Chapter 21

The Middle Ground for Nuclear Waste Management: Social and Ethical Aspects of Shallow Storage

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ABSTRACT

The 2001 terrorist attacks in the USA and the 2011 seismic events in Japan have brought into sharp relief the vulnerabilities involved in storing nuclear waste on the land’s surface. Nuclear engineers and waste managers are deciding that disposing nuclear waste deep underground is the preferred management option. However, deep disposal of nuclear waste is replete with enormous technical uncertainties. A proposed solution to protect against both the technical vagaries of deep disposal and the dangers of surface events is to store the nuclear waste at shallow depths underground. This paper explores social and ethical issues that are relevant to such shallow storage, including security motivations, intergenerational equity, nuclear stigma, and community acceptance. One of the main ethical questions to emerge is whether it is right for the present generation to burden local communities and future generations with these problems since neither local peoples nor future people have sanctioned the industrial and military processes that have produced the waste in the first place.

INTRODUCTION TO SHALLOW STORAGE

Nuclear waste comes in a variety of forms, ranging from low level radioactively-contaminated materials, such as radiated clothing and equipment, to high level radioactive waste such as spent nuclear fuel rods and plutonium. The high-level waste is incredibly dangerous; if a human were to ingest just micrograms, Fetter and von Hippel (1990) point out, it would probably be a fatal dose. The low-level waste is also very dangerous if not contained properly since its escape into the human environment could cause large increases in cancer rates (Perlic, 1990).
Technical approaches about how to store or dispose of nuclear waste stress the importance of the following question: ‘where do we put it?’ Most of the time, the proposed answer to this question involves discussions about how to isolate the waste from the human environment. Suggestions in this matter are numerous and varied (NRC, 2001; Alexander & Mckinley, 2007) from burying it deep below the Earth (usually two to four kilometres), to dispersing the waste far away into open ocean spaces, or even launching it into extraterrestrial space.

All of the above are problematic for technical reasons, political reasons, managerial reasons and ethical reasons, and all the above should be approached within the scope of technoethics, since they involve problems about a) technologically created pollution, b) unevenly distributed environmental risk, and c) democratically-dubious technical decision-making. For instance, the decision to bury nuclear waste more than a few hundred metres below the surface will probably subject future peoples and the local environment to the vagaries of untried technologies, uncertain geological knowledge and probable hydrological return of radioactive liquids. Dispersing waste into the oceans would undoubtedly contaminate marine life and probably devastate some ocean resources. Blasting nuclear waste into space makes the human environment vulnerable to a Challenger or Columbia-type accident that would create radioactive fall-out in hemispheric proportions.

Given the problems noted above, an alternative answer to the question ‘where do we put it?’ might rely less on final disposal—which can never fulfill its promise to permanently isolate radioactive waste from the human and natural environment—but to leave it on the surface where it can be watched and taken care of. This solution keeps the waste visible and actively-managed instead of hidden and buried away where it may do unpredictable things in the near or long-term future. This ‘surface storage’ idea was often-supported waste management option until a) the 2001 terrorist attacks in the USA, and b) the 2011 seismic events in eastern Japan. These events showed up the vulnerabilities of nuclear facilities located on the surface. Before these events, though, the real reason that surface stores were popular and supported usually revolved around their relative ease of construction and lower cost rather than some higher ideals to do with good management of environmental risk.

It should probably be considered quite strange that surface stores have become seen as ‘very risky’ only in the past 10 years since, throughout the history of the ‘Atomic Age’, numerous accidents have occurred at surface storage sites. A very short list could include the following events:

- The 1957 Kyshtym nuclear waste accident, Russia (in which a cooling system failure in a waste facility failed, resulting in massive and widespread radioactive contamination),
- The 1966 US Air Force nuclear accident, Spain (in which nuclear material was spread about the Spanish coastal country-side as a result of two planes colliding, before being buried—both physically and politically),
- The 1967 Mayak nuclear waste accident, Russia (in which unsecured radioactive dust blew off of a containment site before contaminating large populated areas).
- The 1972 West Valley nuclear waste accident, USA (in which 600,000 gallons of high-level wastes leaked into the environment, including Lakes Ontario and Erie).
- The 1973 Hanford nuclear waste accident, USA (in which thousands of cubic meters of radioactive waste flowed out of a nuclear weapons complex),
- The 1981 Muroroa nuclear waste accident, French Territory (in which a tornado washed nuclear waste from a French nuclear site into a Pacific lagoon).
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