Peer Review Comments on contributions to the *Health Physics Journal, Special Issue Vol. 99, August 2010* and considerations of the larger question of the factors that have inhibited the Republic of the Marshall Islands from enjoying fundamental Human Rights

Comment prepared for the United Nations Office of the High Commission and Mr. Calin Georgescu, Rapporteur on Toxics and Human Rights By Dr. Rosalie Bertell, Retired President, International Institute of Concern for Public Health, Toronto, Canada; Regent, International Physicians for Humanitarian Medicine, Geneva, Switzerland, and Palermo, Italy.

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The Health Physics Journal, Special Issue of August 2010 (Volume 99, Number 2) was dedicated completely to an estimate of the cancer cases of the Marshallese attributable to U.S. Nuclear Weapon atmospheric testing 1946 to 1958 in particular, and from remote fallout thereafter (note: remote fallout in the Pacific Ocean area during testing 1946 to 1958, in the Marshall Islands was not counted). There were in all eight content articles all classified as PAPERS, i.e. none were classified as scientific findings or research.

OBSERVATION 1: Of the eight papers, seven were devoted to dose assessment and one to the estimated risk of cancer from the estimated doses attributable to a specific number of nuclear tests. There is no general discussion of the health, social, lifestyle, economic or heritage concerns or general human right to life and health with respect to the past impact of U.S. nuclear activities on the people and culture of the Marshall Islands. Moreover, the late 1990s, 50 years after testing, was the first attempt to do a complete dose assessment of radioactive fallout, 1946 – 1952, in the Trust Territory.

This failure of concern for documentary accountability and public record keeping by the United States does not bode well for the health, well being, and future independence of the Marshallese and their efforts to understand, isolate and properly manage the U.S. nuclear waste and the related health hazards. The complete 1990s assessment was at the request of the RMI government, not the United States. Upon its completion the RMI government submitted the report for peer review. Findings were that there were significant flaws and failures in sampling, assessment and the assumptions used to establish the amount, extent and content of fallout, exposure pathways, rates and health effects. This 2010 publication report is simply a reassessment of the insufficient and flawed historical data and lack thereof.

In this issue of Health Physics, the number of authors is ten, and in all there are eight content papers. This is quite a small number of scientists in terms of the need to make so many assumptions and judgments. Furthermore, citations supporting major contentions include a great many self-citations, and concrete conclusions are asserted for analyses that rely upon an incomplete and flawed data set, resulting, in part, from military rather than public health research priorities, the failure to keep records during and after the nuclear tests, and the classification of many key records and research

findings as secret for U.S. national security. This inhibited critical scrutiny by the broader scientific community.

Distribution of Authors of Papers

Paper Number	1st	2nd	3rd	4th	5th	6th	7th	8th
Steven Simon	X	X	X	X	X	X	X	X
Andre Bouville	X	X	X	X		X	X	X
Charles Land	X				X			
Harold Beck	X	X	X				X	X
Brian Moroz		X						X
Dunstana Melo				X			X	
Iulian Apostoaei					X			
Robert Weinstock				X				
Payne Harris						X		
Shawki Ibrahim						X		

Steven Simon, Ph.D., a nuclear physicist, is a co-author of all papers, showing the major emphasis on dose reconstruction. Between 1990 and 1994, Simon conducted the only radiation monitoring that included all Islands belonging to the Republic of the Marshall Islands [RMI], under contract with the Government of the RMI[1] Prior to 1990 monitoring of fallout from the atmospheric nuclear testing in the Marshall Islands, conducted there between 1946 and 1958, was only conducted on about 30% of the territory.

Only the atomic bombs actually detonated on the territory of the Marshall Islands were included in this investigation. Of the 64 nuclear test series [with an unrecorded number of actual nuclear detonations] carried out there between 1946 and 1958, only 20 individual sub-series or atomic explosions (less than 30%) were considered having fallout 'measurable' in 1990. Measurable, of course, means that it is within the detection limits of your chosen measurement instrument which may be variable. The measurements needed for the study were retroactive projections made more than 30 years after the decaying fallout was laid down.

This plan involves some very basic judgments and ignores relevant factors which significantly affect the final outcome of the study. Many more nuclear tests series [again each with a number of detonations of nuclear bombs] were set off in the Pacific or east of it (prevailing winds are westward). At least 37 separate series by the U.S. at Johnston Atoll, Christmas Island (with the British) and the central Pacific, and by the Russians in their testing site near southern Kazakhstan and the Chinese at Lop Nor, which added to the radiation burden of the Marshallese.

The average Pacific fallout from all of these nuclear test series was subtracted from the assumed dose to the Marshallese from the 20 'measurable' nuclear shots selected to be counted by the authors. This further reduced the Health Physics (HP) estimate of damage done to the people in the conclusion of the report to a narrow "assumed dose attributable to the specific set of nuclear tests and radioactive chemicals" selected by the physicists.

Andre Bouville, Ph.D., is also a Radiation Physicist, formerly a member of UNSCEAR and currently working under the dose assessment for the U.S. National Institute of Health. Hence the study rests on these two physicists.

Charles Land, Ph.D., is a statistician, largely responsible for estimating the dose response to nuclear radiation at Hiroshima and Nagasaki, (a study of high dose fast dose rate exposure from an atomic bomb). He assisted with both the summary paper (1st paper) and the application of the atomic bomb dose responses to the dose data for the chronic low doses of the Marshallese (5th paper), completing the analysis. It needs to be noted that many scientists consider the atomic bomb dose-response estimates to be biased on the low side because of the Healthy Survivor effect, the exposures of the control group (considered to be the norm or non-exposed population for comparison) and the many X-ray examinations for medical and military research reasons of the exposed populations since 1945. Many atomic bomb survivors have had a larger dose of radiation from medical X-ray then from the atomic bomb. The application of risk factors for high dose exposures delivered swiftly to low dose chronic exposures is also suspect since the survivors of the atomic bomb were sufficiently healthy to survive the bomb, lack of medical care and medicines in the chaos of military surrender. Researchers also frequently reduce their calculated dose by a factor of 2 (50%) under the scientifically disputed assumption that the chronic dose can be partly repaired by the body. Since the dose is cumulative, it is equally likely that miss-repair occurs more frequently.

Moreover, dose-response estimates are used as an average response in a large general population of normal age, sex and health status distribution. Even then, the actual health response of individuals to the same dose varies over several orders of magnitude. Responses to nuclear fallout in the small Marshall Island population, many of whom suffered congenital diseases and other health effects from fallout during gestation, infancy and childhood, may well not respond in the same way as the Japanese did to the atomic bomb.

Dr. Simon used Cesium 137 as an indicator of fallout (although the fallout contained more than 600 radioactive chemicals). Since Cesium 137 is a gamma emitter with a

radiological half-life of about 30 years, one can estimate that more than a third of the fallout deposition remained during the period of sample collection and assessment, 1990-1994. From those dose estimates he subtracted an unknown estimate of radioactivity reduction due to decay, weathering and also that assumed due to general Pacific fallout from nuclear tests. If the researchers were concerned for the well-being of the Marshallese rather than to reduce the culpability of the U.S. the total burden on the people from all tests conducted in the Central Pacific, Johnston Atoll, Christmas Island, Russia and China would have been included or at least noted.

> **FIRST POINT: The Marshall Island population on all Atolls has been over exposed to nuclear radiation for more than 50 years, especially over the 13 years of nuclear testing there. It is medically unacceptable to further expose this population to nuclear radiation from leaking nuclear debris and potential nuclear accidents.**

The authors assumed testing carried out in the Marshalls was the only problem of concern. However, radiation damage is cumulative. The Marshallese had been accustomed to unusually low background radiation prior to 1946, over the three thousand years they and their ancestors have lived on the Islands. Therefore the total accumulation of excess nuclear radiation will negatively affect their biological response to any potential further man-made nuclear chemicals from fallout including that which leaches from the nuclear waste disposal site. Average Pacific fallout dose, to which the U.S. was also a major contributor, was wrongly subtracted from the estimated dose to the Marshallese, rather a calculated estimate of fallout from remote and nearby testing would make more sense.

Simon proposed the following estimates of the **average** external doses for Permanent Residents of the various Atolls who were of adult age (those who were gestating, infants or children at the time of fallout would have received greater dose impacts) at the beginning of testing[1], an estimated 90% confidence intervals for each atoll as follows:

Average External Radiation Dose from Marshall Island Nuclear Tests to the Population of permanent adult residents:

Southern Atolls: 5 to 12 mSv* per year for 13 years (0.53 to 4.9)
Mid Latitude Atolls: 22-59 mSv* per year for 13 years
Northern Atolls: In the hundreds to over 1000 mSv* per year for 13 years.

Average Internal Dose to the Population:

Southern Atolls: 1 to 7 mSv* per year for 13 years
Mid-Latitude Atolls: 1 to 7 mSv* per year for 13 years
Northern Atolls: 20 to 500 mSv* per year for 13 years (to red bone marrow and stomach wall)

The **Potential AVERAGE** dose to the Population (depending on radiation distribution patterns and food consumption habits):

Southern Atolls: 6 to 19 mSv* per year for 13 years
Mid-Latitude Atolls: 23 to 66 mSv* per year for 13 years
Northern Atolls: 220 to 1500 mSv* per year for 13 years

NOTE: The measurements are given in mGrays in “Radiation Doses and Cancer Risks in the Marshall Island Associated with exposure to Radioactive fallout from Bikini and Enewetak nuclear Weapon Tests: Summary” page 105, Health Physics Special Issue August 2012. However, for external radiation doses one mGray is equal to one mSv (mSv is the effective dose for producing cancer). With internal exposures, the conversions from mGy to mSv are again equal for gamma and beta radiation and 20 times greater in mSv for alpha radiation, so the average estimates given in the paper may not be less but may be significantly greater than the average dose actually received according to the HP paper by the people during U.S. nuclear testing. Alpha radiation is the predominant type of exposure in nuclear fallout.

At the time of atmospheric nuclear testing, the maximum permissible exposure dose to members of the public was 5 mSv per year in the U.S. and the world. This estimate was lowered to 1 mSv per year (80% lower) by the recommendation of the International Commission on Radiological Protection in 1990. This new more protective dose has been adopted by most of the world, with the exception of the U.S., which still uses the 5 mSv per year limit for exposure of the public to nuclear activities. However, within the U.S. the 5 mSv per year maximum includes both local and transported fallout from nuclear activities.

Even the Southern Atolls were significantly exposed to nuclear radiation, averaging at least 1 to 14 mSv per year, beyond the maximum permissible dose of 5 mSv per year used in the United States for members of the public. A portion of the Southern Atoll people’s exposure may have exceeded that currently permitted to nuclear workers internationally since 1990, namely, 20 mSv per year. Note that portion above the average may include pregnant women and children.

I would note that nuclear workers are exposed for 8 hours a day, with 16 hours respite away from the exposure. They normally work five days a week for 50 weeks a year. They are also generally male and always adult, provided with hazard pay, chosen for excellent health and provided with protective clothing, risk reduction training and medical monitoring. Whereas, in the Marshall Islands, men, women and children were exposed 24 hours a day for 365 days a year with no education about radiation and protecting themselves from fallout, no respite, and little medical monitoring.

Brookhaven researchers sailed to Marshalls once a year in the medical ship outfitted for them by the US Congress. The Brookhaven doctors who found anyone in need of medical care merely wrote a script and sent them to the local sub-standard hospital for medical care. In other words, the Marshallese were a research population for the U.S. on the effects of nuclear fallout, they were not patients. Money raised by the Congress for the Marshall Island went primarily into the research which benefitted the U.S. rather than humanitarian aid to the Marshallese.

As I noted in my Testimony to the U.S. Congress when they were debating the clean-up criteria for Rongelap Atoll, the U.S. cleaned up Johnston Island, where they had also conducted nuclear tests, to a higher standard than that usually used for clean-up for an unexposed population. This exception is also relevant here. The Marshallese population

needs to be protected from more radioactive chemical exposure, not used for hosting a nuclear waste dump!

Exposure to adult permanent residents in the mid-latitude atolls was roughly within and above the yearly permissible exposure for nuclear workers over a year, for a period of 13 years. The maximum permissible does for workers is 50 mSv per year in the U.S. No one among these learned men, who prepared the Special Issue of Health Physics 2012, said that for 13 years the People of the Marshall Islands had been treated as nuclear workers, with a significant number receiving doses above even the maximum permissible dose for nuclear workers for the year. This would clearly be over-exposures on a large scale which would not be permitted at a nuclear power plant.

SECOND POINT: The health damage to the Marshallese was much broader than just "170 excess cancers".

A dose of 800 mSv is sufficient to terminate a pregnancy[2] and a dose of 1500 mSv is sufficient to be lethal for half of the members of the general public[3] (mixed ages and sexes). It is also well known that a lethal exposure of a general population creates wounded survivors. Normally nuclear physicists do not include intra uterine, neo-natal, or stillbirth as a detriment (it has little economic value) yet a significant number of such losses for the Marshallese are reported amongst the population to be high (though actual rates are undetermined as the US specifically chose to not document or study this known health outcome). In the Atomic Bomb Casualty Commission studies they found doses to gonads of both parents between 90 and 180 mSv could cause a major congenital defect, neonatal death or stillbirth in offspring. These are all major calamities for the parents. Intra uterine deaths or molar pregnancies (see note on molar pregnancies at the end of this document) are devastating especially to the mother, and these also occurred, but again have gone uncounted[3].

The number of wounded survivors of a disaster with lethal effect is normally larger than the number of deaths, and both estimates are larger than subsequent cancer deaths. Cancer was the only concern of this Special Issue of the Health Physics Journal. The broad scope of such fatal and non-fatal wounds in this case should include intergenerational effects, congenital malformations and diseases, genetic damage to sperm and ovum transmitted to offspring , damaging to developing organ systems in children and young adults, and immune system damage in adults, in addition to potential development of cancer. For example, it was found at Chernobyl that there were 19 non-cancer thyroid diseases caused by the radiation for every thyroid cancer caused.[4] The U.S. government recognizes other diseases caused by radiation, in addition to cancer, and in the U.S. government study of the radioactive iodine exposure at the Hanford Nuclear Weapons facility, they included ten non-cancer thyroid diseases in addition to cancer in their research. [5]

On Table 2, page 203 of Health Physics 1999, there is an interesting chart of the number of people by age and sex in 1958 and 1978. One can see the deficit of children and young adults in the 1958 age groups: 10 – 14, 15-19, and 20 -24 years. The oldest of this group was born in 1934. They would have been 12 years old or under when the

testing began in 1946. Their lost lives were likely due to either cancer deaths or non-cancer lethal effects of the fallout.

THIRD POINT: The health damage to the Marshallese was much broader than just "170 excess cancers".

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FOURTH POINT: A coral reef in the Pacific Ocean is unsuitable as a permanent waste deposit site for nuclear waste.

These Islands are based on coral, formerly a living organism, now creating soil with very little clay, stone or granite (unlike the mainland U.S.), and very porous. There is no containment for waste storage in such conditions that can be guaranteed even for fifty years, much less for the duration of the radioactivity of these radioactive chemical wastes. The high-level wastes that have been contained through the temporary and now-leaking concrete cap on the Runit Dome in Enewetak demonstrates that the

nuclear chemical waste leaches into the Pacific Ocean – mingling with the sunken radioactive military vessels and debris from the Bikini nuclear testing[6], and wash-off of radioactive chemicals from weathering of the Islands after their use for atmospheric nuclear testing. The Marshallese waters are already polluted with military toxic chemical gas waste and other nuclear waste, dumped there between 1940 and 1970[7], before such action was internationally prohibited, and waste effluence from Navy nuclear powered vessels. Further, there is concern that the Marshallese environment is now receiving additional waste from recent and still-continuing marine and atmospheric releases emanating from the Fukushima-Daiichi disaster in Japan.

The long-term ramifications of uncontrolled nuclear waste in the Marshall Islands are profound, both for the Marshallese population, and the broader world which we all share.

For the current and future generations, the Marshallese must not only contend with the genomic instability inherited from their fore bearers who were significantly exposed to the nuclear fallout, but also the continued and future human and environmental consequences of living in a badly contaminated and hazardous setting.

The Islands of an Atoll form a necklace around the protected lagoon that acts as a fish nursery for the Pacific. The coral also forms a protective reef around the atoll and is home to the many moluscs and fish which are staples in the diet of the Marshallese. As the pollution concentrates in lagoon sediments, it is taken up in coral reefs, and bioaccumulates in the broader web of life, not only affecting the Marshallese, but the world at large. The Pacific Ocean is food source for billions of people and the beginning of the food web that sustains all life on the planet. Our oceans contain 90% of the living biomass on Earth, and they contribute to the water and nourishment needs of the remaining 10% biomass on land.

OBSERVATION 2: Under Article VI of the United Nations Trusteeship Agreement, the United States made a promise to the international community that it would "Protect the inhabitants against the loss of their lands and resources," and that it would "Protect the health of the inhabitants" of the Trust Territory.” Lands and resources have been lost, and the physical, social and cultural health of the nation grievously compromised. There remains a fundamental obligation for the United States to provide meaningful remedy and reparation for the damages incurred by its military and administrative actions.

The preamble of the U.N. international Declaration of Human Rights it is stated in part:

> “Whereas the peoples of the United Nations have in the Charter reaffirmed their faith in fundamental human rights, in the dignity and worth of the human person and in the equal rights of men and women and have determined to promote social progress and better standards of life in larger freedom,

Whereas Member States have pledged themselves to achieve, in co-operation with the United Nations, the promotion of universal respect for and observance of human rights and fundamental freedoms,

Whereas a common understanding of these rights and freedoms is of the greatest importance for the full realization of this pledge,

Now, Therefore THE GENERAL ASSEMBLY proclaims THIS UNIVERSAL DECLARATION OF HUMAN RIGHTS as a common standard of achievement for all peoples and all nations, to the end that every individual and every organ of society, keeping this Declaration constantly in mind, shall strive by teaching and education to promote respect for these rights and freedoms and by progressive measures, national and international, to secure their universal and effective recognition and observance, both among the peoples of Member States themselves and among the peoples of territories under their jurisdiction.

Article 2 and 3 of this Universal Declaration state:

Article 2.

- Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, color, sex, language, religion, political or other opinion, national or social origin, property, birth or other status. Furthermore, no distinction shall be made on the basis of the political, jurisdictional or international status of the country or territory to which a person belongs, whether it be an independent, trust, non-self-governing or under any other limitation of sovereignty.

Article 3.

- Everyone has the right to life, liberty and security of person.

In 1966 the General Assembly adopted the two detailed Declarations, which complete the International Covenant of Human Rights: the International Declaration on Economic, Social and Cultural Rights, and the International Declaration on Civil and Political Rights and its two Optional Protocols. In 1976, after the Declarations had been ratified by a sufficient number of individual nations, the Bill took on the force of international law. The Universal Declaration is a fundamental constitutive document of the United Nations. Many international lawyers believe that the Declaration forms part of customary international law, applied to all nations and is a powerful tool in placing diplomatic and moral pressure on governments that violate any of its articles. The 1968 United Nations International Conference on Human Rights advised that the Declaration "constitutes an obligation for the members of the international community" and for all persons.

FIRST POINT: There remains a fundamental obligation for the United States to provide meaningful remedy and reparation for the damages incurred by the RMI and its people due to U.S. military and administrative actions.

The U.S. is not a signatory of the entire Human Rights Declaration. While it signed, it has not ratified the International Covenant on Economic, Social and Cultural Rights (which include the Right to life, liberty and freedom) but only of the International Declaration on Civil and Political Rights (which was ratified with five reservations, five understandings, and four declarations). In other words, the U.S. may feel it is not bound to protect the right to health and life of the Marshallese People by attending to the consequence of nuclear weapons testing and other contamination resulting from the United States military activities in these islands. Nevertheless, there remains a fundamental obligation for the United States to provide meaningful remedy and reparation for the damages incurred by its military and administrative actions.

> SECOND POINT: The United States has failed under the terms of its initial trusteeship to protect the well-being of the Marshallese people and to help them to achieve viable independence. Simply put, the RMI is still a dependency of the U.S. even under the Compact of Free Association.

Under the Compact of 1986, the United States provides economic and financial aid and defends the Republic of the Marshall Islands' (RMI) territorial integrity. I would note that the RMI has no history of wars and no word in its language for 'enemy'. In return, the RMI provides the United States with unlimited and exclusive access to its land and waterways for strategic purposes.

In a remarkable disregard of the Trust Agreement of July 18, 1947, whereby the U.S. agreed to preserve and elevate the life style of the people belonging to its Trust Territory and help them to achieve independence, the U.S. to this day exercises economic and security rights over the Marshall Islands and has consistently shown little regard for their health and well-being.

The RMI today remains one of the poorest of the Pacific Islands. While its' semi independence was achieved on October 21, 1986 and membership in the United Nations conferred in 1991, the RMI is still dependent on the U.S. for economic support and guidance. Some argue that other than English literacy programs and some selected health "care" (which often supported the U.S. medical research agenda), the U.S. did little to "bring the RMI to full independence".

OBSERVATION 3: There is a moral and legal obligation for the United Nations community to assist in the remediation, restoration and reparation due to the environment, health, and dignity of the Marshallese nation.

The atmospheric nuclear testing began at Bikini Atoll under the U.S. Navy in the summer of 1946, before the RMI had been declared a U.S. Trust Territory by the United Nations. Unlike all other Trust Territories established by the United Nations, the Trust Territory of the Pacific Islands was a Strategic Trust Territory, established through the U.N. Security Council, where the United States has a veto. While the United States was obligated under the terms of the trusteeship to prepare the islands for self-rule, the Strategic Trusteeship acknowledged and tacitly approved of the intended future use as a nuclear proving ground.

It is important to note that the unique structure of the Strategic Trust category which effectively inhibited Marshallese abilities to develop the capacity, infrastructure and means to fully achieve self-rule. A Strategic Trust meant that any problems pertaining to the US military use and administrative actions in the Marshallese people were referred to the Security Council of the U.N. rather than the General Assembly. This meant that only the Security Council could terminate the Trusteeship, and given the power of a US veto, there was no effective mechanism for international intervention. In other words the U.S., through the terms the Strategic Trust, effectively removed U.N. control over this Trust Territory.

> **FIRST POINT: While universal rights are articulated in covenants and other agreements, not all nations have equal opportunity to enjoy these rights, and in this instance, the United Nations helped establish and perpetuate an institutionalized abuse of fundamental rights in the Marshall Islands.**
>
> **SECOND POINT: The international community is tacitly complicit, and by nature of the UN action the international community has a special obligation to assist in the repair, restoration, and sustainable development of the nation.**

Conclusion and Summary:

Since the very first days of its founding, the United Nations has been involved in decisions and actions that largely legitimized U.S. rights to ignore portions of their trusteeship agreement, disregarding not only the rights to health and property, but also the cultural rights of the Marshallese. I believe that the history of U.S. abuse of the Marshallese shows the U.S. disregard of the International Declaration on Economic, Social and Cultural Human Rights. It is also a significant expression of the U.S. assumption that it is free from obligation to social, economic and cultural rights in general. There is a myth in the U.S. which states that if you give someone civil and political rights, they can obtain for themselves economic, social and cultural rights. Many international lawyers would judge that the U.S. is bound to uphold both Conventions under international law.

Many questions go unanswered because the governments of those testing nuclear weapons failed to preserve a public record especially on the two key parameters before the Tribunal: first, extent of fallout and second, changes in human health. However the failure to keep records is also a clear indicator of priorities and legal self-protection. Declassification in the US demonstrates that the government conducted research on the extent and consequences bomb fallout. However, these records were never made available to the Marshallese people, their authorities, or to the varied government entities and interested public health, physicians, and other professionals who have worked with the people of the RMI to improve health. One example of the continuing issues related to this institutionalized control is the fact that access to full medical records remains to this day a difficult and medically compromising problem. Clearly such records were generated at the Tripler Military Hospital in Honolulu, the Cleveland

Clinic in Ohio, and the Walter Reed hospital in Washington, DC, where many were treated, yet Marshallese subjects, including people who received a human subject acknowledgement and apology letter from the Depart of Energy in 1999, have been unable to access their full medical record of health conditions, inoculations, radiogenic-imagery, 'preventive' thyroid removal surgery and other varied interventions.

I first met the Marshall Island survivors in Japan in 1978. I was distressed by their stories of the aftermath of the Bravo event (1954), a large hydrogen bomb explosion 1000 times larger than the Hiroshima bomb. I was distressed especially with their five years of inability to carry a normal pregnancy, followed by molar pregnancies (A molar pregnancy happens when tissue that normally becomes a fetus instead becomes an abnormal growth in your uterus, and this growth triggers symptoms of pregnancy. It is discussed more completely at the end of this document), and subsequent birthing of children with severe abnormalities. No written records had been kept by the Marshallese of these events, but the reports of the mothers were very credible. The women called these abnormal growths 'jellyfish babies' and often kept their feelings of quilt and confusion even from their husbands.

The Rongelap People had taken photographs of many of the deformed births. However, according to Dr. Bernard Lau, who served for us in the Hospital at Ebey for almost a year, the people told him that the Americans took the photos and burned them in front of the people saying: "This is what we think of your evidence." (See pages vii-viii of the 1989 Report to Congress enclosed).

I later visited the Marshall Islands and saw for myself the second-class status of the Marshallese, especially those living on Ebey, one of the Islands of the Kwajalein Atoll. Marshallese working on the U.S. military base at Kwajalein lived on Ebey, which was known among the people as the "slum of the Pacific". The Island was almost totally bereft of trees, desperately hot and un-shaded, and filled with American cultural icons: a disco, motorcycles, movie theatre, etc. However the hospital was fourth class, with one doctor, intermittent electricity, daily water failures, and inadequate medicines and medical equipment. Families provided the bedding and food for patients.

I brought with me the WHO list of basic medicines needed for Third World Hospitals, and found that instead of having this list of medicines in supply, the almost bare cupboards at the Ebey and Majuro hospitals consisted of whatever had been sent through charitable agencies in the U.S. It was often esoteric medicine for a rare ailment, or the usage date had passed. Ordinary often-used medicines were either absent or in short supply. The Doctor who served in Majuro told me that even when he ordered medicines directly they had time-expired before arriving. Sending them back for exchange was next to impossible, so he had to use them. It required a long time wait for medicines from the U.S. to arrive in the Marshalls.

Our Institute (International Institute of Concern for Public Health, Toronto, Canada), sent Dr. Bernard Lau, a Family physician to help in Ebey for an extended period of time, and Dr. Caloyannis, also a Canadian Family physician to preform medical examinations of the people of Rongelap Atoll who had been evacuated from their contaminated home Island for a second time in 1985. This Critique and that of the IICPH Report to the U.S.

Congress in June 1989 (enclosed) summarize the findings from my visits and their reports.

By April 1988, when Dr. Caloyannis performed medical examinations on 544 Rongelap people, we were dealing with the more healthy survivors of the 13 years of extraordinary nuclear fallout radiation exposure. Although in our hematological study we used the U.S. Department of Energy (DOE) designated control group (Brookhaven refused to give me the corresponding data from the exposed population), we discovered that these Marshallese had also received significant nuclear fallout. The general control group often changed over the years of DOE studies since researchers, when they sailed in once a year from Brookhaven were not always able to find the same controls they had used the previous years. Therefore both the cases and controls had varying levels of exposure to nuclear fallout and the comparisons are therefore somewhat muted and biased against demonstrating the severity of effects. This needs to be kept in mind when reading the enclosed 1989 Report and the Brookhaven Reports.

There is one more important program carried out in the Marshall Island that I think you should know about. According to the physician at the Hospital in Majuro, when a native of Rongelap showed the first sign of thyroid malfunction or disease after the 1954 Bravo event, they were sent to the Cleveland Clinic in the U.S. and their thyroid glands were removed. They were sent back to the Islands without an official surgeon's report of the surgery (as is customary), needing continuous thyroid replacement therapy for the rest of their life. As explained earlier, this was a difficult need to fulfill on a distant Pacific Island. This was called the Thyroid Cancer Prevention Program. The Cleveland Clinic records have never been released. There may have been other Hospitals involved in this program. You can imagine that the native Marshallese had little control either over their health care decisions or in understanding of their 'new' diseases and medicinal needs.

There is much more information in our Report to Congress 1989, and I strongly recommend that you consider this as you investigate and prepare your findings for the UN Human Rights Council.

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End note on Molar Pregnancies:

Molar pregnancy is thought to be caused by a problem with the genetic information of an egg or sperm. There are two types of molar pregnancy: complete and partial.

- **Complete molar pregnancy.** An egg with no genetic information is fertilized by a sperm. The sperm grows on-its-own, but it can only become a lump of tissue. It cannot become a fetus. As this tissue grows, it looks a bit like a cluster of grapes. This cluster of tissue can fill the uterus. [Called by the Marshallese women 'a bunch of grapes']

- **Partial molar pregnancy.** An egg is fertilized by two sperm. The placenta becomes the molar growth. Any fetal tissue that forms is likely to have severe defects.[Marshallese women called these jellyfish babies].

According to the Wiki based dictionary:

> "The most common birth defects [of nuclear fallout] have been jellyfish babies, born with no bones in their bodies and with transparent skin. 'We can see their brains and hearts beating'. The babies usually live for a day or two before they stop breathing."

References:

1. The monitoring of the RMI was conducted at the request of the RMI government under Section 177 Agreement of the Compact of Free Association US Public Law 99-239 (1986).
2. Brent and Garson, "Radiation Exposure in Pregnancy". In *Current Problems in Radiology,* Mosby et al. Chicago, Yearbook: Medical Publishers Inc. Vol. 3, 1972.
3. R. Bertell, "A Report to the U.S. Congress on the Heath Problems of the Rongelap People", International Institute of Concern for Public Health, Toronto, Canada, June 1989, p. vi Dr, Caloyannis Technical Summary contains the children's data see especially line 26 of the text.
4. Alexey Yablokov, Vassily Nesterenko and Alexey Nesterenko, *Chernobyl,* Annals of the NY Academy of Science, Vol. I 181, 2009.
5. T.T. Pritikin, in Chapter 2, "Insignificant and Invisible: The Human Toll of the Hanford Thyroid Disease Study", in *Tortured Science: Health Studies, Ethics, and Nuclear Weapons in the United States,* Editors: Dianne Quigley, Amy Lowman and Steve Wing, Baywood Publishing Co. Amityville, NY, 2012
6. Operation Crossroads, Jonathan Weisgall, Naval Institute Press, Annapolis, MD. 1994.
7. After WW I, WWII and the Cold War the U.S., former Soviet Union, U.K., and France dumping of Chemical waste in the Oceans. According to a 1993 U.S. Arms Control and Disarmament study, the U.S. is already responsible for at least 60 underwater chemical dumps and more than 100,000 tons of toxic materials some in Panama, Australia, Japan, and the Philippines. The exact amount and location of the dumps could not be ascertained since thousands of WW II records were destroyed.
8. Republic of the Marshall Islands, Office of Insular Affairs web site http://www.doi.gov/oia/Islandpages/rmipage.htm