

COMMONWEALTH OF PENNSYLVANIA



DEPARTMENT OF ENVIRONMENTAL RESOURCES

POST OFFICE BOX 2063
HARRISBURG, PENNSYLVANIA 17120

June 18, 1979

Mr. Bruce T. Lunden
Staff Director
President's Commission on the
Accident at Three Mile Island
2100 M Street, N.W.
Washington, D.C. 20037

Dear Mr. Lunden:

This is written in response to your May 22, 1979 letter requesting information from this office concerning our activities during the Three Mile Island accident.

1. Enclosed is a copy of the Bureau's response plan for Three Mile Island. The General Plan was rewritten in 1977. The Three Mile Island Annex was written in 1974. All Annexes to the Plan are written in "Draft" form since they are routinely changed to update personnel and telephone numbers. The original "Pennsylvania Plan for the Implementation of Protective Action Guides" (PAIPAG) was written in 1973. It was completely revised in 1977. This plan is intended to address Bureau operations only.
2. This organization was contacted by the Pennsylvania Emergency Management Agency (PEMA) duty officer (Clarence Deller) at 7:03 a.m. on March 28. The Bureau's duty officer for the month was William Dornsife, Nuclear Engineer, who was at home at the time. Mr. Dornsife was informed that TMI had contacted the PEMA duty officer at 7:01 a.m. and that a site emergency had been declared. TMI had requested that the Bureau call Unit 2 control room as per standard procedures. Mr. Dornsife first contacted Ms. Margaret Reilly, Chief, Division of Environmental Radiation, to inform her of the incident and request that she and other staff members proceed to the office immediately. At approximately 7:05 a.m. Mr. Dornsife called the TMI switchboard and was unable to be connected to the Unit 2 control room. He was contacted at home by Unit 2 control room at 7:06 a.m.

In general, they stated that a site emergency had been declared, high radiation levels were present in the plant and that they may have had a small loss of coolant accident. The leakage was stopped and the plant was stable and being cooled normally. In addition, on-site surveys found no detectable radiation levels above background. Other information relating to plant status was obtained to assure that conditions were stable. No recommendation was made for protective actions for off-site populations. While on the phone, Mr. Dornsife remembers hearing a public address announcement to evacuate the fuel handling and auxiliary building. He was then transferred to a plant health physicist who verified out-of-plant radiation levels. The individual then said he had to go--"I'll call you back"--and hung up. Mr. Dornsife proceeded into the office as per the plan.

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By that time, Ms. Reilly had contacted Thomas Gerusky, Director of the Bureau, to inform him and to request that he leave for the office. She also called Kevin Malloy, Dauphin County Emergency Management Director, to inform him of the accident and suggest that he head for his office.

Mr. Thomas Gerusky was the first to reach the office, contacted TMI at 7:25 a.m. by telephone and established an open line with Unit 2 control room. Ms. Reilly arrived momentarily and Mr. Dornisfe followed within 10 minutes. A summary of the information obtained from the control room (taken from notes and recall is as follows:

There was a site emergency at Unit 2--steam generator failure, primary to secondary leak and loop isolated. At approximately 7:30 a.m. a general emergency was declared because of a high reading of 800 R/hr in the reactor containment building. The unit had been shut down, there was some failed fuel, the high pressure injection system was initiated, some primary coolant was lost and high radiation areas in the auxiliary building.

With the dome monitor reading 800 R/hr, the procedure is to estimate off-site doses in the event of a leak in the containment building. Assuming a 0.2% leak rate and the wind out of 30°, the estimated exposure on the west side of the river was 10R/hr from a reference containment atmosphere mix. A State Police helicopter was at the site and the Bureau requested that TMI survey teams be flown across the river to establish the exposure rate.

Meanwhile, other Bureau of Radiation Protection staff were in contact with the Pennsylvania Emergency Management Agency to notify them of the reactor condition, that an evacuation of an area southwest of the plant in York County (between Goldsboro and York Haven) was a possibility and that York County should be alerted. A few minutes later it was verified that no radiation levels above background were detectable. PEMA was so notified.

Following this information, we notified other staff members and the Department administration of the accident and present conditions.

We alerted the Pennsylvania Department of Agriculture, Division of Milk Sanitation, of the event.

We had learned during the Chinese fallout episode of 1976 that telephones would be tied up, that the press would be contacting us and that communications would be a problem. We maintained the open line with the site and contacted the Department's Public Information Officer to handle press inquiries. Our regular clerical staff was experienced in responding to public inquiries and had all press calls referred to the Public Information Officer.

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At approximately 9:00 a.m., Mr. Charles Meinhold, Director of Health and Safety at DOE's Brookhaven National Laboratory and head of the Federal Interagency Radiation Assistance Program Team at BNL, contacted us by telephone to state that their team was ready to assist us at our request. At that point, no off-site problems were occurring so we told them to hold until we had more information. At about 11:00 a.m. we requested assistance.

At 9:00 a.m., Mr. Dornsife was requested by the Deputy Secretary to go to Lieutenant Governor Scranton's office to brief him on the situation and to participate in a press conference at 10:00 a.m.

He contacted Gary Miller, TMI station superintendent, to be updated on what had occurred. Mr. Miller's briefing of Mr. Dornsife is reconstructed (based partly on notes and partly on memory) as follows:

At about 0400 a turbine trip occurred at 98% power. As designed, the reactor tripped and all safeguard systems, including high pressure injection, actuated automatically when required. There was a violation of technical specifications, specifically, that the auxiliary feed system block valves were initially closed. The electromatic relief valve on the pressurizer lifted and did not reset; however, the indication in the control room (electrical signal to valve) let the operator to believe it had reclosed. The block valve downstream of the relief valve is now closed. The pressurizer may have gone solid and low pressure in the reactor coolant system probably caused flashing and steam bubbles in the system. This may have led to a temporary loss of main coolant circulation. There was a possible primary to secondary leak in the "B" steam generator which has been isolated. The boron concentration in the primary has been diluted to about 100 ppm. This may have been caused by secondary to primary feedback through the leaking steam generator when the system was pressurized. There has been a slight amount of failed fuel. The exact magnitude is not certain at this time--it may have been only some gap activity. The reactor building dome monitor was reading 600R/hr and the reactor building pressure was about 1 psig. The fence post dose was less than 1 mrem/hr. The wind is currently blowing to the west at about 1 to 2 mph and they are sending monitoring teams to Goldsboro.

At approximately 10:45 a.m. the utility notified us that radiation was being detected off-site and that exposure rates were 3 mr/hr or less. A Bureau radiation monitoring team was sent out to verify the TMI readings. Similar levels were observed.

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We were concerned about the probable presence of radiiodines in the plume of radiogases from the plant. The DFR Bureau of Radiation Protection (BRP) was not equipped to do mobile in-the-field airborne iodine estimates. (We did have a fixed monitor at the Observation Building which we chose to leave in place for a historical sample.) TMI field teams were out, though, making these measurements according to plan. Several of their field estimate samples were suggesting I-131 concentrations of up to tens of thousands of picocuries per cubic meter. Unconfirmed, this concentration range would suggest an eventual (days) need for protective actions against inhalation with plant deterioration and a significant impact on fresh fluid milk production and use.

Since the backgrounds at the facility had understandably increased, Mr. Dubiel, TMI health physicist, asked if we could recount the samples in our labs at Harrisburg. We agreed. The samples were transported by helicopter to the helipad at Holy Spirit Hospital and thence to the lab by BRP staff. Spectrum analysis, using GeLi detector, indicated no I-131 (sensitivity at about 10 pCi/m³). We began to suspect the current direct exposure mode to be noble gases with little, if any, I-131. This was consistent with knowledge that the dominant source was the water on the aux building floor and the existent charcoal filters on the aux building vent.

We advised the Agriculture Department that milk sampling should begin with farm sampling of milkings of Wednesday evening (3/28) and Thursday morning (3/29). The results of the analyses of those samples showed milkborne I-131 to be in the range of tens of picocuries per liter--hardly an acute contaminating episode. The sampling of fresh milk continues.

For the remainder of the first day--ground surveys performed by teams from this Bureau, DOE, NRC and utility confirmed that the off-site levels of radioactivity were in the range of about 1-10 mrem/hr (β - γ). Occasional higher levels were observed on site, in the plume and in relatively stagnant pockets due to the meteorological condition. The meteorological conditions during the first few days were such that the wind speed was very low and the direction was variable. Therefore, very little dispersion was occurring and pockets of noble gases with higher than average radiation levels were not uncommon near the site.

Reports from the site and from the NRC I&E teams which had arrived first after 10:00 a.m. confirmed that the primary source of radioactive releases were noble gases which were being offgassed from reactor coolant water which had been pumped from the reactor building sump to the auxiliary building sump tank and that the sumps had overflowed onto the floor. Prior to this it had been suspected that the main source of release had been the venting of steam from the "A" steam generator directly to the atmosphere which had occurred most of the morning.

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During that morning, the Peach Bottom Atomic Power Plant staff called offering assistance, as did the State of New Jersey and Pennsylvania State University.

Levels of radioactivity in the environment remained at or below 3 mr/hr throughout the next day with some occasional high reading found on site and in the plume. Helicopter surveys were being performed by the ARMS aircraft which came with the DOE teams. Levels detected in the plume right over the release stack ranged up to 3000 mr/hr (β - γ).

On Friday morning, March 30, releases from the plant increased due to venting of gases from the make-up tank. Levels as high as 20-25 mr/hr (β - γ) were observed for a short period of time just off-site. One helicopter reading of 1200 mr/hr (β - γ) was found at 600 feet, 300 feet above the reactor building and in the plume. DOE teams and Bureau teams were measuring ground level radiation levels off-site as was the NRC and the utility.

The Bureau received a call from PEMA stating that "Doc" Collins of NRC-Bethesda had called them recommending evacuation out to ten miles downwind because of the 1200 mr/hr reading. We advised PEMA that off-site readings did not indicate a need for evacuation and that the plant had stated that the venting should be over shortly.

Ms. Reilly and Mr. Dornsife contacted Mr. Collins at NRC-Bethesda to ask why the recommendation was made. He stated that the "top brass" had recommended it and he was only following orders. By that time telephone lines were tied up, and Mr. Dornsife went to PEMA headquarters while Mr. Gerusky went to the Governor's office. Ms. Reilly stayed in contact with TMI and the survey teams. Both Mr. Dornsife and Mr. Gerusky recommended against evacuation due to current conditions.

Radiation levels off-site steadily decreased to 1 mr/hr or less during the day. Some intermittent readings were higher in the immediate vicinity of the site and on-site. Levels remained at that point until they declined to background much later in the episode.

Effective March 28, 1979, the Bureau of Radiation Protection office went on a 24-hour schedule. The Bureau has a full-time Harrisburg staff of 19 including four laboratory personnel. Good working relationships had been long established with the NRC Region I office, with the DOE emergency teams and with the utility's radiation protection organization.

Following the March 30 episode, additional EPA, HEW, DOE and NRC health physics personnel were involved in environmental radiation surveillance activity. The operation of the Bureau became one of collecting and analyzing data and making recommendations based upon the data. Assistance in operations was gained from other program personnel in the Department and the Laboratory.

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The Bureau stayed on a 24-hour schedule for approximately two weeks, a 12-hour schedule for the third week, and back to normal for the remaining time. On Friday, May 30, 1979, the Bureau Nuclear Engineer was assigned to the Three Mile Island Site on a 12-hour-a-day basis to keep the Governor's Office and this Bureau informed of any activity which could cause off-site problems. Dedicated telephone lines were installed in our office with the NRC Region I trailer, NRC headquarters, DOE operations at the Harrisburg-York State Airport, and the FDA Bureau of Radiological Health. On about April 1, 1979, representatives from NRC, LXIE and FDA were located in our Harrisburg office as liaison personnel to collect and relay information with their respective organizations.

Water releases were also a problem and additional monitoring was required. The Department's Bureau of Water Quality Management, the Bureau of Radiation Protection and USEPA combined resources to provide a water sampling and analysis program. A copy of that program is attached.

Activities wound down slowly until the reactor was placed in a natural circulation cooling mode. With the "crisis" over, the Bureau continues a long-term operation to monitor the environment during the recovery stage.

3. Comments

There is no doubt that there was a lack of understanding of the scope of the problem during the first days of the accident. It was known that some fuel cladding failure had occurred but the extent of core damage was not known until later. Off-site consequences were initially caused because of contaminated water being pumped from the containment to the auxiliary building and the sumps overflowing. Other releases resulted when venting of radioactive gases occurred prior to hooking up a line to return the gases to the containment building.

Based on the monitoring information that we had received throughout the accident, we felt assured that the maximum accumulated off-site dose to any individual would not have exceeded 100 mrem. This was a factor of ten below the EPA protective action guidelines upon which our plan was based and where we were prepared to take protective actions to limit further off-site cumulative dose.

After the decision was made to move the NRC headquarters staff to Middletown and to set up an adequate communications system, the problems became more solvable and calmness returned to the area. There was a serious problem in communications from the facility, to Commonwealth and Federal officials and to the general public. This was partially resolved when the decision was made to issue press statements from either the Governor's Office or NRC-Middletown.

TMG/MAR/WPD/dmm

cc: Bill Dornsife
Bruce Segal, DOE
Historian's Office
Rm. C478-GT
DOE, 20545

Sincerely yours,

Thomas M. Gerusky
Thomas M. Gerusky, Director
Bureau of Radiation Protection

Att.

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