

THREE MILE ISLAND: THE TRUTH

INTRODUCTION

The disaster at Unit 2 of the Three Mile Island (TMI) nuclear power plant near Harrisburg, Pennsylvania, began on March 28, 1979. Now, 35 years later, the reality, not only of what happened, but also the long-term aftermath and effects, remain cloaked in mystery and misinformation. Ironically, despite today's popular "too much information" shorthand, TMI is a story of too *little* information.

Beyond Nuclear has endeavored to dig into the lies and myths in order to uncover the truth about TMI.

What actually happened at TMI? How much radiation was really released? Why does the unprovable myth persist that "no one died at TMI?" We take a look at these questions and other problematic events surrounding the disaster, including the evacuation fiasco and the lack of adequate emergency preparedness. We also

listen to the people's experience downwind of the accident and note the impacts to humans, animals and plants.

In looking into the truth about TMI, it is reasonable to ask whether similar mistakes and cover-ups happened after Chernobyl and are occurring in the wake of the Fukushima nuclear disaster. And, if these lessons remain unlearned, whether we are destined to repeat, rather than prevent them, the next time.

THE DISASTER: WHAT HAPPENED?

The Three Mile Island nuclear power plant is located on an island in the middle of the Susquehanna River, in Pennsylvania Dutch farming country, just ten miles southeast of Harrisburg. At the time of the disaster, the two unit reactor site was owned and operated by Metropolitan Edison and its parent

holding company, General Public Utilities. Both Unit 1 (800 megawatts electric) and Unit 2 (900 megawatts electric) are B&W Pressurized Water Reactors that were originally licensed for commercial operation on September 2, 1974 and December 30, 1978, respectively.

TMI Unit 2 was running at full power, but had been commercially operational for just 88 days when, at 4 A.M. on Wednesday, March 28, 1979, it experienced either a mechanical or electrical failure in the pumps that send primary cooling water to the steam generators. With pump failure, the operators lost the ability to remove the tremendous amount of fission-generated heat — used for making steam — from the reactor core.

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The Disaster: What Happened?

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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. This valve stuck open, but malfunctioning instrumentation indicated 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 and that the exposed reactor core was experiencing a serious "Loss-Of-Coolant-Accident."

As operators mistakenly reduced the amount of cooling water flowing into the core, the super hot uranium pellets began to swell, burst through their zirconium tube assemblies and melt. Workers deliberately and repeatedly vented radioactive gas over several days to relieve pressure and save the containment structure. The U.S.

Nuclear Regulatory Commission (NRC) confirmed that significant amounts of radioactivity were being released into the atmosphere from Unit 2.

By late March 29th, concerns had arisen about a hydrogen gas bubble that could shatter the containment structure and release a catastrophic cloud of radiation. Soon the press was reporting that an explosion was imminent. However, on April 1, when President Jimmy Carter arrived at the site, operators had reduced the size of the hydrogen bubble. By April 27, the now destroyed reactor was put into "cold shutdown."

However, the disaster was by no means over. Deliberate radioactive releases and purges into the environment — in the guise of "cleanup" — continued into the 1990s. Accident details were downplayed or kept from the public entirely. TMI-2 was finished. But its deadly legacy was to last decades.

"NO ONE DIED": THE BIGGEST LIE



Last NRC public meeting, Middletown, March 19, 1980. Photo: Robert Del Tredici.

The nuclear industry line — that "no one died at Three Mile Island" — does not stand the test of fundamental medical scrutiny. Yet it is often repeated, including by the media, and has been taken up by today's nuclear deniers in asserting that the Fukushima nuclear disaster, too, will yield no fatalities.

Not only deaths but illnesses resulting from the disaster are downplayed. The NRC website alleges that there were "negligible effects on the physical health of individuals or the environment." Again, this is contradicted both by independent analysis and by medical science.

Given that exposure to ionizing radiation is medically understood to cause diseases like cancer which can be fatal, there is no way definitively to state that "no one died at TMI" or later developed cancers. The opposite is far more likely to be true.

Estimates are complicated by the long latency period for illnesses caused by exposure to radiation and by the fact that many victims move away after an accident and are not then tracked in any scientific database.

Long after a catastrophic radiation release, disease can still manifest, both from the initial radiation exposure and from slow environmental poisoning, as the radionuclides released by the

disaster are ingested or inhaled for many generations.

The two studies — from Columbia and Pittsburgh Universities — that have perpetuated the "no harm" myth, were conducted under the constraints of a court order that established the "TMI Public Health Fund" and significantly compromised the study findings. Columbia and Pittsburgh each concluded that they could not attribute increased cancers to the TMI disaster.

The only independent study, by Dr. Stephen Wing et al. at the University of North Carolina, Chapel Hill, looked at radiation-specific markers in residents' blood, called biomarkers, to assess dose, rather than relying solely on industry-measured (or mis-measured as the case was) radiation emissions.

The Wing et al. study's very different conclusions found that lung cancer and leukemia rates were two to 10 times higher downwind of the Three Mile Island reactor than upwind.

THE RADIATION METERS WENT OFF SCALE

Within hours of the beginning of the nuclear disaster, onsite radiation monitors went off scale because radiation levels exceeded their measurement capacity. There were only a few offsite radiation monitors operating that day.

Claims that very little radiation was released cannot be substantiated. In fact, subsequent examination of human blood, and of anomalies in animals and plants, suggest that very significant levels were released.

We learned from the Hiroshima and Nagasaki bombing that the symptoms of acute radiation exposure include

nausea and vomiting, severe fatigue, diarrhea, hair loss and graying, and a radiation-induced reddening of the skin medically known as erythema. In the days following the TMI meltdown, hundreds of local residents reported the same symptoms.

For example, Marie Holowka, a dairy farmer near TMI, left the milkhouse the morning of the accident. Outside, “it was so blue, I couldn’t see ten feet ahead of myself.” There was a “copper taste” in the air. She would later be treated for thyroid problems.

Met Ed claimed that the maximum radiation releases were orders of

MEDIA MYTHS

“No one was killed or injured at Three Mile Island, not so much as a sprained ankle...”

Scott Simon, NPR broadcast
March 28, 2009

magnitude less than a dose required to produce the documented physiological symptoms, domestic and wild animal deaths, and destruction of plant life. But the absence of monitors and the paucity of evidence dispute this. The only real radiation meters were the people of Three Mile Island.

Damage to Plants and Animals

After the radiation releases from Three Mile Island, a number of plants exhibited strange mutations including extra large leaves (gigantism) and double-headed blossoms (pictured right). These plant anomalies were documented over decades by Mary Stamos (Osborn), a local resident who conducted meticulous plant research and is a founder of “Three Mile Island Alert.”

Robert Weber, a Mechanicsburg veterinarian, reported a 10% increase in stillbirths, and a marked increase in the need for Cesarean Sections among sheep, goats and pigs in 1979, 1980, and 1981 in a 15-mile area around the TMI site. Dr. Weber also reported significant increases in the cancer rate among animals with shorter life spans such as dogs and cats.

These findings are consistent with research around Chernobyl where radiation releases from the 1986 reactor explosion killed pine trees, turning their needles red. Lesser-exposed pine trees suffered damage, including gigantism and trunk discoloration beginning precisely at the growth ring for the disaster year.

Around Fukushima, researchers have reported deformed butterflies with damage at physiological and genetic levels consistent with other field studies performed at Chernobyl.

Studies of Chernobyl animal populations living in chronic low-dose radiation show an increase in radiosensitivity among those whose ancestors were exposed. This indicates that successive generations could be less able to cope with the same degree of exposure as their parents were and that, for certain animal species, there is no genetic adaptation to mutations from low-dose, chronic, man-made radiation exposure, whether from a disaster or routine radioactive releases from a nuclear plant.



This photo by Mary Stamos of a double-headed rose is part of her documented collection of mutations likely caused by radiation releases from the TMI disaster.

TMI, Chernobyl, Fukushima: the Parallels

- * Information withheld or situation “under control.” The truth hushed up or downplayed. Evacuations delayed or directed into plume path. Radiation releases much higher than stated.
- * Public health compromised to protect industry’s public image. KI unavailable to exposed populations, leading to elevated rates of thyroid problems, including cancer.
- * Plant mutations and higher incidences of certain diseases in animals even in later generations. Animals left to perish as humans evacuated and unable to return to tend them.
- * Global nuclear industry escapes liability as disaster costs soar. Financial costs shouldered by taxpayers; health and environmental costs borne by victims and future generations.
- * “Cleanup” a misnomer. Fallout knows no boundaries. On-site contamination ultimately moved to another location where it leaks into the environment.
- * Propaganda ensures public believes “no one died” or minimal harm, supported by compromised, non-independent studies.

EVACUATION: TOO LITTLE INFORMATION, TOO LATE

During the licensing phase of the construction and operation of TMI, a nuclear disaster was considered unthinkable. Consequently, emergency plans were practically non-existent when the reactor core began its March 28 meltdown. Emergency planning officials were repeatedly misinformed by Met Ed on the disaster's progression and kept in the dark about the need for public protective actions in the early days at TMI.

On March 30, 1979, Pennsylvania Governor Richard Thornburgh finally "advised" that pregnant women and pre-school age children voluntarily evacuate a five-mile perimeter around TMI, an anticipated target population of 3,500 people. Instead, approximately 200,000 people spontaneously evacuated from a 25-mile perimeter.

TMI demonstrated that managing human behavior during a nuclear

catastrophe is not realistic and provokes unique human responses not comparable to any other hazard.

Competing loyalties between work duty and personal family caused a significant number of staffing problems for various emergency response roles. As the crisis intensified, more emergency workers reported late or not at all.

Doctors, nurses and technicians in hospitals beyond the five-mile perimeter and out to 25 miles, spontaneously evacuated emergency rooms and their patients. Pennsylvania National Guard, nuclear power plant workers, school teachers and bus drivers assigned to accompany their students, abandoned their roles for family obligations.

During the Fukushima, Japan meltdowns in 2011, such loyalties

could not even be tested. Emergency responders were prevented from rescuing victims trapped in the earthquake and tsunami wreckage because the area was now radioactive.

"Too little information, too late" persisted throughout the TMI disaster. Neither state nor federal NRC officials had precise data on time, direction and amount of radioactivity releases.

At Fukushima, with no official guidance, a large number of people from the town of Namie spontaneously evacuated, camping for three nights in the open as wind blew invisible radioactivity into their camp.

Officials were in fact deliberately withholding this crucial computer weather modeling data in order to avoid expanding the evacuation zone, which would mean acknowledging the true severity of the disaster.

The People's Testament

From 1979 to 1988, Katagiri Mitsuru and Aileen Mioko Smith (right) took testimonials from about 250 TMI eyewitnesses and compiled "Three Mile Island: The People's Testament." Today, Smith is the director of Green Action, a prominent anti-nuclear group in Japan. Edited excerpts follow:

Jean Trimmer, 54. Farmer

"Our cat had gone out and when he didn't come back I became worried. I went to the front porch and called to him. Suddenly, the wind stopped abruptly, and a wave of heat engulfed me, bringing the rain in all over me. It happened so quickly that it startled me. I still relive, over and over, those few minutes. I washed my face and hands with soap and water and only dried rain from my arms, neck, shoulders and legs with a towel. About an hour later, my skin became pink and very prickly. On Saturday, my skin was a darker shade of red and extremely



irritated. On Sunday morning, several people at church asked me where I had got my sunburn. Small, hard bumps had come out on my forehead and up into the front of my scalp. About three weeks later, white hairs appeared all through the front of my hair and the tops of my eyebrows were white. The hair came out in my comb in unbelievable amounts. I have lost my left kidney completely. It just dried up and disappeared with no medical explanation whatever."

Bill Peters, 46. Auto body shop owner

"We heard on the news March 28th that there was a minor mishap at Three Mile Island. We kind of laughed about it. Thursday, we were in the garage. My son and I were in there working all day. We had the doors open 'cause the weather was warm. We went up about nine-thirty and took a shower. I said, 'I got a sunburn!' Friday, I was redder. We were getting this hot feeling in the throat. And you were tasting, it tasted like you were burning galvanized steel with a torch. Friday morning I had blisters on my lips and in my nose. So, we left here about four. We were gone seven days. We had a four year-old male German shepherd. He was healthy when we left. We had 200 pounds of Purina Dog Chow separated out in boxes. I had ten five-gallon cans of water. When we came back, he was laying on his mattress dead. And both eyes burnt white."

NO THYROID PROTECTION THEN OR NOW

In 1979, potassium iodide (KI) was not available for distribution downwind of the TMI disaster to protect populations, particularly children, from the radioactive iodine that was venting from the reactor.

KI provides protection to the thyroid if administered promptly. The USDA set out immediately to deliver 237,013 doses to the TMI area. These doses arrived six days after the accident began. However, the hastily fashioned KI solution was never distributed because the individual dosage bottles did not have matching screw top caps.

The NRC initially supported a subsequent recommendation

from President Carter's Kemeny Commission report to stockpile KI around all U.S. reactors.

However, the nuclear industry has successfully resisted the implementation of KI planning, viewing it as detrimental to "public confidence" in nuclear safety.

The passage of a Congressional law in 2002, in response to the 9/11 terrorist attacks on New York City and Washington, DC, required KI stockpiles within 20 miles of reactors. To date, the NRC and the nuclear industry have not complied with the federal law, leaving populations unprepared to protect



Middletown council meeting, June 20, 1979. Photo: Robert Del Tredici

against highly mobile radioactive iodine releases in the event of a disaster at, or attack on, a nuclear power plant.

Busting the Myths: A nuclear engineer's view



Arnie Gundersen, Chief Engineer at Fairewinds Associates, is a nuclear whistleblower who formerly managed and coordinated projects at 70 atomic reactors in the U.S. Once a skeptic that the TMI accident was not serious, he was retained in 1992 by accident survivors. His expert work on their behalf led him to conclude that TMI was "a significant event that we need to learn from." Beyond Nuclear asked him a number of key questions pertaining to the many myths that continue to cloak the truth about TMI.

Should an evacuation have been ordered right away?

Yes, the first day. By 7 AM on the first morning, utility policy required evacuation orders when calculations showed 10 Rem/hour (R/hr) area dose rates. TMI workers had already measured elevated doses on site.

By 10 AM, very high temperatures, low amps on massive pumps, and high neutron levels, indicated low to no cooling flow, core uncovering, and zirc-water reactions generating explosive hydrogen (H₂) gas. Dose rates that constitute lethal levels after short exposures were mea-

sured inside containment, and in reactor coolant, indicating fuel damage. The Auxiliary Building was evacuated. But the State of PA was not told.

TMI Station Manager, Gary Miller, later admitted: "[In-core temperatures] were hot enough that they scared you"; "Pretty early we were scared. Radiation was all over the place. Everything was off scale"; "We don't know where the hell the plant was going"; "We were not in our minds convinced that the core was totally covered." All were clear indications evacuation was required.

At 12:20 PM, GPU/MetEd deceived NRC, concealing elevated core temperatures that indicated a meltdown in progress. Just before 2 PM, an H₂ explosion occurred, but NRC was not informed until two days later. Miller was well aware of it – the control room shook. This was the last time where I think anybody of conscience would have ordered an evacuation.

Did the containment leak?

Based on pressure data, a portion of TMI Unit 2's containment wall clearly failed after the H₂ detonation. An industry expert estimated 10 billion Curies of radioactivity within containment. A structural engineering expert testified at trial that up to 1 billion Curies – 100 times NRC's estimate – may have escaped.

Although most of the radiation detectors had already gone off scale, I documented three that went off scale only after the explosion. The most significant was a detector shielded in four-inch-thick lead documenting a doubling of incredibly powerful gamma rays.

How much radioactivity escaped early on?

Thorough analysis indicates that releases were 100 to 1,000 times higher than the NRC estimated. (NRC's 2009 official figure is 10 Mega-Curies, although an agency official, even using overly optimistic assumptions, calculated 36 MCi in 1979.) But an industry expert admitted to just 17 MCi in court. Applying the industry expert's assumptions, I showed his figure should have been an order of magnitude larger. Documented evidence of radioactive I-131 in milk, via cows inhaling airborne contamination 150 miles downwind, also indicates releases orders of magnitude larger than NRC's official estimates.

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The thunderbird, in Lakota tradition,
is the Guardian of the Truth.
Thunderbird design courtesy of Glenn Carroll



ABOUT BEYOND NUCLEAR

Beyond Nuclear aims to educate and activate the public about the connections between nuclear power and nuclear weapons and the need to abandon both to safeguard our future. Beyond Nuclear advocates for an energy future that is sustainable, benign and democratic.

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Cover photo of TMI courtesy of Mary Stamos. Photo of Aileen Mioko Smith courtesy of the subject. Photos by Robert Del Tredici are from his book: *The People of Three Mile Island* (Sierra Club Books, 1980.) For additional backgrounders, see the Beyond Nuclear TMI Truth web page at: <http://www.beyondnuclear.org/tmi-truth/>. And listen to: *Voices from Three Mile Island*, directed by Robbie Lepzer and available at <http://www.turningtide.com/voicesfromtmi.htm>. And see Karl Grossman's 1993 EnviroVideo, "*Three Mile Island Revisited*" at: <http://blip.tv/envirovideo/three-mile-island-revisited-4917737>

Spring 2014

Among the World's Finest People. Dr. Judith Johnsrud

July 1, 1931-March 9, 2014

Dr. Judith Johnsrud (pictured right in a 1980 photo by Robert Del Tredici), a geographer, dedicated more than 50 years of her life to the opposition of nuclear power in all its phases and forms. With Pennsylvania the epicenter of many proposed nuclear projects — some of which Judy and her allies helped to defeat and some, like Three Mile Island, which they could not — Judy was at the forefront of multiple anti-nuclear campaigns. She helped create and lead the Environmental Coalition on Nuclear Power and was also a longtime member of the Sierra Club which recognized her lifetime of work with a special award in 2012. Of the Coalition, she wrote:



“Although nuclear power is patently failing, and in a rational world would never have been developed, constant vigilance by citizen activists like all of you will continue to be essential far into the future. But by far the greatest benefit from the existence of this Coalition has been the opportunity to develop deep, lasting friendships, and the privilege of meeting and working with its members, friends and colleagues — surely high among the world's finest people.”

And in a call to action she said:

“I was the legal representative for the citizens of the Harrisburg area in the original Nuclear Regulatory Commission licensing of Three Mile Island in the mid to late 1970s, before the accident. In the course of that licensing we were not permitted to ask a single question about the probability or the consequences of an accident more severe than the safety systems were designed to contain. Why? Because the Nuclear Regulatory Commission's engineers

had done probability analyses and they concluded that a severe accident was a highly improbable event. Three months after the plant went online, TMI Unit 2 suffered this nation's worst nuclear accident.

If we can't help people to understand the nature of this hazard, then they will be condemned to suffer more, and more, and more of it. . . So, organize. Teach the young. Teach the not so young. Recognize that this is a political problem and that problem lies in the law of the United States. It's time to end the nuclear age, not to continue and expand it. I'm counting on all of you.”

Robin Mann, former Sierra Club president

“Judy inspired many people, inside Sierra Club and beyond, to work to halt the dangerous release of radionuclides into the environment. I have no doubt that Judy has been the most important anti-nuclear advocate in Pennsylvania's history.”