Book Review

Is the era of electronuclear power drawing to a close?

Nuclear Servitude: Subcontracting and Health in the French Civil Nuclear Industry.
Annie Thébaud-Mony
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Behind every permanently contracted worker in charge of maintenance in the French nuclear industry are eight or nine 'outside workers' who perform the indispensable manual labor of maintenance, repair and clean-up of the installations. This labor system enables the French company, Electricité de France (EDF), to deal with the unavoidable occupational exposure to radioactivity in maintenance activities. EDF subcontracts such activities to companies that often themselves subcontract tasks to other companies or hire temporary workers. In France, this division of labor represents a division of risk: 'outside workers' are, in the majority, temporary employees, sometimes of foreign origin, employed by companies that EDF subcontracts with to do maintenance work. These 'outside workers' receive 80 per cent of the collective exposure to ionizing radiation.

Outside workers are the subject of Annie Thébaud-Mony's excellent and engrossing book, *Nuclear Servitude: Subcontracting and Health in the French Civil Nuclear Industry*, which is based on her 6-year study of maintenance work in the nuclear power industry. Thébaud-Mony interviewed not only workers, but also company doctors, mine and worksite inspectors, union representatives, engineers, and members of the government offices and institutes that control nuclear research. She supplemented interviews with analyses of regulations, legislation, employee training courses and two public hearings plus a conference on radiation protection. The study was financed by INSERM (the French national health research institution), the Ministry of Labor, and public funds for public health research. Originally published in French in 2000, the editors of Baywood's Work, Health and Environment Series

were prescient in commissioning an English translation, which appeared just before the accident in Japan.

EDF currently operates 58 nuclear reactors on 20 sites in France; they supply 78 per cent of the electricity produced in the country. Headquartered in Paris, with €65.2 billion (about $93.3 billion) in revenues in 2010, EDF is the world's largest utility company.[1] Nuclear power represents three-quarters of its European business. EDF was founded in 1946, following the nationalization of several electricity producers, transporters and distributors. Until 2004, EDF was a state-owned corporation, but now operates as a limited-liability corporation under the laws covering the private sector. As of 2008, the French government retained almost 85 per cent ownership. Each year, EDF contracts with more than 1000 subcontracting companies who employ 20 000–30 000 'outside workers' to maintain nuclear installations – dangerous and difficult tasks that expose them to ionizing radiation.

The health consequences for these exposed workers are magnified by the government's reliance on the industry's out-dated model of radiation risk. The model, adopted by the International Commission on Radiation Protection (ICRP), is based on extrapolations from the exposure suffered by Japanese living in Hiroshima and Nagasaki when the United States bombed the cities with nuclear weapons in August 1945. The ICRP understands cancer to be the effect of a single event, although the Atomic Bomb Casualty Commission looked at both the acute effects of radiation from the bombs and the exposure to fallout in the environment, that resulted in some inhalation and ingestion, not simply the direct alpha, beta and gamma radiation from the nuclear detonation.

Workers in the nuclear industry are chronically exposed to low doses of ionizing radiation over a long period of time. Exposure in the working environment entails the regular inhalation or ingestion of radioactive particles. Workers' bodies respond to this internal exposure by retaining or purging radioactive particles, which play a role at various stages in carcinogenesis and cause immune and endocrine system disorders.

French academicians have consistently contested the notion of a no-threshold linear relation between ionizing radiation and cancer. The European Committee on Radiation Risks reported in 2003 on the effects of low-dose radiation, citing cellular biology studies and a series of experimental, epidemiological and observation studies, including

studies of the health consequences of the Chernobyl disaster done by Russian and Belarusan researchers. These investigations call into question the validity of the ICRP-established model based solely on results of the cohort study of survivors of the Hiroshima and Nagasaki bombings.

Nuclear Servitude is first, a story of the risks to the health and safety of individual 'outside workers' who suffer the devastating consequences of precarious employment and sometimes tragic effects on their health and equilibrium and that of their families. Some workers who were in their twenties when hired developed cancer in their fifties. *Nuclear Servitude* also relates the consequences for society of this division of labor, because the maintenance work is organized to increase productivity and efficiency so as to raise the profitability of the industry, not to protect public health.

The negative consequences of using subcontractors, vividly demonstrated in the stories told by the workers, include the failure to capture knowledge for public health and retain practical experience about nuclear reactors. An especially galling practice is 'return on experience' which might have meant learning from the accumulated experience of workers. Not so, as it refers to the history of plant components. Those that have posed no problems at annual inspections are not inspected in subsequent years. In this way, the maintenance process bypasses the know-how veteran workers have acquired and makes their contribution invisible. It allows EDF to attach more importance to the tests that measure acquisition of theoretical and formal knowledge. In the end it undermines nuclear safety – for all of us.

Magnify this French picture by an additional 383 commercial nuclear power reactors in 46 additional countries (not to mention research reactors and the reactors that power ships and submarines, see www.world-nuclear.org). Another 60 reactors are under construction. China, which currently operates 13 plants, has 28 under construction.[2] Many aging rectors must be dismantled in the next two decades. Then in March 2011 the Japanese nuclear installation, Fukushima Daiichi, experienced a 9.0 earthquake followed quickly by an enormous tsunami. Because the Japanese government and Tokyo Electric Power Company (TEPCO), the company that operates the installation, colluded in downplaying the gravity of the disaster, we still do not know the full extent of the consequences for workers or the surrounding communities of the melt-down.[3] *Nuclear Servitude* had

noted that Japanese nuclear power plants are organized along lines similar to those in France, with a permanent workforce of skilled cadres and a 'gypsy' or 'nomadic' workforce hired specifically to do subcontracted maintenance tasks (p. 6).

> The characteristics of maintenance work organization in Japanese nuclear plants are very similar to those in French ones: subcontracting; marked inequality between permanent and subcontracted workers when it comes to exposure to radiation and radioactive contamination; employment threatened if regulation-specific radiation dose is exceeded; intense mobility of workers among the various nuclear power plants.

The New York Times carried one story on the Japanese workers at Fukushima Daiichi, explaining that 89 per cent of the 10 303 workers were untrained, itinerant, temporary laborers who 'handle the bulk of the dangerous work at nuclear power plants here and in other countries, lured by the higher wages offered for working with radiation'.[4] The temporary workers were exposed to levels of radiation about 16 times higher than the levels faced by TEPCO permanent employees. Temporary workers 'remain vital to efforts to contain the nuclear crisis at the Fukushima nuclear plants'.

In the United States, it is also common practice to use temporary workers, but their status varies according to the type of contract: they may be independent workers, members of professional skilled worker unions, or hired by 'job shops' that serve as *supply and demand intermediaries* to ensure management of work contracts (similar to French temporary agencies). Plant owners (who may be public utilities or private corporations) contract with companies (subcontractors) to perform certain functions. In turn, these subcontractors hire workers, often temporary workers, to do particularly dangerous jobs. The same lack of knowledge of the effects of low-dose radiation on nuclear workers exists in the United States with the same failure to distinguish between permanent and temporary workers.[5]

At the end of her book, Thébaud-Mony deplores the lack of research, especially epidemiological studies with tested protocols to quantify occupational health risks and workplace dangers. Instead, since the 1970s, the focus in France has been on the 'risky' individual worker. She calls for multidisciplinary studies of all work, including

subcontracted work plus prospective studies of unit shutdowns. She asks for the integration of occupational health research into permanent surveillance of workers, and she recommends the development of hypotheses about health damage to these workers.

Perhaps the most impressive part of this study, beyond its meticulous collection of original sociological data, is the ability to connect the health and safety problems in nuclear power plants with larger issues of work organization and the division of labor. Finally, she asks (p. 236):

> What kind of public health policy, what kind of institutional vigilance, will allow us to effectively protect the health of the 'temporary and subcontracted' operators who will be performing – for French society as a whole – the tasks required for managing this [nuclear] waste?

One might ask the same questions of the current Administration in the United States and all other governments that are contemplating a revival of nuclear power to solve their energy problems.

References

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