DISTRIBUTION: DN 50-320 NRC PDR Local PDR DCS TMI HQ r/f TMI Site r/f WDTravers MTMasnik RCook CCowail1 LChandler IE ACRS M-town Office Service List

HRC TMI 86-015 February 7, 1986

Docket No. 50-320

Mr. F. R. Standerfer Vice President/Director THI-2 GPU Nuclear Corporation P. 0. 3ox 480 Middletown, PA 17057

Dear Mr. Standerfer:

Subject: Temporary Reactor Vessel Hater Filtration System (TRVNFS)

Reference: Letter 4410-85-L-0029, F. Standerfer to W. Travers, Safety Evaluation Report for the TRVWFS

The staff completed a safety review and approves operation of the subject system. Concurrently, the staff has reviewed and approved the related procedures per Technical Specification 6.8.2. This letter transmits our Safety Evaluation. Our Safety Evaluation concludes that the operation of the system does not constitute an unreviewed safety question and is within the scope of activities discussed in the PEIS.

Sincerely,

/s/ C. Cowgill for

William D. Travers Director Cleanup Project Directorate

Attachment: TRVWFS Safety Evaulation

cc: T. F. Demnitt R. E. Rogan S. Levin W. H. Linton J. J. Byrne A. W. Hiller Service Distribution List (see attached)

	~		PDR ADOC	PDR			
	MICPD	TMICPOL					
	RHLO	WDTraver			[1	
DATE	217.186	2/1/86					[
NRC FORM	1 318 (10-80) NACA	A 0240	OFFICIAL	RECORD CO	DPY	1	Land Street

3602260209 860207

SAFETY EVALUATION OF THE TEMPORARY REACTOR VESSEL

WATER FILTRATION SYSTEM

Introduction:

Operation of the Defueling Water Cleanup System (DWCS) revealed that the differential pressure across its filter canisters tends to increase rapidly. As the differential pressure increases, the reactor coolant processing flow rate decreases. Consequently, only a relatively small amount of reactor coolant can be processed before the maximum design pressure is reached and the filter canisters have to be replaced. The probable cause of this problem is the growth of micro-organisms in the reactor coolant. This phenomenon has increased such that the amount of reactor coolant that can be processed between filter canister change-outs decreased from 250,000 gallons initially to about 45,000 gallons during the third change-out. While the licensee is investigating the problem and developing a program to permanently correct the situation, a Temporary Peactor Vessel Water Filtration System (TRWFS) has been proposed to improve the visibility in the reactor vessel such that

System Description:

The TRVWFS consists of a 75 gpm pump, a diatomaceous earth precoated filter assembly, a spent filter precoat waste collection drum, a gamma radiation monitor, radiation shields around the filter assembly and the waste drum, and the shadow shield wall enclosing the entire system. Reactor coolant suction and return hoses are secured in the Internals Indexing Fixture (IIF) and submerged to no more than two feet below the normal reactor coolant level (327'6"). The filter is housed in a shielded container and filtration is provided by about 100 15 inch long by i inch diameter filter bags on which about 7 lbs of diatomaceous earth precoat is attached. The filter media can be regenerated by recirculation flow or the spent filter media can be drained to the waste drum and clean diatomaceous earth recharged. When the contact dose rate of the filter assembly reaches a predetermined limit (currently 3 R/hr), the filter media will be removed and recharged.

Criticality:

To approach criticality, either at the filter assembly or at the waste drum, a minimum of 70 kg of UO_2 has to accumulate. Several considerations will ensure that even a small fraction of that amount will not be accumulated.

(1) The filter assembly surface will be continuously monitored for gamma radiation. Filter change-out will take place prior to the radiation level reaching a conservative set-point (currently 3 R/hr). In order for the amount of UO, to reach 70 kg, the corresponding radiation level would have reached 15,000 R/hr. Therefore, there is a safety factor of about 5,000. The safety margin at the waste drum would also be a factor of about 500, assuming that it contains 10 filter media change-outs with each batch at the maximum radiation level prior to change-out.

8602260215 860207 PDR ADOCK 05000320 PDR PDR

- (2) The suction of reactor coolant will be taken through a hose in the IIF at no more than two feet below the normal reactor coolant level which is more than 10 feet above the top of the core debris bed. At the maximum flow rate of 75 gpm through the 11" I.D. suction hose, there will be no velocity effects to pickup any significant amount of fuel debris from the debris bed. Only materials suspended in the reactor coolant will be removed. It is estimated that no more than about 0.2 kg of U0, will accumulate in the filter media after 12 hours of continuous operation assuming that the reactor coolant contains 1 ppm of U0,. This assumed U0, concentration is conservative since analysis of the DWCS fluid has shown no detectable fissile material. In addition, it is estimated that the radiation level at the surface of the filter assembly containing 0.2 kg of U0, would be above 30 R/hr; a factor of about ten above the radiation level when filter media change-out would have taken place.
- (3) Sample analysis for gross alpha radioactivity will be performed on the waste drums. Although the amount of UO, in each spent filter media batch is expected to be no more than a few grams, analysis of the grab sample from the waste drums will provide further assurance that no significant quantities of UO₂ accumulate in each waste drum.

Radiation Dose Considerations:

Lead shielding will be provided for the filter assembly and the waste drum. In addition, shadow shields will be installed around the entire system. A gamma radiation detector with remote read-out will continuously monitor the contact radiation level of the filter housing. This radiation level is currently limited to 3 R/hr. At 3 R/hr, the dose rate to workers outside of the shields on the defueling platform is expected to be no more than 5 mR/hr. The only times an operator must enter the shadow shields are during initial startup of a recharged filter to monitor filter differential pressure rise, during filter regeneration or replacement, and during waste drum transfer. During initial filter monitoring, the radiation levels are expected to be less than 10 mRem/hr. During filter regeneration or replacement, the shielding on the filter will reduce the radiation levels to less than 100 mRem/hr and the expected dose to the operator is about 50 mRem. The expected dose to the operator during waste drum transfer is about 50 mRem. Based on these estimates, the staff concludes that the projected occupational exposure is within the scope of considerations made in Supplement 1 to the Programmatic Environmental Impact Statement on TMI-2 Cleanup (PEIS).

Conclusion:

Based on the above evaluation, the staff concludes that the operation of the TRVWFS does not pose a significant risk to the public or the occupational work force. The staff further concludes that its operation does not present an unreviewed safety question per 10 CFR 50.59 and the potential environmental consequences fall within the scope of activities already discussed in the PEIS.

IMI-Z SERVICE LIST

Dr. Thomas Murley Regional Administrator, Region I U.S. Nuclear Regulatory Commission 631 Park Avenue King of Prussia, PA 19406

John F. Wolfe, Esq., Chairman, Administrative Judge 3409 Shepherd St. Chevy Chase, MD. 20015

177

Dr. Oscar H. Paris Administrative Judge Atomic Safety and Licensing Board Fanel U.S. Nuclear Regulatory Commission

Weshington, D.C. 20555 Dr. Frederick H. Shon Asministrative Judge Atomic Safety and Licensing Board Panel U.S. Nuclear Regulatory Commission Washington, D.C. 20555

Karin W. Carter Assistant Attorney General SDS Executive Mouse P.U. Box 2257 Marrisburg, PA 17120

Dr. Judith H. Johnsrud Environmental Coalition on Nuclear Power 433 Orlando Ave. State College, PA 16801

George F. Trowbridge, Esq. Shaw, Pittman, Potts and Trowbridge 1800 M. St., NW. Weshington, D.C. 20036

Atomic Safety and Licensing Board Panel U.S. Nuclear Regulatory Commission Washington, D.C. 20555

Atomic Safety and Licensing Appeal Panel U.S. Auclear Regulatory Cormission Washington, D.C. 20555

Secretary U.S. Nuclear Regulatory Connission ATTN: Chief, Docketing & Service Brench Weshington, D.C. 20555

Mr. Larry Mochendoner Dauphin County Commissioner P.C. Bua 1295 Marrisburg, PA 17105-1295

.

John E. Minnich, Chairperson, Dauphin County Board of Commissioners Dauphin County Courthouse Front and Market Streets Narrisburg, PA 17101

Dauphin County Office of Emergency Preparedness Court House, Boom 7 Front & Market Streets Marrisburg, PA 17101

U.S. Environmental Protection Apency Feguna 113 Office ATTN: EIS Coordinator Curtis Suilding (Sisth Floor) Sth & Welnut Streets Phildelphia, PA 19106

Thomes M. Gerusiy, Director Bureau of Padiation Protection Department of Environmental Resources P.O. Box 2063 Marrisburg, PA 12120

Den Kenneby Untrik of Introduceds' Frensis Deutsbert of Introduceds' resources (1. by 200) entrispung, 24.07121 Willis Biaby, Site Manager U.S. Department of Energy P.O. Box 88 Middletown, PA 17057-0311

David J. McGoff Division of Three Mile Island Programs ME-23 U.S. Department of Energy Washington, D.C. 20545

William Lochstet 104 Cavey Laboratory Pennsylvania State University University Park, PA 16802

Randy Myers, Editorial The Patriot B12 Market St. Marrisburg, FA 17105

Fobert B. Borsum Eabcork & Wilcon huclear Power Generation Division Suite 220 7910 Woodmount Ave. Bethesda, MD. 2001a

Michael Churchhill, Esq. PILCOP 1315 Walnut St., Suite 1632 Philadelphia, PA 19107

Linda W. Little 5000 Hermitage DR. Raleigh.NC 27612

Marvin I. Lewis 6504 Bradford Terrace Philadelphia, PA 19149

Jene Lee 183 Valley Rd. Etters.PA 17319

J.B. Liberman, Esquire Berlack, Israels, Liberman 26 Broadway New York, NY 10008

Welter W. Cohen, Consumer Advocate Department of Justice Stramberry Square, 14th Floor Harrisburg, PA 17127

Edward D. Swartz Board of Supervisors Londonderry Township BFD e1 Grans Church 2d. Middletown, PA 17057

Robert L. Knupp, Escuire Assistant Solicitor Knupp and Andrews P.O. Box P 407 N. Front St. Harrisburg, PA 17105

John Levin, Esquire Pennsylvania Public Utilities Comm. P.O. Box 1265 Harrisburg, PA 17120

Mr. [d=if Kintner Executive Tice President General Judik Utilities Nuclear Corp. 100 Intersee Parsay Parsiopeny, NJ 07054

Ar Crepts Schletter has Erg F welt king tires Schletter, No. 1965