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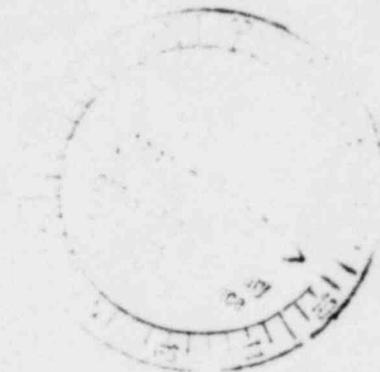
UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of
METROPOLITAN EDISON COMPANY
(Three Mile Island Nuclear
Station, Unit No. 1)

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Docket No. 50-289 SP
(Restart)



LICENSEE'S TESTIMONY OF
ROBERT W. KEATEN AND ROBERT L. LONG
REGARDING CLI-80-5, ISSUE (10)
(MANAGEMENT RESPONSE TO TMI-2 ACCIDENT)

OUTLINE

The purpose of this testimony is to provide, in response to Issue (10) of Commission Order CLI-80-5, a description of management's response to the TMI-2 accident. The witnesses, Dr. Robert Long and Robert Keaten, headed up efforts by Licensee to determine and evaluate the accident's scenario, including the response by Licensee's management. The testimony describes the initial notification process and actions taken by individuals at the site and throughout the GPU System during the first day and then during the initial days and weeks after the accident. The principal individuals involved, the organizational framework which was developed and implemented, and the procurement efforts which were undertaken are described. In the opinion of these witnesses, management's response to the unique and extraordinary demands which resulted from this unprecedented accident demonstrate management's total commitment to the public's health and welfare and display initiative and professionalism. Following the TMI-2 accident, management made, under trying conditions, prompt determinations which proved to be the forerunners of many additional post-accident organizational planning requirements now being imposed on other NRC licensees.

This testimony, by Robert Keaten, Manager of Systems Engineering, GPU Nuclear Corporation, and Dr. Robert Long, Director, Training and Education, GPU Nuclear Corporation, addresses the following issue posed by the Commission in CMI-80-5:

ISSUE (10)

Whether the actions of Metropolitan Edison's corporate or plant management (or any part or individual member thereof) in connection with the accident at Unit 2 reveal deficiencies in the corporate or plant management that must be corrected before Unit 1 can be operated safely.

Mr. Keaten was involved in several different aspects of the GPU response to the accident. Initially on March 28 he was a member of the technical group who worked with Mr. Arnold in advising the plant staff to repressurize the reactor cooling system and start a cooling pump. Starting on Friday, March 30, he organized the GPU Technical Staff in Parsippany to provide around the clock technical support to the site. He then became the GPU liason with the industry advisory group. About one week after the accident, he became Deputy Director of the Technical Support Group. After the transition to natural circulation cooling, Mr. Keaten returned to Parsippany to head up the GPU investigation into the accident.

Dr. Long was also involved in various aspects of the GPU response. On March 29 he arrived at the TMI site as a member of the GPUSC recovery team. After assisting with the organization of the onsite support team, he was assigned as manager of

the data reduction and management group on April 5. With this group organized and functioning, Dr. Long became head of the GPU Accident Assessment Documentation Team. He continued to play an active management role in various support group responsibilities until returning to Parsippany in mid-May. He then served as a member of the GPU Accident Investigation Team.

SUMMARY OF ONSITE MANAGEMENT RESPONSE (FIRST DAY)

The first management notification of TMI-2's unplanned shutdown on March 28, 1979 was initiated by the Unit 2 Shift Supervisor, Mr. William Zewe, shortly after the turbine and reactor trips at 4:00 a.m. At the request of Mr. Zewe, the Unit 1 Shift Foreman called the Station Manager, Mr. Gary Miller, and the Unit 1 Operations Supervisor, Mr. Michael Ross, in accordance with standard practices following an unplanned shutdown. Nuclear engineers, coming to Unit 2 from the Unit 1 refueling startup crew, called the Unit 2 Superintendent, Mr. Joseph Logan and the Unit 2 Superintendent - Technical Support, Mr. George Kunder. These senior managers were informed of the Unit 2 turbine and reactor trips as a matter of normal site policy and not as a result of any suspicion that this trip was unusual. The Unit 2 Operations Supervisor, Mr. James Floyd, was not called since he was in Lynchburg, Virginia attending B&W simulator training.

The Unit 2 Superintendent - Technical Support, who was the assigned oncall "duty section head" at that time, was the first

individual from management beyond the duty section personnel to arrive on site. Shortly after his arrival just before 5:00 a.m., Mr. Kunder directed additional technical and operations personnel be called in. Those called included the Unit 2 Operations Engineer, Mr. Walter Marshall, the Station Chemistry/Health Physics Supervisor, Mr. Richard Dubiel, the Maintenance Superintendent, Mr. Daniel Shovlin, and at least ten others.

Having received no additional information since the initial post-trip notification, the Station Manager called Unit 2 shortly after 5:00 a.m. to ascertain the status of the plant. Mr. Miller was informed by his management representative of the current plant conditions and the fact that an automatic actuation of HPI had occurred. Disturbed by the coincidence of low RCS pressure and high pressurizer level, Mr. Miller decided to initiate a conference call with selected technical people. First, however, he called the Unit 1 Superintendent, Mr. James Seelinger, informing him of the peculiar trip conditions at Unit 2 and requesting that Unit 1 cooperate by giving Unit 2 heating steam. Mr. Miller also called the Maintenance Superintendent, Mr. Shovlin, requesting that he report to the plant.

The Unit 2 Superintendent, Mr. Logan, arrived onsite before 6:00 a.m. and proceeded to the Unit 2 control room, where he was briefed by the Shift Supervisor and the

Superintendent - Technical Support. At the request of the Unit 2 Shift Supervisor, the Unit 1 Operations Supervisor, who had been in Unit 1 since about 5:30 a.m. to assist in its startup, reported to the Unit 2 control room to assist as needed. Also onsite by this time was the Station Chemistry/Health Physics Supervisor.

With the Unit 2 Superintendent and the Unit 1 Operations Supervisor following operations, the Superintendent - Technical Support retired to the Unit 2 Shift Supervisor's office to participate in the conference call established by the Station Manager. The conference call, which was initiated at about 6:00 a.m., additionally included the B&W Site Operation Manager, Mr. Leland Rogers, and the Vice President - Generation of Metropolitan Edison, Mr. John Herbein. Mr. Herbein, the first corporate management individual to be notified, was in Philadelphia on temporary Naval Reserve duty. As a result of the conference call, Mr. Rogers and Mr. Miller reported to the site.

Approximately 30 minutes after the conference call, radiation monitors throughout the plant indicated alarm status and a Site Emergency was declared by the Unit 2 Shift Supervisor. The Unit 1 Superintendent, Mr. James Seelinger, who had just arrived on site, heard the announcement of the Site Emergency, proceeded to the Unit 1 control room, and declared himself the Emergency Director of that unit after

being briefed on the situation by shift personnel. The Station Manager arrived onsite several minutes later and proceeded to the Unit 2 control room, where he was briefed by Mr. Zewe and his managers. Mr. Miller then declared he was the Emergency Director at Unit 2 and established an emergency command team.

Under Mr. Miller's direction, the Unit 1 Operations Supervisor was put in charge of operations, the Station Chemistry/Health Physics Supervisor was put in charge of onsite and offsite radiation and environmental concerns, and the Unit 1 Superintendent was put in overall charge of Unit 1 and the Emergency Control Station, then being established in Unit 1. In addition, the Unit 2 Superintendent was put in charge of reviewing and verifying personnel compliance with procedures and plans, the Maintenance Superintendent was put in charge of emergency maintenance, the Superintendent - Technical Support was put in charge of notifications, communications and technical support, and the B&W Site Manager, who had also arrived onsite, was requested to provide technical assistance and communications with B&W. Mr. Miller further declared these personnel were to be the funnels through which information relevant to areas under their charge would be directed to or from him.

By about 7:30 a.m., conditions had deteriorated to the point where the Station Manager declared a General Emergency. Mr. Miller called and directed the Unit 1 Superintendent to

join him in Unit 2. He then caucused his emergency command team -- comprised of the individuals responsible for the areas outlined above -- in the Shift Supervisor's office. The emergency command team met frequently during the following hours. Plant status was reviewed, opinions expressed, courses of action considered, decisions made and orders issued. In subsequent meetings the team discussed the results of actions taken and/or communications with offsite individuals or groups.

Meanwhile, offsite, it was decided that Mr. Herbein should report to the site. While still in Philadelphia, however, Mr. Herbein continued to check on plant conditions. He called the site at approximately 9:00 a.m. and learned the current status of the plant from those in the Control Room. Mr. Herbein again called at approximately 10:00 a.m. to obtain an update on plant status from the Station Manager. About an hour and a half later, Mr. Herbein arrived at the Observation Center, which is immediately adjacent to Three Mile Island, but offsite, and called the Station Manager again for an update on the current plant status. Mr. Herbein elected not to proceed to the Unit 2 Control Room and insert himself in the command chain, since in his opinion competent people were in charge there, performing tasks for which they were trained. Rather, he made himself immediately accessible to personnel onsite, setting up a command post at the adjacent Observation Center. As the afternoon progressed, Mr. Herbein worked to improve communications with offsite and onsite groups. In response to a request

from the Commonwealth for a briefing on plant conditions, the Station Manager was directed by Mr. Herbein to prepare to accompany him to the Lieutenant Governor's office. Mr. Miller directed the Superintendent-Technical Support to gather the necessary information and prepare as well for the briefing. Mr. Herbein, Mr. Miller and Mr. Kunder left the site at about 2:00 p.m. and proceeded to the Lieutenant Governor's office. Prior to leaving, Mr. Miller satisfied himself that conditions were stable; ordered the Unit 1 Operations Supervisor to maintain the status quo; appointed the Unit 2 Superintendent as the acting Emergency Director; and alerted the Unit 1 Superintendent where he was going and how to reach him. Mr. Miller carried a beeper and had Mr. Kunder reestablish phone communication once they had reached the Lieutenant Governor's Office.

During Mr. Miller's absence and at the request of the Unit 1 Operations Supervisor, the Unit 1 Superintendent returned to the Unit 2 control room from Unit 1, where he had been since about 10:00 that morning. Mr. Seelinger assisted Mr. Logan, the Unit 2 Superintendent, in maintaining communications and joined the emergency command team that continued periodically to caucus during the Station Manager's absence.

Mr. Herbein, Mr. Miller and Mr. Kunder returned at 4:30 p.m. from their trip to the Lieutenant Governor's office and were briefed on current plant status and trends. Mr. Herbein

communicated this information to Robert Arnold, GPU Service Corporation's Vice President, Generation and between them, it was determined the plant should be repressurized. Although the emergency command team initially recommended continuation of their current policy of attempting to establish natural circulation, it was subsequently decided to repressurize with everyone, including B&W, concurring in this course of action.

By 8:00 that night reactor coolant pressure had stabilized; hot and cold leg temperatures converged and stabilized; and steam generators' pressures had stabilized. Stable plant conditions, as earlier defined by the emergency command team, had been reached.

SUMMARY OF OFFSITE MANAGEMENT RESPONSE (FIRST DAY)

Contact from the site to offsite management included discussions with Mr. Herbein (initially in Philadelphia), with Met Ed's corporate headquarters in Reading, Pennsylvania and with GPU Service Company's offices in New Jersey. In accordance with Emergency Plan notification procedures, Mr. Lawrence Lawyer, the Metropolitan Edison Manager of Generation Operations, was called in Reading at about 7:00 a.m. The call was taken by Mr. Richard Klingaman, the Metropolitan Edison Manager of Generation Engineering, because Mr. Lawyer was out of town. Mr. Klingaman was informed that a Site Emergency had been declared for TMI-2. A second call at approximately 7:30

a.m. informed Mr. Klingaman that a General Emergency had been declared. The President of Metropolitan Edison; Mr. Walter Creitz, was apprised of the situation at approximately 8:00 a.m. and thereafter updated based on contacts with the site.

The involvement of the Metropolitan Edison engineering corporate staff throughout the first day was generally of a standby nature. Mr. Klingaman, the Manager of Generation Engineering, periodically was advised of Unit 2's status by personnel at the site. During the late afternoon and evening of March 28, the Met Ed corporate staff assisted communications service personnel in answering calls from the public and the press.

The General Public Utility Service Corporation (GPUSC) in New Jersey was contacted by Metropolitan Edison's Manager, Operational Quality Assurance, Mr. George Troffer, at approximately 8:00 in the morning. Contact was made by phone to Robert Arnold, the Vice President - Generation, GPU Service Corporation. Mr. Arnold was informed that a Site Emergency existed at TMI-2 and that TMI-2 had undergone a turbine and reactor trip, the steam generator appeared to have a primary to secondary leak, and there were increased radiation levels in the reactor building. Throughout that first day Service Corporation staff personnel received general information about the status of the plant, including: turbine trip/reactor trip, instrument air problem, condensate pump trip, RCP trip, OTSG possible leak.

By late morning, GPU Service Corporation management decided to dispatch five of their technical staff to the site to provide assistance related to the information they had available. The GPU Service Corporation engineering personnel arrived at the Observation Center that afternoon. They were given a briefing by Mr. Kunder, the Superintendent - Technical Support, at approximately 6:00 that evening.

The GPU Service Corporation management personnel who remained at their headquarters continued throughout the day to receive information on plant status from the site. They were not called upon to provide technical input and provided none, with one important exception. They were involved in the recommendation late in the afternoon to increase reactor coolant makeup flow, repressurize the plant and restart a reactor coolant pump. The decision to recommend this action was transmitted from Mr. Arnold at the Service Company, based on input from his technical staff, to Mr. Herbein at the Observation Center. It was the implementation of this decision by the plant staff which led to sustained and stable cooling conditions at 8:00 in the evening on March 28.

COMMENT ON MANAGEMENT'S RESPONSE DURING FIRST DAY

At the time of the plant trip, the Shift Supervisor was in immediate charge of the unit and represented management. His responsibilities were to oversee the operators' actions and to

notify his superiors, both of which he did. Not only did he alert the TMI Station Manager and Operations Supervisor, he had the duty section head, who was Superintendent-Technical Support, called to the unit to assist in post-trip actions. As plant conditions suggested a more severe transient had occurred than initially appreciated, management responded. Additional members of plant management were summoned to the site to assist the shift personnel. Additionally, the Station Manager alerted a corporate official and discussed with him and personnel at the site, including the reactor vendor's representative, the plant's status. The Station Manager, himself, decided to proceed to the site along with additional supervising personnel.

With the arrival at the site of various members of plant management and with the declaration of emergency conditions dictated by plant status, management reacted accordingly. The emergency plan and procedures were implemented and the Station Manager organized his supervisors to oversee the various aspects of plant personnel response. He set up an emergency command team of supervisors covering each of the response areas to advise and consult with him. Under this organization, lines of authority and areas of responsibility were established and communications links which included contact with offsite technical support, were set up. Meetings of the emergency command team were held away from control room activities to

allow more considered thought relative to plant status, long term goals, potential actions and their consequences. These meetings allowed a sharing of knowledge, but clearly none of the participants doubted that Mr. Miller, the Station Manager and Emergency Director, was in charge and that ultimately, it would be his decision they would carry out.

In addition to plant supervisory and management response, Met Ed's cognizant corporate officer proceeded immediately to the site to provide support and liason with offsite authorities. Rather than interjecting himself into the control room decisionmaking chain, however, he positioned himself at a location adjacent to the site where he could maintain contact and was available for immediate consultation. Plant management, too, had developed communications links with offsite technical groups at B&W and GPUSC through which assistance on technical decisions could be received. In fact, as a result of the link with GPUSC and the discussions with plant staff through Mr. Herbein, actions were taken which achieved a stable cooling configuration on March 29.

The response, then, by supervisory personnel on duty at the unit at the time of the trip was to notify promptly members of plant management. Plant management responded by contacting offsite corporate level management and by proceeding directly to the site to assist on-duty personnel. Once at the site, and in the face of emergency declarations, management organized a

command team to enhance decision-making and communications. Additionally, technical links with offsite groups were established and corporate management responded by making an office immediately available at the site locale to support the plant staff. Although in retrospect, callout of plant supervisory and management personnel would today be far more expeditious and links with outside technical resources more disciplined and effective, the instincts which management demonstrated were appropriate and provided the premise for many institutionalized requirements placed on licensees today.

MANAGEMENT ORGANIZATION AND RESPONSE IN THE DAYS
AND WEEKS IMMEDIATELY FOLLOWING THE ACCIDENT

On the morning of March 29, a 12 hours on, 12 hours off rotating shift coverage system was put into effect by the plant staff. Mr. Miller, the Station Manager, alternated shifts with Mr. Seelinger, the Unit 1 Superintendent. These individuals functioned as 'Site Supervisors' with responsibility for operation of the plant and Emergency Control Station activities. Mr. Miller and Mr. Seelinger reported to Mr. Herbein, who remained at the Observation Center. Reporting to the 'Site Supervisors' were Mr. Joseph Logan, the Unit 2 Superintendent, and Mr. Ronald Toole, Unit Superintendent, Homer City Units One and Two (Mr. Toole was the former TMI Unit 2 Test Superintendent), who alternated as Shift Superintendents. Under the Shift Superintendents were the Shift

Operations Supervisors who had the responsibility of directing the on-duty Shift Supervisor and his crew. Mr. Michael Ross, the Unit 1 Operations Supervisor and Mr. James Floyd, the Unit 2 Operations Supervisor, alternated shifts in this position. Mr. Potts and Mr. Tsaggaris rotated as Emergency Control Station Coordinators with responsibility for directing the efforts in the Emergency Control Station. This 12-on, 12-off shift arrangement provided three senior management people in the Unit 2 Control Room and one senior management person in the Unit 1 Control Room ECS, and was in effect from March 29 until early May.

The initial response contingent of GPU technical people arriving at the site consisted of GPUSC engineers and consultants. Two consulting engineers arrived at 10 a.m. on March 28 followed by GPU Service Corporation personnel in the afternoon. Together these engineers began various efforts to understand the transient, evaluate critical plant components and contingencies, and determine what needed to be done to support the plant operations staff. Continuous communication between TMI and GPUSC engineering offices in Mt. Lakes, New Jersey, were established. On March 29, an additional eight engineers were dispatched to the site from GPUSC. On March 30, regular shift work by GPUSC support personnel commenced in a technical support center established on site under the direction of Richard F. Wilson, GPUSC Director Technical Functions. Shift

work on a 24-hour basis also commenced at GPUSC in both the executive and engineering offices at Parsippany and Mt. Lakes, New Jersey.

Meanwhile, Babcock & Wilcox on March 29 established an operations center at Lynchburg and commenced 24-hour shift work, involving approximately 200 personnel in a spectrum of technical tasks. Burns & Roe, the architect engineer familiar with the plant, also staffed to provide additional engineering support. Four engineers arrived in Mt. Lakes from Westinghouse, too, to provide technical support and analysis.

Despite the GPU System's mobilization of its engineering resources and the support immediately available from B&W and Burns & Roe, the need for even more technical capability was realized. As a result, on March 30, the President of GPU, Mr. Herman Dieckamp, established telephone contacts with recognized technical authorities in major nuclear plant engineering disciplines across the country. Through these telephone contacts, GPU attempted to muster the best mindpower to analyze the then existent plant conditions and chart a course toward a more stable configuration.

During the weekend of April 1, other engineers and consultants from GPUSC and personnel from industry, national laboratories and universities continued to arrive at the site and the Observation Center support facilities (Trailer City). As the number of personnel at the site increased, a more

structured management was required; therefore, on April 4 and 5, a formal recovery organization was established by GPU management with various technical groups assigned specific responsibilities (Figure 1). Arriving personnel from utilities, architect engineers, NSSS vendors, and equipment manufacturers, as well as GPUSC personnel, were assembled into this organization and placed on a 24-hour shift rotation. Office and communication facilities had been set up for these groups at the Observation Center and on site in trailers. By the 17th of April, a total of 1,964 people, representing some 150 companies, had been checked in for support work at the TMI Observation Center and at the site.

The senior engineering personnel from GPUSC, Met-Ed, JCP&L and Pickard, Lowe, & Garrick, Inc. reporting to the site on March 28th and 29th to assess the situation, determined the need for the around the clock two-shift technical support. Initially all resources were used to solve the immediate technical problems. Over the following few days the workload was assigned to subgroups with responsibilities to write procedures, investigate system problems, interface with operations, interface with outside organizations and plan future activities and responses.

During the first week the capabilities of the General Public Utilities System were applied as the only ones available on such short notice. The technical expertise immediately

assigned was considerable, and many of the initial team members assumed responsible positions in the long term technical support group (see Figure 1) that handled the major organizational and technical problems until the plant was stabilized on natural circulation in late April. Most, if not all of the technical problems that would need to be solved within the next thirty days were identified and assessed as to their significance and their priority for solution. The need for extensive communication interfaces was determined and action was taken immediately to establish these interfaces. The need for contingency plans was realized and generalized plans were created that later became the framework for extensive contingency planning and emergency procedures development.

The TMI-2 Recovery Organization shown in Figure 1 contained five important elements. The Plant Modification Group designed, engineered, procured, and installed modifications identified by the other groups. The Waste Management Group was responsible for the control and processing of those radioactive wastes isolated in tanks and for the monitoring and reduction of those being continuously or intermittently released to the atmosphere. The Met Ed Plant Operations Group consisted of the TMI-2 operating staff, significantly augmented by TMI-1 staff and other personnel, and they were responsible for continued operations, maintenance, health physics and security. The GPU Technical Support Group continued the functions initiated in

the first few days following the reactor trip. Expanded responsibilities included licensing, formal modification design criteria specification, technical planning, and data reduction and management. The Technical Working Group was a management control team consisting of representatives from each organizational unit, B&W and the NRC, and was headed by the GPU Operations Manager. This group met twice daily for briefings on current status and planned actions. All inputs necessary to permit decisions by the GPU Operations Manager were made available and reviewed, and the decisions on approved evolutions were made at these meetings. In this way all input necessary, as well as all requirements for action or support or cooperation, were identified for all participants. A continued task assignment and scheduling activity supported this Working Group.

This Recovery Organization, conceived out of necessity, was effective because sufficient thought was given to provide a logical problem solving framework and simply defined functions. Under the leadership of GPU personnel, it focused available resources on the problems of contingency planning, procedure development, training, documentation, equipment procurement, system design, accident assessment, radioactivity containment, radioactivity discharge monitoring, and all of the logistics associated with the site personnel buildup.

Another element of the recovery forces acting as an independent "think tank" on the range of technical problems

which the accident posed, assembled at the Air National Guard Headquarters (Building 26) in Middletown, some three miles from the site, on the weekend following the accident. This group was composed of senior experienced scientists, engineers, and technicians from all disciplines of the nuclear industry and was one of the early products of the GPU telephone contacts with the nuclear industry requesting technical support in the form of senior experienced scientists and technicians. By late Saturday afternoon, March 31, about 30 people from 10 organizations arrived at the site to form the nucleus of this group which came to be known as the Industry Advisory Group (IAG). In some cases, these individuals were representative of an entire company's commitment since task forces were established at the company's home office to which the individuals at TMI had immediate access. Thus, for example, each of the three remaining NSSS vendors, Combustion Engineering, General Electric and Westinghouse, had established task forces which generally utilized a senior manager as a contact, with the full resources of each corporation available to GPU for consulting, analysis or computer simulation as needed.

The IAG charter, developed by GPU's management, was to:

Function as a "think tank" in parallel with all ongoing activities. It is not part of the implementation structure, although people may go back and forth between the two.

- A. During Technical Working Group meetings, tasks for the IAG will arise two ways:

1. The IAG will be requested to review something scheduled or under consideration. This review will generally be an assessment based on experience and judgment as opposed to detailed engineering review or to new calculations.
 2. The IAG will decide to look into some particular aspects of planned or considered tasks.
- B. The IAG on its own initiative may look into potential problems of any kind.
- C. An attempt will be made to maintain a current awareness of the perceived status of the core.

At the time of the IAG charter, EPRI was asked to coordinate and lead the efforts of this group. Of the approximately 110 eventual participants, 29% were from research and educational institutions, 12% from utility companies, 7% from governmental bodies, and the balance from private industry. Although many members of the IAG were from competitive companies, the group assembled and attacked common goals, lending their vast background and years of nuclear experience to provide expertise to solve the problems at hand.

The IAG coordinator was a member of the Technical Working Group. He would attend the daily status meetings, and report back to the IAG on the plant situation and outline particular areas of concern to be studied. Tasks would be assigned to the appropriate subgroup for resolution and comment. If tasks arose that required talent not already assembled, the nuclear

industry through the IAG coordinator would provide the needed expertise. After they finished their evaluation of a particular task, each subgroup would input their conclusions to the Technical Working Group through the IAG coordinator.

The achievement of cooling by natural circulation removed much of the urgency that necessitated the establishment of this special "think tank". Its work complete, the IAG was disbanded on May 7 after 5 weeks of operation, allowing many of its members to return home to continue working on projects related to the TMI Recovery Operation.

Another facet of management's response involved the unprecedented and immediate resource procurement problems that the accident posed. On March 28, 1979, in order to fill urgent requests from the site for materials, the Met Ed Purchasing staff reverted to its Emergency Procedure Mode (used in outages or weather related emergencies). On March 29 a Met Ed Materials Management Task Force was established. This task force incorporated the existing personnel at the Middletown (Crawford) warehouse, added the TMI Contract Administrator, and established a Reading support team consisting of buyers, contracts personnel and transportation personnel, as well as the TMI Contract staff. In addition, an interface with GPUSC's procurement organization was established. The task force arranged for the availability of water removal capability and tanks, boration equipment, facilities for support personnel to

be located at the Observation Center, as well as a decontamination unit from Salem Nuclear Plant.

By March 30, Project Procurement activities were mobilized at GPUSC and Burns & Roe offices in New Jersey. The thrust of the GPU/B&R effort was to assist Met Ed in procurement of tanks, tank trailers, carbon absorption units, charcoal and miscellaneous pipe and hardware. Similar procurement activities continued during Saturday, March 31 by the Task Forces at Crawford and Reading and the procurement agencies at GPUSC and Burns & Roe.

At 5:45 a.m. on April 1, 1979, the TMI Recovery Logistics Group, consisting of four GPU buyers from New Jersey and one Burns & Roe buyer, arrived on-site to coordinate the procurement, delivery and warehousing of the truck loads of equipment that were constantly arriving on the site. Procurement by GPU personnel in New Jersey ceased on March 31, 1979. Burns & Roe personnel continued in Paramus until moved to the site on April 6, 1979.

Initially, the Logistics Group consisted of GPUSC, Met Ed and Burns & Roe personnel. Located in the garage at Crawford station in Middletown, it worked 24 hours a day in rotation with the Met Ed warehouse organization. All procured items including recovery equipment or materials, and items required at Trailer City or the regular TMI/Met Ed departments were ordered by the combined procurement team of Met Ed Purchasing

and the TMI Recovery Logistic Group. General responsibility for procurement remained with Met Ed and Met Ed Purchasing requisitions and procedures were utilized.

During the week of April 1, 1979, two Met Ed buyers from Reading arrived to supplement the Met Ed warehouse organization. Burns & Roe purchasing personnel were dispatched to Crawford Station on April 1 and 2, 1979, to coordinate receipt of Burns & Roe specified material and to otherwise assist in activities at the site.

On April 5, the Manager of Purchasing and Material Systems Management (Met Ed) met with the GPU Logistics Support Manager, Jim Kunkel to discuss the procurement plans and involvement of GPUSC in the Recovery Effort at TMI Unit 2. Both parties agreed that GPUSC's role was to provide all assistance in the Recovery Effort under orders from GPU management. Met Ed's role would be that of supporting Trailer City needs, Unit #1's requirements and all of the materials to be used in the health physics area. Thereafter, GPUSC used the Unit #2 warehouse for their material and engaged Burns & Roe buyers for the procurement effort. Burns & Roe procurement was requested to relocate their activities from Paramus to the site. A day later, April 6, 1979, a staff of approximately twenty-four buyers, expeditors, contract administrators and secretaries was in-place working on site. This organization, as it appears in Figure 2, served as the procurement and logistics group

supporting TMI-2's needs for the weeks and months of intense recovery efforts that followed.

During the first 30 days of the recovery effort, the combined procurement organization processed over 1,000 purchase orders. These orders included such items as charcoal and filter assemblies; valves, couplings, pumps, tubing, and other hardware; large sheet metal work; a hydrogen recombiner; lead bricks, and other shielding material; radiation detectors and personnel dosimeters; and office trailers and equipment for housing and support of recovery team personnel.

Some examples of extraordinary expedition of certain goods or materials will underscore the effectiveness of the procurement effort. First, consider the shipment of a diesel generator from Morrison Knudsen in Rocky Mount, North Carolina. The four railroads involved were contacted and their superintendents asked to flag the car as an emergency shipment. As a result, a normal ten day movement was compressed into a two day move. Second, with the cooperation of the Pennsylvania State Police over-width and over-weight tank shipments were made without any difficulty. Third, when initially contacted, Dresser Industries indicated that delivery on Heise Compound Gauges was 16 weeks. After explaining the urgency of the situation, the people at Dresser agreed to see what could be done. Four hours later, they called to say they would ship in two days. The next day a call came through that the gauges were completed.

COMMENTS ON MANAGEMENT'S RESPONSE IN THE DAYS AND WEEKS
IMMEDIATELY FOLLOWING THE ACCIDENT

Within a day of the accident's initiation and with ever increasing comprehension of its complexity, Met Ed established twelve-hour shifts for its plant personnel and bolstered the plant complement, instituting a shift arrangement that provided three senior management people in the Unit 2 Control Room and one senior management person in the Unit 1 Control Room ECS 24 hours a day. Additionally, more GPU technical personnel and consultants were called to the site and continuous 24-hour shifts of technical personnel were set up at GPU's offices in New Jersey from which technical advice and information could be obtained by engineers at the site over a continuous open communications line. Similarly, the architect engineer's offices in New Jersey and the nuclear steam supplier's offices in Lynchburg established 24-hour shifts to provide technical support.

One day later, GPU's Director of Technical Functions, Mr. Richard Wilson, had established at the site a technical support center not unlike the Technical Support Center which all licensees are now required to have available for post-accident response.

Even with GPU's significant augmentation of personnel at the site and establishment of communications with technical teams located at the engineering headquarters of GPU in New

Jersey, Burns & Roe in New Jersey and B&W in Virginia, GPU's President, Mr. Dieckamp, realized that this accident posed unprecedented problems and required a similarly novel response. He therefore called on industry resources throughout the country to respond in addition to utilizing GPU's talent at the site. This request was answered immediately. Within days, tens, hundreds, and eventually thousands of individuals representing the best technical talent in virtually every pertinent technical discipline arrived at TMI to assist.

Although the vast majority of persons who came to TMI were integrated directly into the line segments of the TMI Recovery Organization which GPU management developed and implemented to manage the active response effort, one group of experts was set up apart from the line organization. This group, later called the Industry Advisory Group (IAG) was conceived by GPU management and functioned as a "think tank" -- an independent technical advisory panel which was both functionally and physically removed from the recovery organization and acted as a check and balance on line organization approaches and solutions to the myriad of problems which coincidentally needed expeditious resolution. The establishment of this group, which received considerably favorable attention by the various post-accident investigative bodies, was indicative of management's initiative and professional response.

Aside from the personnel demands which the accident precipitated at the site, the equipment and material needs

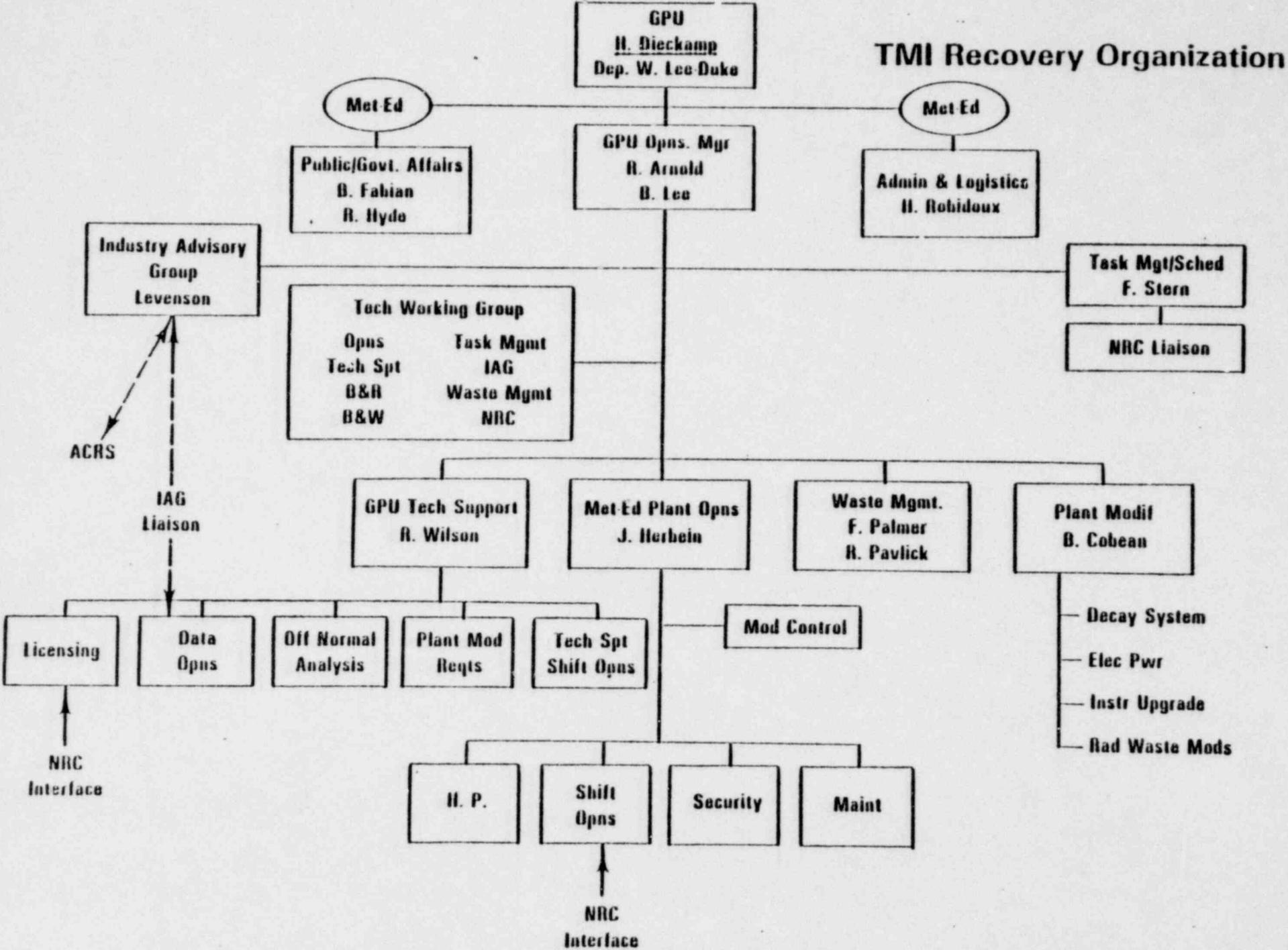
which the accident generated were immense. Like its response on the personnel front, management's reaction to these procurement problems was swift and total. Twenty-four hour logistics support was immediately established through the Company's own personnel. As the demands increased, additional personnel from other GPU organizations and from the architect engineering firm familiar with the plant were added to the logistics support group. An entire organization to meet the demands of procurement and receipt control was conceived and in place in about a week's time. Through this organization's efforts, more than 1,000 purchase orders were processed and large quantities of equipment and material expeditiously delivered to the TMI site in the first thirty days of the recovery effort.

CONCLUSIONS

Based on our review of the events which transpired after the accident which are indicative of management's response, we do not feel that actions taken by Licensee reveal deficiencies that must be corrected before Unit 1 can be operated safely. We are mindful, of course, of the virtual complete reorganization of the GPU nuclear-related organization, of the complete revamping of emergency planning with its far greater attention to preplanned organizational support for accidents, and of the new personnel who have joined the GPU ranks at virtually all

levels of management and technical support. As members of that management prior to and since the accident, we are proud of the initiative displayed and total commitment to safety demonstrated by management in the aftermath of an unprecedented dilemma which posed numerous problems each of which required prompt and correct resolution.

Figure 1



TMI-II RECOVERY
 LOGISTICS GROUP
 EFFECTIVE: 4/9/79 Rev. 2

