I. Introduction

At the birth of the Atomic Age in the 1940s, mankind’s attention was focused on World War II. Following the war, the major powers had a keen interest in the future use of atomic weapons. The United States devised a nuclear testing program in the Northern Atolls (Bikini and Enewetak) of the Marshall Islands. Between 1946 and 1958, the program oversaw the execution of sixty-seven nuclear tests. These tests resulted in fallout over both the land and ocean with radioactive fission, activation products and unfissioned nuclear fuel.

The consequences of the testing program have drawn the attention of scientists, governments, the people of the Marshall Islands and other interested parties. The Republic of the Marshall Islands Nuclear Claims Tribunal was established primarily to address claims for damages to persons and property of citizens of the Marshall Islands. Since 1987, the Tribunal has resolved claims, awarded compensation and stayed informed on nuclear issues. The Tribunal is an independent body that has jurisdiction to exercise both administrative and adjudicatory authority. During the course of its work, the Tribunal has considered radioactive contamination of land and the resulting risk to human health. More importantly for this volume, information on the related themes of contamination in lagoon seawater, sediment, water tables and the oceans has been catalogued in the course of the Tribunal activities.

II. Radionuclides in Sediment and Seawater: A Legacy of Nuclear Testing

Scientific interest in long-lived, man-made radionuclide behavior in the ocean and lagoon sediment and seawater in the Northern Atolls
of the Marshall Islands\(^1\) originated with the conduction of the United States Nuclear Testing Program. Since the program’s inception in 1946, radiological data, which can be used to determine the relationship between radionuclides in the water and their effects on human health, has been collected.

In 1963, E.E. Held from the University of Washington, Laboratory of Radiation Biology, published a ‘qualitative summary’ of data collected from samples at Rongelap Atoll lagoon in the late 1950s. Although mainly gross activity of particles of other than man-made radionuclides were identified, it is assumed that more sensitive techniques would more than likely have shown the presence of man-made radionuclides.\(^2\)

The radionuclides Am\(^{241}\), Eu\(^{155}\), Cs\(^{137}\) and Sr\(^{90}\) have been found in the surface sediments in the Rongelap lagoon.\(^3\) While the radionuclides in the lagoon normally would not place people at risk for radiation exposure, their entry into the human food chain through consumption of marine life and transfer to land through soil replacement could potentially cause adverse human effects.\(^4\) It is noteworthy that sediment from Rongelap lagoon is less contaminated than sediment in Bikini lagoon. Soil replacement utilizing Rongelap lagoon sediment may well be safer than using soil from any of the other four most affected radiated northern atoll islands. Furthermore, Rongelap surface sediments are free of Cs\(^{137}\) and contain very low levels of transuranic radionuclides.\(^5\)

Significantly, the levels of Pu\(^{239+240}\) in lagoon water collected in 1978 and 1981 are greater than background radiation in the equatorial Pacific Surface Waters between 1972 and 1982.\(^6\) Both Cs\(^{137}\) and Sr\(^{90}\) mix with seawater and cannot be differentiated from global fallout in the ocean water that comes into contact with the lagoon.\(^7\) These findings indicate the need for further study of lagoon sediments and seawater.

Findings at Rongelap, in part, show that lagoon sediments contain the long-lived radionuclides Sr\(^{90}\) and the transuranic radionuclides Am\(^{241}\) and Pu\(^{239+240}\). As a consequence, human ingestion of edible marine life

\(^1\) The Northern Atolls of primary concern for scientific work are Enewetak, Bikini, Rongelap, and Utirik. These are collectively known as the Four Atolls.
\(^3\) Ibid., at p. 5, Table 2.
\(^4\) Ibid., at p. 2.
\(^5\) Ibid., at p. 11.
\(^6\) Ibid., at p. 11.
\(^7\) Ibid., at p. 12.