

Japan's nuclear accident: a case of financial sabotage

by Marjorie Mazel Hecht

Although ongoing Japanese investigations of the accident at a nuclear fuel conversion plant in Japan on Sept. 30 continue to amass details of what occurred, the most glaring cause of this industrial sabotage—cost-cutting to squeeze out more profits in a depressed economy—goes unmentioned.

The physical events of the accident remain essentially as first reported: Workers at the JCO Company Ltd. nuclear fuel conversion facility in Tokai, Japan, poured seven times the correct amount of uranium into a mixing container, setting off a chain reaction that seriously injured three workers and exposed 46 others at the plant to higher-than-normal radiation. The accident, Japan's first involving criticality—uranium fissioning outside of a reactor vessel—was rated as level four (out of seven) on the International Nuclear Event Scale, which is defined as an accident without significant risk outside the facility.

The fuel conversion plant, which is owned by Sumitomo Metal Mining Co. Ltd., processes enriched uranium hexafluoride into powdered uranium dioxide for use by nuclear fuel fabrication companies. The workers poured 35 pounds of uranium liquid into a container that is supposed to be limited to about 5.2 pounds. They were using steel buckets, instead of the prescribed equipment, in order to complete the job faster.

At the time of the accident, the workers were preparing fuel for Japan's experimental fast-breeder reactor, Joyo, which requires uranium enriched to a level of 18.8%, instead of the 3.5% to 5% level used for ordinary light-water fission reactors. (Enrichment increases the proportion of the fissionable uranium isotope U-235 to the non-fissionable U-239.) This is a task the plant carries out only occasionally; the last time was three years ago.

The bottom line

Why were the workers taking shortcuts and rushing to complete the fuel preparation? The JCO plant, like many others in Japan's depressed economy, had been restructured, to make it more "profitable." The workforce went from more than 300 to just over 100 today, while the workload has remained the same. Hence the motivation to take shortcuts. In

this case, Japanese press reports indicate that the workers were told just before the accident to prepare the fuel mixture even faster than usual. In addition, it is widely reported in the press, from interviews with plant workers, that an underground manual of how to prepare the fuel in less than half the normal time had been used at the plant for about 10 years, with management winking at the circumvention of safety procedures.

Another by-product of the cost-cutting is lower worker morale. As one Japanese source told me, downsizing has often occurred in Japanese industries, by "relocating" workers from the main office of the company to the boondocks—subsidiaries in far-flung places. The relocated workers are often unhappy in the new location; morale is low, and when they leave the company, their jobs are not filled.

The source noted that these nuclear fuel jobs are shunned by the more educated workers in the population, who no longer will work at any such 3-K jobs—3-K standing for *kitsui*, *kitanai*, and *kusai*, or hard, dirty, and smelly. Therefore, he said, only the lowest-level workers do this work, and the company does not take the time to train them. In this case, according to Japanese press reports of interviews with workers and supervisors, they knew nothing about the dangers of "overbatching" the uranium mixture, or of how to prevent a criticality accident. It is therefore conceivable that the three men preparing the nuclear fuel had no knowledge of how what they did might set off a nuclear chain reaction, endangering themselves and others.

It is also conceivable that in this type of situation, where oversight controls are minimal, there could have been deliberate sabotage.

Regulatory oversight

An obvious question for anyone familiar with the multiple layers of control in the U.S. nuclear industry, is, where was the regulatory oversight in this highly regulated nuclear industry in a highly regulated country?

One answer is that the nuclear regulatory command in Japan is bifurcated: The nuclear plants come under the regulatory umbrella of the Ministry of International Trade and In-

dustry (MITI), while the front end of the nuclear cycle, fuel processing and fabrication, is regulated by the Science and Technology Agency.

According to one U.S. nuclear expert who visited Japan shortly after the accident, the MITI regulatory controls are very stringent, and the Japanese nuclear plants' excellent operating record reflects this control. But the fuel-processing end of the industry was allowed to drift, and company cost-cutting took its toll without government oversight. One unofficial scientific report on the accident, circulating in the nuclear community, notes that there have been no periodic safety reviews, no system of training and qualifying supervisors of staff, and no preparations for accident management measures. Even the anti-nuclear groups ignored these fuel production and processing plants, one Japanese source said.

Nine years ago, according to one report, the Science and Technology agency had issued a new technical guide for production facilities that handle uranium enriched to more than 5%, noting that the possibility of a criticality accident should be assumed, and safety measures should be taken accordingly. Apparently, however, the management at JCO claimed not to have seen the new guide, and therefore did not have the enhanced safety procedures in place.

If the JCO workers had been trained technicians, another U.S. nuclear source said, they might have gotten away with shortcuts, but these workers were so untrained that they "didn't even know where the edge of the cliff was."

Now, this source said, Japanese nuclear officials are working 24 hours a day to solve the problem, to restore what they call the safety culture, and to initiate inspection programs and perhaps even a resident safety inspector at each plant.

U.S. regulatory procedures

Commercial nuclear fuel facilities in the United States have not had a criticality event in the past 35 years. Plants are inspected and safety procedures reviewed before the plant can begin operations, and there are detailed analyses of the specific controls that are in place to prevent situations of criticality. The safety controls are designed, according to a recent Nuclear Regulatory Commission press release, to ensure that "two unlikely and unrelated events must occur before a criticality is possible." There are also alarms in all facilities where nuclear material is stored, and regular safety drills and inspections.

At facilities that handle uranium of higher enrichment, as does the JCO plant, there are full-time resident safety inspectors.

After the Japanese accident, U.S. commercial nuclear fuel facilities announced that they were conducting self-assessments of their criticality programs, taking into account what happened in Japan and the possible lessons to be learned.

Three U.S. scientists went to Japan in mid-October on a

Department of Energy mission to study the accident, especially to note similarities to other criticality accidents that have occurred, since the late 1950s, mainly in the Russian and U.S. weapons programs. In their report-back press conference in Washington, D.C. on Oct. 22, the U.S. experts noted that the Tokai accident was not unlike the 21 other criticality incidents they have studied. According to a draft report prepared by a group at Los Alamos National Laboratory, 20 of the 21 criticality accidents occurred when the fissionable material was in liquid form; human error, not equipment failures, was to blame; and none of the accidents resulted in "measurable radiation consequences . . . beyond the facility to either people or the environment."

The Department of Energy team provided further details of the mechanics of the accident: The Japanese workers were trying to dissolve uranium powder into a liquid, working with buckets with about eight pounds of uranium at a time, they said. They then used smaller beakers to pour the solution into a large cauldron. The change in the geometry and volume of the containers, the DOE team said, heightened the danger of setting off a nuclear reaction. The solution went critical when the workers poured the seventh beaker of the solution into the cauldron.

Cui bono?

Japan now relies on nuclear power generation for 36% of its electrical requirements, with plans to develop the full nuclear cycle—reprocessing of spent reactor fuel, fast-breeder reactors to create new fuel, and later fusion—by the mid-21st century, and to put 10 new nuclear plants on line by 2010. For an island nation without oil or coal reserves, nuclear is the way to energy independence, and Japan intends to pursue this goal, despite opposition from the environmentalists and the oligarchical financial forces that would prefer an energy-dependent, and hence more manipulable, Japanese nation.

Highlighting the pressure put on Japan on the nuclear issue, Standard & Poor's rating agency announced on Oct. 5, that "the accident calls into question the viability of Japan's nuclear power plan," as reported in *Nihon Keizai* newspaper. Other press reports happily warned that this accident would do to Japan what the accident at Three Mile Island did for the U.S. nuclear industry: Shut it down. So far, however, the Japanese government has not succumbed to such pressure.

In the aftermath of the accident, the Japanese government will reorganize its oversight of the industry, improve regulatory controls and their enforcement, and see that the industry pays a price for its negligence. However, the systemic problem—letting marketplace cost-cutting rule, no matter what the consequences to human life—is not being addressed, not even in a superficial way. Until that happens, no one is safe from the predations of the marketplace.