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# Mitsubishi Quietly Cleans Up Its Former Refinery

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BUKIT MERAH, Malaysia — Hidden here in the jungles of north-central Malaysia, in a broad valley fringed with cave-pocked limestone cliffs topped with acacia and durian trees, lies the site of the largest radiation cleanup yet in the rare earth industry.

Residents blamed a rare earth refinery for birth defects and eight leukemia cases within five years in a community of 11,000 — after many years with no leukemia cases. Seven of the leukemia victims have since died.

The Bukit Merah case is little known even elsewhere in Malaysia, and virtually unknown in the West, because Mitsubishi Chemical quietly agreed to fix the problem even without a legal order to do so. Local protesters had contacted Japanese environmentalists and politicians, who in turn helped persuade the image-conscious company to close the refinery in 1992 and subsequently spend an estimated \$100 million to clean up the site.

Image-burnishing was important because the company is part of the Mitsubishi Group of Companies, which has long made Malaysia the cornerstone of its southeast Asian operations. The group has dominant positions in manufacturing a range of products, including air-conditioners and cars.

Mitsubishi Chemical also reached an out-of-court settlement with residents here by agreeing to donate \$164,000 to the community's schools, while denying any responsibility for illnesses.

Osamu Shimizu, the director of Asian Rare Earth, the Mitsubishi Chemical subsidiary that owns the mine, declined to discuss details of the factory's operation before it closed in 1992. But he said that the company was committed to a safe and complete cleanup.

Workers in protective gear have already removed 11,000 truckloads of radioactively contaminated material, hauling away every trace of the old refinery and even tainted soil from beneath it, down to the bedrock as much as 25 feet below, said Anthony Goh, the consultant overseeing the project for one of Mitsubishi's contractors, GeoSyntec, an Atlanta-based firm.

To dispose of the radioactive material, engineers have cut the top off a hill three miles away in a forest reserve, buried the material inside the hill's core and then entombed it under more than 20 feet of clay and granite.

The toughest part of the Bukit Merah cleanup will come this summer, when robots and workers in protective gear are to start trying to move more than 80,000 steel barrels of radioactive waste from a concrete bunker. They will mix it with cement and gypsum, and then permanently store it in the hilltop repository.

The refinery processed slag from old tin mines — material rich in rare earth ore. The company and Malaysian regulators said that it was statistically possible that the leukemia cases were a coincidence because tin mining towns tend to have above-average levels of background radiation. But an academic study of another tin mining town suggested that communities of Bukit Merah's size should only have one leukemia case every 30 years.

Lai Kwan, aged 69, still recalls how she cheerfully moved in the 1980s from a sawmill job to a better-paying position in the refinery that involved proximity to radioactive materials. She remembers that while pregnant, she was told to take an unpaid day off only on days when the factory bosses said that a particularly dangerous consignment of ore had arrived.

She has spent the last 29 years washing, dressing, feeding and otherwise taking care of her son from that pregnancy, who was born with severe mental and physical disabilities. She and other local residents blame the refinery for the problems, although birth defects can have many causes.

“We saw it as a chance to get better pay,” Ms. Lai recalled. “We didn't know what they were producing.”