Exhibit 1

Cleanup problems at TMI-2

In July 1980, Met Ed (GPU) vented 43,000 curies of radioactive Krypton-85 and other radioactive gasses directly into the atmosphere. TMI-2 was designed to release approximately 770 curies of Krypton-85 per year. Four months later, in November 1980, the United States Court of Appeals for the District of Columbia ruled the krypton venting was illegal.

On August 12, 1982, cleanup worker William Pennsyl was fired for insisting he be allowed to wear a respirator while undressing men who entered highly radioactive areas. Pennsyl filed a complaint with the U.S. Department of Labor and, on April 11, 1984, settled out of court two days before an administrative law judge was scheduled to hear his case.

On March 22, 1983, TMI-2 senior-safety, startup engineer Richard Parks publicly charged GPU and Bechtel Corporation with deliberately circumventing safety procedures and harassing him and other workers for reporting safety violations. Parks filed a complaint with the U.S. Department of Labor. On August 12, 1985, GPU and Bechtel were fined $64,000 for the incident by the NRC.

From July 24-27, 1984, during the reactor head lift, which was delayed due to brake failure on the polar crane, GPU vented radioactive gasses into the atmosphere. The venting occurred despite pledges by GPU and the NRC that no radioactive releases would take place during the head lift operation. GPU was fined $40,000 for the violation by the NRC.

In May 1987, a non-licensed plant employee was suspended after he was found sleeping in the radioactive waste control room. Two months later, ten employees working at TMI-1 and TMI-2 tested positive for drugs. Eight individuals were suspended for 30 days without pay and one resigned. Thirty-three people were arrested in all. Since March 1986, 16 employees tested positive for drugs at TMI.

On December 1, 1987, GPU announced the firing of a shift supervisor for sleeping on the job. Although the employee had a record of sleeping on the job dating back to the early 1980s, GPU did not issue a warning until October 1986. Edwin Stier, former director of the New Jersey Division of Criminal Justice, reported that 21 witnesses saw the shift supervisor asleep on the job.

In December 1990, GPU began evaporating 2.3 million gallons of accident-generated radioactive water (AGW) into the atmosphere. In April-May 1991, the evaporator was shut down for most of this period so GPU could "rewrite the main operating procedure." A Notice of Violation was issued by the NRC. In January 1993, GPU "discovered" they failed to take periodic samples of approximately 221,000 gallons of AGW in the borated water storage tank. Evaporation was completed in August 1993; six months behind schedule.

In August 1993, Dr. Michio Kaku, Professor of Nuclear Physics, City University of New York, evaluated studies conducted or commissioned by GPU and the NRC on the amount of fuel left in TMI-2. Dr. Kaku concluded, "It appears that every few months, since 1990, a new estimate is made of core debris, often with little relationship to the previous estimate...estimates range from 608.8 kg to 1,322 kg...This is rather unsettling...The still unanswered questions are therefore: precisely how much uranium is left in the core, and how much uranium can collect in the bottom of the reactor to initiate re-criticality?"

In February, 1997, GPU announced in its *1997 Annual Report* that the cost to decommission TMI-2 doubled in four years. The original $200 million projection had been increased to $399 million for radioactive decommissioning. An additional $34 million was needed for non-radiological decommissioning. The new funding "target" was $433 million; or a 110% increase in just 48 months.

On July 21, 1999, GPU Nuclear received permission from the NRC to reduce the insurance at TMI-2 from $1.06 billion to $50 million.

On December 20, 1999, TMI-1's license was transferred from GPU Nuclear to AmerGen. TMI-2 remains a GPU possession and the facility was placed in Post-Defueling Monitored Storage in 1992. GPU contracts with AmerGen to maintain a skeletal staff presence at TMI-2.

In November, 2001, TMI-2 was formally transferred from GPU Nuclear to FirstEnergy, an Akron, Ohio based company. GPU Nuclear retains the license for TMI-2 and is owned by FirstEnergy Nuclear Operating Company.

On March 26, 2018 the NRC released an analysis saying decommissioning will have a $1.266 billion price tag from 2018 to 2053.

What's Wrong With the NRC Fact Sheet on the 1979 Accident
by Three Mile Island Alert

Because the Nuclear Regulatory Commission (NRC) continues to publicize false information about the TMI accident, we correct the record once again.

The NRC fact sheet claims the problems started when: (NRC quotes are Italicized)

> **1.** *"The main feedwater pumps stopped running, caused by either a mechanical or electrical failure, which prevented the steam generators from removing heat."*

The problems did not start with the feedwater pumps, the trouble began in the condensate polisher system. The NRC reported this in 1979 but also states they don't need to know the exact cause of the condensate polisher valves failure. No one knows why the accident began to this day.

> **2.** *"Signals available to the operator failed to show that the valve was still open... In addition, there was no clear signal that the pilot-operated relief valve was open."*

Because TMI had been falsifying reactor leak rates to the NRC in the months leading to the accident, operators had become conditioned to ignore the high temperature of the leaking valve known as the Pilot Operated Relief Valve (PORV). It sits on top of the reactor, specifically, on top of the pressurizer. On the night of the accident, the high temperature reading of the PORV drain line should have been an obvious sign that the PORV was stuck open and that reactor coolant was being lost through this pathway. In effect, falsifying the records made the operators blind to the fact that a small break loss of coolant accident was occurring.

It should be noted that if the company had operated lawfully, the plant would have been shut down for repairs and there would have been no accident on March 28, 1979. On May 22, 1979, former control room operator Harold W. Hartman, Jr. told NRC investigators that Metropolitan Edison had been falsifying primary-coolant, leak rate data for months prior to the accident. At least two members of management were aware of the practice.

On February 29, 1984, a plea bargain between the Department of Justice and Met Ed settled the Unit 2 leak rate falsification case. Met Ed pleaded guilty to one count, and no contest to six counts of an 11-count indictment.

> ***3.*** *"In a worst-case accident, the melting of nuclear fuel would lead to a breach of the walls of the containment building and release massive quantities of radiation to the environment. But this did not occur as a result of the Three Mile Island accident."*

Fifteen million curies of radiation which were admittedly released during the accident is a "massive quantity." It was only by luck that the reactor walls were not breached. The industry conjectured that voids in the reactor prevented molten fuel from burning through the reactor walls. Had that occurred, we would have found out if the 5000^{F} degree core would burn through the walls or the floor of the containment building. One can conclude that the floors of the containments at the Fukushima triple meltdown have been breached since an estimated total of 300 tons of ground water enter the containments every day.

> ***4.*** *"The accident caught federal and state authorities off guard."*

State officials had no means to measure radiation at the scene. They had to take field samples and return to their laboratories. This was not an effective way to acquire real-time data or collect data on gaseous releases. Their data collection abilities were insufficient to determine release rates. The NRC no longer monitors radioactive releases at reactor sites.

It should also be noted that the NRC was caught off guard believing that a small break loss of coolant accident could not lead to a meltdown

> ***5.*** *"They did not know that the core had melted, but they immediately took steps to try to gain control of the reactor and ensure adequate cooling to the core."*

Reactor core measurements taken during the first morning showed that fuel had likely melted. This data was cast aside because operators believed it was not possible and therefore erroneous. During the first day, the NRC in fact distanced itself from the company by stating it did not tell licensees how to run their plants and that they were only overseers of regulatory matters. Initially, the NRC was more interested in hiding from responsibility than offering advice to the company. Making matters worse, the NRC had only one employee with a reactor operator's license at the time of the emergency.

> **6.** *"Helicopters hired by TMI's owner, General Public Utilities Nuclear, and the Department of Energy were sampling radioactivity in the atmosphere above the plant by midday. A team from the Brookhaven National Laboratory was also sent to assist in radiation monitoring."*

By mid-morning, citizens (many who had not heard about the accident) were reporting a metallic taste in their mouths. Because the reactor had been leaking for several weeks, the reactor drain tank was full and a pathway to the environs had already been created by aligning valves to handle the leaking coolant. This also facilitated the falsification of the leak rates by disguising the volume of water passing through the drain tank.

The GAO reported "Two of four radiation monitors were not working at the time of the accident, and more than half of the radiation survey instruments were not operational. There was no licensee plan to review quality assurance. The NRC knew of the problems associated with the radiation survey instruments but took no action to ensure that the problems were resolved."

At the time of the accident, GPU reported that radiation monitors went off-scale, filters were clogged and other monitoring devices "disappeared." Therefore, we do not know how much radiation escaped undetected into the atmosphere. Still, the Columbia Study found an increased cancer incidence, including lung cancer, from 1975-1985.

> **7.** *"In an atmosphere of growing uncertainty about the condition of the plant, the governor of Pennsylvania, Richard Thornburgh, consulted with the NRC about evacuating the population near the plant. Eventually, he and NRC Chairman Joseph Hendrie agreed that it would be prudent for those members of society most vulnerable to radiation to evacuate the area. Thornburgh announced that he was advising pregnant women and preschool-age children within a five-mile radius of the plant to leave the area."*

The NRC's previously agreed-upon conditions inside a reactor having an accident requiring an evacuation of nearby communities had already been met two days earlier on Wednesday, Nov. 28th. Governor Thornburgh complained often about the conflicting and confusing data coming from the plant and the NRC.

8. *"...even though it led to no deaths or injuries to plant workers or members of the nearby community."*

In August 1996, a study by Dr. Steven Wing, University of North Carolina-Chapel Hill, reviewed the Susser-Hatch study (Columbia University; 1991). Dr. Wing reported that "...there were reports of erythema, hair loss, vomiting, and pet death near TMI at the time of the accident. Accident doses were positively associated with cancer incidence. Associations were largest for leukemia, intermediate for lung cancer, and smallest for all cancers combined... Inhaled radionuclide contamination could differentially impact lung cancers, which show a clear dose-related increase."

Findings from the re-analysis of cancer incidence around Three Mile Island is consistent with the theory that radiation from the accident increased cancer in areas that were in the path of radioactive plumes. "This cancer increase would not be expected to occur over a short time in the general population unless doses were far higher than estimated by industry and government authorities," Wing said. "Rather, our findings support the allegation that the people who reported rashes, hair loss, vomiting and pet deaths after the accident were exposed to high level radiation and not only suffering from emotional stress."

Even under normal operating circumstances nuclear plants release radiation. The NRC acknowledged that 12 people are expected to die as a direct result of normal operation and releases for each commercial nuclear reactor that is granted a license extension of 20 years.

The admission came in a correction to its relicensing regulation, which the NRC published in the Federal Register on July 30, 2001. According to the Federal Register notice, each relicensing is expected to be responsible for the release of 14,800 person-rems of radiation during its 20-year life extension. The figure includes releases from the nuclear fuel chain that supports reactor operation, as well as from the reactors themselves. The NRC calculates that this level of radiation release spread over the population will cause 12 cancer deaths per reactor.

9. *"But new concerns arose by the morning of Friday, March 30. A significant release of radiation from the plant's auxiliary building, performed to relieve pressure on the primary system and avoid curtailing the flow of coolant to the core, caused a great deal of confusion and consternation."*

This was not by accident or design. The release was perpetrated by a lone operator acting on his own and without permission or consultation with

anyone else. There were no regulatory repercussions resulting from his actions.

> ***10.*** *"Today, the TMI-2 reactor is permanently shut down and defueled, with the reactor coolant system drained, the radioactive water decontaminated and evaporated, radioactive waste shipped off-site to an appropriate disposal site, reactor fuel and core debris shipped off-site to a Department of Energy facility, and the remainder of the site being monitored."*

The reactor was destroyed. No one knows how much fuel remains in the reactor core debris. Some estimates have placed it at 20 tons of uranium. Deadly amounts of radiation remain in the water in the basement of the containment building. No one is able to go into the basement. The plan is to let the radiation decay for decades.

Unit #2 is still releasing small amounts of radiation into the air and water. In 2013 when TMI Alert asked the NRC about the amount of radiation being released, after a ten minute delay and two NRC huddles we were incorrectly told zero.

> ***11.*** *"The accident was caused by a combination of personnel error, design deficiencies, and component failures."*

Add to the list: criminal activity, the NRC's failure to disseminate safety data, NRC inspection and enforcement failures, inadequate training, failure to fix problems noted by control room operators, sloppy control room housekeeping and economic gain placed above safety.

> ***12.*** *"Upgrading and strengthening of plant design and equipment requirements. This includes fire protection..."*

As the Union of Concerned Scientists stated in a 2016 report titled *Preventing an American Fukushima*, "For decades, the nuclear industry has been making promises to take certain actions to address severe accident risks in order to ward off imposition of new regulatory requirements by the NRC — promises the industry has not always kept."

A reactor safety division specifically created to spot problem trends in the wake of the TMI accident was abolished by NRC executives in 1999. According to a 2003 report by the NRC's Office of Inspector General, only half of NRC employees feel it is safe to bring up new safety concerns. One former NRC employee stated those who do present their concerns have their careers harmed by NRC executives.

For more than a decade, the NRC was aware that the fire protection material Thermolag was defective and burned at the same rate as plywood. The NRC was also aware that the manufacturer has falsified test results yet did nothing to fix the problem. Finally the NRC asked TMI to remove Thermolag. Two years after that request, TMI was again asked to remove Thermolag. The NRC and TMI were very slow to act.

> ***13.*** *"Expansion of NRC's resident inspector program - first authorized in 1977 -whereby at least two inspectors live nearby and work exclusively at each plant in the U.S to provide daily surveillance of licensee adherence to NRC regulations..."*

At Davis Besse, there was no chief inspector for a year. Inspectors find fewer than two percent of problems identified at the plants. The NRC has decreased total inspection man-hours.

> ***14.*** *"The installing of additional equipment by licensees to mitigate accident conditions, and monitor radiation levels and plant status..."*

The NRC has allowed plants to do away with their hydrogen recombiners. These emergency systems were added to prevent another hydrogen explosion like the one at TMI. The NRC has stated that hydrogen recombiners would be "ineffective at mitigating hydrogen releases from risk-significant beyond design-basis accidents." Instead of requirements to fortify recombiners, the NRC has allowed utilities to disregard them altogether.

The NRC no longer monitors radiation at the plants. On occasion, the communication lines from the control room computers to the NRC are found to be inoperable.

> ***15.*** *"Employment of major initiatives by licensees in early identification of important safety-related problems, and in collecting and assessing relevant data so lessons of experience can be shared and quickly acted upon..."*

Oh, if this were only true. Drastic employee cutbacks and overburdened workers and engineers have little time and are reluctant to raise new safety issues. TMI Alert has learned of TMI employees who simply "up and quit" due to the excessive work load.

16. *"July 1980 Approximately 43,000 curies of krypton were vented from the reactor building."*

For eleven days in June and July of 1980, Met Ed illegally vented 43,000 curies of radioactive Krypton-85 (beta and gamma; 10 year half life) and other radioactive gasses into the environment without having scrubbers in place. In November 1980, the United States Court of Appeals for the District of Columbia **ruled that the krypton venting was illegal**.

By 1993, TMI-2 evaporated 2.3 million gallons of accident-generated radioactive generated water, including tritium, a radioactive form of hydrogen (half life; 12.5 years), into the atmosphere despite legal objections from community-based organizations.

Postscript:
The NRC fails to point out that for more than a year prior to the accident it had ignored a newly discovered safety problem which did occur at TMI. Voids in the coolant created by poorly designed piping caused reactor pumps to cavitate and vibrate violently. These vibrations threatened to destroy the pumps. The coolant pumps had to be turned off during the height of the accident.

The NRC's role in the accident is one of tacit permissiveness. The attitude of the industry was criticized by the President's Commission above all other factors. Three Mile Island Alert has observed that safety conditions and attitudes are returning to the level evidenced by the industry in 1979. Many of the so called "permanent" changes have been downgraded since the time of their installation.

The NRC inspectors have little confidence in the new regulatory process according to a January 2000 Government Accounting Office (GAO) investigation. The new regulatory process handcuffs the ability of inspectors to pursue safety problems at the plants. Unless a suspicious condition is deemed clearly dangerous, the new process doesn't allow for the enactment of special inspections.

The Davis Besse near-miss is a prime example. The NRC did not have a resident inspector there for one year. Although there was clear evidence of a

leaking reactor, the NRC initially denied possession of the "smoking gun" – a picture of the red crud which had formed on the outside of the reactor vessel. The NRC had in fact ignored the problem to allow the plant to continue operating. Determining that something is clearly dangerous is apparently still a subjective skill at the NRC.

There are outstanding safety issues identified by the NRC following the TMI accident which have still not been corrected. One example is the vulnerability of electrical cables during an accident which can electrically short circuit. Another example is the PORV valve which released the coolant during the accident – it is still not rated as a "safety item."

(This paper was updated in 2019 for the 40th anniversary of the TMI Meltdown.)