

“Act responsibly and tell the truth” Alvin Weinberg, 1971

(As published in The Oak Ridger’s Historically Speaking column on December 31, 2012)

This *Historically Speaking* column concludes the two-part story brought by Carolyn Krause. She has researched the details and relied on David Hobson, a participant in the events being published here, to give her first-hand accounts of what has to be a significant and pivotal situation where Oak Ridge played a key role for the nation and even the world regarding nuclear reactor safety.

Now let Carolyn conclude the story:

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One day in late 1971, Alvin Weinberg, director of Oak Ridge National Laboratory, called four ORNL researchers to his office. The Atomic Energy Commission, he said, had ordered them to be the AEC’s expert technical witnesses at its Rulemaking Hearing on Emergency Core Cooling [Systems] for Nuclear Power Reactors.

Little did Weinberg know that the testimony of these witnesses would help shape future regulations designed to make reactors safer. The hearing also prompted the breakup of the AEC into an energy research agency and a commission to regulate nuclear plant construction and operation.

The ORNL witnesses were Phil Rittenhouse, leader of the Fuel Failure group that determined the extent to which the cladding surrounding nuclear fuel rods would swell, potentially blocking emergency water coolant during a postulated loss-of-coolant accident (LOCA); group researcher David Hobson, who found that overheated fuel-rod cladding could oxidize in steam, become brittle and rupture; the late William Cottrell, director of ORNL’s nuclear safety program and the late George Lawson, expert on water flow and heat transfer through the fuel core.

According to Hobson, Weinberg told them to “Act responsibly and tell the truth,” adding that ORNL management would protect their jobs. Hobson’s immediate response was this: “I put Alvin on a tall pedestal and he stayed there from then on. What he told us showed that he believed in our work and that it was our duty to see that it got into the hearing record.”

In January 1972 in Bethesda, Md., the AEC started a formal hearing on the adequacy of the June 1971 interim statement on ECCS policy. Aware they would face cross-examination from the AEC, four reactor vendors, utility representatives and the Consolidated National Interveners, the ORNL researchers felt they “were walking into a buzz saw.”

The AEC and nuclear industry would intensely dislike what they had to say. Only the CNI (scientific critics of nuclear power that Hobson called “strange bedfellows”) would want the ORNL testimony in the record. Hobson noted that the interveners’ goal was not to destroy the nuclear power industry but to improve the way it was run.

Physicist Henry Kendall, Daniel Ford and other members of the Union of Concerned Scientists (CNI group) made secret visits to ORNL and the researchers’ houses to learn about their experiments and results. These visits enabled the interveners’ attorneys to ask appropriate questions during cross-examination.

This is the untold part of the story, Hobson said. The use of the interveners to get their testimony into the hearing record made the ORNL witnesses considerably apprehensive during and after the hearing.

“If what we had done during the hearing had become known at that time, all four of us would probably have been either severely reprimanded or even fired,” Hobson said last week, noting that the secret visits were kept secret for 40 years and that the whole hearing experience had a “traumatic effect” on their careers.

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The ORNL witnesses testified at the AEC hearing March 7-10, March 20-21 and April 18-26, 1972. Rittenhouse was ORNL’s lead witness. He was on the stand for 80 hours, and Hobson testified for 40 hours.

Rittenhouse named 30 persons who caused him to lack confidence in the interim ECCS policy of June 1971. Under questioning, he stated that the AEC’s analysis of water flow blockage during a LOCA “was unreasonable and arbitrary.”

Lawson also testified that he would not change the conclusions of the document “ECCS for Light-Water-Cooled Power Reactors” that he authored in 1968. The nuclear industry was displeased.

Cottrell’s withdrawn letter challenging the interim ECCS policy was mysteriously picked up from his hotel bed and introduced into the record. It was a bombshell, Hobson said.

On Apr. 26, 1972, Cottrell, Hobson and Rittenhouse were questioned about the contractual arrangements that ORNL had with the AEC for the lab’s research and the reason AEC’s reactor chief Milton Shaw stopped the contracted research.

After the ORNL experts completed their testimony, the hearing continued until Dec. 11, 1972. The Atomic Safety Licensing Board issued its verdict on Dec 31, 1973.

The ORNL witnesses were elated to learn that the criterion that they “had taken so much flak about had been changed” into two criteria. One criterion lowered the allowed peak Zircaloy cladding temperature from 2300 to 2200°F, and the other provided a limit on the maximum calculated local oxidation (which can lead to embrittlement and rupture of nuclear fuel rods).

“This was exactly what we had been fighting for,” Hobson said.

In addition to increasing nuclear reactor safety in the 1970s, the AEC rulemaking hearing had another important effect. Like a nucleus undergoing fission, the AEC was split into the Energy Research and Development Administration (which became the U.S. Department of Energy in 1978) and the Nuclear Regulatory Commission.

New studies of cladding-coolant interactions in nuclear plants were funded at \$14 million. But Rittenhouse and Hobson were forbidden from continuing this research or interacting with those who did. And they were subtly harassed by the nuclear industry.

Several years later, the results of the new ECCS-related testing programs were released. “Our original work on fuel-rod failure stood the test of time very well,” Hobson said. “The early findings we had defended in the hearing had been added to and refined, but they had never been disproved. We were vindicated!”

In his Oak Ridge Institute for Continued Learning class, Hobson noted that the ECCS worked well during the Three Mile Island nuclear power plant accident in 1979. The problem was that the operators turned it off twice because they feared the reactor vessel would overfill. “If the operators had just left the reactor alone, there would have been no accident,” he said.

Concerning the radiation-releasing accident at Japan’s Fukushima reactors in 2011, Hobson said, “I do know that a power failure caused by the earthquake and tsunami took out the pumps supplying coolant to the reactor cores.

“The cores melted and the hydrogen generated in conjunction with the steam-cladding reaction exploded and blew the top off the reactor containment. This led to the terrible release of contamination to the outside.

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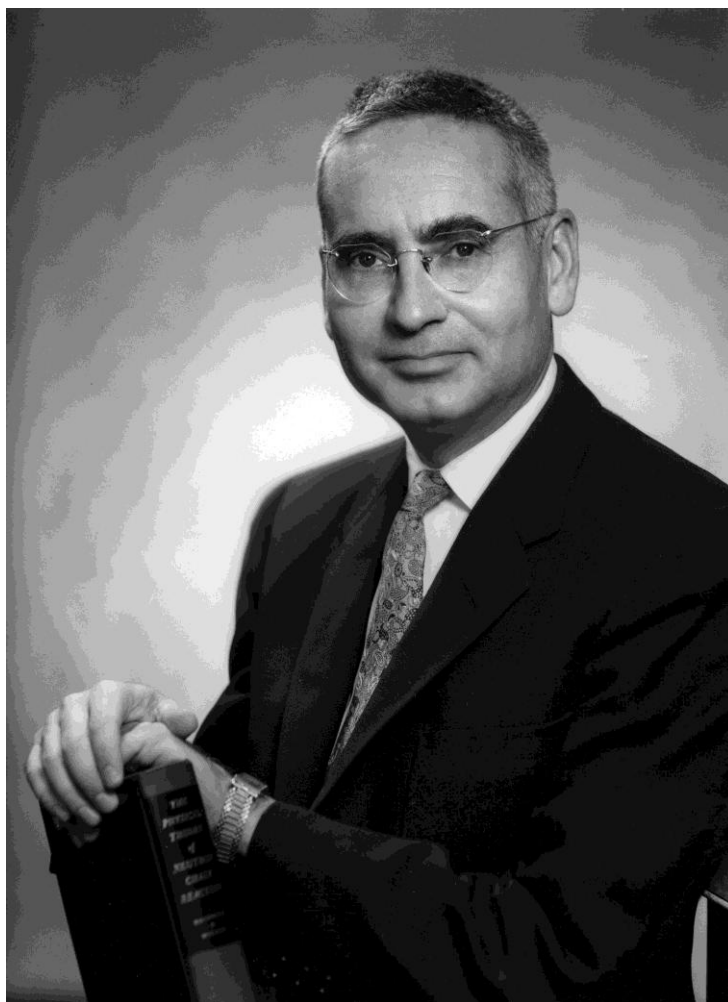
“It’s ironic that the two times ECCS was called upon to save a reactor, the system failed, not because of the system itself, but because of either human error or an event whose magnitude was totally unexpected and for which the system was never designed.”

Fortunately, almost all nuclear power plants in the world have operated safely and reliably, providing much-needed electricity to millions.

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Thanks Carolyn for another most interestingly detailed glimpse into the unique Oak Ridge history that is not well known. It is amazing when one realizes that scientists from Oak Ridge have been called on in such key testimony that helped result in the alteration of a federal agency and established nuclear reactor safety criteria that has stood the test of time. Again, Oak Ridge's role leads the world where nuclear issues are concerned.

And where else in the world could one attend a class (ORICL) where such world changing history is discussed and the one leading the discussion is the person who was one of the individuals involved in the key testimony! Oak Ridge is one of a very small number of such places in the whole world!



In 1971 ORNL Director Alvin Weinberg told AEC’s four expert witnesses based at ORNL to “act responsibly and tell the truth.”

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ORNL’s George Lawson disappointed the nuclear industry when he testified at AEC’s rulemaking hearing in 1972 that he stood by the conclusions of the “ECCS for Light-Water-Cooled Power Reactors” document that he wrote in 1968.