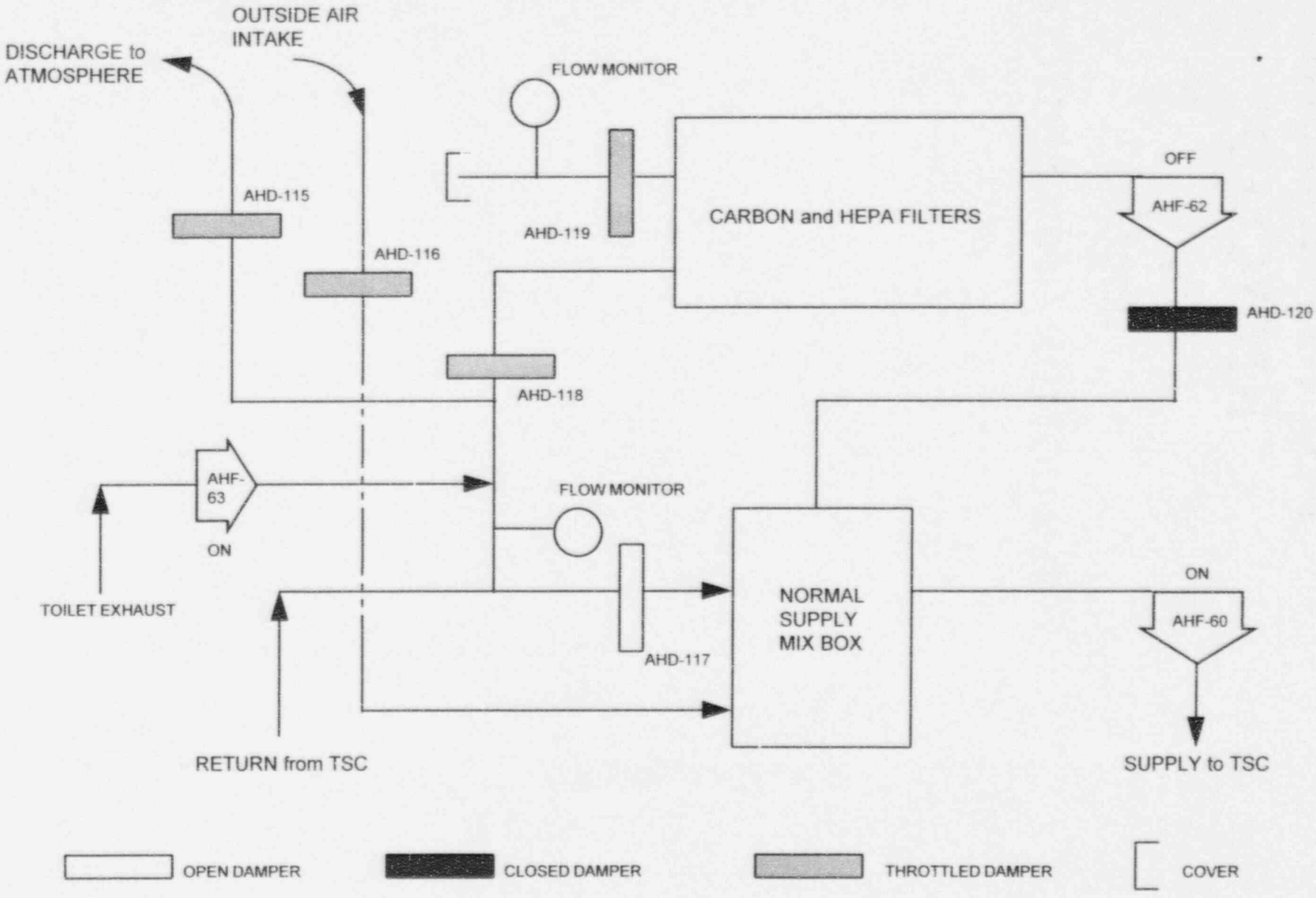
## Original TSC Ventilation System - Normal Operation



# Figure 2
## Original TSC Ventilation System - Emergency Operation



# Figure 3
## Modified TSC Ventilation System - Normal Operation



# Figure 4
## Modified TSC Ventilation System - Emergency Operation