



## **BEYOND NUCLEAR BACKGROUNDER TMI TRUTH**

### **The Disaster: Equipment Failure, Human Error and Deliberate Deception**

March 6, 2014

The Three Mile Island nuclear power plant is located amidst the Pennsylvania Dutch farming communities around Middletown just ten miles southeast of the state capitol in Harrisburg. The two unit reactor site was owned and operated by Metropolitan Edison and its parent holding company General Public Utilities on an island in the middle of the Susquehanna River. Both Unit 1 (800 megawatts electric) and Unit 2 (900 megawatts electric) are B&W Pressurized Water Reactors, originally licensed for commercial operation on September 2, 1974 and December 30, 1978, respectively.

At 4 A.M. on Wednesday, March 28, 1979, TMI Unit 2 at full power had been commercially operational for about 88 days.

It is uncertain what actually caused the uranium powered electric station to experience either a mechanical or electrical failure in the pumps that send primary cooling water to the steam generators.

However, Met Ed had been operating Unit 2 for weeks with illegal leaks in the reactor primary coolant system and would later plead guilty to criminally falsifying reactor cooling leak rate reports to the federal government. This criminal negligence possibly damaged the reactor's cooling system.

With pump failure, the operators lost the ability to remove the tremendous amount of heat from the reactor core generated by fission for making steam. The pump failure caused the turbine-generator and the nuclear reactor to shut down automatically. The pressure and temperature in the reactor began to increase, automatically opening a relief valve on top of the reactor's primary coolant [pressurizer](#) just like the valve on a pressure cooker. The safety valve was designed to close when the proper pressure level was reached but instead it stuck open.

Simultaneously, instrumentation in Unit 2's control room malfunctioned indicating that the valve had shut. The control room operators were unaware that cooling water was emptying out of the reactor through the stuck open valve. There were no instruments to indicate how much water remained over the reactor core.

Secondary cooling systems also failed but service tags were covering the warning lights on the console panel. The control room operators had no idea that the exposed reactor core was experiencing a serious “Loss-Of-Coolant-Accident.” In the confusion and in error, the operators reduced the amount of cooling water flowing into the core and accelerated the runaway atomic reactor. The super hot uranium pellets began to swell, burst through their zirconium tube assemblies and melt. More than half of the reactor core was melting down and began escaping the containment barrier system in uncontrolled releases that morning.

Met Ed operators started deliberately venting the large containment structure, an action that was repeated that over the next several days to release the increasing pressure, rising temperature and escaping radiation.

Company officials were also aware that a “small” hydrogen explosion within the reactor had occurred but withheld this information from state and federal emergency officials.

Met Ed managers withheld more information on the status of the accident to optimistically mislead state emergency response officials. In turn, state officials in public broadcasts played down the severity of the accident, repeated radioactive releases and the need for the public to take protective actions.

By late March 29<sup>th</sup>, there was a growing concern that the uncontrolled chemical reaction from the melting zirconium cladding was generating a hydrogen and oxygen explosive mixture capable of shattering the containment structure and releasing a catastrophic cloud of radiation.

Met Ed Vice President, John Herbein, opened the Friday, March 30<sup>th</sup> press conference with the statement “Conditions are stable,” only to admit the company was venting radioactive gas and pressure that morning to save the containment structure. He further mentioned that a hydrogen gas bubble was growing in the reactor containment. “It’s serious, but not to the extent that we have to evacuate citizenry,” he said. The U.S. Nuclear Regulatory Commission confirmed that significant amounts of radioactivity were being released into the atmosphere through the Unit 2 auxiliary building.

Saturday, March 31<sup>st</sup> brought a dire warning in an AP wire story that the hydrogen bubble in containment could explode at any minute. But by the end of the day, the first noticeable signs appeared that the hydrogen bubble had stopped growing and was beginning to shrink. By the time President Jimmy Carter arrived at the TMI reactor site on Sunday April 1<sup>st</sup>, the hydrogen bubble was steadily getting smaller.

By Monday April 2, 1979, Harold Denton, dispatched from NRC headquarters as the onsite manager, announced that the temperature inside the reactor was going down. Met Ed was gradually bleeding off and reducing the size of the bubble with equipment to recombine the hydrogen and oxygen into water within the containment building.

By April 27, 1979, TMI-2 technically restored the destroyed reactor to “cold shutdown” without the need for mechanically pumping cooling water through the remains of the partially melted reactor core.

Over eleven days during June and July, 1980, Met Ed’s “clean-up” operation included purging the TMI-2 containment’s of 43,000 curies of radioactive Krypton-85 (a gamma and beta source with a ten-year half life) to downwind communities. The United States Court of Appeals for the District of Columbia ruled in November 1980 that venting the destroyed reactor without a public hearing on the environmental impacts was illegal.

By 1993, TMI-2 operators had evaporated 2.3 million gallons of radioactive water generated by the accident into the atmosphere including radioactive tritium despite the legal objections from area community-based organizations.

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