WE ALMOST LOST DETROIT

JOHN G. FULLER

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the temperature readings on the subassemblies and other indicators showed that something was happening in the core that was very real. And so at 3:20 P.M., eleven minutes after the radiation alarm had gone off, the decision was made to manually scram the reactor. The question: Was this too soon or too late?

All the rods went down into the core normally, except one. It stopped six inches from the full "down" position. This was no time to take a chance. A second manual scram signal was activated. The reluctant rod finally closed down fully.

Ken Johnson made his way to the control room. The red light in the corridor which had read REACTOR ON, was no longer on, so he knew now that the reactor had been scrammed. The control room was quiet; operators for the new shift were coming in; several staff members were checking instruments and charts, trying to find out what the trouble was. Johnson knew immediately that it was something serious, something a lot more than a faulty seal. He found Mike Wilber very concerned about the situation; especially the high temperature readings in the core. All the signs seemed to be pointing to a fuel melting situation, and there wasn't a nuclear engineer in the business who didn't know what that could mean.

Walter McCarthy was in a conference in downtown Detroit when it happened. He got a call from Bill Olson, the plant supervisor, who told him that there definitely was evidence of fuel damage, that the reactor had been scrammed, and that the containment building had been isolated with high radiation levels. McCarthy called his wife to say he wouldn't be home for dinner. Then he tried to reach Walker Cisler, who was in New York at the time. He couldn't reach Cisler, so he took off immediately for Lagoona Beach.

When he arrived at the Fermi control room, there was still confusion as to what had happened. The critical question

remained: Was there fuel melting or not? With direct observation impossible, the problem would boil down to instruments, deduction, and a prayer. The only hope for future inspection was to drain the thousands of gallons of the thick, opaque sodium out of the reactor, and then, with infinite care, to try to probe the bowels of the core to see what had happened. This was, of course, impossible at the moment.

McCarthy didn't need to be reminded of the words of J. R. Dietrich in the nuclear engineer's Bible:

> In all but the smallest and most compact fast reactors, the agglomeration of even a fraction of the total fuel into a compact mass will usually result in a highly super-critical assembly. . . .

Some kind of fuel melting was suspected by Mike Wilber, and if his theory was correct, the melting could be in more than one fuel subassembly. The question here was: How much fuel had melted, what was the condition of the core, and what were the chances of a secondary accident?

Again, Dietrich had given a very clear and terrifying picture of this:

> In a fast reactor, the dynamic portion of a reactor accident cannot be considered to end with the general melting or thermal failure of fuel elements. On the contrary, it is conceivable that the serious portion of the accident may only begin at that point.

It didn't take long to deduce that there was definitely fuel melting, and that it wasn't confined to a single subassembly. If there was melting in several subassemblies, it would create a situation that would require extreme caution.

Almost immediately after he arrived at the plant, McCarthy called a meeting. Every available key man of the Fermi team was there—Olson, Wilber, Jens, Amorosi, Johnson, and others—some of whom had nursed the plant from its infancy, for over a decade. Alexanderson was to arrive later.

The prime questions were: Is the reactor secure? Would it stay secure? What could be done to explore the accident that wouldn't trigger a secondary accident more terrible than the first? The urgent, burning priority was to make sure that no hazardous condition existed in the core. The potential hazard was of course enormous, and the lack of experience in handling fast breeder accidents made the situation fraught with danger. Further, no provision had been made in the design for investigating and recovering damaged fuel elements.

To say that the Fermi team was sitting on top of a powder keg would be a major understatement. The threat of a secondary accident was, as McCarthy was to say later, "a terrifying thought. . . ."

However terrifying the situation, it was staring the Fermi crew in the face. The keynote was *uncertainty*. There were few road maps to go by. No one at the hastily called meeting knew exactly what had happened within the reactor core. No one knew what would happen if they tried to look inside it—or how to look inside it. The most probable cause of fuel melting was the blocking of the sodium coolant.

McCarthy took command by saying: "*We will go at this very, very, slowly.*" Before any kind of exploration of the condition of the reactor, a procedure would have to be written. It would have to be checked and double checked before any attempt to put it into action would be permitted. Again, there could be no margin for error.

Outside of the tense atmosphere in the Fermi plant conference room, there was no outward sign of trouble at Lagoona Beach. Speculation about a peacetime nuclear accident had been kept in such a low profile by the AEC that hardly anyone would be likely to think about it. A coal mine disaster, a chlorine explosion, an ammunition ship blowing up—all were tragic sorts of things that could happen. But none of them threatened to contaminate a whole state or to kill in such potentially massive