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July 25, 1983

Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Limerick Generating Station, Units 1 and 2
Meteorology and Effluent Treatment Branch

Reference: PECO and NRC Conference Call dated 7/18/83

File: GOVT 1-1 (NRC)

Dear Mr. Schwencer:

As a result of the discussions in the reference conference call the additional information as requested by the Effluent Treatment Branch Reviewer concerning delta P recording across the first HEPA Filter of the ESF cleanup system is enclosed.

Sincerely,

Eugene J. Bradley

RJS/gra/45

Copy to: See Attached Service List

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cc: Judge Lawrence Brenner (w/enclosure)
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Atomic Safety and Licensing Board Panel (w/enclosure)
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ESF ATMOSPHERE CLEANUP SYSTEMS
RECORDING DELTA P ACROSS THE FIRST HEPA FILTER

As discussed in item 2 of the PECo to NRC letter dated 6-28-83 (E. J. Bradley to A. Schwencer, Additional Information Related to ESF Filter System Instrumentation), we feel that we have met Regulatory Guide 1.52, position C.2.g. by providing alternate system instrumentation to accomplish the aim of the SRP guideline to mitigate a postulated malfunction of the first HEPA filter in the ESF filter systems. Our alternate instrumentation consists of automatically changing over to the standby filter train whenever the system flow reduces to about 80% of design flow due to high HEPA filter delta P. In addition, each filter train is provided with local pressure drop indication and an overall filter train high delta P computer alarm. Specific recommendations to provide control room recording of delta P across the first HEPA did not appear until the 1980 revision to ANSI-N-509 and the July, 1981 revision to SRP 6.5.1, well after the equipment had been designed and installed at Limerick Generating Station. This therefore represents a back fit to our design.

While our design does account for detecting high delta P across the first HEPA filter, the concern has been raised that unless we have recorded delta P of the first HEPA we would not know if a filter failure occurred, thus presenting the possibility of introducing particulate to the charcoal adsorber section of the filter train. The rationale is that a filter failure would result in a noticeable decrease in the first HEPA delta P, which could be detected as a trend on a delta P recording. We have reviewed this concern and offer the following:

Postulated Failure Of The First HEPA Filter

General

Per Reg Guide 1.52 requirements, the safety related HEPA filters undergo stringent manufacturing and testing requirements to assure a quality installation. Each filter is DOP tested at the manufacturer to detect media leakage prior to shipment. After initial installation, at least once per 18 months thereafter, following painting, fire or chemical release in any ventilation zone communicating with the system, and after a partial or total filter bank replacement, the HEPA filter bank is DOP leak tested in accordance with ANSI N510 requirements. During normal plant operation, the HEPA filters are enclosed in an isolated plenum and maintained in a controlled environment by an instrument air plenum purge system. Due to these above actions, the HEPA filter systems will be available at the start of an accident to perform their safety function.

The postulated failure of a HEPA filter bank under accident conditions is very unlikely. One mechanism for filter failure would be overpressurization of the filter bank due to high dust loadings, which would result in the blow-out of the filter assemblies. This would not occur at Limerick since our systems would automatically transfer to the standby filter train on low flow before sufficient filter delta P could be developed to cause this type of failure. Therefore addition of HEPA filter bank delta P recording in the control room would not add any safety benefit.

Another mechanism for filter failure would be localized filter media failures consisting of small media holes or seam rips. The cause of this type of failure is obscure. However, even if this type of failure was to occur, the majority of the air would still be filtered with only a small portion passing through the localized holes. We would not consider this type of failure to cause any significant degradation of the charcoal filters due to the low air quantities bypassing the filter. In addition, a failure of this type would not cause a filter delta P variation sufficient to shift the trend on a filter delta P recorder.

Even though we do not consider it credible that a filter failure of sufficient size to be detectable by a delta P recorder could occur, we have looked at the consequences of such a failure:

Reactor Enclosure Recirculation Filter (RERS)

A postulated failure of sufficient magnitude to produce a measurable delta P trend across the first HEPA filter would slowly build up small particulate matter on the charcoal adsorber. Large particulate matter is removed by the prefilter. Dust loading in the RERS is expected to be minor, since the majority of the ductwork is used during normal operation at three times the air velocity of the RERS. The reactor enclosure represents a closed volume in the post LOCA state. The air is processed through a prefilter, partially bypasses the failed HEPA, is filtered and contaminants adsorbed by the charcoal filter, exits through the second HEPA filter and then into the SGTS HEPA/Charcoal/HEPA sequence of processing prior to entering the atmosphere.

Limerick ESF design is unusual in the respect of installation of the SGTS in series with the RERS.

It is concluded that loss of the first HEPA filter in the RERS filter train will result in negligible, if any, measurable increase in offsite doses.

Standby Gas Treatment System (SGTS)

The SGTS operates in two modes. For a postulated LOCA, the system draws air from the RERS discharge. For a postulated fuel handling accident (FHA), the system draws air directly from the refueling floor.

During the LOCA mode, a postulated failure of the first HEPA has no adverse consequences. The air entering the SGTS has been previously processed by the RERS. Dust and activity accumulation on the charcoal would be minimal. Additionally, an attempted measurement of delta P across the first HEPA filter is complicated by the variable flow through the SGTS, due to its maintaining a selected negative building pressure while the reactor enclosure is experiencing changes in temperature and wind loading. Flows of approximately 500 cfm across a HEPA filter bank designed for 11,000 cfm result in pressure drops near or below the sensitivity of conventional pressure detectors. Attempted measurement of delta P across the first HEPA filter does not add to the safety of the plant, nor to the operators' knowledge of SGTS Operation.

A postulated fuel handling accident and partial failure of the first HEPA filter results in the SGTS drawing air from the refueling floor through a heater, demister, partial first HEPA, charcoal adsorber, and the second HEPA filter. Since the release of activity is postulated to be within

seconds after the accident and lasting not more than two hours, dust accumulation and charcoal degradation is minimal, especially considering the low flow rates and oversized HEPA filter bank.

Since the postulated FHA is of short duration, the consequences of a postulated first HEPA failure are negligible. Furthermore, even if the charcoal bed is assumed to fail, the dose consequences are well below 10CFR100 guidelines.

Control Room Emergency Fresh Air System (CREFAS)

The CREFAS draws a mixture of minimal outdoor air and recirculated control room air. The recirculated control room air is already filtered by a commercial dust filter. This air mixture is then prefiltered prior to reaching the first HEPA filter. Large dust loadings are not anticipated in this configuration.

The first day of a postulated accident is the most significant from the stand point of calculated control room doses (FSAR Table 15.6.5.22). The thyroid dose consequences from iodine releases are low (0.003 REM) due to the effect of the RERS and SGTS and optimum placement of CREFAS intake. Even total failure of the CREFAS would not result in thyroid doses exceeding the 30 REM (GDC 19) limit.