

TMI-1

PHYSICAL HISTORY

- TMI-2 was damaged in the March 1979 accident.
- TMI-1, the undamaged reactor, is adjacent to TMI-2 but a completely separate plant with a completely separate staff.
- TMI-1 reactor plant is comparable to seven other B&W-designed plants in the United States which have operated since 1979. The same improvements made in those plants over the last six years have been made to TMI-1.

ORGANIZATION

- TMI-1 is being run by a dramatically new organization, GPU Nuclear Corporation. GPU Nuclear also operates the Oyster Creek Nuclear Plant and directs cleanup operations of TMI-2.
- The GPU Nuclear Board of Directors includes an outside chairman. Three other highly qualified outside directors form a Nuclear Safety and Compliance Committee that has been given the outside staff resources to independently monitor the nuclear operations.
- The president, executive vice president, and six of the other ten officers of GPU Nuclear have joined the GPU System since the accident. None of the remaining four had responsibility for operation of TMI before the accident.
- General Public Utilities Corporation is a holding company. Its subsidiaries include Metropolitan Edison Company, Pennsylvania Electric Company, Jersey Central Power & Light Company, and GPU Nuclear Corporation. Metropolitan Edison Company owns 50% of TMI-1 and TMI-2, and Pennsylvania Electric Company and Jersey Central Power & Light Company own 25% each. Metropolitan Edison Company operated TMI-1 and TMI-2 before the accident.
- There are over 900 people in GPU Nuclear devoted to TMI-1 activities. This compares to about 320 in March 1979.
- The staffing includes major increases in Training, Quality Assurance, and Engineering. All TMI-1 operators have been examined and licensed or relicensed by the NRC since 1981. There are sufficient licensed operators to permit one shift to be in training at all times.
- Training programs and operating procedures have been completely revised reflecting lessons from the accident. Five training programs have been accredited by the Institute of Nuclear Power Operations (INPO) and five others will be submitted next year to complete accreditation in

all training programs eligible for accreditation by INPO.

- The management and staff of GPU Nuclear have been reviewed and endorsed by the NRC's ASLB; and most recently, by Admiral Rickover. Performance of the organization at TMI-1 has been evaluated and found satisfactory by NRC Systematic Assessment of Licensee Performance and by INPO.
- In February, INPO released a favorable evaluation of TMI-1 operations based on a two-week inspection of the plant in October, 1984. "Based on this evaluation," INPO said, "the team found no reason that, when outage work in progress is completed, TMI-1 should not be ready to be operated safely. Within the scope of this evaluation, the team determined that TMI-1 is being maintained shutdown in a safe manner by qualified personnel."

REGULATORY HISTORY

- TMI-1 was ordered to remain shut down by the NRC in the Summer of 1979. This was done without benefit of a prior hearing. Legal justification for this was "extraordinary circumstances".
- In its Orders, the NRC projected completion of its Atomic Safety and Licensing Board hearing and Commission action on restart by August 1980.
- There have been extensive hearings in Harrisburg, Pennsylvania, involving intervenors and input from the public. The hearings explored Management, Emergency Preparedness, Separation of Units 1 and 2, and Design and Procedure issues. By August 1982, the Atomic Safety and Licensing Board (ASLB) had found in favor of restart on all issues. Emergency preparedness plans for TMI-1 and the surrounding counties have been certified by the NRC and Federal Emergency Management Agency.
- There have been no ASLB conclusions adverse to restart. The Atomic Safety and Licensing Appeal Board ordered reopening of the hearings before the ASLB; in May, 1985, the ASLB issued a favorable decision on training; in August, the ASLB ruled that Herman Dieckamp, president of General Public Utilities Corporation, was truthful in a mailgram he sent to a U.S. Congressman in May, 1979. The mailgram dealt with what was known about plant conditions on the first day of the TMI-2 accident. On the third issue, leak-rate testing at TMI-2 prior to the accident, the NRC overruled the Appeals Board and ordered hearings on the issue separate from the TMI-1 restart proceeding.

- A series of "open issues" was identified as potentially bearing on management integrity and competence. As a result, in May 1983, the NRC Staff withdrew its prior support of management integrity and competence pending resolution of these issues.
- In July 1984, the NRC Staff concluded (NUREG 0680, Supplement 5) that, "Based on all the information reviewed by the Staff and balancing the past improper activities of the licensee against its subsequent record of remedial action and performance, as well as the record of current senior management of the licensee, the Staff concludes that there is reasonable assurance that GPU Nuclear can and will conduct its licensed activities in accordance with regulatory requirements and that GPU Nuclear can and will operate TMI-1 without undue risk to the health and safety of the public. The Staff, therefore, revalidates its position on licensee's management integrity."
- With this conclusion, the NRC Staff also concluded that the Nuclear Regulatory Commission itself has an adequate basis to decide on lifting its 1979 Shutdown Orders on TMI-1. The Staff has consistently advised the Commission that it is obligated to lift these Orders once the extraordinary circumstances which caused them to be issued have been resolved.
- In February, 1985, the NRC decided that no further hearings were necessary in the TMI-1 restart proceeding, beyond those that had recently been completed before the TMI-1 Licensing Board. The Commission also imposed two conditions on GPU Nuclear, which the Company has accepted:
 - No preaccident TMI-2 operator, shift supervisor, shift foreman or any other individual both in the operating crew and on shift for training as a licensed operator at TMI-2 prior to the accident shall be employed at TMI-1 in a responsible management or operational position without specific Commission approval.
 - GPU Nuclear should retain its expanded Board of Directors and its Nuclear Safety and Compliance Committee.
- In April, the NRC's Region 1 issued its latest Systematic Assessment of Licensee Performance (SALP) for TMI-1. Of nine categories in which NRC inspection teams rated performance at Unit 1, seven ratings were in the top of three categories, and two were in the second category. "In a majority of the areas related," the SALP report said, "licensee management continued to be aggressive in problem resolution and involvement in promoting nuclear safety and radiation protection"

CONCLUSION

- On May 29, 1985 the NRC voted 4-1 to lift the immediate effectiveness shutdown orders and allow restart subject to two conditions: NRC staff approval of a Company power ascension schedule, with hold points as necessary at appropriate power levels; and a program for increased NRC oversight at TMI-1 during the period of startup and power ascension. The four commissioners voting to allow restart said that the most extensive examination in NRC's history "... has shown that the present GPU Nuclear management is fundamentally sound." They also said "... the current company and management have the necessary competence and integrity to provide reasonable assurance that TMI-1 will be operated consistent with public health and safety and the Commission's requirements."
- Immediately after the NRC vote William G. Kuhns, GPU chairman and chief executive officer said: "Safety is our number one priority. It is a trust we will not violate and we will demonstrate that to the country." Philip R. Clark, GPU Nuclear's president and chief executive officer, said: "The plant and its staff are ready to restart. The process will be a gradual and deliberate procedure, carried on with great care and attention to detail. It is time now to move ahead."
- On June 7, the U.S. Third Circuit Court of Appeals in Philadelphia issued a stay of the NRC restart order pending review by a three judge panel. On August 27, the court, by a 2-1 vote, upheld the NRC's approval of restart. On August 29, however, the same court issued an order continuing the stay on operation pending consideration by the full 12 judge court of motions for a rehearing of the case. On September 19, the full court, in a 10-2 decision, denied the request to rehear the case. The full court lifted the stay on TMI-1 operation effective September 25, unless there is action by the U.S. Supreme Court.
- Restart of TMI-1 will result in savings of \$72 million a year by the GPU ratepayers in Pennsylvania and New Jersey. Now that protection of public health and safety is adequately assured, these ratepayers, including homeowners as well as business and industry, should no longer be denied this substantial saving.

September, 1985

TMI-2

THE ACCIDENT

- The TMI-2 accident of March 28, 1979, occurred because of a combination of equipment malfunctions and inadequate operator response due to inadequate training.
- The accident severely damaged the TMI-2 fuel core and led to releases of radiation from the plant. Post-accident studies, including that of "The President's Commission on the Accident at Three Mile Island" concluded that there will be no significant health effects to the public as a result of the accident.
- Lessons learned from the accident have produced within the GPU System improved operator training, modifications to equipment and a new nuclear management organization, GPU Nuclear Corporation, with a concentrated focus on nuclear activities. These lessons have been valuable to the entire world nuclear power program.

CLEANUP ORGANIZATION

- Cleanup of TMI-2 represents a uniquely demanding engineering challenge. It required creation of a recovery team with both engineering and operational depth, as well as revision of TMI-2 operating procedures that were unsuited to TMI-2 as a damaged, shut-down plant.
- GPU Nuclear Corporation and Bechtel companies, serving as GPU Nuclear's prime contractor in the cleanup, integrated their TMI-2 organizations in 1982 to improve the administration of the cleanup.
- The cleanup organization draws on the expertise of many individuals and organizations, including the TMI-2 Technical Assistance Advisory Group, TMI-2 Safety Advisory Board, TMI-2 General Office Review Board, GPU Nuclear support divisions, Bechtel off-site groups, Babcock & Wilcox, Westinghouse Electric Corporation, Electric Power Research Institute, U.S. Department of Energy (DOE), and DOE's TMI-2 site contractor, EG&G Idaho, Incorporated.
- Organization and staffing for TMI-2 cleanup is completely independent of that for operating TMI-1. The plants are physically separated and the NRC Atomic Safety and Licensing Board (ASLB) specifically evaluated safety of operating TMI-1 while cleaning up of TMI-2. The Subcommittee of the independent TMI-2 Safety Advisory Board (SAB) confirmed that, "It is our belief that, in its present condition, TMI-2 is less of a risk to the safe operation of TMI-1 than if it were a plant

operating at power. We, therefore, believe that the existence of TMI-2 in its present condition is not a valid technical reason for delaying operation of TMI-1."

MAJOR CLEANUP MILESTONES

- August 1979 - First low-level, accident-generated waste shipped to Richland, Washington.
- October 1979 - Cleaning of contaminated water in basement of auxiliary building.
- November 1979 - First television and radiation inspections of inside of reactor building.
- July 1980 - Venting of 43,000 curies of radioactive krypton gas from reactor building accomplished safely.
- July 23, 1980 - First manned entry into reactor building.
- September 23, 1981 - Cleanup of radioactive water from basement of reactor building begins.
- May 21, 1982 - First waste from cleaning of reactor building water shipped from TMI.
- July-August 1982 - First television camera inspection of the damaged reactor fuel inside of reactor vessel.
- Spring 1983 - Program to lower radiation exposure to workers achieves substantial reductions in radiation dose rates in reactor building.
- August 30, 1983 - Last solid waste from the processing of original accident-related water shipped from TMI.
- August-October 1983 - Further explorations inside reactor vessel produce first samples of damaged fuel core, a sonar mapping of the core void, and the clearest video tapes of the damaged core to date.
- February 29, 1984 - TMI-2 polar crane load-tested to qualify it to lift reactor head.
- June 28, 1984 - First manned entry into reactor building without a protective breathing respirator. Respirators still are required for work involving activities, such as the use of tools, that tend to increase levels of airborne contamination.
- July 24-27, 1984 - Head of reactor vessel removed and reactor shield installed to provide first ready access to internal components of reactor in preparation for removal of the damaged fuel.
- December 1984 - Reactor plenum structure successfully jacked.
- February 1985 - First television inspection of bottom of the reactor vessel shows significant amounts of core debris below the normal core

region. Also, Department of Energy scientists report first evidence of temperatures high enough to melt uranium dioxide fuel in the reactor.

- May 1985 - Reactor plenum removed and safely stored underwater in reactor containment building.

CLEANUP FUNDING

- Estimated to cost about \$1 billion. About \$500 million had been spent as of January 1985.
- Cleanup funding developed under a cost-sharing formula proposed in July 1980 by Pennsylvania Governor Dick Thornburgh.
- Major funding sources through 1985 were GPU, customers of GPU in Pennsylvania and New Jersey, Insurance proceeds, U.S. Department of Energy, Commonwealth of Pennsylvania, State of New Jersey, Japanese nuclear power industry, domestic investor-owned nuclear utility industry, and rebates from Babcock & Wilcox in settlement of GPU's lawsuit against B&W.
- Under existing rate orders, an additional \$16 million to \$17 million annually will be made available to the cleanup following a TMI-1 restart.

CLEANUP OUTLOOK

- Cleanup has succeeded in maintaining plant safety while reducing health risks. The Subcommittee of the TMI-2 Safety Advisory Board said that "The members of the Safety Advisory Board are unanimous in their opinion that TMI-2 does not currently pose a significant risk to the public or worker health and safety."
- In a recent letter to the Chairman of the NRC's Advisory Panel on the Decontamination of Unit 2, the SAB Chairman, Dr. James C. Fletcher, said: "The Safety Advisory Board has been increasingly impressed with the quality of the TMI-2 recovery work in progress. The successful head lift, the preparations for plenum and fuel removal, and the studies of fuel translocation within the reactor system are gratifying evidence that the recovery operations are being carefully planned, well directed and judiciously executed. Moreover, the work is being performed with full concern for public and worker safety and their radiation exposures. It is gratifying that, as each milestone is achieved, the radiation exposures to the workers are proving to be less than those projected originally."
- Next major step is the beginning of fuel removal in October 1985.
- Completion of cleanup scheduled for 1988.
- Disposition of the plant — refurbishment or decommissioning remains to be decided.

October, 1985