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March 8, 1984

Mr. Richard W. Starostecki, Director
Division of Project and Resident Programs
U. S. Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, PA 19406

Dear Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
Inspection Report 84-03

Inspection Report 84-03, dated February 14, 1984 dealt with Post Accident Sampling and Monitoring. On February 23, 1984, GPUN met with NRC to discuss the findings of IR-84-03 and committed to provide within two weeks a list of those actions which are planned along with commitment dates targeted for completion of each item.

Attachment 1 describes each of our commitments and provides a target date for completion. Attachment 2 provides responses for several of these items.

Sincerely,

H. D. Hukill
Director, TMI-1

HDH:RK/kls
attachments

cc: R. Conte

POST ACCIDENT SAMPLING AND MONITORING (IR 84-03)
OUTSTANDING ITEMS

IR Item No.	Inspection Report Item	GPUN Action No.	GPUN Action	Targeted Completion Date (Note 1)
84-03-01	RCS SAMPLING			
1.a	Provide the capability to obtain an RCS sample under all accident conditions and modes of operation.	1.a.1	Revise the EPIP involved in taking the Post Accident RCS sample (1004.15) to include, as an option, the taking of a sample from the Pressurizer rather than the RCS cold leg. (Exposure would be the same as taking a loop sample.)	04/01/84
		1.a.2	Describe GPUN position on sampling at low pressure.	Complete. See Attachment 2
		1.a.3	Complete modification of post accident sampling system to tie in decay heat sample lines with the shielded reactor coolant sample line in the nuclear sampling room.	10/01/84
		1.a.4	Revise procedure to include taking a post accident sample from the decay heat system in the present system configuration. Cautions are to be included to define the need to determine plant conditions and radiation levels prior to obtaining authorization from the Emergency Director to obtain a Decay Heat sample.	04/01/84
		1.a.5	Revise TDR 494 to include additional exposure considerations for taking a decay heat sample after 24 hours in the present system configuration.	05/01/84*

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IR Item No.	Inspection Report Item	GPUN Action No.	GPUN Action	Targeted Completion Date (Note 1)
84-03-03	OTHER			
3.a	Analyze the potential for CA-RV5 to lift at 125# and vent coolant to the Aux. Bldg. sump during flushing and purging of the lines or valve failure.	3.a.1	Provide a response to Item 3.a.	Complete. See Attachment 2
3.b	Determine the resultant pressure once the dissolved gases are stripped from the solution in order to accurately determine the activity concentration.	3.b.1	Provide a response to Item 3.b.	Complete. See Attachment 2
3.c	Establish a formal preventive maintenance and surveillance program for the CAS system.	3.c.1	Describe formal preventive maintenance and surveillance programs for the Containment Atmosphere Sampling System, and provide a schedule for implementation.	05/01/84*
		3.c.2	Incorporate procedural changes required to implement the program described in 3.c.1.	05/01/84
3.d	Address the dose received by personnel transporting the sample to the counting room.	3.d.1	Develop a revised process for collecting and transporting the sample using a portable pig, proceduralize the process, and perform time and motion studies. (See 3.e.1 and 4.2.1)	05/01/84
		3.d.2	Revise JR 529 to include the dose received by personnel transporting the sample to the counting room (See 4.2.1). Consider dose contribution from hydrogen recombiners.	06/01/84*
3.e	Address the possibility of high airborne radioactivity while collecting the CAS and the need to wear a respirator.	3.e.1	Revise the procedure to require a respirator to be worn.	05/01/84

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IR Item No.	Inspection Report Item	GPUN Action No.	GPUN Action	Targeted Completion Date (Note 1)
84-03-02	CAS			
2.a	Modify CAS to permit sampling after containment isolation. Provide temperature and pressure indications at the gas sample bomb. Develop procedures to quantify the sample including temperature and pressure corrections.	2.a.1	Revise procedures to enable override of containment isolation above 30#.	05/01/84
		2.a.2	Review the design of the Containment Atmosphere Sampling System and provide a schedule for completion of any modifications. Address the need for: 1) Additional heat tracing and/or insulation 2) Elimination of the flowmeter 3) Elevation of the sample bomb 4) Shielding the sample bomb	05/01/84*
		2.a.3	Provide a writeup to describe operation of the Containment Atmosphere Sampling System including any modifications.	05/01/84*
		2.a.4	Modify procedures to quantify the sample including temperature and pressure corrections.	06/01/84
2.b	Evaluate sample representativeness in regard to possible condensation and iodine plateout in the gas sample bomb.	2.b.1	Describe the design of the Containment Atmosphere Sampling System to obtain a representative sample in regard to possible condensation and iodine plateout in the gas sample bomb.	05/01/84*
2.c	Perform error analysis to estimate the sample losses attributed to sample transfers called for in the procedures.	2.c.1	Describe sample transfers, perform error analysis and describe acceptability of the Containment Atmosphere Sampling System equipment.	05/01/84*
		2.c.2	Investigate the need for special precautions which might need to be taken to prevent unnecessary failure of the syringe used in obtaining the containment atmosphere sample and incorporate any necessary procedural changes.	05/01/84

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IR Item No.	Inspection Report Item	GPUN Action No.	GPUN Action	Targeted Completion Date (Note 1)
3.f	Containment Hydrogen Analyzers have not been tested or calibrated and operational procedures have not been written.	3.f.1	Provide a response to Item 3.f.	Complete. See Attachment 2
3.g	No procedural provisions for collecting grab sample for Hydrogen analysis.	3.g.1	Provide a response to Item 3.g.	Complete. See Attachment 2
84-03-04	SHIELDING			
4.1	Revise shielding study (RCS sampling) to include the following contributors: a - Sink drain trap and drain line. b - Undiluted coolant in the sink. c - Scattered radiation. d - Unshielded auxiliary lines. e - Residual contamination during subsequent sample attempts. f - Airborne radioactivity originating from sink.	4.1.a	Perform dose rate calcs and revise TDR 494 to include contributors listed in 4.1 for as-built configuration and specify source terms.	05/01/84*
		4.1.b	Provide a response to address measures which are being taken to minimize the dose contributions listed in Item 4.1.	Complete. See Attachment 2
		4.1.c	Revise procedure to verify in-flow of air into the sample hood prior to initiation of RCS sample flow in order to minimize airborne radioactivity originating from the sink. The determination of air flow will be based on visually checking that ribbons attached to the bottom of the hood door are pulled into the hood.	04/01/84
		4.1.d	Revise EPIP 1004.15 to require Radiological Assessment Coordinator and Emergency Director concurrence prior to initiating flow through auxiliary systems which might introduce high activity water through unshielded auxiliary lines located in the chemistry lab/sample sink area.	04/01/84
		4.1.e	Provide temporary shielding for the sample sink drain line and revise procedure to verify shielding is in place prior to initiation of RCS sample flow.	06/01/84

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OUTSTANDING ITEMS

IR Item No.	Inspection Report Item	GPUN Action No.	GPUN Action	Targeted Completion Date (Note 1)
4.2	Conduct a shielding study on the as-built system for collecting and transporting the CAS.	4.2.1	Revision to TDR 529 described in 3.d.2 will include shielding studies for collecting and transporting the Containment Atmosphere Sample (see 3.d.2).	06/01/84*
84-03-05	ANALYTICAL CAPABILITY			
5.a	Develop procedures for use of fluoroborate probe and pH miniprobe.	5.a.1	Provide an interim response to item 5.a.	Comlete. See Attachment 2
		5.a.2	Complete the necessary procedural modifications for performing the Chloride, Boron, and pH analysis using permanent equipment dedicated for use at TMI-1. (Lower minimum range for Boron analysis is 500 ppm.)	04/01/84
		5.a.3	Resolve the problem regarding fluoroborate analysis for Boron concentrations below 500 ppm or justify a lower minimum range for Boron analysis of 500 ppm.	07/01/84
5.b	Provide the results of demonstration of chemical analysis capability for Chloride, Boron, and pH using the intended instrumentation and procedures.	5.b.1	Perform demonstrations onsite using TMI-1 procedures to confirm the results transmitted to NRR on 2/29/84 in preparation for inspector followup demonstrations.	04/01/84
5.c	Revise procedures to address analysis of fission gases stripped from the RCS sample for determining gross activity.	5.c.1	Provide an interim response to 5.c.	Complete. See Attachment 2
		5.c.2	Provide a complete response to 5.c.	06/01/84*
5.d	Provide shielding for the Ion chromatograph.	5.d.1	Provide a response to 5d.	Complete. See Attachment 2

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IR Item No.	Inspection Report Item	GPUN Action No.	GPUN Action	Targeted Completion Date (Note 1)
84-03-06	NOBLE GAS EFFLUENT MONITOR			
6.a	Provide conversion factors from CPM to µci/cc for monitor readouts.	6.a.1	Describe the modifications to offsite dose calculation software which were incomplete at the time of inspection 84-03.	Complete. See Attachment 2
		6.a.2	Complete the modifications to the computer program for offsite dose calculations as described in GPUN response to 6.a.1.	06/01/84
84-03-07	SAMPLING AND ANALYSIS OF PLANT EFFLUENTS (MAP-5)			
7.a	Develop procedures for collection of representative plant effluent samples including provisions for handling and analyzing high dose rate samples.	7.a.1	Investigate the collection, handling, and analysis of high dose rate samples as described in 7.a, make the necessary procedural modifications, and perform time and motion studies for the resultant process.	07/01/84
		7.a.2	Provide dose calculations based on the time and motion studies for the process which results from 7.a.1.	07/01/84*
84-03-08	SAMPLING AND ANALYSIS OF PLANT EFFLUENTS (MAP-5)			
8.a	Install shields around all MAP-5 cartridges.	8.a.1	Complete installation of shields described in 8.a.	06/01/84
8.b	Document followup action taken on IEN-82-49.	8.b.1	Document followup action taken on IEN-82-49 in regard to MAP-5, e.g., provide flow meter correction curves and complete the necessary procedural modifications.	06/01/84

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POST ACCIDENT SAMPLING AND MONITORING (IR 84-03)
OUTSTANDING ITEMS

IR Item No.	Inspection Report Item	GPUN Action No.	GPUN Action	Targeted Completion Date (Note 1)
	Other PASS Commitments			
		9.a	Complete installation of seismic rack for bottled air to serve as backup air for eductor in the Containment Atmosphere Sampling System.	06/01/84
		9.b	In order to insure that sufficient volume remains in the makeup tank to receive the volume of reactor coolant sample which will be discharged, revise procedures to specify a 15 minute purge time and add a prerequisite to ensure a sufficient volume remains available in the makeup tank as freeboard.	04/01/84
		9.c	Determine the effect on Aux. Bldg. habitability of the sink drain containing reactor coolant sample from the accident being flushed to the sump (consider both the drains from the liquid and stripped gas samples).	05/01/84
		9.d	Verify the adequacy of the existing calculational method for analysis of the RCS gas sample.	04/01/84
		9.e	Verify the accuracy of the pressure gauge used for collection of the RCS gas sample.	04/01/84
		9.f	Perform exposure analysis for obtaining a noble gas sample at RMA-5 under post accident conditions.	05/01/84

NOTE 1 - Completion dates which show an asterisk indicate that an additional submittal to NRC is required.

POST ACCIDENT SAMPLING AND MONITORING (IR 84-03)
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GPUN ACTION NO.	GPUN RESPONSE
1.b	TMI-1 currently has the capability of obtaining a post accident reactor coolant sample from either the loop B cold leg or the pressurizer sample points. Samples from either of these points can be obtained between operating pressure and down to a pressure of approximately 114 psig within the 3-hour time limit and exposure criteria of NUREG 0737. Whether the sample is taken from the loop or from the pressurizer is determined by a valve manipulation. Exposure to the technician would be the same for either sample point. The post accident sampling procedure is being revised to incorporate the capability of taking a pressurizer sample. For sampling at a reactor coolant system pressure lower than 114 psig, the normal sampling system has the capability of obtaining a decay heat sample, however, these lines are not currently shielded and personnel exposure would prohibit using this sample point shortly after an accident. GPUN does intend to modify the current system configuration to tie in the decay heat sample lines with the shielded reactor coolant sample line in the nuclear sampling room. If the decay heat system is taking a suction on the reactor building sump, this sample would not be representative of the coolant in the core region. However, under severe accident conditions, analysis of a reactor building sump sample could provide valuable information.
3.a.1	Procedure 1004.15 Rev. 4 cautions the chemistry technician to "Adjust CA-V-110 carefully since pressure of 125 PSIG downstream will cause CA-RV-5 to lift" in the caution before step 6.3.1.15. Step 6.3.1.15 advises the technician to "Slowly open CA-V-110 to obtain pressure of 40-60 PSIG on CA6 PI". Sufficient administrative guidance is given to the technician to prevent the inadvertant lifting of CA-RV-5. The lifting of CA-RV-5 during flushing of obstructions from the tubing is prevented through the use of the valve line-up in section 6.4 of procedure 1004.15 Rev. 4. The valve line-up does not cause the pressurization of the valves and piping downstream of the sample panel. This portion of the piping is past the panel and assumed to be free of obstructions. Nitrogen can be directed through the tubing upstream toward the reactor coolant system to free the tubing of obstructions. Because of this, the high pressure nitrogen is isolated from the 125 PSIG relief valve and the relief valve will not lift.

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OUTSTANDING ITEMS

GPUN ACTION NO.	GPUN RESPONSE
3.a.1 (contd)	Due to the manual nature of the post accident sampling apparatus, leaks from the tubing or valve failures, if they occur, would be isolated manually as soon as they were noted.
3.b.1	The resultant absolute pressure in the expansion bulb due solely to the expansion of dissolved gases from the reactor coolant sample is calculated to be 0.51 atm. The inclusion of fission gases in the calculation would increase the pressure by less than 0.1%. On the basis of this calculation, it is concluded that the expansion bulb volume is adequate for the collection of dissolved gas from a post accident reactor coolant system sample. The details of this calculation are available at the site for review. This information was provided to one of the inspectors on January 25, 1984.
3.f.1	Inspection Report 84-03 is misleading in regard to the status of the containment Hydrogen Analyzers. Operating procedure (OP 1105-18) was approved February 10, 1983. Test and calibration had also been completed earlier. However, as a result of a 10 CFR 21 notice from the vendor, the system underwent modifications. The system was turned back to the Startup and Test group and at the time of the inspection, problems which were discovered more recently were being resolved. It was not until after the inspection that this last round of testing by the Startup and Test group was completed successfully on January 25, 1984. Test and calibration surveillance procedures 1302-18 and 1303-4.23 for the containment hydrogen analyzers have been approved and surveillance testing is in progress to implement these procedures. As of this date, surveillance testing is complete for one of the units. The operating procedure is currently undergoing revision to incorporate recommendations which have resulted from testing.
3.g.1	TMI-1 utilizes redundant in-line Hydrogen Analyzer systems. In the event one system were inoperative, the other system would not be affected. Therefore, it is our understanding that procedural provisions for collecting a grab sample for hydrogen analysis are not required by NUREG 0737.

POST ACCIDENT SAMPLING AND MONITORING (IR 84-03)
OUTSTANDING ITEMS

GPUN ACTION NO.	GPUN RESPONSE
4.1.b	To minimize the dose contribution from unshielded auxiliary lines, procedures will be revised to prevent other samples from being taken which would introduce high activity water into these lines. Any dose contribution from these lines would remain at the low levels which existed prior to accident conditions. To prevent the dose contribution from airborne radioactivity (originating from the sink) from being higher than expected, procedures will be revised to verify ventilation air flow at the sample sink. To minimize post accident exposure to the technicians, provisions will be made to install shielding for the sample sink drain line prior to initial collection of the post accident sample.
5.a.1	Prior to April 1, 1984, GPU Nuclear will have the capability to analyze post accident samples for Chlorides, Boron and pH and be able to demonstrate this capability using actual procedures and equipment dedicated for use at TMI-1. The auto sampler and auto controller to be used in the ion chromatographic analysis of Chlorides will be on site and available for use at that time. A minimum of three foremen and technicians will be trained on the use of the new equipment by April 1. Although all technicians will eventually be trained on the use of this equipment, a minimum of three is considered sufficient to implement the 96 hour Chloride analysis requirement. Results to date on the use of a fluoroborate specific ion electrode to perform the Boron analysis for concentrations less than 500 ppm have been poor. GPU Nuclear is currently evaluating the lowest Boron concentration that would be present after an accident. The use of the pH mini probe is covered by existing procedures.
5.c.1	GPU Nuclear is analyzing the error that would be present in core damage estimates if stripped gas activities are not included in the calculation. If it is determined that stripped gas analysis results are required, procedural guidance will be provided.

POST ACCIDENT SAMPLING AND MONITORING (IR 84-03)
OUTSTANDING ITEMS

GPUN ACTION NO.	GPUN RESPONSE
5.d.1	The estimated radiation dose rate due to the concentration of isotopes from the ion exchange columns in the ion chromatograph are: Contact 17 R/hr 1 ft. 28 mR/hr 3 ft. 3.2 mR/hr Through the use of the auto sampler and auto controller, the technician performing the chloride analysis will stand a minimum of 1 ft. from the instrument. Most of the analysis is automated and could be monitored from much further away. Therefore, there is no need to provide shielding for the ion chromatograph.
6.a.1	GPUN interprets the finding (84-03-06) to be in reference to refinements to the software for offsite dose calculations which were not completed at the time of the inspection. These refinements include translation of the effluent monitor readout from the known calibration isotope to a specific isotope mixture based on the release pathway, the type of accident, and furthermore decay correcting this mixture from the time of reactor shutdown. GPUN has had conversion factors which convert effluent monitor readouts from counts per minute to microcuries per cubic centimeter for some time. Such conversions have not been a source of confusion. We also have the capability to input post accident sample analysis results directly, should these results be available.