

May 31, 1989

Docket No.: 50-352

Mr. George A. Hunger, Jr.  
Director-Licensing  
Philadelphia Electric Company  
Correspondence Control Desk  
P. O. Box 7520  
Philadelphia, Pennsylvania 19101

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MO'Brien	Tech Branch	

Dear Mr. Hunger:

SUBJECT: PORE SIZE OF FILTERS USED DURING TESTING OF DIESEL GENERATOR FUEL OIL (TAC NO. 71888)

RE: LIMERICK GENERATING STATION, UNIT 1

The Commission has issued the enclosed Amendment No. 21 to Facility Operating License No. NPF-39 for the Limerick Generating Station, Unit 1. This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated January 23, 1989.

This amendment would revise the TSs to permit use of filters with an increased pore size when periodically testing the amount of particulate contamination in the diesel generator fuel oil.

A copy of our Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

Original signed by  
Richard J. Clark

Richard J. Clark, Project Manager  
Project Directorate I-2  
Division of Reactor Projects I/II  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 21 to License No. NPF-39
2. Safety Evaluation

cc w/enclosures:  
See next page

[LI AMEND]

*MO'Brien*  
5/31/89

PDI-2/PM  
RClark:m  
05/16/89

*WButler*  
PDI-2/D  
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*CS*  
*[Signature]*



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

May 31, 1989

Docket No.: 50-352

Mr. George A. Hunger, Jr.  
Director-Licensing  
Philadelphia Electric Company  
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P. O. Box 7520  
Philadelphia, Pennsylvania 19101

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SUBJECT: PORE SIZE OF FILTERS USED DURING TESTING OF DIESEL GENERATOR FUEL OIL (TAC NO. 71888)

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Sincerely,

A handwritten signature in cursive script, appearing to read "Richard J. Clark".

Richard J. Clark, Project Manager  
Project Directorate I-2  
Division of Reactor Projects I/II  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 21 to License No. NPF-39
2. Safety Evaluation

cc w/enclosures:  
See next page

Mr. George A. Hunger, Jr.  
Philadelphia Electric Company

Limerick Generating Station  
Units 1 & 2

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

PHILADELPHIA ELECTRIC COMPANY

DOCKET NO. 50-352

LIMERICK GENERATING STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 21  
License No. NPF-39

1. The Nuclear Regulatory Commission (the Commission) has found that
  - A. The application for amendment by Philadelphia Electric Company (the licensee) dated January 23, 1989, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-39 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 21, are hereby incorporated into this license. Philadelphia Electric Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

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PDR ADDCK 05000352  
P PNU

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/s/

Walter R. Butler, Director  
Project Directorate I-2  
Division of Reactor Projects I/II

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: May 31, 1989

*MB*  
PDI-2/BA  
M. Brien  
5/31/89

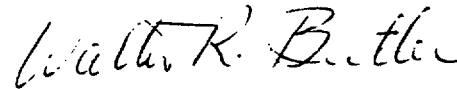
*RC*  
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RC Clark:mp  
05/16/89

*WB*  
5/18/89

*WB*  
PDI-2/D  
WButler  
5/31/89

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Walter R. Butler, Director  
Project Directorate I-2  
Division of Reactor Projects I/II

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: May 31, 1989

ATTACHMENT TO LICENSE AMENDMENT NO. 21

FACILITY OPERATING LICENSE NO. NPF-39

DOCKET NO. 50-352

Replace the following page of the Appendix A Technical Specifications with the attached page. The revised page is identified by Amendment number and contains vertical lines indicating the area of change. Overleaf page is provided to maintain document completeness.\*

Remove

3/4 8-3  
3/4 8-4

Insert

3/4 8-3\*  
3/4 8-4

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS

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4.8.1.1.1 Each of the above required independent circuits between the offsite transmission network and the onsite Class 1E distribution system shall be:

- a. Determined OPERABLE at least once per 7 days by verifying correct breaker alignments and indicated power availability, and
- b. Demonstrated OPERABLE at least once per 18 months during shutdown by transferring, manually and automatically, unit power supply from the normal circuit to the alternate circuit.

4.8.1.1.2 Each of the above required diesel generators shall be demonstrated OPERABLE:

- a. In accordance with the frequency specified in Table 4.8.1.1.2-1 on a STAGGERED TEST BASIS by:
  1. Verifying the fuel level in the day fuel tank.
  2. Verifying the fuel level in the fuel storage tank.
  3. Verifying the fuel transfer pump starts and transfers fuel from the storage system to the day fuel tank.
  4. Verifying the diesel starts from ambient conditions\* and accelerates to at least 882 rpm in less than or equal to 10 seconds. The generator voltage and frequency shall reach  $4285 \pm 420$  volts and  $60 \pm 1.2$  Hz within 10 seconds after the start signal. The diesel generator shall be started for this test by using one of the following signals:
    - a) Manual.\*\*
    - b) Simulated loss-of-offsite power by itself.
    - c) Simulated loss-of-offsite power in conjunction with an ESF actuation test signal.
    - d) An ESF actuation test signal by itself.
  5. Verifying the diesel generator is synchronized, loaded to greater than or equal to 2850 kW in less than or equal to 200 seconds, and operates with this load for at least 60 minutes.
  6. Verifying the diesel generator is aligned to provide standby power to the associated emergency busses.
  7. Verifying the pressure in all diesel generator air start receivers to be greater than or equal to 225 psig.

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\*The diesel generator start (10 sec) and subsequent loading (200 sec) from ambient conditions shall be performed at least once per 184 days in these surveillance tests. All other engine starts and loading for the purpose of this surveillance testing may be preceded by an engine prelube period and/or other warmup procedures recommended by the manufacturer so that mechanical stress and wear on the diesel engine is minimized.

\*\*If diesel generator started manually from the control room, 10 seconds after the automatic prelube period.



## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

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- b. By removing accumulated water:
  - 1) From the day tank at least once per 31 days and after each occasion when the diesel is operated for greater than 1 hour, and
  - 2) From the storage tank at least once per 31 days.
- c. By sampling new fuel oil in accordance with ASTM D4057-81 prior to addition to the storage tanks and:
  - 1) By verifying in accordance with the tests specified in ASTM D975-81 prior to addition to the storage tanks that the sample has:
    - a) An API Gravity of within 0.3 degrees at 60°F or a specific gravity of within 0.0016 at 60/60°F, when compared to the supplier's certificate or an absolute specific gravity at 60/60°F of greater than or equal to 0.83 but less than or equal to 0.89 or an API gravity at 60°F of greater than or equal to 27 degrees but less than or equal to 39 degrees.
    - b) A kinematic viscosity at 40°C of greater than or equal to 1.9 centistokes, but less than or equal to 4.1 centistokes, if gravity was not determined by comparison with the supplier's certification.
    - c) A flash point equal to or greater than 125°F, and
    - d) A clear and bright appearance with proper color when tested in accordance with ASTM D4176-82.
  - 2) By verifying within 31 days of obtaining the sample that the other properties specified in Table 1 of ASTM D975-81 are met when tested in accordance with ASTM D975-81 except that the analysis for sulfur may be performed in accordance with ASTM D1552-79 or ASTM D2622-82.
- d. At least once every 31 days by obtaining a sample of fuel oil from the storage tanks in accordance with ASTM D2276-78, and verifying that total particulate contamination is less than 10 mg/liter when checked in accordance with ASTM D2276-78, Method A, except that the filters specified in ASTM D2276-78, Sections 5.1.6 and 5.1.7, may have a nominal pore size of up to three (3) microns.
- e. At least once per 18 months, during shutdown, by:
  - 1. Subjecting the diesel to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service.
  - 2. Verify the diesel generator capability to reject a load of greater than or equal to that of the RHR Pump Motor (992 Kw) for each diesel generator while maintaining voltage at  $4285 \pm 420$  volts and frequency at  $60 \pm 1.2$  hz.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 21 TO FACILITY OPERATING LICENSE NO. NPF-39

PHILADELPHIA ELECTRIC COMPANY

LIMERICK GENERATING STATION, UNIT 1

DOCKET NO. 50-352

1.0 INTRODUCTION

By letter dated January 23, 1989, Philadelphia Electric Company (the licensee) requested an amendment to Facility Operating License No. NPF-39 for the Limerick Generating Station (LGS), Unit 1. The proposed amendment would revise the Technical Specifications (TSs) to permit the use of filters with an increased pore size when periodically testing the amount of particulate contamination in the diesel generator fuel oil.

2.0 DISCUSSION

The Limerick plant has eight emergency diesel generators (EDGs) for the two units. The EDG fuel oil system is a safety-related system which provides on-site storage and delivery of EDG fuel oil for at least seven days of continuous operation of all EDGs operating at their full-rated load. Each EDG is provided with an independent fuel oil system. Each fuel oil system provides fuel oil to diesel engine fuel injectors and consists of a fuel oil storage tank, a fuel oil transfer pump, a day tank, an engine-driven fuel pump, a dc motor-driven auxiliary fuel pump, and associated piping, valves, strainers, filters and instrumentation (See Figure 1).

One 41,500 gallon capacity storage tank is provided for each EDG. The stored fuel is sufficient for seven days of full load continuous EDG operation. One fuel oil transfer pump is provided for each storage tank. The fuel oil transfer pump discharge lines run directly to the fuel oil day tanks. The fuel oil transfer pumps are started and stopped automatically by day tank level switches. One 850 gallon capacity fuel oil day tank is provided for each EDG. Each fuel oil day tank contains sufficient fuel oil for 3½ hours of continuous EDG operation at full load. Each EDG is provided with two positive displacement fuel oil pumps, one diesel engine-driven and one dc motor-driven. Relief valves and line filters are furnished on the discharge of each pump.

If any particulates should accumulate in the fuel oil after the storage tanks are filled, the transfer system is designed to prevent their entry into the EDG fuel oil injectors by a number of design features described below:

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1. The fuel oil transfer pumps take suction from a point eleven (11) inches above the tank bottom. Because most particulates will settle to the bottom, significant ingress of particulates into the transfer system is not expected to occur.
2. The fuel oil transfer pumps are equipped with a suction strainer to prevent the entrance of any large particles or debris.
3. Any particulates passing through the fuel oil transfer pump would be trapped by the strainers and filters located between the fuel oil transfer pump discharge and the diesel engine. Basket strainers are located on the fuel oil day tank supply piping and one on the suction of both the engine-driven fuel oil pump and the dc motor-driven fuel oil pump.
4. These filters and strainers are equipped with differential pressure indicators and alarms to notify the operators of impending clogging. The basket strainers will alarm when the pressure differential exceeds 3 psid. Due to the higher pressure drop present for fine fuel oil filtration in the line filters, the alarms on these filters will sound when the pressure drop exceeds 13 psid. Operating history of the line filters has resulted in the observation that a rise in the differential pressure across the filters from 1 psi to 4 psi occurs during an 18-month reactor fuel cycle at LGS. This 18-month cycle includes a monthly EDG run for surveillance testing and numerous other EDG runs for various reasons. Operating history of the strainers indicates a negligible rise in differential pressure during an 18-month reactor fuel cycle. These alarm settings provide ample time for the operator to manually switch to the other filter or strainer element before the operability of the EDG is compromised.

### 3.0 EVALUATION

The licensee proposes to revise Surveillance Requirement 4.8.1.1.2.d of the TSs to increase the pore size of the filters (from 0.8 to 3.0 microns) which are used during the performance of the surveillance test which determines the level of EDG fuel oil particulate contamination. Testing for particulates in diesel-generator fuel oil is performed as required by TS Surveillance Requirement section 4.8.1.1.2. This test utilizes the process described in ASTM D2276-78, "Standard Test Methods for Particulate Contamination in Aviation Turbine Fuels." The basis of this surveillance process is that when a known amount of fuel oil is passed through a filter of known weight, particulates larger than the filter pore size will not pass through the filter. The filter is then dried and reweighed to determine the mass of the trapped particulates. The mass of particulates per unit volume of fuel oil is verified to be within the acceptance criteria of 10mg/liter. This proposed TS change does not involve a change

to the 10mg/liter limit; it only will change the filter pore size. The test does, however, provide an indication of fuel oil quality by providing information on the quantity of particulates which are larger than the test filter pore size that is present in the fuel oil. This test is only one of many surveillance tests which determine EDG fuel oil acceptability at Limerick.

The current filter pore size used in the surveillance test, as specified in ASTM D2276-78, is 0.8 microns. The proposed TS change would increase the filter pore size used during the surveillance test from 0.8 microns to 3 microns. This proposed change would prevent the entrapment of particulates less than 3.0 microns in diameter during surveillance testing. Entrapment of particulates in this size range is unnecessary as the in-line filters, which are the final step in the fuel oil filtration process before entering the engines, only trap particulates above 3-5 microns in diameter.

The proposed change has been previously reviewed and approved by the NRC for Peach Bottom Atomic Power Station Units 2 and 3 on May 31, 1988. (See Amendment Nos. 131 and 134 to Facility Operating License Nos. DPR-44 and DPR-56, Docket Nos. 50-277 and 50-278).

The proposed increase of the filter pore size used during surveillance testing of the diesel fuel oil (from 0.8 microns to 3.0 microns) will not adversely affect EDG operability. The presence of particulate below the size of 3.0 microns are of no consequence in the operation of the EDGs as confirmed by the EDG manufacturer. The EDG manufacturer has confirmed that an increase in the filter pore size used during the surveillance testing from 0.8 microns to 3.0 microns will not result in harm to the fuel injectors or otherwise degrade diesel engine performance. Therefore, while a population of particulates up to 3.0 microns in diameter would not be detected in the fuel oil as a consequence of using a larger test filter pore size, this is not of consequence because they will pass into the diesel engine fuel injection system and subsequently into the diesel engine without any adverse consequences.

The staff has concluded that the proposed increase in the filter pore size used during surveillance testing will not affect the ability of the EDGs to operate as described in the NRC Safety Evaluation Report (SER) Section 8.3 and as described in Section 8.3 of the licensee's Final Safety Analysis Report. The proposed change to the TSs is acceptable.

#### 4.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the use of a facility component located within the restricted area as defined in 10 CFR Part 20 and a change to surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents

that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of this amendment.

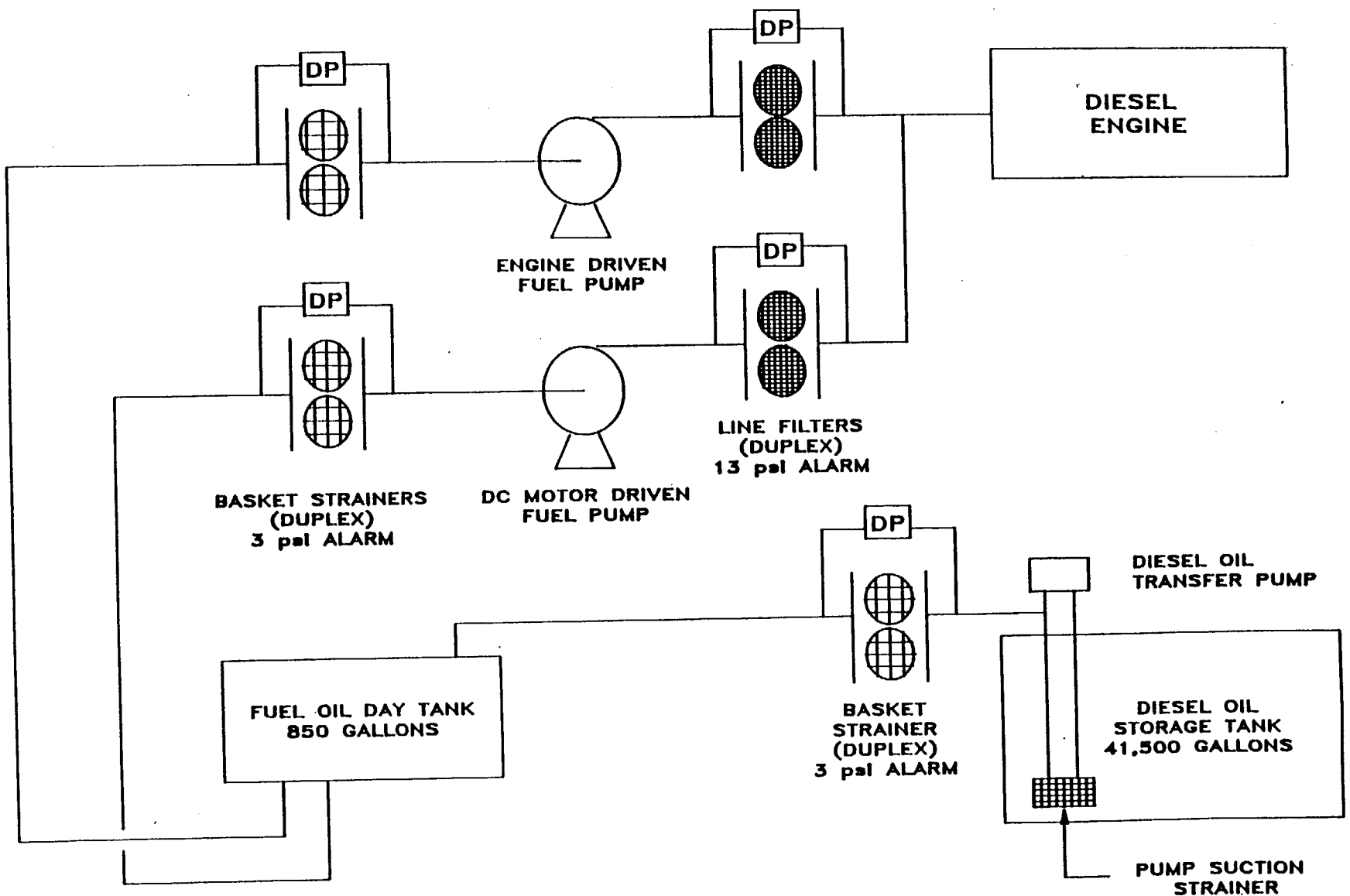
## 5.0 CONCLUSION

The Commission made a proposed determination that the amendment involves no significant hazards consideration which was published in the Federal Register (54 FR 7641) on February 22, 1989 and consulted with the State of Pennsylvania. No public comments were received and the State of Pennsylvania did not have any comments.

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and the security nor to the health and safety of the public.

Principal Contributor: Richard Clark

Dated: May 31, 1989



DIESEL FUEL OIL FILTRATION CONFIGURATION  
FIGURE 1