CHAPTER EIGHT

SUB-SEABED DISPOSAL OF HIGH LEVEL RADIOACTIVE WASTE: THE POLICY CONTEXT THEN AND NOW

Edward L. Miles

I. Introduction

This Chapter contrasts the policy context surrounding the program to test the scientific, technical, legal and institutional feasibility of Sub-Seabed Disposal (SSD) of High Level Radioactive Waste (HLRW) from 1976 to 1987 with the context which exists from the 1990s to the present, given the resurgence of the nuclear power issue in the face of a massive problem of CO$_2$ accumulation and its consequences. Emphasis is placed on the explicit and implied trade-offs in the two periods and on what these differences imply for the future. The Chapter concludes with an assessment of how the science and the policy conflicts evolved in the first period and on what remains to be done in the context of the second period.

II. The SSD Idea, Program and Context, from 1981 to 1987

The origin of the SSD idea emerged in conversation between William Bishop and Charles Hollister in 1974 in the context of developing a U.S. plan for disposing permanently of HLRW based on scientific and technical rationality.$^1$ High level wastes were defined by the U.S. as wastes “which consist either of spent fuel or of wastes generated in the chemical reprocessing of spent fuel. The latter contains almost all fission products and most actinides not separated out during reprocessing.”$^2$

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SSD was imagined as a multi-barrier concept in which the primary barriers were to be the waste form, i.e., vitrification of liquid wastes derived from chemical reprocessing of spent fuel into a borosilicate, or spent fuel itself, the canister that would encase the waste form, and the sediments in the “near field” of the canister, defined as the maximum extent of the 100 °C isotherm.3

Under U.S. leadership both a national (1974) and a coordinated international sub-seabed disposal program (1977) were created, and the latter was hosted by the Nuclear Energy Agency (NEA) and the Organization for Economic Cooperation and Development (OECD) as a restricted group. Ten countries and the Commission of the European Communities (CEC) participated. Three guiding questions were initially posed to the Seabed Working Group (SWG) in the NEA/OECD. These were stated as follows:

1. Are there locations in the oceans which have the geologic stability and barrier properties suitable for disposal?
2. Is it possible to implant waste-filled canisters in the seabed sediments, and what effect would this have on the barrier properties of the containment system?
3. What are the radiological consequences of seabed burial [defined in terms of risks from emplaced waste, accidents and abnormal events?]4

Later, a fourth question was posed: What is the legal and institutional feasibility of engaging in SSD of HLRW beyond national jurisdiction?

The relevant policy environment at that time consisted of the following five factors:

1. U.S. policy, based on scientific/technical rationality, defined objectives for high level nuclear waste disposal to be:
   a. mined repositories in appropriate geologic formations as the highest priority for first repositories;
   b. deep-ocean sediments to be evaluated as a potential alternative to land-based deep geologic sites; and

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3 Hollister, supra note 1, at 1323.