

LOW-LEVEL RADIOACTIVE WASTE DISPOSAL FACILITY SITING—SUCCESSSES AND FAILURES IN SIX COUNTRIES by Anna Vari, Patricia Regan-Cirincione and Jeryl L. Mumpower. Dordrecht, The Netherlands: Kluwer Academic Publishing Technology, Risk, and Society International Series in Risk Analysis, 1994.

This book was written as part of a project sponsored by the New York State Energy Research and Development Authority, apparently to find out what went wrong in its effort to establish a Low Level Radioactive Waste (LLRW) disposal site in the State of New York. Despite the large sums of money spent since the early 1980s, no permanent, accepted solution was found to the problem of disposal of the LLRW generated by industrial, medical and research activities, as well as by the commercial nuclear power reactors in New York State. As the authors point out, most of the problems encountered are social, not technical, and in the book they use an organizational 'competing values' framework to compare and contrast efforts to establish LLRW sites in six countries—five sites in the USA and five in European countries.

The competing values framework shows the conflicting demands and goals encountered in any organizational decision-making process, such as whether the process is flexible or controlled, or how the desires of the individual conflict with the needs of the collective. These conflicts are analyzed from four perspectives—consensual, political, empirical, and rational. Each LLRW siting example is examined accordingly, after a detailed, well-documented review of its history and impact.

This analysis should make the book interesting to persons outside the narrow field of radioactive waste disposal. The LLRW siting difficulty is an example not only of the approval process for siting of hazardous waste disposal, but of the more general problem of the interaction of politics, the communication media, and public conceptions in any decision-making processes regarding controversial technology.

LLRW siting is handicapped by three basic misconceptions: LLRW is more dangerous than other forms of waste; radiation is dangerous in any dose; and 'nuclear' means 'weapon'.

The basis for the first misconception is technical. Radiation from radioactive substances, even in very low concentrations, is easily measured by simple radiation-monitoring instruments. Thus, its presence and possible spread are readily known and feared, even if not harmful. In contrast, industrial or natural chemical compounds can only be detected in much higher concentrations, and thus their effects at very low concentrations are unknown and unregulated.

The second misconception is based on the medical fact that nuclear radiation, in medium or high doses, is harmful or even lethal to the individual exposed to it. However, no harmful effects have been found from low-level radiation doses in

large-scale studies carried out in many countries over long periods of time, on populations of up to hundreds of thousands of people. (See, for example, the 1994 paper by Prof. Rosalyn S. Yalow, the 1977 Nobel Prize winner in Medicine).

The third, most damaging public misconception is the politically motivated connection between nuclear power generation and nuclear weapons, and the resulting opposition to any solution to the radioactive waste disposal problem. Opponents of nuclear power generation realize that without any solution, even to the relatively harmless, short half-lived LLRW, these power stations will eventually be closed. They fail to consider that LLRW includes the waste from the highly beneficial medical use of radioisotopes, which might thus be suspended, or the adverse ecological impact of any alternative sources of electrical power (if found).

With these basic handicaps, it is not surprising that most of the examples studied in the book cannot be called successes, although the reasons for this are diverse due to geographical, sociological, legal, and organizational differences between the countries. For example, one of the complicating factors in the US sites is the federal law requiring states to be members of regional compacts for the purpose of LLRW siting. Because of the different legal and organizational situations in each state, there was a concern that a LLRW site operating in one state would be forced to accept waste from other states that were not members in the particular compact. In some cases this caused a deliberate slowing of the siting approval process.

In most of the successful cases, the disposal sites were eventually located at existing nuclear power stations. The rationale is simple—the environmental impact studies indicate that the additional risk is minimal, and there exists the necessary infrastructure of experienced staff and monitoring systems. Most important, the local communities have already accepted the nuclear installation, based on their ‘good neighbor’ experience over the decades. However, this solution is not always economic or feasible, especially where the geographical distances make the transportation cost prohibitive. The basic ‘two cultures’ distrust may hinder such rational solutions, as can be seen in the Swedish case. There the LLRW disposal site was placed in a highly secure underground tunnel blasted in an impervious rock formation. The nuclear industry complained about the unnecessarily high cost of this solution, while environmental opponents claimed that it proved their argument that LLRW is more dangerous than admitted.

The authors evaluate the results of the siting cases in each perspective of the competing value framework—rational efficient decisions, empirical data based processes, political accountable decisions and consensual participatory processes.¹ Their conclusions lead them to make ten recommendations enhancing, in their opinion, the prospects for a successful siting process. The thrust of the recommendations is for more realistic goals, achieved by a flexible selection process, managed by semi-private or private organizations, with the regulating role in the

hands of a separate public sector organization. Attention should be given to the community's needs by involving it in the methods of site selection, compensation and incentive, and decision-making by local government bodies. The authors emphasize that the leaders of the legislative and executive branches must make a political commitment to establish a LLRW facility. In my opinion, this is a necessary condition, as the existing laws and decision-making processes may have to be changed in order to achieve the desired goal, and this may be difficult without changing prevailing public misconceptions.

The book suffers from the rather narrow coverage of the siting cases; some of the largest producers of LLRW (and nuclear electrical power) outside the USA—Germany, the United Kingdom and Japan, are not included. The latter country should have been included to show the effects of social values and a decision-making process totally different from those prevalent in the USA and European cultures. Useful appendices include examples of specifications for LLRW sites, as well as the evaluating criteria for different sites, which may serve as models for disposal sites of other types of waste. In sum, this book is a valuable addition to the literature dealing with the organizational and social aspects of technological decisions, and should be read by those interested in this subject.

Note

1. A preliminary analysis made by me, modeling the data by artificial neural network techniques, shows a positive influence on the outcome of high graded rational and political aspects, and a negative influence of high graded empirical and consensual aspects. This analysis may lead to interesting conclusions, but the number of cases is too small for this analysis to be definitive.

Reference

Yallow, R.S. (1994) Concerns with low-level ionizing radiation. *Mayo Clinic Proceedings*, 1994:436–440.

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THE NEW ATLAS OF ISRAEL, Survey of Israel, Ministry of Construction and Housing and the Hebrew University of Jerusalem. Tel Aviv: Survey of Israel Printhouse, 1995 (Hebrew version).

Usually, national atlases are published in big, if not giant, formats, bound by hard, if not very hard, covers. Such was the format of the three previous editions of the *Atlas of Israel* published in 1964, 1970, and 1985. Not anymore. The *New Atlas of Israel* justifies its adjective 'new', not only by its updates to the mid-1980s and 1990s and its new and rich contents, but also by its soft cover and relatively small format (33 x 23 cm.). This is truly a refreshing concept in the