



Three Myths of the Three Mile Island Accident

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The Three Myths

- 1. Should an evacuation have been ordered?**
- 2. Did the Contaminant Leak?**
- 3. How much radiation was really released?**

**Should an evacuation
have been ordered?**



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Should an evacuation have been ordered?

Before 7am

- 1.** Engineer and supervisor using approved emergency procedure calculate exposure in Goldsboro at 10R/hr.
- 2.** By this emergency procedure, an evacuation was required.
- 3.** At 7:30 TMI called the State and told them 10R/hour seemed too conservative.

Should an evacuation have been ordered?

Before 7am

4. TMI did not tell the State that employees already received significant radiation exposure.

5. TMI did not tell the State that almost every radiation monitor was already off scale.

6. The State was informed that a helicopter flew to Goldsboro at 7:30am and found no radiation. In fact, a helicopter never arrived on-site until 8:30am.

Should an evacuation have been ordered?

Before 10am

1. Core thermal couples indicate temperatures in excess of 2100 deg F.
2. Hot leg thermal couples indicated super heated steam in excess of 700 deg F.
3. Reactor coolant pump amperage indicates steam, not water, being pumped.
4. Neutron detectors outside vessel indicate excess neutrons.

Should an evacuation have been ordered?

Before 10am

5. Reactor building dome radiation monitors indicate lethal radiation..

6. Reactor coolant samples indicate extensive fuel failures (200R/hr).

7. Health Physics informs management to evacuate auxiliary building.

Should an evacuation have been ordered?

Quotes from plant manager Miller.

“They were hot enough that they scared you.”

referring to in-core temperature.

“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”

-in phone call to corporate requesting a General Emergency.

“We were not, in our minds, convinced the core was totally covered.”

Should an evacuation have been ordered?

Before 2pm

1. Based on core temperature, it's clear that Hydrogen is being generated by 10am.
2. 12:20 - NRC asks '*what is core temperature?*'
3. TMI responds '*computer is printing question marks*', '*that means the computer is messed up*'. In fact, the computer was working and the question marks indicated that the temperature had exceeded 700 degrees.

Should an evacuation have been ordered?

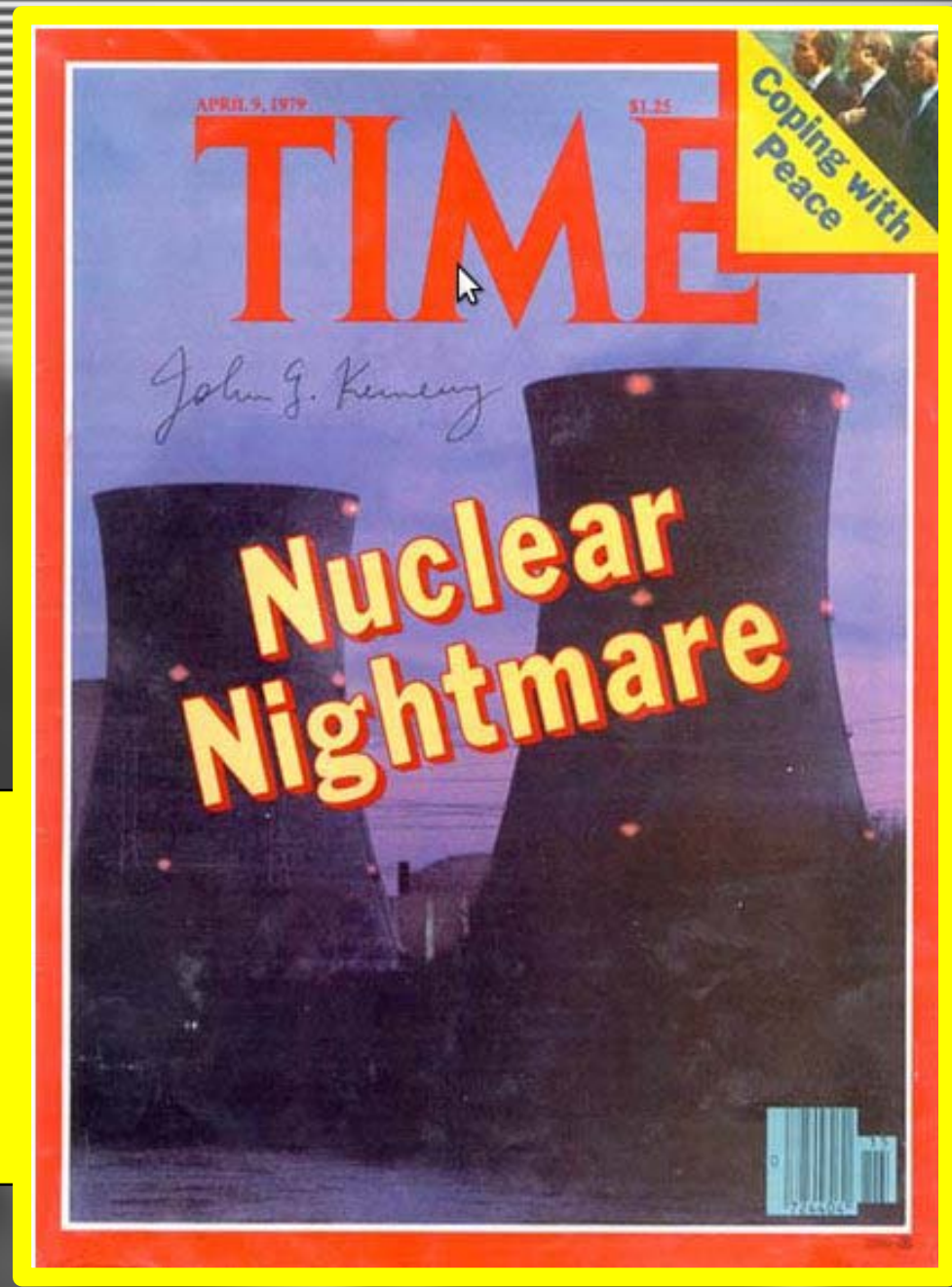
Before 2pm

4. Hydrogen Explosion. Informed NRC two days later.

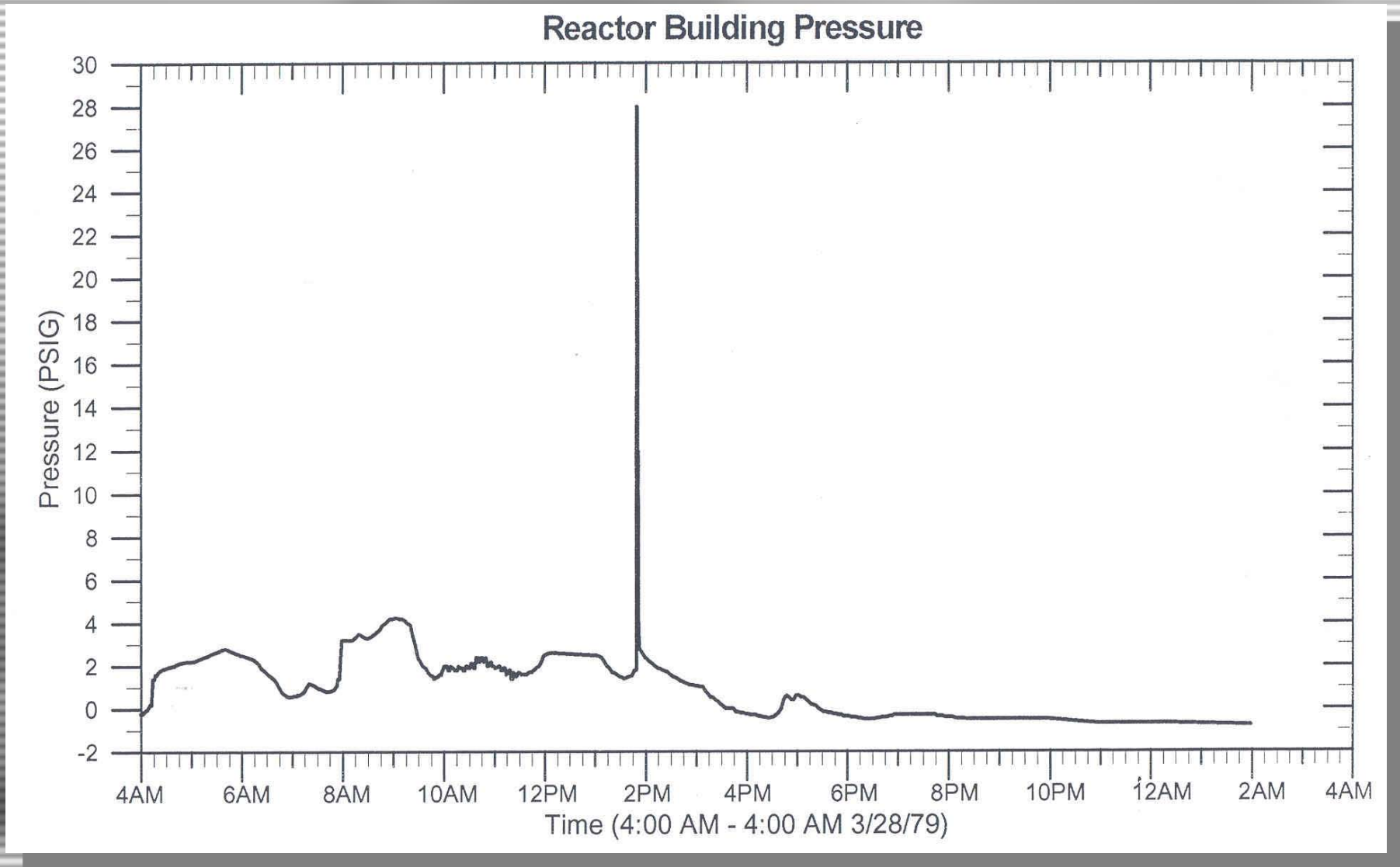
5. Plant manager in control room, when detonation occurred, four operator affidavits confirmed his awareness of the explosion.

6. Control room shook.

**Did
the Containment
Leak?**



Did the Containment Leak?



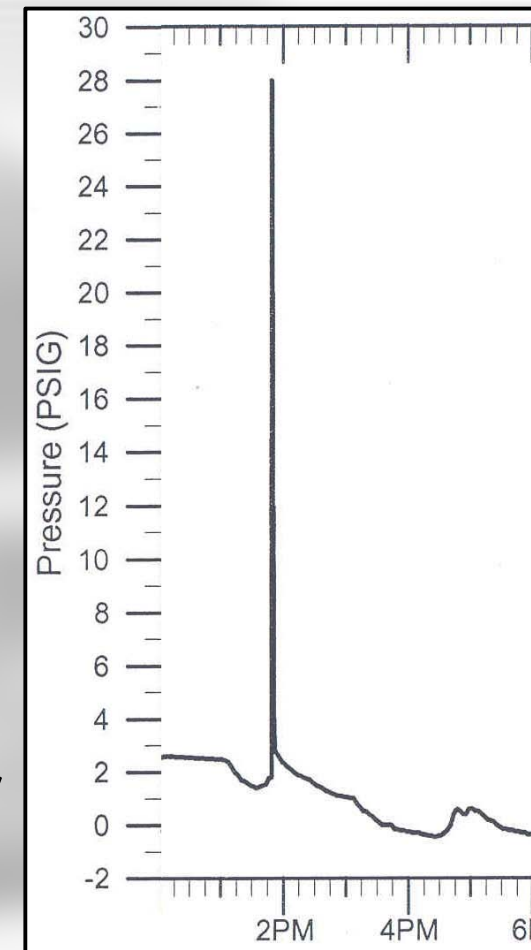
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Did the Containment Leak?

The pressure spike was for the whole containment; sub-compartments are higher.

Before detonation, pressure is 3 pounds higher than outside air pressure.

After detonation, pressure remains at or near outside air pressure.



Did the Containment Leak?

Structural Expert

“A plausible release of up to 8 to 10% of the volatiles may have occurred due to the unavailability of the containment system at the time of the accident.”

Expert report of Dr. Sinovy V. Reytblatt (12/17/1005), p19

Did the Containment Leak?

Industry expert, John Daniel reported that immediately after the detonation:

Radiation monitor HP-R-234 recorded a five-fold increase in radiation.

Radiation monitor HP-R-3240 recorded a ten-fold increase, and then went off scale.

Radiation monitor MU-R-720H doubled in detected radiation. This monitor was protected by 4 inches of lead, meaning that it only measured powerful gamma rays and not any beta or alpha isotopes.

How much Radiation Escaped?



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How Much Radiation Escaped?

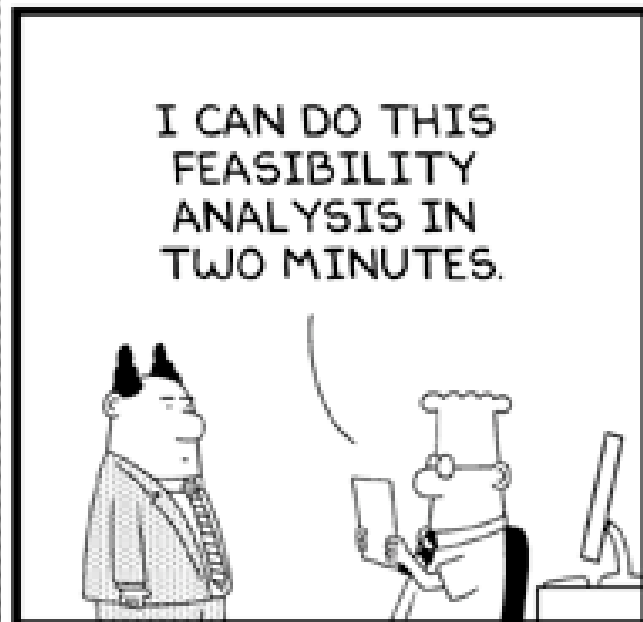


How Much Radiation Escaped?

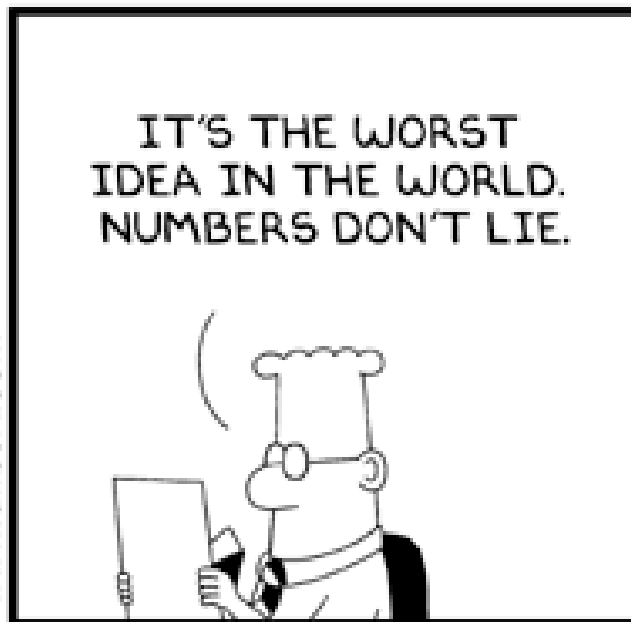
Because all on-site radiation monitors were off scale, it was impossible to measure the radiation released from TMI.

All radiation estimates are based upon off-site dose readings to which mathematical assumptions were applied.

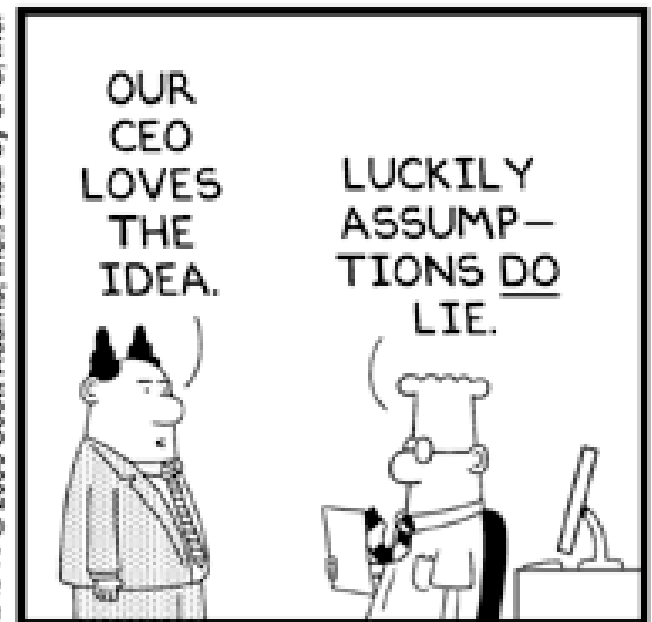
How Much Radiation Escaped?



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How Much Radiation Escaped?

Here's what the NRC's John Collins had to say about off-site measuring of dose.

“My problem... the concern I have about aerial monitoring was that for the first three days we were pretty much into a very static air condition. There was very little dispersion. When you were flying your helicopter and taking your aerial measurements, you were actually reading erroneous readings... I really doubt some of the measurements that were made.”

“...The wind was westward and very light, with minute to minute variation of about 10 to 30 degrees.”

How Much Radiation Escaped?

Here's what the NRC's John Collins had to say about off-site measuring of dose.

“...not only should we have good monitors but also people who understand how to use them. That was a problem here since day one. They get data and nobody sits down and evaluates the data to try and understand what it means.”

“Going out in an automobile and chasing a plume with a meter is a very difficult job. You never know the width of the plume, you never know whether you are in the center or on the edge of it. At best, it gives you a rough idea.”

How Much Radiation Escaped?

Early on in the accident, the NRC estimated that 10,000,000 Curies of radiation were released.

One Curie is 37,000,000,000 disintegrations per second.

Therefore the NRC estimated 370,000,000,000,000,000 disintegrations per second.

How Much Radiation Escaped?

The NRC estimate is based on a report by NRC manager, Mr. Lake Barrett. NUREG-0637, Appendix C.

Barrett uses time averaged plume dispersion (Chi/Q).

Barrett assumes the center (highest concentration) of the plume hits the detector.

Barrett then averages many days of releases.

How Much Radiation Escaped?

Barrett	Table #	Dates	Maximum Curies
	2	3/28 – 3/29	14,000,000
	3	3/29 – 3/31	5,600,000
	4	3/31 – 4/1	9,800,000
	5	4/1 – 4/2	1,100,000
	6	4/2 – 4/3	4,300,000
	7	4/3 – 4/4	162,000
	8	4/4 – 4/5	1,100,000
TOTAL			36,062,000

Did the Containment Leak?

Time averaged plume dispersion can be wrong on the low side by a factor of 10.

Center line Chi/Q can be wrong on the low side by a factor of a 1000.

Averaging the data is wrong on the low side by a factor of 3.4.

THE NET EFFECT IS THAT THE NRC'S 10,000,000 CURIES IS DEFINATELY LOW. THE ACTUAL RELEASES COULD BE 100 AND 1000 TIMES HIGHER THAN THE NRC'S ESTIMATE.

How Much Radiation Escaped?

Industry expert John Daniel also assumed 10,000,000 Curies were released. He attempted to calculate this release differently than the NRC by going back and estimating what radiation was in the core, in the containment, and in other buildings.

Gundersen analyzed Daniel's assumptions and showed that using Daniel's own assumptions, the actual release was at least 150,000,000 Curies.

Daniel then changed his assumptions and determined that 17,000,000 Curies were released.

This then shows that the industry's own expert is estimating that more radiation was released than the NRC.

How Much Radiation Escaped?

Recently released records from Hershey Chocolate, as quoted by Dr. Hellen Caldicott, in her book, “Nuclear Power is Not the Answer”, shows that Iodine-131 was measured in milk as far as 150 miles away from TMI in the several days immediately after the accident. This can not be explained using the NRC's presumed radiation releases.



Ramifications of TMI on Nuclear Policy

Based on its assumption that only 10,000,000 Curies were released and that the containment maintained its integrity, the NRC is allowing the industry to:

Reduce the calculated amount of radiation released from an accident.

(Alternate Source Term)

Design for less robust containments.

(Leak Before Break)

Considering reducing the zones in which the evacuation planning is necessary.

Conclusion

An aerial photograph of a nuclear power plant. Three large, white, cylindrical cooling towers are visible, each emitting a thick plume of white steam that rises into the sky. The plant itself is a complex of various structures, including buildings and piping, situated on a flat, open area. The surrounding landscape includes some greenery and a road in the foreground. The sky is clear and blue.

A thorough analysis of the TMI accident indicates that releases were 100 to 1000 times higher than the NRC estimated and that the containment failed after the hydrogen detonation.
