

INSIDE FUKUSHIMA: How workers tried but failed to avert a nuclear disaster

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THE ASAHI SHIMBUN

Recorded exchanges between staff at the Fukushima No. 1 nuclear plant and officials at Tokyo Electric Power Co. headquarters offer stark vignettes of repeated human error and a grimly farcical hunt for supplies such as car batteries, as Japan's worst-ever nuclear accident disintegrated into a veritable man-made disaster.

Reactors No. 1, 2 and 3 overheated and their fuel melted down; explosions destroyed equipment and buildings; and a fuel storage pool at the No. 4 reactor building became dangerously unprotected.

In August 2012, TEPCO released recordings of company teleconferences. The following blow-by-blow account is based on transcripts of those conversations.

They show how time was lost as slow reactions by TEPCO officials belied the urgency of events unfolding. Attempts to secure supplies lacked strategy. And some of the demands company managers made of on-site staff were unreasonable, at best.

(All professional titles and names of organizations are presented below in their correct form as of March 2011.)

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A DAY WASTED

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"As some time has passed since the fuel rods became exposed, there is the possibility that a core meltdown has taken place." The day after the March 12 explosion at the plant's No. 1 reactor building, TEPCO failed to notice what it should have been watching closely for--a drop in the water level inside the No. 3 reactor core.

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One of the reasons why the meltdown could not be averted was that No. 3 reactor's pressure vessel high-pressure coolant injection system (HPCI) had stopped working. The plant manager did not know this until 70 minutes later.

Masao Yoshida, general manager of the Fukushima No. 1 nuclear plant and a central figure throughout this account, reported the halt of the HPCI at 3:52 a.m.

"Um, there's been a change at the No. 3 unit, so I'm reporting it. It's the HPCI. It stopped working once at 2:44 a.m."

A later investigation found that the HPCI actually halted at 2:42 a.m. on March 13.

The pressure inside the reactor had risen more than fivefold, rendering regular fire hoses useless for pumping water into the reactor. A boric acid solution injector would have been a satisfactory alternative to the HPCI, but its power cable had been damaged and was unusable. Therefore, before coolant could be injected, the internal pressure would need to be eased by venting the reactor containment vessel.

But at 5:23 a.m., a plant worker told Yoshida that venting would be delayed: "I'm so sorry, Mr. Yoshida, so sorry. In order to open the venting valves, we must change the cylinder immediately, and this will take about half an hour."

The venting valves were opened about half an hour after a core meltdown was reported at the Fukushima No. 1 plant.

By the time the main steam safety-release valves of the pressure vessel had been opened and water successfully pumped in using fire hoses, it was 9:20 a.m.

LET'S CALL IN THE ARTILLERY

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At 9:42 a.m., Yoshida voiced concern about a possible hydrogen explosion at the No. 3 reactor due to fuel damage. A marathon teleconference ensued, during which contributors discussed in vain ways to prevent a hydrogen explosion. As a result, the rest of March 13 was effectively wasted.

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TEPCO headquarters conveyed a directive it had received from the Nuclear and Industrial Safety Agency: "Since we think an explosion like the one that occurred at the No. 1 reactor is possible (at the No. 3 reactor), you might consider, for instance, opening the blowout panel (to let hydrogen escape)."

But TEPCO concluded at 1:36 p.m. that this would be difficult.

"We have considered opening the blowout panel, among other measures, but we have decided that would be difficult for physical as well as safety reasons."

From 2:45 p.m., ideas voiced on both sides--at TEPCO headquarters and at the Fukushima No. 1 plant--became more of random thoughts than constructive ideas. How would they open the blowout panel?

"One option could be to force it open from above, from a helicopter."

"I know this sounds pretty far-fetched, but how about we ask the Self-Defense Forces to use weaponry to blow up the panel?"

From the early evening of March 13, gasoline and water shortages became acute, and most of the discussions began to focus on how to secure new supplies.

From 10:40 p.m., the focus shifted to planned rolling blackouts. "I am being swamped with requests from government offices and everywhere, pleading to be exempted from the rolling blackouts. If we accommodate them, our plans to save power will simply collapse. So please, I must ask you all to be absolutely firm in turning down their requests."

EXPLOSION

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At 6:25 a.m. on March 14, a panicked Yoshida called TEPCO Managing Executive Officer Akio Komori at company headquarters. Yoshida's voice broke as he reported, "Oh Mr. Komori, the water level! The water level's fallen."

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The water level in the No. 3 reactor had dropped below measurable levels, and all fuel rods inside were fully exposed.

Half an hour earlier, there had been signs of what to come.

The plant was running short of water, so the work to pump water into the reactor had to be suspended once. When the work resumed, the pressure inside the containment vessel proved too high, rendering the pumping difficult.

Yoshida reported: "The fact that the pressure is rising in the dry well (upper part of the containment vessel) means that, like at the No. 1 reactor, a hydrogen explosion is now a possibility. Even though we vented successfully yesterday and brought the pressure down, it's rising again. I'm saying we must monitor the situation very closely."

Repeated attempts were made to vent the containment vessel, but each time the venting valves closed again quickly.

At 11:01 a.m. on March 14, the video image showing the emergency response room at the Fukushima No. 1 plant, where a teleconference was in progress, shook violently and vertically.

Yoshida shouted 50 seconds later: "We've got a big problem. The No. 3 reactor just blew. Probably a steam explosion."

Then, at 12:50 p.m., the plant reported that the explosion at the No. 3 reactor had damaged the electric circuit for opening the venting valves on the No. 2 reactor.

Work then began in vain to get the No. 2 reactor valves to open. On March 15, that reactor began to spew a massive amount of radioactive materials.

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