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Harvard School of Public Health

THE THREE MILE ISLAND RECOVERY PROGRAM

John C. Collins

Mr. John T. Collins, a member of the Office of Nuclear Reactor Regulation of the Nuclear Regulatory Commission, was assigned to TMI the day after the accident that occurred there on March 28, 1979. He remained at this post as Deputy Director for TMI Operations until January 1, 1981.

He was invited by the Program Committee to give the address at the customary Conference Luncheon Meeting and was asked to discuss his experiences as NRC's On-site Director of TMI Recovery Operations. Dr. Dade W. Moeller was chairman of the session.

Mr. Collins is now Deputy Director for the NRC Region IV Office in Arlington, Texas.

Editor

THE THREE MILE ISLAND RECOVERY PROGRAM

John T. Collins
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It is a real pleasure for me to be here and have the opportunity to discuss with you the status of the cleanup program at Three Mile Island Unit 2 as a result of the accident that occurred on March 28, 1979. As Dr. Moeller indicated, I was a member of the NRC response team that went to TMI on March 30, at the direction of President Carter,along with Harold Denton, Director of NRR, and I have been there ever since. In May of 1979, I took over the responsibility as Sr. NRC official at TMI and directed all NRC operations associated with the cleanup of TMI-2 and the restart of TMI-1. As your chairman indicated, I will be leaving TMI the latter part of this year and will resume my new duties as Deputy Director of our Regional Office in Arlington, Texas. I leave TMI with a lot of regrets, but look forward to my new assignment.

This afternoon I would like to discuss the current status of the plant and the reactor, the financial problems that have plagued Metropolitan-Edison Co., the licensee and owner of TMI, since the accident, and the impact this is having on the cleanup operations. Then, I would like to show you some slides that were taken during the first and second entries into the containment building of TMI-2. If time permits, I would then like to relate some of my personal experiences and impressions of the accident and the cleanup.

Since the accident, the NRC has maintained a staff at TMI, and we continue to do so throughout the entire cleanup operation. Shortly after the accident, we hit a peak of 135 professionals, and at the current time I have a staff of 18 professionals and 4 non-professionals. In addition, I have a part-time Public Affairs Officer and part-time State Liaison Officer.

Since April 28, 1979, the last of the reactor coolant pumps was isolated and the core cooled by natural circulation. This is being accomplished by steaming on the "A" steam generator, bypassing the turbine, and then to the condensor. At present, the maximum in-core temperature is about 150°F, with an average of 120°F. The containment building is being maintained at a negative pressure with respect to atmosphere of about -0.5 psig. This negative pressure resulted either from a hydrogen explosion or a hydrogen burn that occurred shortly after the accident initiated. Consequently, any leakage is into the building and not out. The reactor coolant pressure is being maintained at about 100 psig. by the stand-by pressure control system, a system that was installed after the accident as a backup system. As for the airborne radioactivity inside the reactor building, some noble gases still remain as a result of offgassing from the 650,000 gals. of water in the sump of the building. However, during the last week in June and the first week in July of this year, the bulk of about 44,000 curies of krypton-85 was released under controlled conditions to the environment. Direct radiation readings are in the range of 200-700 mrem/hr with the exception

of the stairwells, which range from 2-5 rem/hr as a result of streaming from the 650,000 gals. of water in the sump. The sump water has a contact reading of 40 rem/hr. The water contains principally cesium-134,137 and strontium-89,90 with a total activity of about 176 μCi/ml.

At present, the amount of decay being generated is approximately 40 KW. There are several backup cooling systems available in the event they are needed; namely, long-term "B" cooling, and the decay heat removal system.

As a result of the accident, approximately 500,000 gals. of contaminated water was generated in the auxiliary building. Shortly after the accident, it was recognized that the installed radwaste system was inoperative both in Unit 1 and Unit 2. As a result, a new water process system was designed, constructed, and installed in the chemical cleaning building which had been built as part of the original plant design for the purpose of cleaning the steam generated in the event this became necessary. The building was modified to handle the equipment, and a new ventilation and filtration system was installed to remove radioiodine and radioactive particulates which may be released during the water cleanup operation. The water cleaning system known as EPICOR-II was pressed into service in October 1979, and all water was processed by August 1980. The cleanup water is being stored in the auxiliary building and will be reused as flush water to further decontaminate the various tanks and components in TMI-2. Under an agreement between the City of Lancaster, Metropolitan-Edison Co., and the NRC, no accident-generated

water will be released to the river until the NRC staff has issued the Programmatic Environmental Impact Statement on the cleanup operation. One must understand that technically the process water could be released to the river because it meets all applicable regulations, including the EPA drinking water standards (with the exception of tritium), but this is a very emotional issue. People living downstream of the plant fear that the water will contaminate their drinking water supplies, will reduce the marketability of produce grown in the area, and have a serious impact on the fishing industry as far south as the Chesapeake Bay. The impact statement will discuss other alternative ways of disposing of the water, and at some future date the NRC Commissioners will have to make a decision on the best course of action, taking into account the concerns of the public.

To fully appreciate the financial problems facing Metropolitan-Edison and the parent holding company, General Public Utilities, one must go back to the time of the accident itself. At that time, TMI-2 was not on the rate base. It had applied to the PA Public Utility Commission for a rate increase, but had not received it. Shortly after the accident, the NRC Commissioners ordered TMI-1 to remain shutdown (at the time of the TMI-2 accident, TMI-1 had just completed a scheduled refueling and was about ready to come back up to power), and to be subjected to a full hearing before the Atomic Safety and Licensing Board similar to other new operating license applications. As a result of this action, the PA PUC removed TMI-1 from the rate base in

November 1979. The utility, however, was allowed to charge its rate payers the cost of replacement power. In July 1980, Met-Ed applied for an emergency rate relief of 35M and a general rate increase of 76.5M. The latter does not come up for consideration until March 1981. In August 1980, the PA PUC denied the emergency rate relief. In addition, they informed Met-Ed that they could not use any monies derived from the rate payers to pay the cost of cleanup. As a result, Met-Ed cut back cleanup operations from a spending level of 100M/yr to 50M/yr and cleanup has virtually come to a standstill.

Shortly after the accident, Met-Ed estimated the cost of cleanup to be about 440M, not including fuel removal, and that it would take 3-4 years. This figure did not include the cost of inflation or increased cost of borrowed money. In August 1980, these figures were revised based on additional information. Met-Ed is now estimating the cleanup will cost 1-1.5B and will take from 5-7 years to complete. The original cost of the plant was 800M, and they were able to cover about 300M from their issuance. The balance of the cost will have to come from the stockholders or from federal assistance. Several bills will be introduced into Congress next session, seeking federal aid similar to that granted to the Chrysler Corp. Only time will tell the outcome of these proposals.

Many people have characterized this as the worst accident to the commercial nuclear power industry. Yet, let's recognize that the maximum dose that could have been received by any individual was 86 mrem over the first week to ten days after the

accident. This is less than that received by people living in the area from natural background radiation of about 119 mrem/yr. The more real problem is not radiation, but the physiological stress caused by the accident.

Let me now discuss some observations and personal experiences related to my tour of duty at TMI. At the time of the accident, there was considerable confusion within the company and the NRC as to the full extent of damage sustained and the amount of radioactive material that had been released to the environment. As a result, the public was not fully aware of exactly what happened until days later. Because of this, the creditability of the licensee, Metropolitan-Edison Co., and the NRC suffered severely until Harold Denton went to TMI at the direction of the President, and became the official spokesman for both the utility and the Commission. The news media also played a great role in escalating the fears of the public by publishing inaccurate information and even overdramatizing the situation. In the months and years following the accident, I believe we have all learned a tremendous lesson, that of honesty with the public.

Over the past two years, I have met with up to 200 groups of various sizes and backgrounds in the 50-mile radius around the site. Because of many people's non-technical backgrounds, it is difficult for them to truly comprehend the causes of the accident and the programs implemented to clean up the plant in a safe manner. The lessons learned from these experiences is that we as technical people must learn to translate our technical work into language that the public can understand. We must have

the patience to listen to their concerns and factor them into our decision-making process. As long as we live in a democratic society where people have the right to express their views, then we must listen to what they have to say, and act accordingly.

As a result of the accident, both the NRC and the nuclear industry have learned much, initiating programs that will reduce the probability of similar accidents in the future. The main job facing all of us in the years to come is to reassure the public that nuclear power plants can be designed, constructed, and operated safely. This will not be an easy task, but it must be done if nuclear power is to remain a viable source of electrical power.