



UNIVERSITY OF PITTSBURGH
Institute of Politics

case study

**Intergovernmental Communication and
Coordination: Networks vs. Hierarchy
in Dynamic Environments**

*by Louise Comfort
and Carrie Miller
April 2004*

In partnership with the Dick Thornburgh
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April 2004

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PROFILES

Governor’s Office

Dick Thornburgh, Governor of Pennsylvania
William Scranton, Lieutenant Governor of Pennsylvania
Paul Critchlow, Press Secretary to the Governor and Director of Communications
Jay Waldman, Executive Assistant to the Governor

Public Utility Commission

Wilson Goode, Chair

Bureau of Radiation Protection within the Department of Environmental Resources

William Dornsife, Nuclear Engineer
Tom Gerusky, Radiation Protection Director
Maggie Reilly, Chief of the Division of Environmental Radiation

Pennsylvania Emergency Management Agency

Oran Henderson, Director

Pennsylvania Department of Health

Gordon MacLeod, Pennsylvania Secretary of Health

Metropolitan Edison

Walter Creitz, President
John (Jack) Herbein, Vice President

General Public Utilities (parent company of Metropolitan Edison)

Herman Dieckamp, President

Nuclear Regulatory Commission

Joe Hendrie, NRC Chair
Richard Kennedy, NRC Commissioner
Victor Gilinsky, NRC Commissioner
Harold Denton, Director of the Office of Nuclear Reactor Regulation
Roger Mattson, Head of the RC Division of Safety Systems
Charles Gallina, Investigator
James Higgins, Reactor Inspector
Harold “Doc” Collins, Assistant Director of Emergency Preparedness
in Office of State Programs
Victor Stello, Director of the Office of Operating Reactors

White House

Jimmy Carter, President of the United States
Jack Watson, Chief of Staff (Assistant to the President)
Jessica Tuchman Mathews, Director of the Office of Global Issues on the staff
of the National Security Council in the White House

U.S. Department of Health, Education and Welfare

Joseph Califano, Secretary of Health
Richard Cotton, Califano’s Assistant

U.S. Department of Energy

James Schlesinger, Secretary of Energy
Bob Freiss, emergency response team

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Federal Disaster Assistance Administration
William Wilcox, Director

Union of Concerned Scientists
Daniel Ford

Other Nuclear Opponents
Ernest Sternglass
George Wald

Local Players
Robert Reid, Mayor of Middletown
Kevin Molloy, Dauphin County Director of Emergency Management

THE POLICY PROBLEM

Extreme events require coordinated action among diverse actors to protect life, property, and continuity of operations. The challenge to practicing managers operating under urgent conditions is how to increase coordination among diverse actors while simultaneously enhancing the capacity of each actor to take informed action to meet its immediate, local demands. This challenge can only be met by increasing the organizational capacity to process information quickly and accurately through nonroutine forms of communication. Information becomes the critical factor for enabling organizations to adapt quickly to rapidly changing conditions, with its lack resulting in failure in coordination and its timely communication contributing to informed adaptation among organizations under threat.

The relationship between communication and coordination in disaster has long been recognized as critical by first responders, but it is not well understood in theory or practice. This relationship depends upon both technical and organizational infrastructure and requires design and development prior to a damaging event.

COMMUNICATION AND COORDINATION IN EXTREME EVENTS

Recent research on complex systems (Scott and Moser 2003) shows that coordination increases with three basic conditions in communications. Conducting a simulation to test the relationship between communication and coordination, Scott and Moser varied the conditions of communication to observe the effects upon coordination. They found that coordination increased as the number of states of communication, or times and access to a decision process, allowed to each agent increased. Further, they observed that coordination increased as the number of messages allowed to each agent increased. Finally, their results showed that coordination increased as the payoffs for the participating agents increased. These findings confirm what first responders have long observed from experience, that timely, effective communication processes among actively participating agents are essential to coordinated action.

This research (Scott and Moser 2003) demonstrated a second aspect regarding the timing of communication in relation to coordination. Their findings showed a dynamic pattern of interaction among agents, but the timing of the communication flow appeared episodic under extreme conditions. It would increase sharply after an incident occurred, then drop. After a quiet period, the exchange of messages would intensify again. The dynamics in communication flow appeared to reflect the discovery of a threat among participating agents; the drop in activity reflected a temporary consensus among the actors and an increase in capacity for coordinated action. The increase in coordination appeared to reflect collective learning, while a decrease in coordinated action generated a new round of increased communication among the agents as they sought a fresh assessment of risk.

The dynamic flow of communication represents a transition from unordered to ordered action in disaster operations, and the rapid increase in communication provides the shared information that is essential for collective action. Collective action requires building a common understanding of a shared goal. In the words of Herbert Simon (1981), "We can only create what we already understand." The emergent strategy becomes the new order, and self-organizing action follows a clear understanding of the immediate goal.

CHALLENGE TO PRACTICE IN COMPLEX DISASTER ENVIRONMENTS

The challenge to practicing managers in complex disaster environments is to manage the shift from routine practices, which are primarily hierarchical in first response organizations such as police, fire, and emergency medical services, to nonroutine practices that direct critical information to the most relevant user in real time. Nonroutine practices most often represent networks of knowledgeable actors who have the capacity to act in the situation while under stress.

Communication processes for extreme events require greater flexibility, knowledge, and access on the part of participating organizations as well as greater initiative by the users. This type of communication builds on an assessment of organizational capacity, awareness of gaps in the communication process, knowledge of skills of the participating actors, and shared knowledge among the agents in the system. When communications are effective, the participating organizations construct a scalable, adaptive infrastructure that supports collective decision-making. When communications break down, collective decision-making is erratic at best and confusing and indecisive at worst. The communication processes were central to achieving coordinated action in the accident at the Three Mile Island (TMI) nuclear power plant, located on an island in the Susquehanna River, 10 miles south of Harrisburg, Pa. The accident occurred in March 1979 and is still relevant when observing how distinct patterns of communication emerged in the sequence of events between, as well as within, the participating agencies. This case study of the accident raises a number of questions that bear reflection in developing capacity to increase coordinated performance among multiple actors in extreme events. The questions are:

1. Who are the major actors that have responsibility for coordinating response for the community in an extreme event?
2. What is the "core information" that needs to be communicated to each actor in order to create an informed basis for action?
3. What are the primary technical means of communication available to each actor?
4. What are the existing gaps or obstacles in the communications network?
5. What are the primary means available to overcome these obstacles and enable the participants to coordinate their actions more effectively?

THE CASE: MARCH 28–31, 1979

The accident at Three Mile Island required rapid communication between governmental jurisdictions, as well as among agencies within jurisdictions. The intergovernmental context in which the accident occurred, however, was unusual. At the federal level, President Carter had been engaged since mid-1978 in consolidating the functions of emergency management, scattered throughout four federal agencies, into a single new agency, the Federal Emergency Management Agency (FEMA). Although the plans had been under discussion and in progress for months, Federal Executive Order 12127 establishing the Federal Emergency Management Agency took effect on April 1, 1979, three days after the accident (Executive Order Number 12127, 44 FR 19367 (1979)). Agencies were operating largely on the basis of previous experience under the Civil Defense Act and in accordance with the emergency plan devised to satisfy the requirements of the Nuclear Regulatory Commission (NRC). That plan, however, was not widely disseminated or practiced. Yet, the accident threatened the health and safety of the residents of York, Dauphin, and Lancaster Counties and immediately required intergovernmental communication and coordination to minimize the threat.

Reviewing the sequence of events in the TMI case, six major actors played critical roles in this process, some as facilitators and some creating confusion. Individual members of the participating organizations both inhibited and contributed to the definition of a coherent strategy of action for the organization, affecting its performance in the overall response process. Intergovernmental coordination depended upon each organization's capacity to develop an effective process of communication among its members in order to define its responsibilities in this uncertain situation, and further, its ability to communicate that strategy of action to other organizations engaged in the crisis operations. The latent interdependencies among the organizations were tested in new and critical ways by the urgency of the events, the unknown requirements for action, and the severe consequences of failure.

In your assessment of this case, please review the positions and actions of the six major actors, and devise a strategy of communication that would support effective coordination in a current threat at a nuclear plant.

THE ACTORS

Municipality of Middletown: Robert Reid, Mayor

Legal Responsibility:

- He would assess threats to the community and declare a local emergency, if conditions warranted. He also would assist in coordinating and carrying out orders from county and state agencies regarding evacuation and other civil defense efforts.

Primary Constituency:

- All residents living in Middletown

Secondary Constituency:

- Mayors of other municipalities and county director of emergency services

Primary Mode of Inquiry and Style of Communication:

- Seek information from public sources and contact constituents directly

Opposing Views:

- Economic costs of evacuation, potential loss of employment to the community if the nuclear plant closed

Long-Term Goal:

- Health, safety, and economic well-being of residents of Middletown

Office of Emergency Services, Dauphin County: Kevin Molloy, Director

Legal Responsibility:

- Coordinate county-wide actions with local authorities, respond to the initial notification of threat by the TMI management, alert and warn the local population, direct emergency services, and provide situation analysis (Scranton 1980).
- The county director was appointed by the Dauphin County Council. "This system was designed to assure that the communications flowing through the emergency channels would be accessible to the local political leadership. It was assumed that the political leaders would recommend directors whom they could trust" (Martin 1980, 104).

- In early 1975, Molloy prepared the five-mile radius plan inside Dauphin County for TMI. Since that time, he had pushed local directors to improve the detail in their local plans. Heading into the crisis in 1979, Molloy did not feel that any of the local plans were adequate (Martin 1980).

Primary Constituency:

- All residents living in Dauphin County

Secondary Constituency:

- Other county directors, Pennsylvania Emergency Management Agency (PEMA) officials

Primary Mode of Inquiry and Style of Communication:

- Seek expert advice from knowledgeable persons, make judgments based on experience

Opposing Views:

- Municipal authorities lacked information regarding nuclear operations, expected more direction from county director and PEMA

Long-Term Goal:

- To protect life and property in Dauphin County

**Pennsylvania Emergency Management Agency (PEMA):
Oran Henderson, Director**

Legal Responsibility:

- "Develop and keep current a comprehensive emergency management plan and program for the defense of the commonwealth, designed to provide for the protection of life and property under both attack and natural disaster conditions" (Department of General Services 1979).
- "Issue planning guidance, coordinate state response to nuclear incidents, maintain emergency communications facility, operate state emergency operations center, provide information regarding emergencies to the public, coordinate action among state agencies and departments" (Scranton 1980).
- Manage an evacuation of the population, if ordered by the Governor, including providing care for those who refuse to leave.

- Provide secure shelter for the Governor in event of a radiation release (Myers 1979).
- Notify responsible parties as specified in the Pennsylvania Disaster Operations Plan. In case of a nuclear accident, PEMA is notified by the plant and in turn, notifies:
 - Bureau of Radiation Protection (BRP) in the Department of Environmental Resources (DER)
 - Counties within a five-mile radius of the plant (for TMI, these counties include Dauphin, York, and Lancaster)
 - Other state agencies and neighboring states
- Implement the course of action proposed by the BRP in response to the release.
- Activate and manage the Emergency Operations Center in case of a state emergency, coordinating the operations of all state agencies with emergency responsibilities.
- Guide and direct counties and state agencies in their areas of responsibility during any kind of an emergency situation.

Primary Constituency:

- The governor's office and other state agencies

Secondary Constituency:

- The residents of Pennsylvania

Primary Mode of Inquiry and Style of Communication:

- Respond to requests and report actions to governor's office

Opposing Views:

- County and municipal officials expected more direction from PEMA, lacked information regarding risk of exposure to radiation from technical failure of nuclear plant

Long-Term Goal:

- Resilient communities that are capable of taking informed action when they are exposed to threats

**Pennsylvania Governor's Office: Dick Thornburgh, Governor;
William Scranton, Lieutenant Governor**

Legal Responsibility:

- Declare a state of emergency, if an urgent situation exceeds the capacity of state and local agencies to restore normal operations, and request federal assistance for the state (Department of General Services 1979).
- Execute the laws of Pennsylvania and deploy the National Guard of Pennsylvania when necessary (Department of General Services 1979).
- Issue all evacuation orders except during a localized immediate crisis (Martin 1980).
- Protect the health and safety of the people of Pennsylvania.

Primary Constituency:

- All Pennsylvania residents

Secondary Constituency:

- Federal agencies, the president, and Congress

Primary Mode of Inquiry and Style of Communication:

- Direct questioning of multiple sources of authority and information, prompt reports to the public based on the facts known at the time

Gaps in Information:

- Inadequate reports on technical status of plant
- Inadequate knowledge regarding the scientific consequences of radiation on human health
- Inadequate knowledge of the capacity of local governments to protect their respective communities

Opposing Views:

- During his gubernatorial campaign, Thornburgh had actually supported nuclear power while at the same time stressing the importance of nuclear safety. He also strongly supported coal-powered energy.

Long-Term Goals:

- Governor Thornburgh created the Governor's Energy Council by executive order on July 19, 1979. Even before the official executive order was signed, Scranton was delegated responsibilities pertaining to energy issues with the idea that he would officially head the Governor's Energy Council. The council's goal was to ensure energy security for the commonwealth through planning, development, and conservation. The council's function was to develop short- and long-term energy policies through coordination with state agencies, local governments, the business community and consumers. The council also acted as the primary recipient and coordinator of federal and private energy funds assigned to Pennsylvania and distributed such funds as needed to implement planning, energy conservation, and research and development of new energy sources (Department of General Services 1979, 63 & 64).

**Metropolitan Edison: Walter Creitz, President;
John Herbein, Vice President for Generation**

Legal Responsibility:

- Ensure compliance by Metropolitan Edison with the rules and regulations issued by the Nuclear Regulatory Commission for the operation of nuclear power plants.
- Organize and direct training of the control room operators at TMI and ensure that their operational skills were current and sufficient to maintain the required NRC licenses for plant operation.
- Maintain commercial operation of TMI.

Primary Constituency:

- Board of Directors and shareholders of Metropolitan Edison

Secondary Constituency:

- Customers for retail service in the four cities, 92 boroughs, and 155 townships located within 14 counties in the eastern and central parts of Pennsylvania, with an estimated population of 830,000. The company also sold wholesale electricity to five municipalities with a combined estimated population of 17,500, to an electric company serving substantially all of one township, and to a rural electric company corporation.

Primary Mode of Inquiry and Style of Communication:

- Limit inquiry to the specific incident and report only information that is required

Opposing Views:

- Citizens' groups had staged protests against the presence of a nuclear power plant since the initial construction of the TMI plant in 1967. Protests and hearings caused temporary delays in the opening of the plant, and citizens' groups voiced serious concerns regarding the safe operation of the plant within their community (Martin 1980).
- TMI generated significant economic benefits to the central Pennsylvania region, with 500 employees earning an average of \$20,000 a year—a \$10 million annual payroll in 1979 (Froelich et al. April 8, 1979).
- "Met Ed pressed Unit 2 into regular service on December 30, 1978. By meeting the year-end deadline, the utility qualified for \$17 to \$28 million in 1978 tax investment credits, plus \$20 million in depreciation deductions. It also got approval for a \$49 million rate increase, as ... there was strong incentive for the company to get that plant on line fast" (Time Magazine April 16, 1979, 25).

Long-Term Goal:

- Profitable operation of a nuclear power plant

U.S. Nuclear Regulatory Commission (NRC):

Victor Stello, Harold Denton, Joseph Hendrie, Chair

Legal Responsibility:

- Regulate and license the operation of nuclear plants in the United States, review plant applications, and issue construction permits and operating licenses for new units.

- Assist state and local governments in developing emergency response plans for radiological releases from nuclear facilities. The NRC had no authority to either require states to develop plans or disapprove states' plans. When the NRC determined that a plan met all the essential planning elements, it issued a formal letter of concurrence with the plan (U.S. General Accounting Office 1979).
- Collect and evaluate the facts surrounding an accidental release of radioactive material from a licensed nuclear facility, in conjunction with the Pennsylvania Bureau of Radiation and Protection (Scranton 1980).
- Require utilities to report violations of existing operating agreements and adjudicate suspected violations.
- Shut down a plant if it was not operating in a safe manner and provide manpower resources in the event of serious radiological incidents (Starr and Pearman 1983).

Primary Constituency:

- The president, Congress

Secondary Constituency:

- The nuclear power industry

Primary Mode of Inquiry and Style of Communication:

- Technical reports and communication with experts

Gaps in Information:

- Inadequate knowledge of plant operations
- Inadequate knowledge of local area, communities, and organizations

Opposing Views:

- In practice, the NRC assigned only three professionals and one secretary out of 2,500 employees to work with the states on emergency planning for nuclear power plants in 1979.

Long-Term Goal

- Safe, sustainable operation of the nuclear power industry

THE ACCIDENT: CHRONOLOGY, MARCH 28–31, 1979

The sequence of events surrounding the accident at TMI revealed the importance of communication for the coordination of action. Critical gaps in this process led, alternately, to worsening or improving the situation. Please review this chronology in light of the questions posed above to identify both strengths and weaknesses of the communications process and its relation to coordinated action in this event.

Wednesday, March 28, 1979

04:00: Something began to go wrong at the nuclear power plant facility located on Three Mile Island (TMI) near Harrisburg, Pa. That morning, the plant was operating at 97 percent power. The accident began in Unit II with a relatively minor mechanical malfunction. A small-break loss-of-coolant accident (LOCA) occurred when a valve failed to close. The indicator light in the control room showed that the signal had been sent to close the valve even though the valve remained open. Relying on this indicator light, the control room operators believed that the valve had closed. They ignored other indications that the valve was actually open and that temperatures in the core were rising. The emergency core cooling system (ECCS) automatically came on, but the operators turned it off because they did not understand what was actually taking place. By doing this, they severely restricted the amount of water that was being injected into the core by the ECCS. As a result, a significant portion of the core was left uncovered for an extended period of time. If the operators had let the ECCS come on and perform the operation it was designed to do, the accident would have been a minor glitch in the life of the plant.¹

04:45: George Kunder, the superintendent of technical support for the plant, arrived at TMI. Kunder was not expecting the situation he found when he entered the control room. Working with four operators in the control room, Kunder tried to assess and cope with the events that were taking place. The five control room operators had never experienced a combination of events such as the ones they faced on that day—either during normal plant operation or during their training programs.²

06:00: A conference call between managers from Metropolitan Edison, the owner of the Three Mile Island plant, and managers from Babcock and Wilcox, the company that designed and built the reactor, took place. The managers discussed what was happening, but still believed that the valve had closed. At the time, the core was slowly being uncovered. Since there was no radiation alarm, and no fuel pellets were rupturing, the men were unaware that the core was in serious danger.³

06:50: The operators in the control room realized that the radiation levels were abnormal. It was now time to alert authorities outside the plant of the problem. Following procedures for emergencies at the plant, William Zewe, the shift supervisor for Units I and II and a senior operator, called Dauphin County emergency management officials and told them there was a “site emergency.”⁴

07:02: Zewe then called the Pennsylvania Emergency Management Agency (PEMA). Zewe told the PEMA watch officer, Clarence Deller, that the reactor “has been shut down ... There is a high level of radiation within the reactor room. ...”⁵ Under the established flow of communication for a nuclear accident, the plant was required to notify Dauphin County and PEMA.

07:04: The PEMA duty officer contacted the Bureau of Radiation Protection (BRP) within the Department of Environmental Resources (DER) and spoke with William Dornsife, the only nuclear engineer employed by the state of Pennsylvania.⁶ PEMA also notified all counties within a five-mile radius of the plant (Lancaster, Dauphin, York) and other state agencies and states.⁷ The Bureau of Radiation Protection was responsible for determining the parameters of the situation at the plant. With an understanding of the technical details and implications, the BRP then contacted PEMA with a proposed course of action.⁸ This communication flow functioned exactly as it should have.

07:04: The first phone call was placed to the Nuclear Regulatory Commission (NRC). Since the office was not open, the call was received by an answering service. The operator who received the call called the duty officer at home, but he was already on his way to the office. After being paged by the answering service, the duty officer waited until he got to the office to answer the page.⁹

³ Martin, Daniel. (1980) *Three Mile Island: Prologue or Epilogue?* Cambridge, MA: Ballinger Publishing Company, 57.

⁴ Governor’s Office. Press Conference Transcript. March 28, 1979, 11 a.m.

⁵ Henderson, Oran. Memorandum to Governor Richard Thornburgh. “The Chronology of Alerting—Three Mile Island Incident,” March 29, 1979.

⁶ Gerusky, Thomas. Memorandum. “Department of Environmental Resources: Bureau of Radiation Protection Actions,” undated, 1.

⁷ Ibid.

⁸ Henderson, Oran. Testimony to President’s Commission on Three Mile Island. August 2, 1979, 33.

⁹ Martin, 74.

¹ *Report of the President’s Commission on the Accident at Three Mile Island.* Washington, D.C.: U.S. Government Printing Office, 1979, 27, 28, 110, & 111.

² Ibid., at 119

07:08: PEMA contacted Dauphin County, and the county official verified that they had been contacted directly by the operators at TMI earlier.¹⁰

07:10: The U.S. Department of Energy (DOE) received notice of the situation. Metropolitan Edison contacted the Brookhaven National Laboratory of the DOE to notify them of the situation and the potential need for a Radiological Assistance Team (RAT). Although Metropolitan Edison did not request immediate assistance, the RAT team went on stand-by status.¹¹

07:12: PEMA called the Lancaster Emergency Management Office to notify them of the situation. PEMA was having difficulty contacting York County officials, and they asked Lancaster County to contact York County. (York County acknowledged receipt of this information at **07:20**.)¹²

07:15: Gary Miller, station manager and Metropolitan Edison’s senior executive stationed at the facility, arrived to take charge of the control room. Miller had participated in the earlier conference call, so anticipated what he would find when he entered the control room. Miller established and sent out teams, as was required by the site emergency plan, to monitor radiation both on and off site.¹³

07:15: Dornsife finally spoke with the operators in the control room. He had tried to call as soon as he got the notification from PEMA, but his call was not connected with the control room. The control room operators got word that he had called and called him back. The operators told Dornsife that a small-break LOCA had occurred, but that it was now contained. They also told him that a site emergency had been declared due to the increased levels of radiation in the control room, but that no radiation had been detected outside of the building. The plant was considered stable and in the process of being cooled. During this phone call, a loudspeaker in the control room sounded, announcing that due to radiation in the fuel-handling auxiliary building, the building was to be evacuated immediately. Dornsife was then connected with a representative from the health physics department at Metropolitan Edison who once again assured him that there were no off-site releases.¹⁴ After receiving details about the status of the plant, Dornsife immediately called Maggie Reilly at the BRP and asked her to establish the required open telephone line to the plant.¹⁵

¹⁰ Henderson, Oran. Memorandum to Governor Richard Thornburgh.

¹¹ Cantelon, Philip L. and Robert C. Williams. (1982) *Crisis Contained: The Department of Energy at Three Mile Island*. Carbondale, Illinois: Southern Illinois University Press, 167.

¹² Henderson, Oran. Memorandum to Governor Richard Thornburgh.

¹³ Martin, 62.

¹⁴ Martin, 103.

¹⁵ Gerusky, 1.

07:24: The emergency was escalated from a “site emergency” to a “general emergency.” A general emergency is defined by Metropolitan Edison as an “incident which has the potential for serious radiological consequences to the health and safety of the general public.”¹⁶ After this change in status, the plant was evacuated.¹⁷ Colonel Oran Henderson, director of PEMA, was first told of the incident at the plant by one of his operations officers as the evacuation was occurring.¹⁸

07:30: James Floyd, supervisor of operations for TMI Unit 2, called the plant from the Babcock and Wilcox training center in Lynchburg, Va., where he was taking a refresher course on the simulator. That morning, he heard rumors about the events that were occurring in Pennsylvania. He immediately called the plant for more information about what was happening. The operators were able to give him most of the details about the situation, but omitted one important piece of information. The operators had not understood and thus did not mention that the pressure relief valve had been stuck open. To help the TMI operators deal with the accident, Floyd and engineers at Babcock and Wilcox tried to recreate and simulate what was occurring at the plant. If they could simulate the event, they could offer suggestions for a remedy or plan of action. Because they did not have information about the open valve, the technicians at Babcock and Wilcox could not recreate a similar condition as that being described by the control room operators in Pennsylvania.¹⁹

07:30: The BRP learned from TMI that a general emergency had been declared. At this point, Tom Gerusky, the radiation protection director at the BRP, requested verification of on- and off-site radiation survey instrumentation.²⁰

07:36: TMI called PEMA to notify them of the general emergency status. TMI warned PEMA to be ready to evacuate Brunner Island and the community of Goldsboro, both within close proximity to the plant.²¹ A few minutes later, the DER verified the general emergency condition and recommended that PEMA initiate preparedness for an emergency evacuation.²²

07:40: The Nuclear Regulatory Commission (Region I—King of Prussia) switchboard operator arrived at work and received the message about events occurring at TMI. The operator immediately began calling appropriate people within the organization to inform them of the situation.²³

¹⁶ *Report of the President’s Commission on the Accident at Three Mile Island*, 122.

¹⁷ *Ibid.*

¹⁸ Henderson, Oran. Testimony to President’s Commission on Three Mile Island. August 2, 1979, 35 & 36.

¹⁹ Martin, 79.

²⁰ Gerusky, 1.

²¹ Henderson, Oran. Testimony to President’s Commission on Three Mile Island. August 2, 1979, 36.

²² Henderson, Oran. Memorandum to Governor Richard Thornburgh.

²³ Martin, 74 & 75.

07:40–07:50: PEMA alerted York, Dauphin, and Lancaster County Emergency Management Offices, the Pennsylvania State Police, the Pennsylvania Department of Transportation, and the Departments of Public Welfare, Health, Agriculture, and Community Affairs regarding possible risk from the emergency at the plant.²⁴

07:50: In Harrisburg, Governor Dick Thornburgh was called out of a meeting to answer a phone call from Oran Henderson.²⁵ Thornburgh recalled his thoughts after hearing the information from Henderson: “I tried to think where that was and then recalled from a briefing I’d had that it was about 10 miles down the Susquehanna River from the [state] capitol. ... I knew immediately that any kind of an accident at a facility like that was [going to be] a serious consideration for us.”²⁶ The information given to Thornburgh was brief and lacked details.

08:00: The containment building at the plant was isolated. The pipes going between the buildings were shut off. When the operators opened them, some radioactivity leaked into the atmosphere.²⁷

08:10: At the NRC Region 1 Office in King of Prussia, Pa., Charles Gallina, an investigator with the NRC, was designated to organize the Inspection and Enforcement Team. Gallina ensured that telephone lines were established with both the plant and the NRC national management center in Bethesda, Md.²⁸

08:13: Governor Thornburgh left his breakfast meeting and called his press secretary and director of communications, Paul Critchlow. After Critchlow reported everything he knew about the situation, Thornburgh asked him to gather as much information as he could about the incident.²⁹

08:20: Henderson contacted the lieutenant governor, William Scranton, to notify him about the incident.³⁰ The lieutenant governor was the chair of the State Emergency Council and acted as the liaison between the governor and PEMA when state emergencies occurred.³¹

08:30: PEMA contacted Cumberland County’s emergency preparedness office. Cumberland County was not within a five-mile radius of the plant, but was on the border of the 10-mile radius.³²

08:45: Kevin Malloy, Dauphin County civil defense director, notified Robert Reid, mayor of Middletown, of the accident at TMI. Middletown is a small community only a few miles from Three Mile Island. Mayor Reid, a high school teacher who

was paid \$150 a month for his job as the mayor, claimed the only information he received about the situation was from television and radio and complained that this information was “confusing and contradictory.”³³

08:45: Charles Gallina finished gathering the NRC site team in King of Prussia that would depart for TMI. The team consisted of Gallina, James Higgins, a reactor inspector, and three health inspectors.³⁴

08:50: After a group of people from the appropriate offices within the NRC gathered, the NRC emergency center in Bethesda became operational.³⁵

Sometime between **08:00 and 09:00**, Gordon MacLeod, Pennsylvania’s secretary of health, was notified of the events unfolding at TMI. MacLeod, who had held his office for a total of 12 days, was in the Pittsburgh office at the time. In later testimony, he recalled this notification call: “I asked the person who called me, the director of health communications, to put me in touch with the person who was in charge of radiation health within the health department. He advised me that we did not have a Division of Radiation Health. ... Well, I asked him where was radiation health, and he said that it was in the Department of Environmental Resources. I then asked him if he would put me in touch with the person who was our liaison person, and I found out that in fact, we have no liaison with that department. I then asked him to collect for me the library references and journals that would inform me about radiation health and found out that we did not have a library. It had been dismantled about two years ago for budgetary reasons.”³⁶

09:05: Thornburgh contacted Scranton and requested a report about the events at TMI.³⁷ Thornburgh later acknowledged that he “had really put the major burden of fact-finding and briefing ... on [Scranton’s] shoulders, and so his contacts with DER ... were, in effect, my contacts because they formed the basis of any briefing that he gave me.”³⁸

09:15: The NRC contacted the White House to notify them of the incident near the capitol of Pennsylvania.³⁹ Victor Gilinsky, one of the five commissioners of the Nuclear Regulatory Commission, considered calling the White House, but was unsure who he should contact. He was acquainted with Jessica Tuchman Mathews, a PhD in biophysics and member of the National Security Council staff, and spoke with her. After speaking with Gilinsky, Mathews wrote a memo about the situation at the TMI plant and delivered it to her boss, Zbigniew Brzezinski. Brzezinski delivered the memo to President Carter.⁴⁰

²⁴ Henderson, Oran. Memorandum to Governor Richard Thornburgh.

²⁵ Ibid.

²⁶ Gazit, Chana. 1999. *The American Experience: The Meltdown at Three Mile Island*. Produced and written by Chana Gazit. 60 min. PBS Home Video. Videocassette.

²⁷ *Report of the President’s Commission on the Accident at Three Mile Island*, 122 & 123.

²⁸ Martin, 75.

²⁹ Thornburgh, Richard L. Deposition for the President’s Commission on the Accident at Three Mile Island. Harrisburg, Pennsylvania, 5 & 6.

³⁰ Henderson, Oran. Memorandum to Governor Richard Thornburgh.

³¹ Martin, 105.

³² Staff Writer. “Call for Investigation: Area Officials Concerned Over ‘Proper’ Notification,” *The Patriot*, 29 March 1979.

³³ Reid, Robert. Testimony for The Select Committee’s Report of the hearing concerning Three Mile Island. June 8, 1979, 21.

³⁴ Martin, 75.

³⁵ Ibid.

³⁶ MacLeod, Gordon. Testimony to President’s Commission on the Accident at Three Mile Island. August 2, 1979, 133 & 134.

³⁷ Governor’s Office. Chronology of the T.M.I. Incident: March 28, 1979–April 1, 1979. (Draft prepared in preparation for the President’s Commission testimonies.), 2.

³⁸ Thornburgh, Richard L. Deposition for the President’s Commission on the Accident at Three Mile Island. Harrisburg, Pennsylvania, 13.

³⁹ *Report of the President’s Commission on the Accident at Three Mile Island*, 124.

⁴⁰ Martin, 157.

09:30: Floyd and the engineers from Babcock and Wilcox called the plant again to gather more information for their efforts to simulate the accident. This time they learned about the valve being stuck open, but were not told how long it was open. They tried again to simulate the events that were in occurring Pennsylvania and, again, were unsuccessful. In fact, they later learned that the simulator was not programmed to respond to the situation correctly.⁴¹

09:30: John (Jack) Herbein, the vice president of generation for Metropolitan Edison was getting ready to leave Philadelphia and head for the plant at TMI. Once he arrived, his main responsibility would be to manage media relations.⁴² There were, in fact, dozens (soon to be hundreds) of reporters already gathered near the plant waiting to obtain information about the situation.

10:05: The first officials arrived from the NRC.⁴³ James Higgins immediately began collecting information about the current conditions of the plant and reported back to the incident response center in King of Prussia. From there the information was sent to the emergency center in Bethesda. Higgins was in the control room of Unit 2, and Gallina was in Unit 1. They each had an open phone line to the Region 1 office in King of Prussia. Higgins was responsible for discussing reactor problems, while Gallina was responsible for discussing radiation problems.⁴⁴

10:55: State officials prepared to give the first press conference of the day. Present were Scranton, Dornsife, Henderson, and other state officials. Scranton gave the opening statement and quoted Metropolitan Edison as saying, “There is and was no danger to public health and safety.” He told the press corps that there was a small amount of radiation released into the atmosphere. He also reported that all safety equipment functioned properly, that a helicopter was currently monitoring the air around the plant and the near vicinity, and that there was no need for evacuation.⁴⁵

11:00: The BRP requested a team from the Brookhaven National Laboratory of the U.S. Department of Energy (DOE) to monitor the radiation levels in the area.⁴⁶ The DOE had been offering their assistance throughout the morning, so they were prepared to come when asked.⁴⁷ The DOE actually began its first helicopter flight to monitor radiation levels at **13:45**.⁴⁸

11:00: Mayor Reid finally got through to Three Mile Island, but the operator told him to call Metropolitan Edison’s headquarters in Reading, Pa. After hours of calling and trying to get more information, he finally received a phone call from the company assuring him “that no radioactive particles had been released and there were no injuries.” He described what happened next in his testimony before the House Select Committee: “I walked out to my car, which took about 20 seconds, turned on my radio, and the announcer said that radioactive particles had been released. Now that’s 20 seconds after the man told me that there were no radioactive particles released.”⁴⁹

11:30: Governor Thornburgh called a meeting in his office to review what had transpired at the press conference. Thornburgh, Scranton, and Dornsife were all in attendance. According to the governor’s deposition for the President’s Commission, he understood that “there had been a venting to the environment of radiation; that at that time there was not perceived to be any substantial off-site threat or any concern; that they did not have the thing under control; that they were still trying to find out precisely what happened, and that our people were in contact with the utility people at the site; and that for the moment, there was no need for us to take any ... action insofar as evacuation was concerned.”⁵⁰

13:00: Metropolitan Edison held its first press conference. John Herbein answered questions from reporters outside the observation deck of the plant. During the question-and-answer session Herbein said, “I would not call it at this point a very serious accident.” He also reported that no significant levels of radiation were released, that the reactor was being cooled in accordance with design, and that there was no danger of a meltdown.⁵¹

14:30: Metropolitan Edison and state officials had their first meeting. Present at the meeting were Herbein, Critchlow, and Tom Gerusky, the radiation protection director at the BRP, as well as some other state officials. Critchlow requested that a lawyer be present, so a lawyer from the Department of Justice was also in attendance. Gerusky reported that a release of radiation had occurred between 11:00 and 13:30 and complained that the company had not provided appropriate notification of this event. Herbein claimed that it was normal ventilation and that, in fact, there would probably have to be more controlled releases of steam.

⁴¹ Ibid., at 79.

⁴² *Report of the President’s Commission on the Accident at Three Mile Island*, 124.

⁴³ Ibid.

⁴⁴ Martin, 84 & 85.

⁴⁵ Governor’s Office. Press Conference Transcript. March 28, 1979, 11 a.m., Part II–3a.

⁴⁶ *Report of the President’s Commission on the Accident at Three Mile Island*, 126.

⁴⁷ Cantelon, Philip L. and Robert C. Williams. (1982) *Crisis Contained: The Department of Energy at Three Mile Island*. Carbondale, Illinois: Southern Illinois University Press.

⁴⁸ *Report of the President’s Commission on the Accident at Three Mile Island*, 126.

⁴⁹ Reid, Robert. Testimony for The Select Committee’s Report of the hearing concerning Three Mile Island. June 8, 1979, 21.

⁵⁰ Thornburgh, Richard L. Deposition for the President’s Commission on the Accident at Three Mile Island. Harrisburg, Pennsylvania, 11 & 12.

⁵¹ Metropolitan Edison. 1979. Video Recording of 1 p.m. Press Conference, dated March 28, 1979. Filmed and produced by WQED. Videocassette.

When confronted as to why he had not mentioned the release in his earlier press conference, Herbein responded by saying, “It didn’t come up.” During this meeting, Herbein also admitted that there was possible fuel damage at the plant.⁵²

16:30: Scranton held his second press conference of the day. He read a prepared statement that gave the press corps an update on the situation at the plant. He stated that the “incident is more complex than Metropolitan Edison led us to believe.” He reported that more tests were being taken and that the governor’s office and experts on scene remained convinced that there was no danger to public health. Scranton said that the company had given out conflicting information. He stated that there had been a release of radiation, but there was no evidence that it was at a dangerous level. He also informed them that steam was discharged earlier in the day during normal venting procedures, but due to the leak, radioactive material was also released. The DER was not notified until after the release had taken place, but Scranton assured the press that Metropolitan Edison would be notifying the DER of any future ventilation. During the question-and-answer session, Scranton admitted his disappointment with the company for not revealing the information about the venting.⁵³

20:45: Gallina, Higgins, Critchlow, and Gerusky met with Lieutenant Governor Scranton in his office. Bob Freiss from the emergency response team of the DOE and Jay Waldman, Thornburgh’s executive assistant, were also present. Gallina stated that, “Future emissions, if any, will be less than today’s venting from the auxiliary building.” He also mentioned possible core exposure.⁵⁴ The officials had difficulty in understanding the technical language used to describe the events occurring at the plant and communicating this information clearly to the public.⁵⁵ By the end of the meeting, they established that there was a slight chance of a meltdown, but if that were to occur, they would have plenty of time to order and carry out an evacuation. Shortly after the discussion, Scranton called Thornburgh to brief him on what had occurred, and they arranged to meet later that evening.⁵⁶

22:00: Scranton held his third and final press conference of the day. Scranton informed the press that there was currently no radioactive leakage from the primary building or the reactor itself. Scranton also told the press that the auxiliary building did contain radioactive material, which was being vented.

As a result of the ventilation, some radiation was escaping into the atmosphere, but the levels were not dangerous. During a lengthy question-and-answer session, NRC officials reported that there had been no human error detected at this point. They also said that the reactor was in a safe condition, the NRC was monitoring everything, no mechanical damage had been detected, there was no problem with containment, there was no significant core damage, and Metropolitan Edison had acted responsibly throughout the day.⁵⁷

23:00: Governor Thornburgh held a meeting in his offices with NRC and DER officials.⁵⁸ This meeting was the first full briefing that Governor Thornburgh had received. NRC and DER representatives gave Thornburgh a thorough account of what had happened at the TMI plant throughout the day. They also attempted to predict what could happen in the coming hours and days. During this meeting, the potential for core meltdown was not discussed.⁵⁹

Thursday, March 29, 1979

Thursday, March 29, 1979, began with a number of talk show appearances by many of the key players in the situation. *The Today Show* with Tom Brokaw featured interviews with Walter Creitz, Richard Pollack from the Ralph Nader Critical Mass Energy Project, Daniel Ford from the Union of Concerned Scientists, and Senator Gary Hart, the chair of the Senate Subcommittee on Nuclear Regulations. *The Today Show* correspondent announced that the DOE and the NRC had been aware of problems, including a problem with a safety valve, at TMI as early as one month before the accident. He was amazed that the plant was still in operation after being shut down for five out of the last 12 months due to safety-related problems. Tom Brokaw reported that the NRC had said that radiation penetrated through four-foot thick walls and had spread as far as 10 to 16 miles from the plant. When Creitz was interviewed, he assured the viewers that there was no human error involved in the incident at the plant. During the debate between Ford and Creitz about the safety of the plant, Ford cited a NRC report from before the accident on safety problems at TMI. When Senator Hart was interviewed, he reported that there was, in fact, human error involved in the situation at TMI. He also supported the fact that the plant had been shut down four times already for safety reasons. During the same interview, Hart also stated that he did not believe the events at TMI would affect the future of nuclear energy in the United States.⁶⁰

⁵² Governor’s Office. Chronology of the T.M.I. Incident: March 28, 1979–April 1, 1979, 3

⁵³ Governor’s Office. Press Conference Transcript. March 28, 1979, 4:30 p.m., Part I–4 & 5.

⁵⁴ Governor’s Office. Chronology of the T.M.I. Incident: March 28, 1979–April 1, 1979, 4

⁵⁵ Martin, 110.

⁵⁶ Governor’s Office. Chronology of the T.M.I. Incident: March 28, 1979–April 1, 1979, 5

⁵⁷ Governor’s Office. Press Conference Transcript. March 28, 1979, 10:30 p.m.

⁵⁸ Governor’s Office. Chronology of the T.M.I. Incident: March 28, 1979–April 1, 1979, 5

⁵⁹ Thornburgh, Richard L. Deposition for the President’s Commission on the Accident at Three Mile Island. Harrisburg, Pennsylvania, 22 & 23.

⁶⁰ National Broadcasting Company. *The Today Show*, March 29, 1979. Produced and written by WNBC-TV & NBC Television Network: New York. Transcript.

Later that morning, Creitz and Ford were also on *Good Morning America*, once again debating the safety of nuclear power plants. This time, Ford pointed to five other plants in the United States that had recently been shut down due to safety problems. Ford said, “The fact ... is that the regulatory program has been exceedingly lax. ... They have been so interested in seeing a large nuclear power program that they have compromised the safety of the reactors in the interest of promoting the commercial prospects of the industry. That’s the problem.” Creitz responded, “I think the record of the industry having 72 reactors in operation and never injuring any member of the public certainly speaks highly of the safety precautions that are followed in the nuclear industry.”⁶¹

10:00: Metropolitan Edison held another press conference. Herbein told the press that the situation was secure, cooling was in progress, and that there was no immediate danger to the general public. He anticipated that the reactor would be stabilized sometime later that day. During the press conference, Herbein said, “There is presently no danger to the public health or safety. We didn’t injure anybody, we didn’t over-expose anybody, and we certainly didn’t kill anybody.” Mayor Reid was at the press conference and confronted Herbein about the difficulty of getting any kind of concrete information from the company during the first hours of the incident.⁶²

12:45: Scranton toured the TMI facility.⁶³

During that afternoon, Anthony Robbins, the director of the National Institute for Occupational Safety and Health (NIOSH), made a phone call to Gordon MacLeod. MacLeod claims that during this phone call Robbins urged him to consider evacuation of the area around TMI. MacLeod informed Robbins that evacuation was not in order at the present time because radiation levels were low. Robbins asserted he was more concerned about the inability to bring the reactors to a cold shutdown than he was about radiation levels. Robbins also said he was speaking from the perspective of both NIOSH and the Bureau of Radiological Health within the Food and Drug Administration.⁶⁴ The actual content of this conversation was contested. Robbins denied that he called to urge evacuation, claiming that he called MacLeod to offer support and assistance.⁶⁵ After this phone call, MacLeod set up a conference call between Henderson, Gerusky, and one of Thornburgh’s staff members to discuss the need for evacuation. MacLeod suggested that they

consider advising pregnant women and children under the age of two to leave the area because they are the population most susceptible to the harmful effects of radiation. The group agreed not to take any action at the time.⁶⁶

Mobilization for Survival, a coalition of 250 people against nuclear technology, also called a press conference that afternoon. George Wald, professor emeritus of biology at Harvard University and winner of the 1967 Nobel Prize for physiology and medicine, and Ernest Sternglass, director of radiological physics at the University of Pittsburgh spoke. Wald said, “Every dose of radiation is an overdose. ... A little radiation does a little harm and more radiation does more harm.” He also criticized the nuclear industry for prioritizing profit-making over safety and said, “The business of the power industry is not to make power but to make money. ... The industry has regularly cut corners to save money ... and from the very beginning, the American insurance companies have refused to insure nuclear plants, making the bulk of liability rest on the government.”⁶⁷ Sternglass spoke after Wald and argued that the plants should be shut down. He expressed his belief that more money should be spent on alternative energy sources such as clean oil and gas facilities. Both men also warned of latent cancers and ailments that could “creep up” on people and occur as many as 30 years after exposure.⁶⁸

22:00: Higgins called Critchlow and reported that the NRC’s awareness of the seriousness of the problem had changed. They had discovered that there was, in fact, serious fuel damage. He also told Critchlow that the recovery time could be very lengthy and that there was a strong possibility of more emissions being released from the plant.⁶⁹

22:20: Governor Thornburgh held a press conference and assured the press that there was no reason for alarm or to disrupt one’s daily routine and no reason to believe that public health had been affected. He said he had spent “the last 36 hours trying to separate fact from fiction.” He empathized with reporters for receiving conflicting information and let them know he had received that same confusing information. Thornburgh shared his belief that things were now under control. Gallina said, “A preliminary evaluation indicated no operator error.” He also stated that the danger was now over for people off site.⁷⁰ Thornburgh later reported that he was uncomfortable with this last statement. He thought it was too soon to be issuing these kinds of assurances to the public.⁷¹

⁶⁶ MacLeod, Gordon. Testimony to President’s Commission on the Accident at Three Mile Island. August 2, 1979, 137–140.

⁶⁷ Mobilization for Survival. Press Conference, dated March 29, 1979. Filmed and produced by WQED. Videocassette.

⁶⁸ Klaus, Mary. 1979. Radiation Above Normal: Scientists Seek Closing. *The Patriot*. 30 March.

⁶⁹ *Report of the President’s Commission on the Accident at Three Mile Island*, 135.

⁷⁰ Governor’s Office. Press Conference Transcript. March 29, 1979, 10:20 p.m.

⁷¹ Thornburgh, Dick. (2003) Draft Copy—*Where the Evidence Leads: An Autobiography*. Pittsburgh, PA: University of Pittsburgh Press. Located at the Dick Thornburgh Archives, University of Pittsburgh, Pittsburgh.

⁶¹ American Broadcasting Company. *Good Morning America*, March 29, 1979. Produced and written by WABC-TV & ABC Television Network: New York. Transcript, 5.

⁶² Metropolitan Edison. 1979. Video Recording of 10 a.m. Press Conference, dated March 29, 1979. Filmed and produced by WQED. Videocassette.

⁶³ Scranton, William. Handwritten notes from Three Mile Island plant tour. March 29, 1979.

⁶⁴ MacLeod, Gordon. Testimony to President’s Commission on the Accident at Three Mile Island. August 2, 1979, 137–140.

⁶⁵ Martin, 123 & 124.

James Schlesinger, the secretary of the U.S. Department of Energy, said the DOE would be investigating the accident at Three Mile Island. He also stated that the nuclear power industry had a good safety record and that, “over the years there have been no fatalities resulting from the use of nuclear power ... Nothing is riskless, but when one weighs the risks overall, the advantages of nuclear power exceed the risks.”⁷² He noted that nuclear power was vital to the U.S. economy and that without nuclear energy the United States would be forced to increase dependence on foreign oil and potentially suffer from energy shortages.⁷³

Senator Edward Kennedy, chair of the Subcommittee on Energy of the Joint Economic Committee, urged Schlesinger to reconsider submitting a bill designed to expedite the licensing process for nuclear power plants.⁷⁴ Kennedy referred to safety issues, saying, “The shutdown of five reactors two weeks ago for safety reasons and the accident yesterday ... show that the nuclear safety licensing process is not working.” He stressed the importance of building the plants safely rather than trying to build them quickly.⁷⁵

Other newspaper articles from Thursday cited interviews with mayors of the various towns surrounding the TMI plant. Charles Erisman, the mayor of Royalton, a small community within Dauphin County, complained that he did not hear any information about the incident until after 11:00 on Wednesday, March 28. Because the mayor is responsible for coordinating the civil defense efforts, he was frustrated with this lack of information. Kevin Molloy, director of Dauphin County Office of Emergency Preparedness, thought that Middletown had told Royalton about the situation. Highspire, another small community, did not get any official communication about the accident until after 21:30 on Wednesday.⁷⁶ Kenneth Myers, mayor of another nearby community, Goldsboro, said he “wasn’t notified of the accident, and [didn’t] know how many other municipal officials were ... They should have notified the officials in the local area.”⁷⁷

Sometime Thursday, Lieutenant Governor Scranton received a letter from William Wilcox, the director of the Federal Disaster Assistance Administration (FDAA). The letter stated that the FDAA would be “pleased to cooperate either in sponsorship or participation, or both, in a critique of the evacuation plans in place.” The letter also informed Scranton that the Region III office of the FDAA would assume this responsibility and that the regional director of that office, Bob Adamcik, would soon be contacting Henderson, the director of PEMA.⁷⁸

⁷² Staff Writer. 1979. He Favors N-Power Despite Accident. *The Patriot*. 29 March.

⁷³ Ibid.

⁷⁴ Washington Bureau. 1979. Schlesinger Is Cautioned. *The Patriot*. 30 March.

⁷⁵ Ibid.

⁷⁶ Harwood, Jon. 1979. Royalton Never Got the Word. *The Patriot*. 29 March.

⁷⁷ Quigley, Roger. 1979. Goldsboro: Tranquility and Anger. *The Patriot*. 29 March.

⁷⁸ Wilcox, William. Letter to William Scranton. March 29, 1979.

Friday, March 30, 1979

08:00: Radioactive steam was released from the plant when Floyd and the other TMI operators opened a valve to release building pressure. They took this action without approval from anyone. At the very moment they released this steam, a helicopter was flying over the plant monitoring radiation levels. The helicopter took a reading of 1,200 millirems/hour over the plant.⁷⁹

08:40: PEMA spoke with the operators at the plant. Floyd reported to PEMA that they had another incident at the plant and recommended getting prepared for evacuation if the release were to get out of control.⁸⁰ Henderson asked Floyd, “Are you ready to evacuate?” Floyd answered yes, meaning that if the people at the plant had to be evacuated, they were ready to do so. Henderson misinterpreted his answer and thought Floyd was urging that evacuation measures be taken.⁸¹

09:00: The NRC officials in Bethesda, Md., learned about the emission from the plant. Lake Barrett, a section leader in the environmental branch of the NRC, later said in testimony for the President’s Commission, “One of the NRC inspection people that had direct phone lines to the TMI control room reported that he had received the message from the site that the tanks were full, that the relief valves on the tanks had lifted, and that gases were passing from the make-up tank to a waste gas decay tank where they could not go, and the gases were being vented from the plant.” The NRC officials at Bethesda asked Barrett to make some quick calculations about what the radioactive material release rate would be. When he relayed this information to the five NRC commissioners, they asked him to estimate what the off-site radiation dose would be. Barrett was uncomfortable making the calculation right on the spot, but came up with a number—1,200 millirems/hour.⁸²

Within 15 seconds of Barrett’s announcement, the plant called the NRC to report the recent radiation reading taken by helicopter of 1,200 millirems/hour. Since the two numbers matched exactly, Barrett said it had a “profound effect on the whole center.” He described a shift “from sort of a lack of information on things and nothing really firm to, well, here [was] a piece of meaty information that had significance to it ... It took a hypothetical situation and rather carved it in stone and set it on a mountain with a burning bush behind it. There was considerable concern.”⁸³ The group in Bethesda immediately began discussing evacuation.

⁷⁹ Starr, Philip and William Pearman (1983). *Three Mile Island Sourcebook: Annotations of a Disaster*. New York, New York: Garland Publishers.

⁸⁰ Henderson, Oran. Testimony to President’s Commission on Three Mile Island. August 2, 1979, 36.

⁸¹ Martin, Daniel. 1980. Three Mile Island. *University of Baltimore Magazine*. Date of publication unknown.

⁸² Barrett, Lake. Testimony to President’s Commission on Three Mile Island. August 2, 1979, 294–298.

⁸³ Ibid., at 299.

⁸⁴ Ibid.

⁸⁵ Molloy, Kevin. Testimony to President's Commission on Three Mile Island. August 2, 1979, 10.

⁸⁶ Martin, 103, 104 & 105.

⁸⁷ Governor's Office. Typed list of daily chronological events. March 30, 1979.

⁸⁸ Henderson, Oran. Testimony to President's Commission on Three Mile Island. August 2, 1979, 41 & 42.

⁸⁹ Governor's Office. Typed list of daily chronological events. March 30, 1979.

⁹⁰ Henderson, Oran. Testimony to President's Commission on Three Mile Island. August 2, 1979, 43.

⁹¹ *Report of the President's Commission on the Accident at Three Mile Island*, 139.

⁹² Henderson, Oran. Testimony to President's Commission on Three Mile Island. August 2, 1979, 43.

⁹³ Barrett, Lake. Testimony to President's Commission on Three Mile Island. August 2, 1979, 303.

They wanted to make sure they were taking all necessary precautions and agreed it was best to err on the side of caution. Harold "Doc" Collins, the assistant director for emergency preparedness in the Office of State Programs of the NRC, was asked to make the phone call to recommend evacuation.⁸⁴

09:00: PEMA contacted Molloy to inform him about the radiation release at the plant.⁸⁵ Henderson called Scranton to share this information with him.⁸⁶ Shortly after 09:00, Thornburgh and Scranton talked over the phone about the unplanned emissions from the cooling towers. Critchlow then called the NRC and spoke with Karl Abraham, who confirmed that there had been an emission.⁸⁷

09:15: Henderson received a phone call from "Doc" Collins from the NRC. Collins informed Henderson that they should conduct an evacuation of the area. Henderson received a second phone call from Collins within 5–10 minutes of the first one reiterating the need for evacuation and assuring Henderson that all the NRC commissioners supported this recommendation.⁸⁸ Critchlow and Thornburgh learned about these phone calls from Bethesda.⁸⁹ Instead of immediately following through on the evacuation recommendation, Thornburgh first called Henderson to find out who "Doc" Collins was and asked for Henderson's judgment on evacuation. Henderson recommended they do so.⁹⁰

09:25: Henderson called Molloy in Dauphin County and warned him of the impending evacuation. He told Molloy to expect an official evacuation order within about five minutes. Following procedures, Molloy began to prepare for the evacuation by alerting the firehouses and making a radio announcement about the potential evacuation.⁹¹

At the same time, Gerusky and Dornsife were trying to reach Thornburgh and Henderson to recommend against evacuation. Gerusky could not get through on the phone lines to either Thornburgh or Henderson, so he and Dornsife split up and personally went to their offices to try to stop the evacuation. Dornsife reached Henderson's office and informed him that the emission at the plant had stopped and that the BRP was recommending against any evacuation.⁹²

Shortly after, the operators at the plant called the NRC to tell them that the 1,200 millirems/hour reading had been taken directly over the containment structures, not off site. If Barrett had this information to take into account while calculating the potential radiation figures, there would have been no concern about the need for evacuation.⁹³

10:00: Henderson called Critchlow to advise against the evacuation. He told Critchlow about his conversation with Dornsife and informed him that the numbers from the BRP did not indicate a need for evacuation.⁹⁴

10:07: Thornburgh called Joseph Hendrie, chair of the NRC, to discuss the evacuation recommendation confusion. Hendrie assured him that there was no need for an evacuation, but that the NRC would encourage the citizens within 10 miles to stay indoors for a while. Thornburgh asked Hendrie to send an expert upon whom he could rely for accurate technical information and much-needed advice.⁹⁵

Sometime on Friday morning, PEMA contacted the four counties within a 10-mile radius of Three Mile Island—Dauphin, York, Lancaster, and Cumberland—and told them to extend their evacuation plans out to the 10-mile range. He warned them that they should be prepared for a potential evacuation. He also told these "risk counties" that the governor would be advising all people within the 10-mile radius of the plant to remain under cover for the rest of the morning.⁹⁶

Friday morning a U.S. Senator contacted Joseph Califano, the secretary of Department of Health, Education, and Welfare (HEW), to inquire what role the HEW was playing in the TMI situation. Califano was actually unaware of what the HEW was doing, so he and his assistant, Rick Cotton, began contacting various health officers within the HEW and the Environmental Protection Agency. Through their investigative efforts, they learned that the Food and Drug Administration (FDA) was sampling food in Harrisburg and that the Centers for Disease Control and Prevention was "on call." Califano was concerned that most of the radiation monitoring was being done by pronuclear organizations—the DOE, the NRC, and Metropolitan Edison.⁹⁷ Califano also became concerned about the possible release of radioactive iodine and began a search for sufficient amounts of potassium iodide, a drug that prevents radioactive iodide from affecting the thyroid. They finally found a company willing to provide the HEW with almost 250,000 one-ounce bottles of potassium iodide. Shipments began arriving very early Sunday morning, April 1; the last shipment arrived on Wednesday, April 4.⁹⁸

10:30: President Jimmy Carter called Hendrie to determine whether the NRC needed assistance. Hendrie told him that the communications were "a mess," and Carter promised to help with that problem. During the phone call, Carter

⁹⁴ Governor's Office. Chronology of the T.M.I. Incident: March 28, 1979–April 1, 1979, 10.

⁹⁵ *Report of the President's Commission on the Accident at Three Mile Island*, 139.

⁹⁶ Henderson, Oran. Testimony to President's Commission on Three Mile Island. August 2, 1979, 45.

⁹⁷ Martin, 156.

⁹⁸ *Report of the President's Commission on the Accident at Three Mile Island*, 145.

asked for a recommendation of someone who could be on site to speak for the government. Hendrie told Carter that Harold Denton was the appropriate person and that he was already on the way to Pennsylvania.⁹⁹

11:15: President Carter called Governor Thornburgh. Carter had attempted to call earlier, but could not get through due to busy phone lines. Thornburgh asked for an expert to be sent to help with the technical issues. Carter assured him that Denton was on the way. Carter also promised to establish a special communications system to link the plant, the governor's office, the White House, and the NRC.¹⁰⁰

11:40: Joseph Hendrie called Thornburgh to apologize for the NRC's erroneous evacuation recommendation. Thornburgh mentioned that MacLeod had suggested the evacuation of pregnant women and children from the area and asked Hendrie what he thought about it. (MacLeod, a physician, was aware that radiation has a much more significant impact on fetuses and developing children than it does on adults.)¹⁰¹ Hendrie told him, "If my wife were pregnant and I had small children in the area, I would get them out because we don't know what is going to happen."¹⁰² At **12:15**, the governor's office and PEMA issued a directive requesting "that all children attending school within the five-mile radius of Three Mile Island be sent home immediately. All pregnant women and preschool children within the five-mile area should be evacuated immediately."¹⁰³

12:30: Thornburgh held another press conference. He reported that there was no reason for panic or the implementation of emergency measures. Thornburgh also stated that Denton from the NRC was arriving to assist with the situation. He advised that pregnant women and children should leave the area within a five-mile radius of the plant. Schools within that same area had been ordered to close. He assured the press that the radiation readings were no higher than they had been the day before, but they wanted to take "excess caution" to protect the health and safety of the public.¹⁰⁴

13:00: Metropolitan Edison held another press conference. Herbein told the press that the earlier release had been measured at around 300–350 millirems/hour by an aircraft flying over the plant. The press corps had heard the 1,200 millirems/hour earlier in the day, but Herbein admitted he had not heard that figure mentioned. There were many questions from the press about the validity of the numbers and whether the release had been controlled or uncontrolled. They also

asked about public safety and the previous release of the waste water from the plant. Herbein was visibly frustrated with the situation and finally responded to a question by saying, "I don't know why we have to tell you each and every thing we do!" The media were upset by this remark and questioned the responsibility of the plant.¹⁰⁵

13:30: Representatives from many federal agencies, including the NRC, Department of Defense, DOE, Joint Chiefs of Staff, FDA, and FDAA, met at the White House. Hendrie briefed the participants on the status of the nuclear plant. The group then focused on the organization of federal efforts and the chain of command for doing so. Jack Watson, Carter's executive assistant for intergovernmental affairs, informed the group that he was the White House coordinator for TMI issues. Denton was identified as the sole future source of information regarding the plant's status, and the FDAA was identified as the coordinator of evacuation planning.¹⁰⁶

After the meeting, Jessica Mathews informed Jay Waldman, Thornburgh's executive assistant, that Watson would now be his contact person at the White House. She also confirmed information she learned at the meeting—that the situation was unprecedented and that the "worst case" scenario was a meltdown. When Mathews spoke with Thornburgh a bit later, she informed him that there was a gas bubble present in the reactor, but the situation was stable. She also told him the core was hot and partially uncovered and admitted that there was "nobody with a very good picture of the situation."¹⁰⁷

14:00: Denton arrived in Harrisburg with a team of experts to assess the situation.¹⁰⁸

15:15: Denton called Hendrie to share the technical information about the plant. Denton concurred with the earlier decision that evacuation was not necessary at the present time.¹⁰⁹ About 30 minutes later, Hendrie called Thornburgh and told him that the NRC and Metropolitan Edison agreed that the core damage was serious. He confirmed that a bubble was present in the reactor, but that it was stable and had only a small chance of exploding.¹¹⁰

⁹⁹ Martin, 148.

¹⁰⁰ *Report of the President's Commission on the Accident at Three Mile Island*, 145.

¹⁰¹ *Ibid.*

¹⁰² *Ibid.*

¹⁰³ Manchester, Frank. Memorandum to IU Directors. March 30, 1979.

¹⁰⁴ Governor's Office. Press Conference Transcript. March 30, 1979, 12:30 p.m.

¹⁰⁵ Metropolitan Edison. 1979. Video Recording of 1 p.m. Press Conference, dated March 30, 1979. Filmed and produced by WQED. Videocassette.

¹⁰⁶ Martin, 159.

¹⁰⁷ Governor's Office. Chronology of the T.M.I. Incident: March 28, 1979–April 1, 1979, 13.

¹⁰⁸ Martin, 165.

¹⁰⁹ *Ibid.*

¹¹⁰ Governor's Office. Chronology of the T.M.I. Incident: March 28, 1979–April 1, 1979, 15.

16:05: Denton called Thornburgh to give him an update on the status of the situation. Denton reported that he had assigned four task forces to study the situation, that the releases off site were routine noble gases and were not threatening, that the fuel damage was significant, and that a bubble was present at the top of the core and that it might be expanding. They agreed on the need for another press conference to inform the public about the current status of the plant and the general situation.¹¹¹

16:30: Watson called Waldman. While there is some controversy about the content of the conversation, Waldman claimed the purpose of the call was to request that Thornburgh not ask for a declaration of a state of emergency or disaster because of the panic it could cause. He claimed that Watson promised the state the same type and amount of federal assistance they would receive if they did ask for such a declaration.¹¹² Watson disputes the content of the conversation and claims he did not make that request of the governor. Thornburgh never requested an emergency declaration.¹¹³

17:15: The White House held a press conference. After the press conference, Jody Powell, Carter's press secretary, requested that the NRC cancel the two television appearances scheduled for later that night.¹¹⁴ He wanted to make sure that a limited number of people were actually delivering information about the incident at TMI.

Friday evening in Washington, D.C., Califano gathered an informal group of top health officials to advise him on recommendations to the White House, the NRC, and the state in order to protect public health. Among the members of the informal group were the surgeon general, the director of the National Institutes of Health, the director of the National Cancer Institute, the director of the Centers for Disease Control and Prevention, the commissioner of the FDA, the director of the National Institute of Safety and Health, and the director of the Bureau of Radiological Health. At this time, there was no established system for the HEW to relay this information to other federal officials.¹¹⁵

20:30: Denton briefed Governor Thornburgh in person and reported that there was extensive fuel damage and that the bubble posed a problem in cooling the core. They discussed meltdown as a worst-case scenario. Denton recommended that a 20-mile evacuation plan should be ready.¹¹⁶ Denton acknowledged that Metropolitan Edison was "thin on technical proficiency" and sought more experts to solve the bubble dilemma.¹¹⁷

23:00: Bob Adamcik from the FDAA arrived in Harrisburg. His primary responsibility was to organize the federal emergency management response to support an emergency evacuation if it was necessary. Adamcik described his assignment as sensitive, and he realized that an unnecessary evacuation would threaten the public's health and safety.¹¹⁸

On Friday, Herman Dieckamp, the president of General Public Utilities (the parent company of Metropolitan Edison), organized a team of experts from all over the country to assist in managing the situation. Members of the Industry Advisory Group began arriving in Harrisburg the next day.¹¹⁹

Thornburgh received a letter on Friday from the chair of the Public Utility Commission (PUC), Wilson Goode. The PUC has legal responsibility for regulating the safety aspects of power-generating stations. The letter from Goode requested that the PUC be notified of future briefings and press conferences regarding TMI.¹²⁰

Saturday, March 31, 1979

02:00: Hendrie called the plant and spoke to Victor Stello, the director of the Office of Operating Reactors at the NRC. Hendrie was still very concerned about the oxygen buildup in the reactor and what was happening with the bubble. Hendrie asked Stello to enlist the help of some of the other experts who were on site to investigate the situation.¹²¹ Hendrie expressed this same concern to Denton later in the morning.¹²²

09:35: Denton briefed Thornburgh and Scranton on the status of the plant. He confirmed that the fuel was damaged and also explained precautions taken to avoid the potential explosion of the bubble. Denton stated that the reactor was in a stable condition, but that it would take several days to bring the plant to a cold shutdown.¹²³

11:00: Metropolitan Edison held its final press conference. Herbein declared, "I personally think the crisis is over." Creitz announced that the press conference was the last to be held by the company. The White House wanted all further information regarding the situation to be released by the NRC.¹²⁴

¹¹¹ Ibid.

¹¹² *Report of the President's Commission on the Accident at Three Mile Island*, 145.

¹¹³ Ibid.

¹¹⁴ Martin, 167.

¹¹⁵ Champion, Hale. Testimony to President's Commission on the Accident at Three Mile Island. April 26, 1979.

¹¹⁶ *Report of the President's Commission on the Accident at Three Mile Island*, 144.

¹¹⁷ Governor's Office. Chronology of the T.M.I. Incident: March 28, 1979–April 1, 1979, 16, 17 & 18.

¹¹⁸ Federal Disaster Assistance Administration. *Disaster Information: A Report by the U.S. Department of Housing and Urban Development*. Washington, D.C.: U.S. Government Printing Office, June, 1979.

¹¹⁹ *Report of the President's Commission on the Accident at Three Mile Island*, 143.

¹²⁰ Goode, Wilson. Letter to Governor Richard Thornburgh, March 30, 1979.

¹²¹ Martin, 168.

¹²² *Report of the President's Commission on the Accident at Three Mile Island*, 146.

¹²³ Scranton, William. Personal notes regarding telephone call with Harold Denton at TMI.

¹²⁴ Martin, 166.

12:00: Denton held a press conference and asserted that, unlike Herbein, he believed the crisis would not be over until the reactor was in a state of cold shutdown.¹²⁵

12:00: Watson received a memo from Califano urging that unless the NRC was certain the plant could be brought to a cold shutdown, the president should be recommending evacuation to the state officials in Pennsylvania. The memo also stressed Califano's opinion that the NRC should be consulting with the HEW and the EPA regarding health issues. Watson conferred with Denton and White House representatives after receiving the memo, and they concurred that Califano's evacuation caution/recommendation did not need attention at the time.¹²⁶

15:27: Roger Mattson, the director of the systems safety in the Office of Nuclear Reactor Regulation at the NRC met with the NRC commissioners and assured them that there were still a few days left before the bubble would become potentially explosive. Not long after that meeting, Mattson was notified by the consultants working with him on the situation that their calculations now indicated the bubble was "on the threshold of the flammability limit."¹²⁷

23:00: Denton and Thornburgh held another press conference. Thornburgh announced that President Carter would be visiting the site the next day. Denton reassured the press that the bubble was much less threatening than they once believed; there was no possibility of an explosion. He also admitted that communication had been difficult and that contradictory information had been released. He noted the need for better communication between NRC representatives in Pennsylvania and Bethesda.¹²⁸

23:00: Pennsylvania Senator George Gekas called Thornburgh and Scranton to complain about the lack of information communicated to people at the local level.¹²⁹ Molloy later recalled the situation and said, "I don't remember who he talked to, but ... we were unsatisfied with the type of information that we were getting and that we were very seriously considering an evacuation ourselves the next morning unless the problems were straightened out to our satisfaction."¹³⁰

¹²⁵ Nuclear Regulatory Commission. Press Release: Office of Public Affairs, Washington, D.C. March 31, 1979, 12 p.m.

¹²⁶ Martin, 181.

¹²⁷ *Report of the President's Commission on the Accident at Three Mile Island*, 149.

¹²⁸ Governor's Office. Press Conference Transcript. March 31, 1979, 10 p.m.

¹²⁹ Molloy, Kevin. Testimony to President's Commission on Three Mile Island. August 2, 1979, 15.

¹³⁰ Ibid.

DISCUSSION: COMMUNICATIONS INFRASTRUCTURE FOR EXTREME EVENTS

Reviewing the events of these critical days in 1979, please return to the questions originally posed on page 5.

1. Who are the major actors that have responsibility for coordinating response for the community in an extreme event?
2. What is the "core information" that needs to be communicated to each actor in order to create an informed basis for action?
3. What are the primary technical means of communication available to each actor?
4. What are the existing gaps or obstacles in the communications network?
5. What are the primary means available to overcome these obstacles and enable the participants to coordinate their actions more effectively?

The chronology of events in the Three Mile Island accident demonstrates that different individuals and different organizations need different types of information, simultaneously, in order to create an informed basis for coordinated action in dynamic disaster environments. Further, a communications infrastructure that can function effectively in extreme events is most effective if it is designed before the event occurs. In your assessment of this case, please design a communications infrastructure that will support collective learning and coordinated action in extreme events.

ACKNOWLEDGMENTS

We acknowledge, with thanks and appreciation, the expert guidance to the materials in the Thornburgh Archives by Nancy Watson; the willing assistance provided by Holly Mengel; and the professional review of the footnotes, references, and sources by Thomas W. Haase.

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The University of Pittsburgh is an affirmative action, equal opportunity institution. Published in cooperation with the Department of University Marketing Communications. UMC4587-0404



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