THREE MILE ISLAND 1 COMBUSTIBLE GAS CONTROL SYSTEM

The Three Mile Island 1 plant will utilize a containment purge system which is designed to maintain the hydrogen concentration build-up below its lower flammability limit. This is accomplished by introducing outside air into the containment building and allowing the displaced containment atmosphere to be discharged to the plant vent through the purge exhaust filters. The hydrogen purge system consists of a containment atmosphere monitoring subsystem (hydrogen and radioactivity), a fresh air make-up subsystem and a discharge subsystem. We have reviewed the TMI-1 system using the guidelines of the supplement to Safety Guide 7, "Control of Combustible Gas Concentrations in Containment Following a Loss-of-Coolant Accident - Backfitting Considerations", and Safety Guide 26, "Quality Group Classifications and Standards."

In Amendment 14, Supplement No. 1, dated July 1, 1970, the applicant submitted the results of calculations, using his assumptions, to predict when purging would be initiated following a LOCA, the required purge rates, and the off-site doses. The applicant limits hydrogen concentrations to about 3.5 v/o and predicts that purging would be started about 3 months following an accident, and the containment would be purged at a rate of 7 scfm. The applicant calculates minimal incremental increases in accident doses at the site boundary based on these conditions and using his assumptions. We have performed independent calculations using the assumptions of Safety Guide 7 and predict that purging would be started about 30 days following an accident and the containment would be purged at a rate of about 13 to 15 scfm. This results in an incremental whole body dose increase at the site boundary of about (4)* rem. which still results in a total dose less than the guidelines of 10 CFR Part 100. On this basis we find that the resultant incremental increase in radiological doses due to purging to control combustible gases are acceptable. A further reduction of radiological doses would be realized if purging of the containment were started at 40 days after the accident when, by our calculations and assumptions, minimum combustible gas concentrations could be reached.

The applicant stated that the discharge subsystem piping and major components (valves, fans, filters, flowmeters) are designed to seismic Class I criteria, whereas the seismic design and quality group standards for the monitoring and make-up subsystems are not specified. We recommend that each of these subsystems, including the ductwork which connects these systems with the containment environment, meet seismic Class I and quality Group B standards. Alternately, the applicant could submit analyses showing that the system could be effectively

* Parenthesis indicates that these values and the statement should be verified by the Site Safety Branch.

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operated following a seismic event and/or a LOCA. In addition, we recommend that the applicant document the capacity and availability of the redundant air compressors needed to operate the intake subsystem.

The reactor building cooling fan circulates the atmosphere within the containment to provide positive mixing and should prevent stratification of the hydrogen following a loss-of-coolant accident. Although we conclude that this method of mixing is adequate at this time, we are continuing studies to verify this conclusion.

We conclude that the applicant's proposed system for purging as a means to control hydrogen concentrations in the containment following a loss-of-coolant accident is acceptable provided the applicant submits the confirmatory information described above.