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**SUBJECT:** Forwards addl info on design of cleaning of diesel generator fuel oil storage tank.

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AEP:NRC:0896I  
Tac Nos. 64515  
and 64516

Donald C. Cook Nuclear Plant Units 1 and 2  
Docket Nos. 50-315 and 50-316  
License Nos. DPR-58 and DPR-74  
INFORMATION ON CLEANING THE DIESEL GENERATOR  
FUEL OIL STORAGE TANK

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

Attn: T. E. Murley

January 24, 1989

Dear Dr. Murley:

In AEP:NRC:0896H dated November 25, 1987, we submitted changes to our Technical Specifications (T/Ss) to address concerns with diesel generator fuel oil chemistry. Included among the proposed changes was a requirement to clean the fuel oil storage tanks at least once every ten years. When the proposed changes were submitted, the design of our tank cleaning system had not yet been finalized and we were therefore unable to provide some of the information requested by your staff. As a result, our submittal included a commitment to submit the requested information once the final design of the cleaning system had been developed. Attachment 1 to this letter provides the requested information. Specifically, the attachment includes information on our proposed cleaning methods, the acceptance criteria for determining what constitutes a clean tank, a schedule for cleaning the tanks, and details on the leak detection test proposed as an alternative to pressure testing the tanks. Attachment 2 contains an Edison Electric Institute document that describes one possible leak detection test that may be employed in testing our tanks.

This document has been prepared following Corporate procedures that incorporate a reasonable set of controls to ensure its accuracy and completeness prior to signature by the undersigned.

Sincerely,

M. P. Alexich  
Vice President

ldp  
Attachments

8901310287 890124  
PDR ADUCK 05000315  
P PDC

*Aool*  
*11* *10*

Dr. Murley

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AEP:NRC:0896I

cc: D. H. Williams, Jr.  
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NRC Resident Inspector - Bridgman

Attachment 1 to AEP:NRC:0896I  
Information on Design of Cleaning System,  
Clean Tank Acceptance Criteria,  
Schedule for Cleaning, and  
Details of Leak Detection Test



### Introduction

This attachment includes a description of our cleaning methods, the acceptance criteria for determining what constitutes a clean tank, a schedule for cleaning the tanks, and details of the leak detection test.

### Description of Cleaning Methods and Acceptance Criteria

Section 4.8.1.1.2.f.1 of our proposed Technical Specifications (T/Ss) requires that we either (1) drain each storage tank, remove accumulated sediment, and clean the tank, or (2) agitate the fuel oil in the tank while pumping the oil from the bottom of the tank through a 5-micron filter and back into the tank.

#### 1. Draining and Cleaning

- a. Description: The tanks will be emptied of fuel oil and the tank interior will be mechanically cleaned, most likely by hydrolasing (water blasting). To preclude the introduction of surfactants into the fuel system, no soap or detergent will be used in the cleaning process.
- b. Acceptance Criteria: Tank cleanliness will be a clean dry interior as determined by visual examination.

#### 2. Agitation - Filtration

- a. Description: The oil will be agitated by bubbling nitrogen gas into the oil while a minimum of five tank volumes of oil is circulated through a five-micron nominal rated filter. Circulation of the oil will provide additional agitation.
- b. Acceptance Criteria: Following the circulation of five tank volumes, three successive samples of fuel from the tank will be analyzed according to ASTM D2276-83. These samples will be spaced over at least an additional one-half tank volume to ensure that we collect three separate and independent samples. All samples must indicate a total contaminant level of less than ten mg per liter. If any of the three samples indicate greater than ten mg per liter, the oil will be recirculated through the filter until three successive samples indicate less than ten mg per liter.

### Cleaning Schedule

We anticipate conducting the first cleaning of our diesel generator fuel storage tanks in the Spring of 1989. Cleaning of

the tanks will be done at least once per 10 years thereafter.

Details of Leak Detection Test

Section 4.8.1.1.2.f.2 of the proposed T/Ss requires that we perform a precision leak detection test to verify that the leakage rate from the fuel oil system is less than or equal to 0.05 gallons per hour. This procedure may be performed by a vendor and will follow a method giving the required accuracy. A possible procedure is described in an Edison Electric Institute document entitled "Integrity Tests and Leak Detection for Underground Storage Tanks." Applicable sections of this document are included as Attachment 2 to this letter.

Attachment 2 to AEP:NRC:0896I  
Edison Electric Institute Document  
Describing Our Leak Detection Method



EDISON ELECTRIC INSTITUTE

INTEGRITY  
TESTS  
AND  
LEAK  
DETECTION  
FOR  
**UNDERGROUND  
STORAGE  
TANKS**

Submitted by:  
Performance Standards/Criteria Task Force  
of the Underground Storage Tank Committee  
Utility Solid Waste Activities Group

Prepared by  
**RADIAN CORPORATION**

B.8     Leak Lokator® LD-2000 Test (Hunter - Formerly Sunmark Leak Detec-  
tion) (18,31,32)

This method operates on the Archimedes Principle of Buoyancy which states "the apparent loss in weight of any object submerged in a liquid is equal to the weight of the displaced volume of the liquid."

The Leak Lokator® consists of a hollow cylinder which is sealed at the bottom, an analytical balance (weighing scale), electronic transmitting circuitry, and a strip chart recorder. A sensor, suspended from the analytical balance, is placed in the tank liquid. The weight of the sensor is equal to its actual weight minus the buoyancy force from the liquid in the tank. Any change in liquid level will change the buoyancy force on the sensor and, hence, the weight of the sensor. The weight change is monitored by the analytical balance which electronically transmits a "signal" to the recorder. The chart recorder graphically shows volume changes versus time. The angle and length of the line drawn by the recorder is directly correlated to the quantity and rate of leakage.

The chart recorder notes the lapsed time in minutes versus volume change in cubic centimeters of the product displaced either into or out of the tank. A vertical line shows no change in volume, while lines with positive or negative slopes indicate decrease and increase, respectively, in the product volume. The system is calibrated at least six times during each test. This is performed by quickly adding or removing a calibration rod of precisely known volume to a system being tested.

The typical time for equipment setup and temperature adjustment is 1.5 hours. A complete testing on one tank can usually be performed in 3 to 4 hours and on four tanks in 8 to 10 hours. After the equipment is set up, the test to determine a volume change typically takes less than one hour. This time will increase to at least two hours for in-tank testing. The least sensitivity occurs when the product level is near the center line of the tank. However, even at this level, volume changes of 0.05 gallon per hour reportedly can be detected by adjusting test time and the electronic signal. The greatest sensitivity for detecting a small leak is achieved if the testing is conducted with the liquid in a riser above grade.

Hunter Environmental Services offers nationwide testing services on a one-time or retainer contractual basis. Testers go through an in-house



training program. The company has tested well over 25,000 tanks. Clients have included ten major oil companies and numerous large corporations. A wide variety of products have been tested, including chlorinated solvents, alcohols, and acetone.

In the Leak Lokator® testing, the accuracy may be affected due to the following reasons (18): differences between measured apparent temperature change and actual average temperature change; leak rate change due to the water table effect; tank end deflection, if it is unidentified; vapor pockets; occurrence of wave due to wind and vibration; differences between theoretical tank volume and actual tank volume; power variations due to the use of 110V AC power source; and in some cases, the fill pipe is at such an angle from vertical that the sensor cannot be installed in the tank without touching the wall.