

THREE MILE ISLAND (TMI) LESSONS LEARNED: BETTER PROTECTION FOR THE PUBLIC AND THE ENVIRONMENT

The Department of Environmental Protection (DEP) has made great strides in protecting the health and safety of citizens who live near or work at Pennsylvania's nuclear power plants since the accident at Three Mile Island's Unit-2 (TMI-2) reactor on March 28, 1979, in Middletown, Dauphin County.

The accident was the most serious in U.S. commercial nuclear power plant operating history. The accident resulted in no deaths or injuries to plant workers or members of the nearby community. However, it brought about sweeping changes involving emergency response planning, reactor operator training, nuclear power plant design and operation, radiation protection and many other areas of nuclear power plant operations. It also caused the U.S. Nuclear Regulatory Commission (NRC) to tighten and heighten its regulatory oversight. Safety in the nuclear power industry and the NRC was enhanced as a direct result of this accident.

How Pennsylvania Is Better Prepared

For its part, the Commonwealth of Pennsylvania has made great strides in improving its preparedness for any event similar to the accident at TMI-2. DEP, the Pennsylvania Department of Health (DOH), and the Pennsylvania Emergency Management Agency (PEMA), along with several other commonwealth agencies, have worked together under the direction of several governors to make these improvements.

The program responsible at DEP for responding to a nuclear power plant accident is primarily the Bureau of Radiation Protection (BRP). The BRP's Nuclear Safety Division is responsible for independent nuclear safety review and oversight at all of the nuclear power plants in Pennsylvania. It is also responsible for developing and maintaining the radiological emergency response plan for the state. As part of its emergency response program, the Nuclear Safety Division maintains the Radiological Assessment Center (RAC) at the Rachel Carson State Office Building in Harrisburg. The RAC acts as a back-up facility to the State Emergency Operations Center (SEOC). All duties performed by the bureau can be accomplished through the RAC in the event the SEOC is unavailable for any reason.

The Nuclear Safety Division consists of several experienced nuclear safety specialists who are assigned to all of the nuclear plant sites in the state. The BRP nuclear safety specialists conduct independent nuclear power plant evaluations and participate in inspections with the NRC inspectors at these facilities. These nuclear safety specialists were not in place before the 1979 accident. They were put in place soon after the accident primarily to ensure that the governor would have people on hand with the expertise necessary to handle a nuclear power plant emergency. The Nuclear Safety Division staff are the commonwealth's first line of defense during a nuclear power plant incident. However, they are not the only staff trained to respond in emergencies. All bureau personnel, including the staff from DEP regional offices, have been trained to perform multiple tasks and to fill any number of roles during a nuclear power plant incident.

It is important for state and local officials to know how much and what type of radioactive material is being released from a nuclear plant or other radiation source, both during normal operations and during an emergency situation. Knowing what normal background radiation is at a given site is key to determining how much additional radiation is getting into the atmosphere during an accident or other unusual situation. The actual allowable amount of radiation released from a nuclear power plant or other radioactive material is subject to federal law. The bureau, in its oversight capacity, has access to real-time plant data, reviews effluent reports, and can take immediate action if the public health and safety is in danger.

The BRP Environmental Surveillance Section performs environmental monitoring and surveillance sampling around nuclear power plants and other radiological facilities. In cooperation with the DEP Radiation Measurements Laboratory (RML) located in Harrisburg, the bureau performs radiochemical analysis of samples collected as part of the routine environmental monitoring program around each nuclear power plant site in the state. RML also performs analysis of samples collected by state and federal field monitoring teams during emergencies. Designated BRP staff are positioned at the RML prior to delivery of the samples. The function of BRP staff at the RML is review and communication of environmental sample data to BRP, state decision-makers, and the Federal Radiological Monitoring and Assessment Center. BRP provides the RML with analysis priorities and detection limits, and assists with contamination control procedures.

State field monitoring teams today can be deployed within minutes of being notified of an emergency. During the accident in 1979, DEP did not have organized field teams. Staff from the DEP regional offices form the majority of the field monitoring teams used in nuclear power plant and radiological emergency and event response/exercises. These regional staff have the knowledge of the local area around power plants necessary to effectively gather appropriate

environmental data. BRP field monitoring teams are equipped with radiological response vehicles, state-of-the-art communication equipment, portable survey meters and air sampling and analysis equipment for measuring radiation in the air and deposited on the ground. Teams are deployed as directed from the SEOC and will be on location within one to four hours. Radiological information will be transmitted to bureau staff at the SEOC for evaluation and development of Protective Action Recommendations (PAR) for the public.

PEMA and the SEOC

The SEOC is located at the PEMA Headquarters in Harrisburg. The SEOC serves as the location for overall coordination of state response activities and protective action decision-making. This central clearinghouse of information and decision-making came about as a direct result of the confusion and inadequate communication surrounding the 1979 accident.

The functions of the BRP staff at the SEOC are accident assessment, radiation dose assessment (which includes guidance and control of field monitoring teams, field data collection and dose projection), interpretation and assessment of utility PAR, the development of BRP PAR, conveyance of PAR to PEMA and general management of BRP response activities. Designated BRP staff report to the SEOC upon activation of alert or higher emergency classification.

The BRP assets in the SEOC include equipment to monitor actual plant conditions, computer programs to calculate and project radiation dose to anyone near a plant during an event, dedicated telephone lines to each nuclear power plant and to the RAC, reference documents for each nuclear power plant, as well as standard office equipment. BRP staff communicate directly with staff in the field and at the utility's emergency operations facility. The BRP incident manager at the SEOC advises senior state officials on PARs.

The Department of Health

Based on dose projections calculated by BRP health physicists, BRP may recommend to the DOH that the public be directed to take predistributed potassium iodide (KI). It is important to note that BRP can only make a recommendation to DOH, and that the final decision is up to the secretary of the DOH.

Summarizing Pennsylvania's Improvement

To summarize, there are two critical areas that answer the question, "how are we better prepared for a nuclear or radiological emergency years after the accident at TMI?" The two areas are communication and planning.

Communication

- Dedicated phone lines now connect each nuclear power plant with DEP, BRP and PEMA at all times.
- DEP now has access to real-time nuclear power plant data from every nuclear power plant in the state routinely and during normal operations and emergencies.
- DEP now has an onsite representative who has intimate knowledge of each plant.
- The lines of communication between the media and public have been streamlined by putting a single agency, PEMA, in the lead during any major emergency event.

Planning

- DEP and PEMA have developed and maintain an emergency plan and procedures for response to a nuclear power plant accident. The plans in 1979 were superficial and lacked the rigorous training and exercising that there is today.
- The predistribution of KI has supplemented the planning process by ensuring that all individuals within an emergency planning zone of each nuclear power plant can have access to KI tablets. However, if needed, we would rely on evacuation to protect the public.

Additional Information

More information can be obtained at the following websites:

- www.nrc.gov/reading-rm/doc-collections/fact-sheets/3mile-isle.html
- www.pbs.org/wgbh/amex/three/
- echo.gmu.edu/tmi/

For more information about radiation in general, visit www.dep.state.pa.us, keyword: Radiation Protection or call the Bureau of Radiation Protection at 717-787-2480.