BEFORE THE NUCLEAR CLAIMS TRIBUNAL

REPUBLIC OF THE MARSHALL ISLANDS

In the Matter of The Alabs of Rongelap, et al, Claimants for Compensation Rongelap Atoll Local Government/Rongelap Local Distribution Authority, Intervener	NCT No. 23-02440
In the Matter of Jabon on Rongelap Atoll and In the Matter of Rongerik Atoll Ronglap Atoll By Iroij Anjua Loeak, et al, Claimants for Compensation	NCT No. 23-05443-B NCT No. 23-05445-B
In the Matter of Iroij Imata Jabro Kabua Ronglap Atoll Claimant for Compensation	NCT No. 23-00501

MEMORANDUM OF DECISION AND ORDER

The Alabs of Rongelap filed a class action for damage to property with the Nuclear Claims Tribunal on November 11, 1991. The Tribunal has jurisdiction to hear his claim by virtue of Section 105(a) of the Marshall Islands Nuclear Claims Tribunal Act 1987, as amended ("NCTA") which grants the duty and responsibility to "decide claims by and disburse compensation to the Government and citizens and nationals of the Marshall Islands under Section 123 for existing and prospective loss or damage to person or property which are based on, arise out of or are in any way related to the Nuclear Testing Program . . . "

Unlike other class action claims for damage to property brought before the Tribunal by local governments/Local Distribution Authorities (LDA's) as class representative, the claim filed

by the Alabs of Rongelap specifically excluded certain property interests including the Iroij interests. As a result, during the process to establish the class, certain individual property claims were consolidated with the claim of the Alabs. In addition, the Rongelap Local Government/Rongelap Local Distribution Authority (RLDA) intervened in these consolidated claims on January 23, 2001.

I. BACKGROUND FACTS

As was done in prior cases, factual issues were narrowed during the pre-hearing process with stipulations and joint statements resulting in the following undisputed facts. Prior to World War II (and during the war before the arrival of the U.S. military,) people resided on the three atolls of Rongelap, Ailinginae and Rongerik. On Rongelap, there were three principal villages on Rongelap, Jabon, and Eniaetok Islands. On Ailinginae, the principal village was located on Enibuk Island, and on Rongerik, the principal village was located on Rongerik Island.

Rongelap Atoll is made up of approximately 61 islands and islets comprising a land area of approximately 3.2 square miles with a lagoon area of approximately 400 square miles. Ailinginae Atoll is made up of approximately 26 islands and islets with a combined land area of approximately one square mile and a lagoon area of approximately 41 square miles. Rongerik Atoll is made up of approximately 15 islands and islets with a combined land area of approximately 0.8 square miles and a lagoon area of approximately 55 square miles.

The United States' first series of atomic weapons tests in the Marshall Islands in 1946, referred to as "Operations Crossroads," resulted in the removal of the people of Rongelap by U.S. military authorities to a tent camp on Lae Atoll for approximately three months. Thereafter, the people were resettled back to Rongelap and Ailinginae Atolls, but resettlement of Rongerik

was restricted. Subsequently, the U.S. military authorities resettled a group of people from Bikini at Rongerik Atoll as part of "Operation Crossroads." On March 1, 1954, the United States detonated the "Bravo" nuclear bomb on Bikini Atoll. Substantial radioactive fallout from "Bravo" began falling on the Rongelap people approximately five hours following the blast. Approximately 50 hours after the "Bravo" detonation, the U.S. Navy removed the Rongelap people residing on Rongelap and Ailinginae to Kwajalein due to the contamination resulting from the fallout from "Bravo".

From 1954 until their return in 1957, the Rongelap people lived first on Ebeye Island, Kwajalein Atoll, and then on Ejit Island, Majuro Atoll under various circumstances of deprivation, hardship, and distress. During February 1957, the Rongelap people were informed by the United States Government, through the Atomic Energy Commission and the Trust Territory Government, that it was safe to return to Rongelap Island, and in June of 1957, the Rongelap people were returned to Rongelap Island, but were warned not to resettle or eat food from the northern islands within Rongelap Atoll.

Notwithstanding the admonition against eating local food from the northern islands, inadequate and infrequent supplies of food were brought to the people of Rongelap, resulting in visits to the northern islands for food gathering purposes.

In 1982, the U.S. Department of Energy published the results of the 1978 aerial radiological survey of the northern Marshall Islands, including Rongelap Atoll. The findings of this report, and subsequent reports, suggested that significant radioactive contamination continued to make Rongelap unsafe for habitation. As a result, the people of Rongelap again left their islands and resettled principally on Mejatto Island within Kwajalein Atoll. In 1999, work

began on a resettlement project for Rongelap Island involving remediation and cleanup of the island for future habitation by the people of Rongelap.

II. RESTORATION

The Tribunal has previously ruled that the cost of remediation is an appropriate category of compensation for damage to property, resulting from the Nuclear Testing Program (see *In the Matter of the People of Enewetak*[1] and *In the Matter of the People of Bikini.*[2])

A. The 15 mrem standard

The Tribunal adopted the U.S. EPA cleanup levels for radioactive contamination in a consolidated action, including the present claim, to address appropriate radiation protection standards for cleanup purposes.[3] As stated in the *Enewetak* decision:

> Those standards, established by the U.S. Environmental Protection Agency, are described in an EPA document entitled "Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination," wherein it is stated:
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> > Cleanup should generally achieve a level of risk with the 10^{-4} to 10^{-6} carcinogenic risk range based on the reasonable maximum exposure for an individual. . . .
> >
> > If a dose assessment is conducted at the site [footnote omitted] then 15 millirem per year (mrem/yr) effective dose equivalent (EDE) should generally be the maximum dose limit for humans.[4]

This 15 mrem dose applies not just to the average resident, but also to those persons experiencing high end risk or to the "reasonably maximally exposed individual"[5] and is over and above existing levels of background radiation, including a component from global fallout.

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[1] MEMORANDUM OF DECISION AND ORDER, *In the Matter of the People of Enewetak, et al.,* NCT No. 23-0902, April 13, 2000, (pp. 12-16.)
[2] MEMORANDUM OF DECISION AND ORDER, *In the Matter of the People of Bikini, et al.*, NCT No. 23-04134, March 5, 2001.
[3] MEMORANDUM OF DECISION AND ORDER, filed December 21, 1998.
[4] *Enewetak*, p. 17
[5] *Ibid*., p. 18.

The EPA has given guidance for determination of the "reasonably maximally exposed individual" (RMEI):

> . . . actions at Superfund sites should be based on an estimate of the reasonable maximum exposure (RME) expected to occur under both current and future land use conditions. The reasonable maximum exposure is defined here as the highest exposure that is reasonably expected to occur at a site. . . the intent of the RME is to estimate a conservative exposure case (i.e., well above the average) that is still within the range of possible exposures.[6]

Additionally, the EPA states:

> The high end of the risk distribution is, conceptually, above the 90th percentile of the actual (either measured or estimated) distribution. The conceptual range is not meant to precisely define the limits of this descriptor, but should be used by the assessor as a target range for characterizing "high-end risk."[7]

B. Current Dose

Experts in this case have evaluated current doses that people would receive if they were residing on Rongelap, Ailinginae, and Rongerik utilizing a number of different methodologies. These calculations show that the RMEI would exceed 15 mrem.

Claimants' experts, John Mauro and Hans Behling of S. Cohen and Associates (SCA,) provided two different methodologies for determining the relevant doses. SCA reviewed the methodology utilized by the Lawrence Livermore National Laboratory for calculation of Rongelap doses:

> The result of the Robison 1994 analysis predicts an estimated maximum dose equivalent (EDE) of 0.26 mSv/yr (26 mrem/yr) above background to the average member of the island's population in the year 1995 for Case 1 (Combination diet)

[6] U.S. Environmental Protection Agency, Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A) Interim Final, EPA/540/1-89/002, December 1989 (page 6-4), cited in Claimants' Exhibit 1, John Mauro, PhD CHP, Hans Behling, PhD, S. Cohen & Associates, Final Report Regarding the Potential Radiation Doses and Health Risks to the Resettled Populations of Rongelap Atoll, Rongerik Atoll, and Ailinginae Atoll and An Evaluation of the Costs and Effectiveness of Alternative Strategies for Reducing the Doses and Risks, (August, 2000), CLAIMANTS' EXHIBIT 1, p. 6-9.

[7] *Ibid.,* p. 6-10.

> an .048 mSv per year (48 mrem/yr) for Case 2 (local diet). In both cases, 11 mrem is from external exposure and the remainder is from food ingestion.[8]

In addition, SCA cites the work of Simon (1997), which found annual doses based on a 75% local diet range from an average of 28 mrem to a high end of 174 mrem.[9] Using EPA guidelines for assessing the RMEI, SCA determined there were two significant variables, diet and high end contamination locations:

> Two independent sets of modeling assumptions are required in order to determine the high-end doses and health risks attributable to the RME individual:
>
> > - The diet and living habits of the RME individual (which we refer to as the "exposure" scenarios)
> > - The radionuclide concentrations in the environment and in the food items at the high-end locations on each of the islands (which we refer to as the "source" scenarios.)[10]

SCA analyzed doses using four different diets for the Rongelap people, two "combination" diets which consisted of local and imported foods, and two "local-only" diets, which consisted entirely of foods from Rongelap. The Tribunal determined in *Enewetak* that a local foods only diet was appropriate for determination of the reasonably maximally exposed individual.[11] In evaluating the effect of high-end radionuclide concentrations on dose for a local foods only diet, SCA determined that doses for Rongelap range from about 100 to 220 mrem/year.[12]

SCA also performed this analysis for high end doses for Rongerik and Ailinginae Atolls. In the case of Rongerik Atoll, Cs-137 concentrations and doses are significantly lower than those on the islands of Rongelap, and in the case of Ailinginae Atoll, the doses are the lowest of all

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[8] *Ibid*., p. 6-1.
[9] *Ibid,*. page 6-8.
[10] *Ibid.,* p. 6-10.
[11] *Enewetak,* p. 18.
[12] CLAIMANTS' EXHIBIT 1, 6-25.

three atolls, where most of the islands are close to or below the 15 mrem EDE cleanup criterion.[13]

The Defender of the Fund retained M.H. Chew and Associates Inc. as its expert to provide an analysis of doses for the people of Rongelap and of various remediation strategies. Although the Chew Report found that doses were sufficient to require remediation, it placed great emphasis on a dietary model of 75% local food, and 25% imported food in calculating doses.[14] As noted *supra,* the Tribunal determined in *Enewetak* that a local foods only diet was appropriate for determination of the reasonably maximally exposed individual.

C. Remediation Strategies and Costs

All experts agreed that some remediation strategy would be necessary for the eventual full resettlement of Rongelap, Rongerik and Ailinginae Atolls in order to safely support future residents.

SCA considered several remediation strategies for the clean up of Rongelap, Rongerik and Ailinginae Atolls. Those strategies consisted of Soil Removal; Soil Treatment with Potassium/Fertilizer; Soil Washing, including In Situ Soil Washing; and Soil Immobilization with Zeolite and Phytoremediation and Plant Cropping.

The costs and effectiveness of these various strategies varied considerably with some methods exceeding $1 billion. However, at the close of the Tribunal's hearing on restoration and remediation, Claimants' experts and the Defender of the Fund's expert filed a written Statement on September 22, 2000, agreeing as follows:

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[13] *Ibid.*, 6-38.

[14] Dose Assessment and Remediation Alternatives Study in Support of Resettlement of Rongelap, Rongerik and Ailinginae Atolls, Republic of the Marshall Islands, August 18, 2000, M.H. Chew and Associates, Inc. DEFENDER'S EXHIBT A, at pp. 1-1 to 1-2.

> Sanford Cohen and Associates (SC&A), who is the scientific expert witness team for claimants, and M.H. Chew and Associates, Inc. (CAI), who is the scientific team for Defender, have independently evaluated the remediation of the islands of Rongelap, Ailinginae and Rongerik Atolls. Both SC&A and CAI agree that a preferred remediation strategy that will be effective in achieving a cleanup goal of 15 mrem/yr to the high end individual consists of the application of potassium, supplemented by soil removal and replacement, as required and as defined by SC&A's case number 3 and CAI's report to the Tribunal. The preferred method for disposal of contaminated soil is by means of an oceanside stabilized berm or equivalent. Both SC&A and CAI agree that the cost for this strategy would be about $212 million. The cost of this strategy may be adjusted in accordance with any finding by the Nuclear Claims Tribunal that the acreage is greater or lesser than assumed in the analysis performed by SC&A and CAI.

Accordingly, the Tribunal awards the amount of $212,000,000 for remediation and restoration of Rongelap and Rongerik Atolls. The sum of $193,950,000 is allocated for clean up and restoration of Rongelap Atoll, with the balance of $18,050,000 allocated for such purposes to Rongerik Atoll.[15]

III. Loss of Use.

The people of Rongelap are entitled to damages for the period of time their use of their property was impaired as a result of radioactive contamination from the nuclear testing program.

A. Application of 15 mrem standard to property damages

The Tribunal's determination that exposures to individuals exceeding 15 mrem/year above background are unsafe and thus interfere with claimants' use of their property is guided by U.S. precedent. Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), cleanup remedies are required to "at a minimum. . . assure protection of human health and the environment." CERCLA §121(d)(1). The U.S.

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[15] ALLOCATION OF CLEANUP AND RESTORATION COSTS, September 28, 2006, page 11.

Environmental Protection Agency implemented this statutory mandate through the National Oil and Hazardous Substances Pollution Contingency Plan (NCP.) EPA states:

> The NCP provides that, for carcinogens, preliminary remediation goals should generally be set at levels that represent an upper-bound lifetime cancer risk to an individual of between 10^{-4} to 10^{-6}. 40 CFR § 300.430(e)(2) (I)(A)(1). This regulatory level was set based on EPA's conclusion that the CERCLA protectiveness mandate is complied with "when the amount of exposure is reduced so that the risk posed by contaminants is very small, i.e., at an acceptable level. EPA's risk range of 10^{-4} to 10^{-6} represents EPA's opinion on what are generally acceptable levels." 55 Fed. Reg. at 8716 (March 8, 1990). EPA's adoption of this risk range was sustained in judicial review of the NCP. State of Ohio v. EPA, 997 F.2d 1520, 1533 (D.C. Cir. 1993)[16]

This risk, furthermore, is not an average risk, but rather is "based on the reasonable maximum exposure for an individual."[17] For radioactively contaminated sites, 15 millirem per year (mrem/yr) effective dose equivalent (EDE) should generally be the maximum dose limit for humans. This level equates to approximately 3 x 10^{-4} increased lifetime risk and is consistent with levels generally considered protective in other governmental actions, particularly regulations and guidance developed by EPA in other radiation control programs.[18]

This 15 mrem/year limit was adopted by the Tribunal as the applicable standard for determination of contamination of the Utrik lands for the purpose of assessing loss or damage to property in its January 30, 2004 MEMORANDUM DECISION AND ORDER in the *Utrik* claim, NCT No. 23-06103. The Tribunal determined in *Utrik*: "In light of the levels of contamination of the subject lands, the Tribunal finds such lands were unmarketable for their

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[16] U.S. Environmental Protection Agency, *Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination,* OSWER No. 9200.4-18, Attachment B, August 20, 1997, p. 3.

[17] OSWER No. 9200.4-18, p. 4.

[18] *Ibid*., p. 5.

intended use for the period of time at issue here."[19] The subject properties in this claim were contaminated substantially in excess of those in *Utrik*.

The Tribunal finds that the lands of Rongelap, Rongerik and Ailinginae were contaminated so as to result in exposures in excess of 15 mrem/year to the reasonably maximally exposed individual for the relevant periods of this claim. As discussed above in the restoration and remediation section, current doses to the RMEI would substantially exceed 15 mrem for most islands within the three atolls.

B. Joint Appraisal Report

The Public Advocate and Defender of the Fund filed a STIPULATION in these claims in advance of their experts conducting a joint appraisal on the loss of use of property on April 7, 2000, which stipulated as to periods of denied use as follows:

Rongerik	February 26 to the present
Rongelap	May, 1946 to August 1946 and March 1, 1954 to present
Ailinginae	May, 1946 to August 1946 and March 1, 1954 to present

The STIPULATION also provided that "the Public Advocate and Defender of the Fund shall instruct their respective appraisers to consider both the fact of occupation of the subject land by claimants and the alterations to their lands resulting from the nuclear weapons testing program as well as any restrictions on the use of the lands by claimants in the opinion of the appraisers regarding establishment of a loss of use value for the three atolls".

The Public Advocate and Defender of the Fund submitted a Joint Appraisal[20] in December 2000, containing loss of use estimates for Rongelap, Rongerik, and Ailinginae Atolls.

[19] *In the Matter of the People of Utrik*, NCT 23-06103, MEMORADUM OF DECISION AND ORDER, filed January 30, 2004, p. 19.

The Joint Appraisal utilized two methodologies in the analysis. The first methodology, referred to as Methodology A, is similar to that employed in the *Enewetak* and *Bikini* claims, and relies in paert on "government use" values.[21] Methodology B consisted of an analysis based on a residential/agricultural highest and best use. Although the appraisal experts referred to government use values as being substantially similar to the methodology employed in *Enewetak* and *Bikini,* the expert appraisers in those claims characterized the highest and best use for the properties as residential/agricultural, and not government use.

The experts utilized two versions of Methodology A. The first version consisted of market rent conclusions based on a statistical model of land transactions through 1979, with 1980 through 2000 market rents based on the official government rate with five-year rent reviews.[22] The second version consisted of market rent conclusions based on a statistical model for the period from 1946 to 2000. In Version 1, the expert appraisers concluded a loss of use value for the three atolls of $840,000,000. In Version 2, the loss of use value conclusion was $790,000,000. The appraisers considered both versions to be "reliable indicators of loss in use in value" and concluded that the loss of use value under Methodology A was $815,000,000 (the average of the two versions) as of the date of their report.[23]

Methodology B consisted of a residential/agricultural use approach utilizing criteria contained in CERCLA and Superfund Acts. This analysis considered issues such a damage to natural resources; damage to real or personal property; subsistence use, revenues, and profits and earning capacities.[24] In rejecting this approach, the appraisers stated:

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[20] Appraisal & Damage Analysis Loss in Use, Rongelap, Rongerik and Ailinginae Atolls, Marshall Islands, Captain Company, Bell Anderson & Saunders LLC, Yamaguchi and Yamaguchi, Inc., LOU CLAIMANTS EXHIBIT 1 and DEFENDER'S EXHIBIT B ("Joint Appraisal"), filed December 7, 2000 ("Joint Appraisal").
[21] *Ibid.,* pp. 3-4.
[22] *Ibid.,* p.42.

> Based upon a review of these four types of damages provided under CERCLA, a residential-agricultural use does not represent the highest and best use of the land, as the values derived from a governmental land use approach are higher. Indeed the actual use of the land was for government uses, which further justifies this approach in the final analysis.[24]

C. Highest and Best Use

The Tribunal had determined in each of the preceding class action property actions that the highest and best use for the subject properties was a residential/agricultural use. Nevertheless, Claimants' and the Defender of the Fund's appraisal experts have argued that the highest and best use for the Rongelap lands is a governmental/military use. The 2000 Joint Appraisal notes: "It is impossible to ignore the strong arguments presented under the two possible highest and best use conclusions."[25] The appraisers acknowledged:

> Support for the residential/agricultural highest and best use conclusion is primarily based on ignoring the nuclear weapons testing program and focusing on the uses which the inhabitants would have logically put the islands. Such a perspective may be appropriate if strict U.S. condemnation-style laws are followed. However, the Nuclear Claims Tribunal has directed that strict condemnation-style law not be utilized and that all alternative approaches be utilized.[26]

While the Tribunal noted in the *Enewetak* case that Tribunal property claims are not condemnation proceedings, in part because there is no governmental party, it went on to state that constitutional "principles of just compensation, to the extent that they aid in a determination of what is necessary to make claimants whole, may be referenced by this Tribunal where appropriate."[27] Whatever the source of the supposed direction not to utilize strict condemnation law is perceived to be, the Tribunal has consistently determined a residential/agricultural highest

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[23] *Ibid.*
[24] *Ibid.*, p. 51.
[25] Joint Appraisal, p. 28.
[26] Joint Appraisal, p. 27.

and best use in the three preceding property loss cases, including circumstances where a more compelling case could be made of governmental/military highest and best use (Enewetak and Bikini, where the government actually occupied and made use of the atolls for governmental purposes.) As the Tribunal determined in *Utrik*:

> The Tribunal finds the arguments in favor of a residential/agricultural highest and best use to be persuasive. The fact of contamination from the nuclear testing at a remote site did not convert Utrik to a governmental use. It continued to be used by the people of Utrik, albeit in impaired state, for the same residential and agricultural purposes for which it had been traditionally used. The purpose of compensation is to place the injured party in as good a position as the party would have been in the absence of the injury. In the absence of the contamination by the nuclear testing program, the use of the Utrik lands would be for residential and agricultural purposes. To assume a higher economic use based upon the injury itself, would not further the goal of compensation, but would rather result in a windfall to the injured party.[28]

The Tribunal further declared in *Utrik*: "The subject Utrik properties are not distinguished from the Enewetak and Bikini lands in relevant past, current and anticipated future use."[29] The Tribunal finds similarly in this case, that the highest and best use of the subject properties is a residential/agricultural one.

D. Effect of Highest and Best Use Determination on Valuation

In the cases decided to date by the Tribunal, the differentiation between residential/ agricultural and governmental/military highest and best use in rural areas has had little practical effect in terms of valuation of the properties. In *Utrik*, the Tribunal stated:

> In any case, the question of governmental versus residential/agricultural highest and best use is largely irrelevant for the purposes of valuation. Both reports agree

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[27] *Enewetak*, p. 4.
[28] *In the Matter of the People of Utrik*, NCT 23-06103, MEMORADUM OF DECISION AND ORDER, filed December 15, 2006, p. 22.
[29] *Ibid.*, p. 21.

> in large part that transactional values for either governmental or residential/ agricultural uses are similar in rural areas of the Marshall Islands.[30]

This is consistent with the Tribunal's findings in *Enewetak* and *Bikini*. To be consistent with the methodologies utilized for calculating residential/agricultural highest and best use values in previous cases, a combination of appropriate government and private transactions should be included in the database. The database of the Joint Report government use calculations substantially mimics that utilized in residential/agricultural calculations in *Enewetak/Bikini/Utrik*. As noted in the Joint Report itself: "Methodology A is similar to analyses completed for Bikini and Enewetak Atolls loss in use appraisal report."[31] Consequently, the Tribunal finds that methodology forms an appropriate basis for determination of lost use values in this case.[32]

E. Effect of Occupancy

Subsequent to the hearing on the Joint Report, an issue arose in respect to the instructions given to the appraisers in preparing that report, and the Stipulation of the Public Advocate and

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[30] *Ibid.*, p. 23.
[31] Joint Report, p. 3.
[32] Claimants' experts for consequential damages have asserted lost use values assessed by the appraisers are incomplete in that they fail to address "Natural resource damage and loss of lagoon, reef heads, clam beds, reef fisheries, turtle and bird nesting grounds" (CLAIMANTS' EXHIBIT C-1, p. 102) as well as "Cultural resource damage and loss of access to family cemeteries, burial sites of iroij, sacred sites and sanctuaries, and morjinkot land." To the extent the Tribunal has adopted the land valuation analysis utilized in previous cases, this analysis explicitly includes these values. See, e.g., claimants' appraisal reports in the Bikini, Enewetak and Utrik cases which all include language to the effect that "recognizing that traditional property rights are usually designated by wetos, which generally run across an island from the ocean to the lagoon and convey fishing and gathering rights in the adjacent reef shelf, the rent estimates in this report include the use value of the adjoining reef, lagoon and ocean." (*Enewetak*, Claimants' Exhibit 1, Defender's Exhibit A, p. 17; *Bikini*, Claimants' Exhibit 1, p. 18; *Utrik*, Claimants' Exhibit 30, p. 9) These appraisals also determined that in the outer islands, value was not dependent on use, so the values related to cultural uses are likewise included in these values.

Defender of the Fund with respect to periods of lost use. The Joint Report states: "It is noted that the appraisers are aware that the subject property was occupied by claimants during a portion of the stipulated periods of lost use. Based on client instructions, we have not considered the temporary occupation for lost use value purposes herein."[33] Nonetheless, the parties had stipulated that the fact of occupation was to be considered. This resulted in a protracted process of determining how the fact of occupancy on contaminated lands should be taken in account in determining lost use, an issue that did not exist for the most part in the *Enewetak* and *Bikini* claims.

This conundrum was finally resolved in the *Utrik* case where the same issue was present, given the Utrik people's occupancy on contaminated land after the Bravo detonation. In *Utrik*, the Tribunal determined that the applicable radiation protection standard of 15 mrem should control in determining when Claimants have been denied use of their land:

> In determining the applicable standard for evaluation of what loss the Claimants suffered, the Tribunal will not ignore a half century of scientific knowledge and policy development. In the Tribunal's personal injury program, compensation is not made on the basis of outdated science. It has not been suggested that the damage to Utrik lands should be considered on the basis of contemporaneous knowledge of exposures to the people of Utrik. Rather, considerable effort has been expended to retrospectively determine exposures. In like manner, current standards, which are based on the current level of scientific knowledge, should be applied. To apply less stringent historical standards invites the question, "if the land is contaminated now, how could it not have been contaminated in the past when exposure levels resulting from the contamination were even higher?" As a result, the Tribunal believes that the 15 mrem standard as adopted by the Tribunal in its December 21, 1998 MEMORANDUM OF DECISION AND ORDER should be the applicable standard for determination of contamination of the Utrik lands for the purpose of determining loss or damage to property and it is so ORDERED.[34]

[33] Joint Report, p. 2.
[34] *In the Matter of the People of Utrik*, MEMORANDUM DECISION AND ORDER of January 30, 2004, pp. 7-8.

The Tribunal adopted the 15 mrem standard for purposes of determining period of denied use in these claims in its DECISION AND ORDER of April 4, 2004.

The Defender of the Fund's appraiser has suggested that the "historic physical occupancy of the subject property allowed the residents to benefit from habitation and activity on the land."[35] Mr. Captain suggests such benefit should be calculated with reference to historical regulatory dose limits, with an adjustment to the loss of use values for such periods as the reasonably maximally exposed individual doses were below the historical limit. In finding that lands contaminated above the 15 mrem limit are unmarketable, the Tribunal has addressed that argument. The Defender may not circumvent the Tribunal's ruling in that issue by characterizing the valuation based on historic radiological standards, rather than the 15 mrem standard, as an "offset." The Tribunal recognized in *Utrik* that contaminated properties could have value in use despite their unmarketability, as evidenced by economic benefits derived from copra production. No evidence in relation to such economic benefits was introduced in this claim and consequently the Tribunal is unable to adjust the award on that basis.

F. Joint Supplemental Appraisal Report

A Supplemental Appraisal Report was filed by the Public Advocate and Defender of the Fund on September 28, 2006.[36] This report updated the Joint Report filed with the Tribunal on December 2000; refined the original report's analysis; and applied items of prior compensation to the loss of use calculations. The Tribunal has determined that the Joint Report Methodology A provides an appropriate basis for calculation of lost use in this case. The Supplemental Appraisal Report, utilizing Methodology A with some refinements, concluded with loss of use calculations through the year 2000, the date of the initial appraisal, based on a total land area for all three atolls (3,166.9 acres) as follows:

Rongelap Atoll $460,000,000 less $66,000,000 of prior compensation = $394,000,000

[35] Supplemental Appraisal Report, filed September 28, 2006, p. 10.
[36] Ibid.

Rongerik Atoll	$115,000,000
Ailinginae Atoll	$180,000,000

G. Future loss of use

Claimants are also due an amount for future loss of use from 2000, the date of the initial joint appraisal. On May 24, 2006, the parties filed a STIPULATION[37] relating to property affected by radiation for the purpose of determining future lost use. This STIPULATION was based on the calculations of the parties' experts of the anticipated time it would take for the affected lands to reach a safe, habitable level based upon the effective half-life of the primary contaminating agent, Cs-137. The Defender of the Fund's expert, utilizing recent reports relating to the effective and environmental half life of Cs-137, calculated a total of 61,334 acre-years of contaminated lands. Claimants' expert reviewed these same reports and tested the results against results from a methodology utilizing whole body counting results of the Rongelap people and concluded a total of 81,188 acre-years. In the STIPULATION the parties acknowledged that "both of the scientific calculations are estimates which reflect reasonable differences in assumptions relating to the effective half-life of Cesium-137" and consequently "agreed to resolve the issue of future radiological conditions on the subject properties by taking the average of the scientists' calculations during the agreed upon period, a total equaling 71,261 acre-years (15,204 acre-years for Rongelap Islands, 37,406 for the other islands in Rongelap Atoll, 5,158 for Ailinginae and 13,493 for Rongerik)."[38] The calculations were based upon a determination of acres per year that exceeded the Tribunal's 15 mrem standard. As the lands became safe as a result of decay and environmental depletion, annual acreages were adjusted accordingly. The Tribunal finds this STIPULATION to be reasonable and accepts the stipulated acreages for calculation of future lost use.

[37] STIPULATION TO SCIENTIFIC ANALYSIS OF RADIOLOGICAL CONDITIONS FOR USE BY APPRAISAL EXPERTS IN VALUING FUTURE LOSS OF USE, filed May 24, 2006.
[38] *Ibid.*

The joint Supplemental Appraisal Report included calculation of future lost use[39] based upon the STIPULATION and upon the methodology approved by the Tribunal for past lost use. Based upon this calculation, the Tribunal finds the damage to the affected properties for future use is as follows:

Rongelap Atoll	$72,000,000 less $2,500,000 of prior compensation = $69,500,000
Rongerik Atoll	$19,000,000
Ailinginae Atoll	$7,000,000

H. Award for Loss of Use

Accordingly, Claimants are awarded a total of $784,500,000 for past and future lost value of their lands, as set out above, as a result of the Nuclear Testing Program.

IV Consequential Damages

A. Legal Framework

The people of Rongelap have requested compensation for damages that were a consequence of the harm to their property arising out of the Nuclear Testing Program. In *Utrik*, the Tribunal reviewed the basis for compensation for such damages. The Tribunal referred to §929 of the Restatement (Second) Torts, Harm to Land from Past Invasions that provides for compensation for "discomfort and annoyance." The Tribunal recognized the scope of such damages as provided in *Ayers v. Township of Jackson*, 525 A.2d 289 (Sup. Ct. N.J. 1987) where plaintiffs' water supply had been contaminated by toxic chemicals, included damages for emotional distress, deterioration in the quality of life, and medical monitoring.

The Tribunal also recapitulated its approach to quantification of these damages through assessing an annual amount for each affected person for the period of hardship based upon the

[39] Supplemental Appraisal Report, p. 15.

relative severity of the hardship. The Tribunal noted that in *Bikini* and *Enewetak* where consequential damages were awarded, physical hardship was only one aspect of the consequential damages suffered by claimants.

B. Structure of analysis of consequential damages

At the close of the hearing on consequential damages in this case in November 2001, the Tribunal requested counsel for Claimants and the Defender of the Fund to submit post-hearing briefs on the issue of consequential damages, setting out relevant legal precedent and monetizing the specific consequential damages claimed. In these post-hearing briefs, the parties structured their positions in a manner largely consistent with the Tribunal's approach established in *Enewetak* and *Bikini*.

Claimants, in their BRIEF IN SUPPORT OF CLAIMANTS' CLAIM FOR DAMAGES[40] (hereafter CLAIMANTS' BRIEF), set out six areas they assert warrant an award for consequential damages.[41] While the Defender opposed some of these and calculated others

[40] Filed February 12, 2002.

[41] Claimants' experts have suggested consequential damages also include "3) The consequential damages to this and future generations produced by the loss of access to and ability to use a healthy ecosystem. 4) Consequential damages include problems resulting from the inability to interact in a healthy land and seascape in ways that allow the transmission of knowledge and the ability to sustain a healthy way of life." (CLAIMANTS' EXHIBIT C-1, p. 102.) These areas are not included in CLAIMANTS' BRIEF. The Tribunal notes, however, that these are similar to claimants' assertion in *Enewetak* that restoration costs should include infrastructure necessary to return them to the self-sufficiency they enjoyed prior to the nuclear testing program forced their evacuation from Enewetak. The Tribunal determined "The economic values inherent in the request for claimants' resettlement costs are addressed through the award for loss of use." Cases cited by claimants' experts called for consequential damages did not include loss of use damages in the nature of those awarded here. The Tribunal believes the loss of use award made in this case adequately addresses the claim of the people of Rongelap for the referenced loss of way of life damages.

differently than Claimants,[42] these six categories provide a useful means of addressing Claimants' claim. In all but one instance, these areas reflect specific periods of time: May to August 1946 (evacuation to Lae Atoll), March 4, 1954 to June 1954 (evacuation to Kwajalein Atoll), June 1954 - 1957 (relocation to Ejit Island), 1957 - 1985 (return to Rongelap), and 1985 - 1990 (evacuation to Mejatto.) Additionally, as a separate category of damage, Claimants request compensation for being the subjects of human experimentation.

1. Evacuation to Lae

During the testing of the Able and Baker devices on Bikini Atoll, 108 people of Rongelap were evacuated by the United States from their homeland to Lae Atoll for three months, beginning in May 1946 until August of that year. During their stay on Lae, the people suffered from inadequate food and water and a lowered quality of life. Almira Matayoshi stated: "We were sad when we left Rongelap because we had no idea what we were going to face when we got to Lae. We ran out of food on Lae. There was rice, but nothing to go with it."[43] Isao Eknilang reported:

> It was difficult because we lived in tents for several months. We had no privacy, and many aspects of Marshallese custom were broken, particularly those relating to adults changing their clothes or trying to leave to go to the bathroom in front of children of the opposite sex…
>
> Another custom that people began to violate for the first time I remember was not sharing food with people. The Navy gave some food to us Rongelapese, but it was not adequate. I remember a fist-fight that broke out over whether or not to share our food resources. Some people thought we had to share our food with the people of Lae and Wotho, and others thought we shouldn't because the resources were inadequate for everyone. I remember being stunned that adults

[42] DEFENDER OF THE FUND REPLY BRIEF TO CLAIMANTS POST-HEARING BRIEF ADDRESSING ISSUES RELATED TO CONSEQUENTIAL DAMAGES (hereafter DEFENDER'S BRIEF.)
[43] CLAIMANTS' EXHIBIT C-1, p. XX

> would fight over this. In addition to food, there was not enough water for everyone, and the Navy didn't bring in water supplies when we asked.[44]

Claimants and Defender agree on the time period (three months) and number of people (108) but disagree on the level of compensation appropriate to this period, Claimants arguing for the higher level of $4,500, Defender for the lower level of $3,000. In this instance, the Tribunal believes the appropriate level is $3,000 in light of the relative severity of the conditions, for compensation in the amount of $81,000.

2. Evacuation to Kwajalein

The next period of concern is March 4, 1954 to June 1954, when the people of Rongelap were evacuated from Rongelap to Kwajalein as a result of the contamination of the people and their lands by fallout from the Bravo test, the largest nuclear device tested by the United States. While the Claimants in *Bikini* were awarded no compensation for their period of relocation to Kwajalein in light of the relative level of physical comfort while on Kwajalein, the experience of the Rongelap people was different as a result of their severe exposure to radioactive fallout. As noted by Claimants' experts:

> Given the severity of illness the Rongelapese experienced immediately after Bravo, there was an urgent need to evacuate them from Rongelap, decontaminate them, and provide them with medical care. The Rongelapese had serious medical consequences from their exposure that required immediate attention. . . .[45]

Despite the critical need for medical attention, the manner in which such care was provided resulted in significant emotional distress to the people.

One woman from Rongelap described the indignities the people were forced to endure:

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[44] *Ibid.*, p. 13.
[45] *Ibid.*, p. 20.

> I really cried when we were on Kwajalein. When it was time to decontaminate us, they gave us the men's underwear that the Navy men wore. The underwear was too small to cover us, and it was completely see-through when we got wet from the hose they sprayed us with. The water from the hose was so strong, too! [The male Rongelapese translator] . . . was translating and assisting the Navy, and saw us all standing there naked. We had tears pouring down our faces because we couldn't believe that our custom was being violated so badly. [The male translator] . . . was related to so many of the women, and it was like our culture was being ripped apart.[46]

This distress continued for the three months the people of Rongelap stayed on Kwajalein.

Another woman from Rongelap stated:

> In front of [the male Rongelapese translators] . . . , three times a day for three months, the Rongelapese women were told to undress and stand naked at the lagoon's edge. The women would cry from embarrassment and try to cover their genitals with their hands. U.S. Government officials, all men, ran Geiger counters up and down the bodies of the naked women both before and after they bathed in the lagoon. Frequently, the Geiger counters would start clicking wildly when taking readings from the hair on the women's heads and from their pubic hair. The U.S. Government workers would tell the women to soap their pubic hair again, in front of everyone, before a second reading. [The male translators] . . . tried to advert their eyes whenever possible but their presence by their naked mothers and sisters was mortifying.[47]

In addition to the mortification suffered by the people of Rongelap, they were shunned by their unexposed family members who had not been on Rongelap at the time of BRAVO. Almira Matayoshi commented:

> The two hardest things for us to talk about are the divisions in our families caused by the bomb, and what happened to our bodies. The Rongelapese who weren't exposed wouldn't admit they were Rongelapese. This was awful because we are family, and this is the worst kind of damage to have splits in the family.[48]

Isao Eknilang noted this division of families:

> We were very isolated on Kwajalein. Our relatives on Ebeye were afraid of their own family members, they were afraid to visit us for fear they would get radiation from us. Even the Rongelapese who were not on Rongelap during Bravo became

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[46] *Ibid.*, p. 21

[47] *Ibid.*, pp 21-22.

[48] CLAIMANTS' EXHIBIT C-1, p. 22.

> embarrassed to be Rongelapese. They wouldn't want to admit they were Rongelapese. They were embarrassed because we were like monkeys. Our arrival on Kwajalein caused family divisions because family did not want to help us for fear of being exposed themselves.[49]

At the same time, while the people of Rongelap suffered these indignities, their physical needs were addressed adequately. One member of the community noted, "The people on Kwajalein, the Americans, helped us with clothes. On Kwajalein, we ate three times a day. We were treated well. . ."[50]

Based upon the compensation structure established in its earlier cases, the Tribunal will award $61,500 for this period, based upon an affected population of 82 and a period of 1/4 year and an annual value of $3,000 per person.

3. Relocation to Ejit

In June 1954 the people of Rongelap were relocated to Ejit, an island in Majuro Atoll, where they remained until 1957. Indicative of the hardships they suffered there was the report of Norio Kebenli:

> When the community was on Kwajalein after Bravo, they were fed very well and didn't have to cook… Suddenly they were moved to Ejit with no cooking utensils or appliance… They used the cardboard boxes from the c-rations and k-rations to build (mon tutu) a separate place especially for the women, and to paper the walls of their shelters to prevent rain from seeping through. Houses were studio type and it was very hard.
>
> On Ejit there was not enough water. The groundwater was bad for drinking. We went all over the island digging holes and trying to find good water, but there was none… It was while on Ejit that life started to get hard. There wasn't enough food; there was no breadfruit and no place to fish.[51]

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[49] *Ibid.*, p. 22.
[50] *Ibid.*, p. 20.
[51] *Ibid.*, p. 25

The harm suffered during this three year time period warrants compensation at the $3,000 annual level. Although population numbers were not introduced at the November 2001 hearing, Claimants have proposed an average annual population of 168.5 based on documentary sources,[52] which the Defender adopted in its calculations,[53] and which the Tribunal will accept, for compensation in the amount of $1,516,500 for this period of time.

4. Return to Rongelap

In July of 1957, the people of Rongelap were returned to their home atoll, where they remained until 1985. During that time, Claimants suffered emotional distress and a degraded quality of life as a consequence of the contamination of their property.

One aspect of these damages was the people's fear resulting from being in what they reasonably perceived as a contaminated environment. Claimants' experts note:

> Although radionuclides and their bioaccumulation in foodstuffs were an invisible threat to the Rongelapese, the people suspected that their problems stemmed from the high levels of radiation in their food. The Rongelapese got blisters in their mouths and food poisoning from eating certain foods. The foods that made them ill after resettlement never made them sick before the Bravo test. Because of the blisters in their mouths from the food, and because they could see the effects of radiation in the trees and plants they ate from, the Rongelapese attribute their health problems to the presence of radiation in their environment. [54]

The people came to feel like guinea pigs, used for experimentation by the U.S.[55] and "were so angry about the experimental nature of the medical program that they refused to host a DOE

[52] CLAIMANTS' BRIEF, p. 9.
[53] DEFENDER'S BRIEF, p. 11.
[54] CLAIMANTS' EXHIBIT C-1, p. 32-33.
[55] *Ibid.*, p. 42.

medical survey visit scheduled for the spring of 1972."[56] These concerns were contained in a letter from Magistrate Nelson Anjain to Dr. Conard in 1975, in which he stated:

> You have never really cared about us as people -- only as a group of guinea pigs for your government's bomb research effort. For me and for other people on Rongelap, it is life which matters most. For you it is facts and figures. There is no question about your technical competence, but we often wonder about your humanity. We don't need you and your technological machinery. We want our life and our health. We want to be free.
>
> In all the years you've come to our island, you've never really treated us as people. You've never sat down among us and really helped us honestly with our problems. You have told people that the "worst is over", then Lekoj died. I don't know yet how many new cases you'll find during your current trip, but I am worried that we will suffer again and again.[57]

Ample evidence was presented as the people's belief that their health was affected as a result of living in a contaminated environment.[58] As noted in Claimants' Brief, "Given the medical problems experienced by the Rongelapese as documented in the Hardships and Consequential Damages Report, their fears and attendant emotional distress were clearly reasonable."[59] The most compelling evidence of their fear of living on Rongelap was their decision to depart in 1985.

Claimants propose that compensation for this 28-year period be based upon a per capita annual amount of $9,000 a year for an average annual population of 213.25. The Defender of the Fund proposes an annual per capita amount of $4,500 (the maximum awarded by the Tribunal in past cases) for an average annual population of 227.2. The Tribunal will not exceed the annual per capita amount set in prior cases. The Tribunal will accept the higher annual population numbers proposed by the Defender of the Fund, resulting in compensation for this period of $28,627,200.

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[56] *Ibid.*, p. 43.
[57] Quoted in CLAIMANTS' EXHIBIT C-1, p. 45.
[58] CLAIMANTS' EXHIBIT C-1, pp. 31-34.

5. Evacuation to Mejatto

Concerns of the people of Rongelap over living in a contaminated environment came to a head in 1985 when they decided they could no longer live on Rongelap. A July 22, 1985 memo from Tommy McCraw of the Radiological Controls Division, Office of Nuclear Safety, Department of Energy, described the decision of the Rongelap people to evacuate:

> On May 21, 1985, the first of about 300 people left Rongelap Atoll claiming their atoll was not a safe place to live. . . . The Rongelap people have been disillusioned by what they perceive as contradictory advice from DOE on radiation protection, by monitoring results from a DOE contractor indicating that whole body exposures have increased at Rongelap Atoll . . . , by a high exposure prediction in a Marshallese/English booklet prepared by DOE, and by DOE's failure to provide answers to questions on their total radiation exposure experience.[60]

The contradictory advice concerned "advice given by the DPO at a meeting at Majuro Atoll in December 1982."[61] Mr. McCraw noted that the "advice was confusing and non-specific. The people were told that they should make their own judgments on radiation protection. They were also told that they could eat food that had been restricted for many years."[62] He further stated:

> Medical followup and advice has been very good for the Rongelapese, but not providing them information on their total radiation condition, information that is available, amounts to a coverup. The questions the Marshallese have raised about radiological conditions in their atolls have not been answered satisfactorily by DOE's Marshallese/English booklet that evaluated radiological conditions in the Marshalls in terms of risk and cancer fatalities instead of using radiation standards. The Marshallese, to my knowledge, have never argued against the use of standards or complained that they were not applicable. This booklet may be a factor of confusion rather than education for the Marshallese.[63]

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[59] CLAIMANTS BRIEF, p. 10.
[60] CLAIMANTS' EXHIBIT LOU-16.
[61] *Ibid.*
[62] *Ibid*.
[63] *Ibid.*

Indeed, Mr. McCraw went on to remark "Right or wrong, I have argued that exposures not found acceptable for the U.S. population are also not acceptable in the Marshalls, and that radiological criteria should be the same from atoll to atoll."[64]

He concluded: "Turning radiological judgments over to the people was a drastic unilateral action. This appears to have been a profoundly disturbing experience for some Marshallese and an action that undermined confidence in DOE and in the United States Government." Perhaps inevitably, the "new advice that was obviously intended to give freedom of choice has backfired. The Rongelap people followed the advice they were given, made the judgment not to accept the risk, and left their atoll."[65]

The environment awaiting the Rongelap people in Mejatto was significantly less capable of supporting the population than that of pre-testing Rongelap. As noted by Claimants' experts: "When the Rongelapese relocated on Mejatto there was little traditional food. The people planted pandanus, breadfruit, and coconut, but it took five years before they would produce food (Greenpeace 1986). The islands surrounding Mejatto had food, but the Rongelapese were reluctant to gather food because they had no rights or permission to use these islands."[66] An interview with Johnsay Riklon revealed:

> Mejatto is really different from Rongelap. Mejatto is really small. There are scarce resources, such as fish and grown foods. In Mejatto, people fish only 2-3 times a week, but on Rongelap people fished everyday. People depend on USDA and imported foods. It's like a camp. People are not healthy. They have bad diets, diseases, and the health services are inadequate. It's expensive for me to visit Mejatto... It is too rough to fish in Mejatto, and there are too many sharks. People die in the current around Mejatto (February 28, 1999, Holly M. Barker, Barbara Rose Johnston, and Stuart Kirsch, Majuro).[67]

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[64] *Ibid.*
[65] *Ibid*.
[66] CLAIMANTS' EXHIBIT C-1, p. 62.
[67] *Ibid.*, p. 63

As stated by Boney Boaz:

> I didn't want to leave Rongelap in 1985, but the elders did, so I went. Because Rongelap was no good, I left, but I didn't like Mejatto. It is pretty difficult to fish on Mejatto. Wind prevents people from fishing. On Rongelap, there were many choices: many ways to fish and many places to fish...
>
> Kids on Mejatto don't know how to sail an outrigger canoe. It's too low to launch there. On Mejatto it's hard to sail and hard to teach.
> On Mejatto there is lots of American food. There's more food, local food on Rongelap. There was nothing at all on Mejatto in the beginning. Now it's better because we planted food.
>
> Mejatto is bad because it's hard to get back and forth. It's dangerous on all the small islands. Some people have disappeared, some drowned. It's hard to move about.[68]

Claimants have requested compensation for "the first five years of struggle while on Mejatto," the time it took to plant local foods and for them to become productive.[69]

In evaluating the consequential damages suffered by the people of Rongelap during this period, the Tribunal finds it most similar to the hardships endured by the people of Bikini on Kili in the early years of their habitation there. The Tribunal stated:

> Likewise, in the current claim, claimants' expert Dr. Kiste noted: "With the exception of their sojourn at Kwajalein, the Bikinians experienced serious subsistence problems most years since their initial relocation. Their ordeal at Rongerik was one of basic survival. At Kili, food shortages routinely occurred during the annual period of rough seas."[Footnote omitted.] The Tribunal is cognizant that serious food shortages are only one aspect of the "annoyance and discomfort" suffered by the Bikini people. Nonetheless, it believes this is reflective of the relative level of hardship endured. In this manner, the Tribunal assigns two levels of annual compensation, $4,500 per person per year for the period on Rongerik (1946-1947) and $3,000 per person per year for the period on Kili up until 1982 (1949-1982.)

The population for this period of time is variously estimated as "about 320" (Greenpeace), "about 300" (Tommy McCraw), 301 (Claimants' Brief), 288 (1988 RMI Census), and 265 (Defender of the Fund's Reply Brief.) In light of the uncertainty related to these numbers, the

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[68] *Ibid.*
[69] CLAIMANTS BRIEF, p. 15.

Tribunal will accept the RMI Census number of 288. Compensation for this period will be in the amount of $4,320,000.

6. Medical Experimentation.

Claimants request damages for unknowing participation in human radiation experiments conducted by the U.S. Typically, such damages would be considered as part of a tort claim for negligence (failure to obtain informed consent) or battery, rather than as part of a property claim. The Tribunal has established a personal injury program to deal with medical conditions, but the type of damages asserted here do not fall into that program. This claim is closely related to the matters addressed in connection with consequential damages and consequently will be considered here. There is no prejudice to the Defender of the Fund, who has responded to these claimed damages.

Although the people were assured that it was safe to return to Rongelap in 1957,[70] it was evident that the U.S. knew Rongelap was still contaminated at that time, based on reports cited by Claimants' experts.

> Rongelap was resurveyed beginning in 1954, with soil and food samples taken from Rongelap Atoll by biologists, geologists and other scientists to learn about the movements of isotopes in the environment (DOE#167:53). In 1954 United States researchers identified Cesium-137 (Cs-137) as "one of the principal radio nuclides found at Rongelap" (DOE #341:164). Cesium-137 was detected in edible portions of plants prior to the resettlement of the Rongelapese and the average counts in soils for Cs-137 appeared higher at Rongelap than at Bikini or Enewetak (DOE #298). A 1955 survey conducted by the University of Washington on Rongelap and Ailinginae indicated that: "Edible plants other than coconuts, such as pandanus, papaya, and squash, have been found to contain levels of Sr 90 which are above the tolerance level as defined in the Radiological Health handbook" (DOE #342:32).[71]

[70] CLAIMANTS' EXHIBIT C-1, p. 29.
[71] *Ibid.*, p. 29

Researchers also found that the coconut crab fed on land plants high in Sr-90 and Cs-137 levels (DOE #342:48). In a 1955 survey of Rongelap and Ailinginae, radiation ecology studies indicated that "the highest Cs 137 levels were found in the land plants and the coconut crab" accounting for 26% to 100% of the radioactivity in the specimens that year (DOE #342:58). Researchers also noted that Stronium-90 (Sr-90) taken up by plants was deposited in the bones of humans via air, water, plants and animal products (DOE #348). Because researchers understood that coconut crabs bioaccumulate radiation, one year before the Rongelapese returned home, a recommendation was made to resettle the people provided they do not eat coconut crab (DOE #240, DOE #458:2453). This recommendation was not implemented until several years after the people returned, and the resulting exposure allowed scientists to measure the amount of radionuclides present in human beings and confirm the levels of fallout produced by the weapons since "the deposition in the human body seems roughly to parallel the levels of fallout" (DOE#361:6). (Footnotes omitted)[72]

> Shortly after their return, scientists returned to Rongelap to collect foodstuff samples and analyze them for radiological contamination. The United States military wanted to conduct nuclear weapons pre-test surveys of Rongelap to determine the residual amounts of radioactivity before conducting the next series of nuclear tests. This July 1957 survey of food, soil, water and plankton indicated that radiation levels were "appreciably above background" (DOE #376:57).[73]

The President's Advisory Committee on Human Radiation Experiment's Final Report[74] (ACHRE) notes the decision to return the people to Rongelap in 1957 "was made even though in

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[72] *Ibid.,* p. 29

[73] *Ibid.*, p. 30

[74] The Advisory Committee was created on January 15, 1994 by President Clinton to investigate reports of possibly unethical conduct of the U.S. government, and institutions funded by the government, in exposing human beings to ionizing radiation at the height of the Cold War. The experience of the Marshall Islanders was one of the case studies of the Committee. Chapter 12 of the ACHRE Final Report, dealing with the Marshallese experience was appended to

1954 U.S. medical officers had recommended that the exposed Rongelapese 'should be exposed to no further radiation, external or internal with the exception of essential diagnostic and therapeutic x-rays for at least 12 years. If allowance is made for unknown effects of surface dose and internal deposition there probably should be no exposure for the rest of their natural lives.'[Footnote omitted]"[75]

U.S. recognition of the contaminated nature of the Rongelap environment was further evidenced by the restrictions placed upon use of the atoll resources.

> Use of Rongelap Atoll, however, was restricted to just Rongelap Island by United States Naval edict. Similarly, Ailinginae Atoll was off limits. The Rongelapese were not allowed to return to Rongerik because the environment still had not recovered from the time the Bikinians' depletion of the resource base, and because it remained contaminated from the tests. As a result, the resettled Rongelapese stopped using Rongerik Atoll.[76]

Despite the knowledge of contamination and the potential danger to the health of the Rongelap people in light of their heavy exposures from BRAVO, the AEC Advisory Committee on Biology and Medicine justified the return:

> The current low morale of the natives was pointed out and the advantages of returning them to their homes presented as a factor which should be balanced against the possible radiation hazard in their return… It was agreed that because of the already high relative exposure to which the natives had already been subjected, limiting their exposure in terms from now on was unrealistic; but on the other hand, the psychological effect of permitting them to receive more radiation than our own people, could be subject to criticism.[77]

However, it was also clear that return also supported scientific research and military defense concerns.

CLAIMANT'S BRIEF as Exhibit 2, hereafter referred to as "ACHRE," while page references reflect the numbered pages of that exhibit.

[75] ACHRE, p. 6.

[76] CLAIMANTS' EXHIBIT C-1, p. 30.

[77] *Ibid.*, p. 30.

> The decision to repatriate the people of Rongelap to a still contaminated setting ignored medical recommendations to avoid future exposures. This decision also supported the United States scientific research and military defense agendas. In 1957, the United States Government was battling an effort at the United Nations to produce a test ban treaty. Given global concern over the plight of the Rongelapese, the United States Government worried that any future evacuation to protect the population would generate negative publicity highlighting the fallout dangers of nuclear weapons tests. Injuries from the Bravo Event had been highly publicized, and United States officials worried that further injury might produce a resolution from the United Nations banning future weapons tests.[78]

Claimants assert, "Policies and priorities established in 1954 by the United States scientists and military officials emphasized monitoring and human subject research rather than treatment of the Rongelap people."[79] Claimants have mounted a substantial body of evidence to indicate the extent of the studies conducted on the Rongelap people. However, ACHRE found:

> Although the medical program for the exposed Marshallese was designated a "study," Dr. Cronkite and his successor, Dr. Robert A. Conard, maintain the project never included nontherapeutic research. [Footnote omitted.] Both men assert that the primary goal has always been the treatment of the exposed population and that the data that were collected were always intended first and foremost to benefit the Marshallese. There is no conclusive evidence available to Advisory Committee to contradict their statements. In examining various studies of the Marshallese that could have been driven by pure research goals, the Advisory Committee has found treatment-related goals that are at least plausible. It appears that in the medical follow-up to the Bravo shot, treatment and research objectives were essentially congruent.[80]

ACHRE did, however, note that there were "two examples of research in the Rongelap and Utrik populations that appear to have been nontherapeutic: this research was intended to learn about radiation effects in this population and offered little or no prospect to benefit to the individual subjects."[81]

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[78] *Ibid.*, p. 29.
[79] *Ibid.*, p. 55.
[80] ACHRE, p. 4.
[81] *Ibid.*, p. 2.

One of these studies involved the administration of a "chelating agent", EDTA (ethylene diamine tetra-acetic acid.) The Committee noted that EDTA

> normally administered shortly after internal radiation contamination to remove radioactive material, was administered seven weeks after exposure. The stated rationale was that the agent would "mobilize and make detection of isotopes easier, even though it was realized that the procedure would have limited value at this time" [footnote omitted.] Because there was virtually no therapeutic benefit envisioned, it appears the primary goal of the study was to measure radiation exposures for research purposes, although the knowledge may have been helpful in the clinical care of the patient.[82]

Claimants' experts assert "There were also adverse health risks associated with this experiment, as in the early 1950s several deaths occurred from kidney toxicity after EDTA treatment (dosage used at that time was about 10 grams per infusion, current recommended dosage is 3 grams)."[83] The Tribunal, based upon the record before it, is unable to determine how many subjects were involved in this experiment and is thus unable to make an award of compensation on this basis.

In the second study cited by ACHRE

> a radioactive tracer (chromium 51) was used to tag red blood cells in ten unexposed Rongelapese to measure their red blood cell mass. The purpose was to determine whether the anemia that had been observed among Marshallese was an ethnic characteristic or due to their radiation exposures [footnote omitted.] The tracer dose would have posed a very minimal risk, but it was clearly not for the benefit of the ten subjects themselves.[84]

However, Claimants' experts assert "the Cr-51 received by the ten 'non-exposed' Rongelapese subjects mentioned in the ACHRE report represents an additional burden to the already considerable exposure from consuming contaminated foods and living in a radioactive environment."[85] In light of the relative harm involved in this instance, the Tribunal will award each of the ten subjects an amount equal to the least serious personal injury award, $12,500, for a

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[82] *Ibid.*, pp. 7-8.
[83] CLAIMANTS' EXHIBIT C-1, p. 56
[84] ACHRE, p. 8.

total of $125,000. Although Claimants have offered evidence that "suggests" or "raises the possibility" of repeats of the chromium 51 study, the evidence falls short of proving to the satisfaction of the Tribunal that these studies took place.

The Advisory Committee on Human Radiation Experiment report concluded

> The research conducted between 1954 and today consisted mainly of blood and urine test and procedures to measure radiation with little or no additional risk to the subjects. Overall, these tests seem to have been related to patient care, although two instance of minimal-risk nontherapeutic research have been identified. The Committee found no evidence that the initial exposure of the Rongelapese or their later relocation constituted a deliberate human experiment. On the contrary, the Committee believes that the AEC had an ethical imperative to take advantage of the unique opportunity posed by the fallout from Bravo to learn as much as possible about radiation effects in humans.[86]

Nonetheless, the Tribunal believes that the emotional distress resulting from the participation in these studies and the manner in which they were carried out, warrants compensation, and is a component in the consequential damages related to the period of time the people spent on Rongelap from 1957 to 1985.

Based on the foregoing, the Tribunal awards the amount of $34,731,200 to the people of Rongelap for consequential damages.

V. CONCLUSION

The Tribunal has determined the amount of compensation due to the Claimants in this case is $1,031,231,200. This amount includes $212,000,000 for remediation and restoration of Rongelap and Rongerik Atolls. This award further includes $784,500,000 for past and future lost property value of Rongelap, Rongerik and Ailinginae Atolls as a result of the Nuclear Testing Program. Finally, it includes $34,731,200 to the Claimants for consequential damages.

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[85] CLAIMANTS' EXHIBIT C-1, p. 56
[86] ACHRE, p. 11.

ORDER

Based on this decision, it is hereby ORDERED that a hearing shall be set for post-judgment proceedings, including a determination of annual funding pursuant to 42 MIRC 123(17)(b)(iii)(B).

Dated this 17th day of April 2007 at Majuro, Marshall Islands.

/s/

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JAMES H. PLASMAN
CHAIRMAN

/s/

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GREGORY J. DANZ
MEMBER