Submission to the South Australian Nuclear Fuel Cycle Royal Commission
Subject: Issues Paper 1. Exploration, Extraction and Milling. Question 1.8 Would an expansion in extraction activities give rise to new or different risks for the health and safety of workers and the community? If so, what are those risks and what needs to be done to ensure they do not exceed safe levels?

A Cultural Analysis of Information Handling and Openness in the Nuclear Regulatory and Nuclear Expert Regimes
1999 -2015

By Paul Langley

2 August 2015
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A Cultural Analysis of Information Handling and Openness in the Nuclear Regulatory and Nuclear Expert Regimes 1999 -2015

By Paul Langley
Port Willunga SA
2 August 2015

Preamble
Trust in and understanding of the nuclear regulatory regime is essential if South Australians are to both feel safe and be safe. This is true both in the current setting, and the case of expansion in uranium extraction and other related activities. In relation to relevant information peer review must be accompanied by unfettered public review.

This submission examines the regulatory and expert nuclear culture. This examination consists of a study of statements issued by nuclear authorities relevant to the public perception of nuclear safety published in the accessible media. It examines the outcome of public requests for information. It examines the quality of information provided to the public. The submission compares the information provided to the public with information provided to peer organisations, including international organisations.

This submission will examine modern examples of decisions delivered by the current nuclear regulatory and expert regime from 1999 onward. Some recent decisions relate to historic events.

The expert culture includes the opinions published as statements of facts by expert scientists and advocates located in South Australia. These statements will be compared with findings of science published by other qualified sources.

Communication and disclosures between authorities, experts and the general public needs to improve.

Claims made by one radiological effects schools of thought in the current debate are shown to be deviant to qualified contrary findings and evidence.

I propose that interested members of the public be incorporated into the formal radiological monitoring regime of South Australia and its environment.

The recent results relating to the release of information, public statements and current determinations made in relation to past events help define the cultural imperatives of the
nuclear and experts regimes. In the absence of change, these recent and current outcomes may predict the nature of future determinations. Is the present and recent past cause for optimism?

**Modern Determinations Regarding Historic Radiation Exposures**
The nature of the modern nuclear regulatory and expert culture may be assessed by the determinations it has made in the current era in regard to historic exposures.

The Comprehensive Test Ban Treaty Organisation (CTBTO) equates fallout from nuclear weapons and fallout from a nuclear reactor accident as follows:


A former Federal Minister summarized the dangers of nuclear fallout as follows:

“The results of the global research effort (Project Sunshine) showed that humans were being adversely affected by radioactive fallout from atmospheric testing of nuclear weapons….” Source: Media Release, Dr Michael Wooldridge Minister for Health and Aged Care, MW82/01 5 September 2001, ARPANSA REPORT ON STRONTIUM 90 TESTING PROGRAM.

**The Health Survey Announced in 1999**
In 1999 the Australian Federal Government announced its intention to conduct a health survey of people directly affected by nuclear exposures caused by the nuclear weapons tests and minor trials conducted in Australia. This was in response to findings reported by researcher Sue Roff. Roff found a disturbing incidence of disease among British and New Zealand Nuclear Veterans and their children. The diseases were not confirmed to cancers. At the time Sue Roff was a researcher (now tutor) at the University of Dundee, Scotland. (http://medicine.dundee.ac.uk/staff-member/mrs-sue-roff).

The “Commonwealth of Australia Parliamentary Debates HOUSE OF REPRESENTATIVES Official Hansard, of TUESDAY, 10 AUGUST 1999, THIRTY- NINTH PARLIAMENT FIRST SESSION—FOURTH PERIOD BY AUTHORITY OF THE HOUSE OF REPRESENTATIVES, CANBERRA” records the following statements and promises to include Indigenous Australians in the Australian Health Survey:

“Kaldor, Professor John: Expert Report (Question No. 764). Mr Laurie Ferguson asked the Minister Assisting the Minister for Defence, upon notice, on 22 June 1999: Has he received an expert report by Professor John Kaldor reviewing the methodology used by the Scotland-based Australian researcher Sue Rabbitt Roff on the health of British and New Zealand nuclear veterans and their families; if so, (a) on what date, (b) has Ms Rabbitt
Roff been provided with a copy and given a chance to respond; if not, why not, (c) what was the cost of the report, (d) are copies available to the public; if not, why not, and (e) has he accepted Professor Kaldor’s recommendations; if so, will he provide details of further action to be taken to address the situation of Australian military and civilian personnel who participated in British nuclear tests in Australia. Mr Bruce Scott—The answer to the honourable member’s question is as follows: Yes. (a) Thursday 15 July 1999. (b) Professor Kaldor had discussions with Ms Rabbitt Roff during the preparation of his report. A copy of his report will be provided to Ms Rabbitt Roff. She may choose to comment. (c) Professor Kaldor is still to submit his account. (d) Yes. (e) I have announced the compilation of a nominal roll of ex-service personnel involved in the testing and also civilians, aborigines and pastoralists, for whom information is available. This nominal roll will be used to conduct mortality and cancer incidence studies of Australians involved in the UK nuclear tests. This will enable the Government to determine if current compensation and assessment arrangements are sufficient.” End quote.

The Failure to Include Aboriginal Australians in the Health Survey

The failure of the Australian Government to include Aborigines and pastoralists in its survey, as promised in its statements to Parliament, is a glaring omission. I asked the Minister responsible at the time to explain why Indigenous Australians were omitted from the Health Survey.

I received an email response from the Minister in which he provided the following response:

“The Hon Bruce Billson MP Minister for Veterans’ Affairs Minister Assisting the Minister for Defence Federal Member for Dunkley….

“...Dear Mr. Langley Thank you for your emails of 2, 9 and 10 March 2006 concerning the Australian Participants in the British Nuclear Test Programme – Cancer Incidence and Mortality Study.....

“While the Australian Government recognises the effect of the atomic tests on Indigenous Australians, having extended compensation eligibility to them under the Compensation (Commonwealth Government Employees) Act 1971, Indigenous Australians have not been included in the current study.

“Indigenous Australians were excluded from the study because there is no available list of Indigenous Australians who were present in the areas of the tests at the time. In the 1950s and 1960s the indigenous population was not counted in the census and there were no records kept of Indigenous Australians who lived in the test areas.

“However, I assure you that all reasonable steps were taken to include in the study all relevant aspects of Indigenous people’s experience of the atomic tests. Thank you for taking the time to write to me with your concerns. Yours sincerely

Signed Billson MP Minister for Veterans Affairs
Parliament House, Canberra ACT 2600 Tel: (02) 6277 7820 Fax: (02) 6273 4140
b.billson.mp@aph.gov.au” End quote. Source: email from Billson to myself received by me in March 2006.
The assertion that “Indigenous Australians were excluded from the study because there is no available list of Indigenous people who were present in the areas of tests at the time” is open to critical questioning. The issue of the health impacts suffered by Aboriginal Australians has been debated in Federal parliament over a long period of time. For instance:

**Senator Chaney’s 1980 Questions to SA Health authorities regarding Aboriginal people**

**Federal Hansard (Entry 2186) SENATE 14 MAY 1980 QUESTIONS WITHOUT NOTICE**

**MARALINGA ATOMIC TESTS**

(Entry 2186) SENATE 14 MAY 1980 QUESTIONS WITHOUT NOTICE MARALINGA ATOMIC TESTS

Senator ELSTOB – “My question is directed to the Minister for Aboriginal Affairs and may also bring some response from the Minister representing the Minister for Health. What plans has the Government for initiating inquiries into the deaths and illnesses of Aboriginals and white people who were exposed to the fall-out of the Maralinga atomic tests? According to reports received by Dr T. Cutter, who is heading an Alice Springs based Aboriginal health service team, many Aboriginals died immediately after the tests. Will the Minister consider holding a full inquiry into the short and long term effects on the health of the people living in the north of South Australia at the time of the atomic tests and check on the reports of mass burials of Aboriginals?”

Senator CHANEY – “*Needless to say, this matter has been of concern to me. The concern predates the recent spate of publicity which related to Dr Cutter’s visit to northern South Australia and, of course, to a series of articles in, I think, the Advertiser in South Australia. At present the Commonwealth is seeking information on the matters which have been raised. Perhaps it is worth quoting Mr Toyne, one of the people who has been interviewed in this area and who is an employee of the Pitjantjatjara Council. I refer to his comment on radio the other morning.. When asked about possible deaths he said: all I can say is that it is quite speculative. We are still in the area of speculation.*

“We are still seeking information. Over the past month or so I have written on a couple of occasions to the Minister of Health in South Australia seeking information from the South Australian Health Commission. I am not in a position to give a final response…..” Senator Chaney, Senate, 14 May 1980, as recorded in Federal Parliamentary Hansard.

I can find no Hansard entry in which Chaney was able to report a final and complete response. However, Chaney states that he sent letters to authorities in South Australia. What did Chaney consider likely for South Australian authorities to know about the relevant matters?

**The SA Government Refusal to Supply Information regarding Chaney’s questions.**

I asked the State Government of South Australia for access to the letters Senator Chaney sent to the SA Health Commission, as described in Federal Hansard, and for access to the letters officers of the SA government and its agencies wrote to Senator Chaney in reply. The State Government refused my request for access to these documents. The letter to me from Mr Jim Dadds, FOI Officer, document numbers 99/03212, 00299/0347, 27 September 1999 is shown below:
DEPARTMENT OF HUMAN SERVICES

Public and Environmental Health Service

PEHS: 99/02250
PEHS: 00296/00347

2 August 1999

Mr Paul Langley
WILLUNGA SA 5173

Dear Mr Langley

I refer to your letter dated the 22nd July 1999 seeking access to all documents in relation to nuclear weapon tests held in South Australia under the Freedom of Information Act 1991.

I wish to advise that your request has been refused under Section 20(1)(e) of the Freedom of Information Act 1991 which states that "An agency may refuse access to a document if it is a document which came into existence before 1 January 1987."

I have attached a copy of your rights of appeal under the Freedom of Information Act 1991.

Should you have any further queries please do not hesitate to contact me on 8226-6325.

Yours sincerely

Alan Dadds
Director, Resources and Planning
PUBLIC AND ENVIRONMENTAL HEALTH SERVICE (Designated Freedom of Information Officer)
Department of Health, DEPARTMENT OF HUMAN SERVICES

By way of compromise Mr. Dadds sent me copies of public documents the SA government generated in response to the situation created by Senator Chaney's letters regarding the health of affected Indigenous Australians to the SA Health Commission.

The McClelland Royal Commission Response to the SA Health Survey of Aboriginal People One of the documents Mr. Dadds sent to me was a copy of the Health Survey of Aboriginal people who were likely to have been affected by the releases of nuclear pollution from the test sites at Emu and Maralinga. Royal Commissioner McClelland famously and devastatingly dealt with this particular Health Survey during his Royal Commission in the 1980s. McClelland's findings regarding this SA Health Survey are contained within the report of the McClelland Royal Commission (short title). The fact of this SA Health Commission Health
Survey of Indigenous Australians, conducted in the 1980s is very telling. It is not impossible to conduct a Health Survey of Aboriginal people who were affected by the atomic tests. It is a terrible tragedy that the South Australian survey, involving the SA nuclear safety regime, and that culture, resulted in such a uselessly poor report. One that Royal Commissioner McClelland found to be quite scandalously inadequate and self serving. This leaves the matters surrounding the questions put to Senator Chaney, and the information sought by Senator Chaney in 1980 unresolved. The exclusion of Aboriginal people from the Health Survey which reported in 2006 further ignores the promise made to parliament by Senator Chaney unfulfilled. Given the extreme importance of the matters involved, the Australian people and the affected people deserve a clear and straightforward resolution to this matter.

The 2010 British Government Reply to My 2001 Request for Information
As a result of the refusal by South Australian authorities to release the relevant documents to me, on 23 July 2001 I wrote to British authorities. I asked the British authorities what was known by the United Kingdom in this matter. I received the following reply from the British Consulate in Canberra. It took ten years for them to reply to me.
Dear Mr. Langley,

I am very sorry that you received no reply to questions that you put on 23 July 2001.

The report of the Royal Commission into British Nuclear Tests in Australia, issued in 1985 by the Australian Government Public Service (and sometimes referred to as the McClelland Report) should contain all the information required to answer your questions and I would encourage you to get hold of a copy. I enclose the information sheet published on the Internet by the National Library of Australia, which should help your local librarian to track the document down.

Once again, please accept my apologies for the extraordinary delay in following up with a reply to your original letter.

Yours sincerely,

The long delay is not surprising in my experience. The response of nuclear authorities to ordinary people usually demands some degree of patience on the part of the public. This occasion was no different. It is typical for questions relating to nuclear issues. The answer from the British authorities completes a futile circle, for the McClelland Royal Commission was not able to make any robust findings relating to the impact suffered by Aboriginal people as a result of their radiation exposure. In nuclear matters, this is not unusual at all.
Exclusion of Aboriginal Diet from Food Monitoring in Australia in the Post Bomb Era
As far as I am aware, no study of the Australian Indigenous diet in the context of Radiological Safety has ever been published by the nuclear elite in Australia. In contrast, the White Australian diet was studied from this perspective from at least 1957, probably earlier, and was published from at least 1962. For example:


Of course, in 1962, lay people did not have access to University libraries. At that time, the readership of science journals was largely self selecting on the basis of income, expertise and entitlement to access technical and academic libraries. These factors tended to keep the general public out of reach of such journals and the information they contained.

While components of the White Australian diet were studied and published in exclusive readership markets in detail, the components of the traditional Indigenous Australian Diet was not considered. The degree to which this diet was affected by nuclear fallout was unreported even in the specialist and elite publications. The matter of diet is reasonably one which may lead to insights in relation to the health impacts suffered by Australian Aboriginal people. Were insight gained into the radiological impact of that diet then some progress toward answering the questions asked in Federal Parliament on 14 May 1980 might be made.

For example, in the United States, a belated admission of expert ignorance regarding the same information has occurred:

“Native Americans residing in a broad region downwind from the Nevada Test Site during the 1950s and 1960s received significant radiation exposures from nuclear weapons testing. Because of differences in diet, activities and housing, their radiation exposures are only very imperfectly represented in the Department of Energy dose reconstructions. There are important missing pathways, including exposures to radioactive iodine from eating small game. The dose reconstruction model assumptions about cattle feeding practices across a year are unlikely to apply to the native communities as are other model assumptions about diet. Thus exposures from drinking milk and eating vegetables have not yet been properly..."
estimated for these communities. Through consultation with members of the affected communities, these deficiencies could be corrected and the dose reconstruction extended to Native Americans. An illustration of the feasibility of extending the dose reconstruction is provided by a sample calculation to estimate radiation exposures to the thyroid from eating radio-iodine contaminated rabbit thyroids after the Sedan nuclear test. The illustration is continued with a discussion of how the calculation results may be used to make estimates for other tests and other locations.” end quote. Source: “The Assessment of Radiation Exposure In Native American Communities from Nuclear Weapons Testing in Nevada”, Eric Frohmberg, Robert Goble, Virginia Sanchez and Dianne Quigley, Risk Analysis Vol 20, No. 1, 2000.

It is plausible that the same official ignorance occurs within the Australian nuclear regulatory and nuclear expert cultures in the matter of the traditional “native diet” as America admits to.

However, some people close to the Aboriginal people, such as mission station staff and one politician, seem to have had some degree of insight. The records and reports produced Grayden, M.P., Western Australia, cast severe doubts in my mind about the rationality of the claim made by the Australian government in 2006 that there was no official knowledge of who the affected Aboriginal people are. See for example, the following text:

The Aboriginal people should have been included in the Federal Health Survey that reported in 2006.

**ARPANSA’s modern Record regarding Effects vs A Finding in Law**

I received the following 2 page letter from the CEO of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), Mr. C. Larsson. This letter carries some authority and is considered correct information:
Mr Paul Langley
PO Box 47
Aldinga Beach SA 5173

Dear Mr Langley,

Thank you for your submission of 19 February 2010 to the Minister for Families, Housing, Community Services and Indigenous Affairs, the Hon Jenny Macklin MP, discussing health concerns related to the “black mist” as a result of British nuclear testing in South Australia. Your submission was referred to the Department of Health and Ageing for consideration and this matter falls within the portfolio responsibility of the Parliamentary Secretary for Health, the Hon Mark Butler MP. The Parliamentary Secretary has asked me to reply on his behalf.

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) is a Commonwealth Government agency charged with responsibility for protecting the health and safety of people, and the environment, from the harmful effects of ionising and non-ionising radiation. One of the functions of the CEO of ARPANSA is to provide advice on radiation protection and related issues. In that capacity ARPANSA has reviewed your letter of transmittal and the accompanying submission regarding the exposure of Lallie and Bruce Lennon to Totem 1 nuclear tests carried out by the British Government on 15 October 1953.

ARPANSA acknowledges that previous inquiries (made by the Australian Ionising Radiation Advisory Council (AIRAC) and the McClelland Royal Commission into British Nuclear Weapons Tests in Australia) have linked the phenomenon known as the “black mist” or the occurrence of ground-level clouds of debris to the Totem 1 test conducted at Emu.

We note that Ms Lennon and her family were located at the Wallatinna/Mintabie region which is about 173 kilometres from Totem 1 ground zero at the time of the Black Mist phenomenon. The AIRAC Report No. 9 (“British nuclear tests in Australia – a review of operational safety measures and of possible after-effects”, January 1983, Report to the Minister, the Hon. D.T. McVeigh, M.P. Minister for Home Affairs & Environment) has provided estimates of potential doses received by those in the Wallatinna region. These dose estimates were based upon ground and aerial surveys of fallout from Totem 1 along the centre line to the fallout path. The AIRAC report noted that the fallout cloud from the tests would have passed near the Wallatinna station about 5 hours after the detonation (which took place at 7 am on the morning of 15 October 1953).

AIRAC has estimated that the worst exposure from the fallout at Wallatinna was an accumulated dose of 9 mSv. The International Commission on Radiological Protection (ICRP) recommends dose limits to members of the public and for occupational exposure. Currently, it recommends an effective dose limit of 1 mSv per year for members of the public and 20 mSv per year for occupational exposure. This dose estimate was for external exposure.
produced by gamma radiation of the whole body. A specific radiation dose to the skin from immersion in a ground-based cloud of radioactive fallout was not calculated by AIRAC.

The McClelland Royal Commission concluded the largest estimate of beta dose on the skin (if no decontamination or shielding was undertaken, i.e., washing skin and/or presence of protective clothing) to be 170 mSv. The ICRP currently recommends skin dose limits to 50 mSv per year for members of the public and 500 mSv per year for occupational exposure.

The AIRAC report concluded that the atomic tests carried out at Emu could not have caused acute illness or the early death of indigenous peoples at Wallatinna or nearby as the dose estimates for the region were well within limits deemed acceptable for members of the public at that time.

From the dose estimates provided in the AIRAC January 1983 report and those presented to the McClelland Commission, it is very unlikely that radiation exposure either caused or contributed to Ms Lennon’s or her son Bruce’s psoriasis.

You should note that the AIRAC report also mentions confusion over the cause of the symptoms and deaths, resulting from the timing of the mist and of measles epidemics amongst Aborigines in the region. ARPANSA is not qualified to provide advice on non-radioactive factors that may have caused or contributed to an individual’s medical history.

Thank you for taking the time to provide your submission.

Yours sincerely

Carl-Magnus Larsson
CEO of ARPANSA

14 May 2010
Some months after ARPANSA assured me that the Totem 1 nuclear test detonation “was not likely” to have caused any illness or disease in any populations, I received the following email from a solicitor well known for his legal assistance rendered to affected South Australians. I have redacted the email for privacy reasons:

Subject: 

From: Andrew Collett <ACC@  
Date: 24 November 2010 21:53  
To: pauljeremyangle:

Hi Paul,

I have been provided with your submission on behalf of

Are you aware that I acted for and secured compensation for on the basis that psoriasis was caused by the Totem I blast? 

Regards

Andrew

In regard to the diagnosis of psoriasis, in this case, it was not the victims fault that the victim was refused diagnosis at the time (1953) by medical authorities. Nor was it the fault of the victim that it took, actually, 30 years to obtain a diagnosis. I refer to the IAEA Training Module “Diagnosis of Local Radiation Injury”, Day 3. Where an injury consistent with beta burn – local radiation injury – occurs when radiation is present then “RADIATION MUST BE CONSIDERED” as a possible causative agent. Source: “Diagnosis of Local Radiation Injury”, International Atomic Energy Agency,

I later learned from a personal verbal message conveyed from Mr. Collett that I could not view any documents relating to this successful court action against the Commonwealth for radiation injury. No person may. The proceedings have been suppressed from the open legal record. If nuclear authorities want to be trusted by the public, the suppression of legal proceedings and determinations made by courts based upon medical evidence should be available in the open legal record.

Brief Summary

In May 1980 questions in the Australian parliament put in train events which resulted in Health Survey of South Australian people likely to have been affected by nuclear fallout. The report was created by the State of South Australia. Later Royal Commissioner McClelland found that report to be useless and derelict and self serving. And so, to this day there is no public knowledge of any valid investigation of the matters raised. These matters pertain to radiological safety and to health impacts due to radiation exposure. As the 1984 McClelland Royal Commission had insufficient evidence, due in large part to the actually useless South
Australian Health Survey, that Royal Commission could not actually provide an answer on the matter to the Australian people. The Royal Commission found that the Aboriginal people who provided evidence to that Royal Commission were to be believed. However, it takes a qualified expert to make a diagnosis.

The matter was compounded in 2006 when the Federal Government breached a promise made in Parliament in 1999 and failed to include affected Aboriginal people in the Health Survey of those affected by the nuclear weapons test of the 1950s.

2006 is not long ago, and it is the South Australian failure of the 1980s to produce a valid Health Survey which is key here. For had South Australian health and nuclear experts produced a valid Health Survey, this matter would not have been outstanding for so very long.

Given this precedent, how does the State of South Australia propose to ensure that no person or community suffers the same exclusion as has been suffered by Australian Aboriginal people since the commencement of the modern nuclear era in Australia, that is, since the detonation of nuclear weapons in Australia commencing 1952? Will the tradition of exclusion, denial, delays in diagnosis, with holding of information and other aspects resultant from the nuclear regulatory culture, be continued? If so, is this safe or dangerous?

The 2006 Findings regarding Nuclear Veterans – Causation, Dose and Risk
If one sets out to be an advocate for nuclear veterans – or any other group at all, actually – one has to recognise that individuals within groups have, and are fully entitled to, diverse views. On anything, including the nuclear future, or not, of South Australia. Obviously, the nuclear groups have reason for being. It is the state of justice nuclear veterans groups experience as a groups of individuals that I write about here, nothing else.

There are salient lessons regarding the nuclear expert culture here though, I believe.

In 2006 nuclear authorities reported the following:
"Other findings included:
"Of the 26 mesothelioma cases in test participants, 16 occurred in RAN personnel, which was nearly three times the number expected in RAAF personnel, there was nearly double the expected number of deaths from melanoma, and cases of melanoma were increased by two-thirds.
"The increases in cancer rates do not appear to have been caused by exposure to radiation. No relationship could be found between overall cancer incidence or mortality and exposure to radiation. None of the above cancers occurring in excess showed any association with radiation exposure in this study. In particular, there was no link between radiation exposure and leukaemia, excluding chronic lymphatic leukaemia (non-CLL leukaemia), which is commonly found to be increased in groups exposed to radiation. These findings are consistent with the low levels of radiation exposure found in this study.
"Only 4% of the study population had an estimated radiation exposure greater than 20 millisieverts (mSv) from test participation, and 79% had an estimated exposure of less than 1 mSv. The estimated mean radiation exposure of the study population due to participation in the tests was 2.8 mSv, only slightly greater than the background exposure
received by every Australian every year.

"In the absence of a correlation with radiation exposure, the excess of non-CLL leukaemia is unexplained. Other than radiation, the best established cause of leukaemia is exposure to benzene, but there is no information available about benzene exposure in test participants." End quote. Source: Australian participants in British nuclear tests in Australia Vol 1: Dosimetry May 2006, Michael Carter, Francis (Rob) Robotham, Keith Wise, Geoffrey Williams and Philip Crouch © Commonwealth of Australia 2006 ISBN 1 920720 38 3

The publication quoted above is one of two volumes which resulted from the Health Survey of Australian Veterans announced by the Howard Government in 2001.

After 5 years work the report’s most significant finding regarding the nuclear veterans can reasonably be seen effectively as consisting “We don’t know” in regards to the cause of the very large increase in risk of disease the Study found in regard to the Nuclear Veterans. The question of benzene was raised by the authors of the study. However, this at first sight, merely added another “don’t know” to the report. Not knowing about Benzene does not take away the obligation of expert bodies – successor organisations to those of the era – to allow obligations to be fulfilled and for expertise to be obtained in the current era. If current authorities cannot establish the cause of the proven excess suffering which afflicts surviving nuclear veterans how can these same authorities claim to know anything much about any other nuclear victims now or in the future? Apart from the fact that similar exposures may produce similar outcomes, though the link between the similar activity and exposure and outcome will again not be made. Medical mysteries then, such as the great increase of risk among surviving nuclear veterans, as proven in 2006, won’t stop uranium expansion and other similar activities in SA. Will it? Do we know enough in these matters?

On what basis then the State government advocate an expansion of the uranium mines in an epoch in which petrol and diesel based transport predominates, and will remain a factor? Will the experts monitor for benzene as well as radioactive materials and radiation at the new mines? If one becomes excessive, how will that impact on society?

The Example of the Late Mr. Jones

The accuracy of this additional mean dose of 2.8mSv of radiation exposure is contested by facts revealed in Commonwealth Parliamentary Hansard as follows:

“1020 COMMONWEALTH PARLIAMENTARY HANSARD REPRESENTATIVES 20 MARCH 1980 Mr UREN (Reid) (12.35)

"in today’s grievance debate I want to raise further questions about the British nuclear weapons tests that were conducted in South Australia from the early 1950s to the early 1960s. In particular I would like to open up the question of the effect of those tests on the health of Australians who were involved in the weapons testing program at that time….

"William Jones had been a member of the Army from 1952 to 1965 when he was discharged as medically unfit for military service. He died of carcinoma nine months later in 1966 at the age of 39. Mrs Jones says that her husband was sent on a secret mission for several months from his home base at Puckapunyal to Woomera in South Australia in late 1953. She says that his crew took a tank to be placed in the blast of an atomic explosion.

"She believes that after the explosion he went back to bring the tank out but it did not work; so
he remained in the blast area for two days waiting for parts. There is evidence to support her story in the book Blast the Bush by Len Beadell. It is the story of the first atomic test at Emu on 15 October 1953. Mr Beadell says that a Centurion tank was transported to Emu and placed close to the bomb with a dummy inside to test the effects of the atomic blast. I believe that Mrs Jones’ claims should be examined and investigated. After her husband’s death Mrs Jones applied for compensation for herself and her five children on his behalf. After a long battle she was finally awarded compensation in 1974. under the Compensation (Australian Government Employees) Act. The delegate of the Commissioner for Employees Compensation determined that the disease William Jones had suffered from constituted a disease due to the nature of his employment with the Army.

“I want to stress that aspect. It was a metastatic carcinoma of bone. He also determined that William Jones death resulted from a disease due to the nature of his employment. I seek leave to have these two determinations incorporated in Hansard. Leave granted. The documents read as follows – End partial quote. Source: Commonwealth Parliamentary Hansard, as previously given. I urge the reader to study the entire Hansard entry.

The following photograph show the tank being driven by the late Mr Jones in action at the “close in areas” of Emu. Occam’s Razor or synergistic and thus boosted harms at Maralinga?
The Expert Unknowns – Benzene or Radiation or Benzene/Radiation Synergy

We have seen that the reports of 2006 include the finding that benzene suffered at Maralinga is not known.

I refer to the following scientific papers: “The combined effect of ionizing radiation and benzene on immunoreactivity indices in the spleen and lymph nodes”, Sharetskii AN, Abramova MR, Zamulaeva IA, Kulish IuS. Radiats Biol Radioecol. 1997 May-Jun;37(3):387-94. The authors report: "Under the influence of the combined action of gamma irradiation (1 Gy, 1.15 Gy/min) and benzene the synergistic reduction of proportion and absolute content of B-cells and less expressed reduction of absolute content T-cells in spleen and lymph nodes was observed. In spleen the thymus-dependent humoral immune response was resistant to combined effect of irradiation and benzene, while in lymph nodes it was highly sensitive. The profound suppression of antibody formation in lymph nodes was characterized by synergism. It was accompanied by the block of specific recruitment of antigen sensitive cells within drained lymph nodes from migrating stream. The suppression of local immune response resulting from the combined effect of radiation and toxicants may be the cause of protective immunity disturbance."

and

“Analysis of combined effects of benzene with radiation on chromosomes in cultured human leukocytes.” Morimoto K. Sangyo Igaku. 1976 Jan;18(1):23-34. The authors found: “1) Benzene can induce mainly chromatid-type deletions, especially gaps, suggesting that the cells in their late S-G2 stage have a higher susceptibility to chromosome breakage by benzene. 2) The aberration tield of dicentrics and rings induced by 100 rads irradiation can significantly be enhanced by the treatment of benzene equal to or in excess of 0.2 mM. 3)
Quantitative analyses using newly defined "Synergetic effect factor" revealed that combined cytogenetic effect of benzene with radiation could be synergetic exclusively in dicentrics and rings, being almost additive in the other types of aberration. 4) The experiment with dosage fractionation method showed that the more strongly benzene could inhibit the rejoining of radiation-induced chromosome breaks, the higher concentration it was treated at. Related with these results, possible inducpts, and the repair and its inhibition of radiation-induced DNA-strand(s) breaks. Further studies for related effects by benzene are needed on protein synthesis, activities of repair enzymes and fine structure of chromosomes."

There seems little doubt that Benzene and radiation synergy produces a potent boosting in the harmful effects of any given radiation dose.

The questions which arises in relation to the findings include: What are the risks of locating uranium and nuclear activities within settings which car, truck and equipment exhaust can be expected to produce benzene/radiation synergistic effects within the life processes of adjacent and involved populations? Not withstanding the fact that some schools of radiological thought reject the notion of synergism.

These findings of the 2006 Health Survey reports show that some researchers do give credit to the notion that fossil fuel combustion plus radiation equals greatly enhanced risk. It is in my mind a great tragedy that nuclear activities past and present were and are conducted on the assumption of inherent safety, when in fact inherent risk is and was present. The law should be changed so that where illness of specific types occur in a radiation/benzene exposed population, the presumption of association negates the requirement to prove cause and effect.

This would allow access to justice for victims and for swift compensation to be paid to victims by nuclear industry. Whether the industry could run at a profit in such a just setting is for the State Treasurer to work out perhaps. Some will disagree most strongly with this. None of the opponents are likely to have been victims though. It is a travesty that radiation syngery with the components of fossil fuels is not central to the current debate.

I cover other factors which act to enhance the effectiveness of radiation dose later in this submission.

Unlike the previous two references, which study the interactions between ionizing radiation and benzene, the following study took place in a setting where no ionizing radiation was present in a benzene laced workplace:

Quote: "Concentrations of airborne benzene due to diesel exhaust from a locomotive were measured during a worst-case exposure scenario in a roundhouse. To understand the upper bound human health risk due to benzene, an electromotive diesel and a General Electric fourcycle turbo locomotive were allowed to run for four 30-min intervals during an 8-h workshift in a roundhouse. Full-shift and 1-h airborne concentrations of benzene were measured in the breathing zone of surrogate locomotive repairmen over the 8-h workshift on 2 consecutive days. In addition, carbon monoxide was measured continuously; elemental carbon (surrogate for diesel exhaust) was sampled with full-shift area samples; and nitrogen dioxide/nitric oxide was sampled using full-shift and 15-min (nitrogen dioxide only) area samples. Peak concentrations of carbon monoxide ranged from 22.5 to 93 ppm. The average concentration of elemental carbon for each day of the roundhouse study was 0.0543 and 0.0552 microg/m(3) for an 8-h workshift. These were considered "worst-case" conditions since the work environment was intolerably irritating to the eyes, nose, and throat. Short-term nitrogen dioxide concentrations ranged from 0.81 to 2.63 ppm during the diesel emission events with the doors closed. One-hour airborne benzene concentrations ranged from 0.001 to 0.015 ppm with 45% of the measurements below the detection limit of 0.002-0.004 ppm.

"Results indicated that the 8-h time-weighted average for benzene in the roundhouse was approximately 100-fold less than the current threshold limit value (TLV) of 0.5 ppm. These
data are consistent with other studies, which have indicated that benzene concentrations due to diesel emissions, even in a confined environment, are quite low." End quote. Source: Airborne concentrations of benzene due to diesel locomotive exhaust in a roundhouse, Madl AK1, Paustenbach DJ. J Toxicol Environ Health A. 2002 Dec 13;65(23):1945-64.”

Benzene alone is a risk to health. So is radiation. Together the two produce greatly enhanced risks to health.

By 2011 such was the plight of the veterans that few avenues remained open. One nuclear veteran wrote to the Governor General of Australia. This letter is rather long and technical. The author of the letter sent me a copy of it at the time, to reproduce as required. The letter is included as Appendix 1. of this submission.

Never, in the course of legal battle, have Australian legal authorities spent so much money fighting so few who asked for so little.

I wonder why this is so. I believe nuclear culture, the assumptions it makes and it’s mode of information handling. It also pivots upon the fact that the nuclear veterans have little or no access to their dose records. And it certainly pivots upon the fact that the nuclear veterans have no access to their Maralinga health files.

It is sad to me that I have my radiation exposure records, of mundane doses from a comfortable military lab/workshop setting in the 1970s, from my turn as a soldier, whereas these older diggers who served on a proxy nuclear battlefield, by and large, do not.

Is there a policy of not releasing exposure and medical information to individuals if that information tends to indicate legal liability on the part of the State?

To verify this claim the following evidence is provided. What had the Australian Army learned by the early 1970s from it’s experience from 1952 until the mid 1960s? One thing at least, preserve relevant records.

Why was the Premier John Bannon surprised by the extent of the nuclear contamination at Maralinga during his visit there in the 1980s? Is it credible to posit that there was no monitoring of the Australian nuclear test sites from the 1950s to the mid 1970s at least? No.

So why did the government of SA not know the extent of the contamination at Maralinga if nuclear authorities were handling information properly?

How will the state government avoid a repeat of the Bannon Maralinga experience in relation to uranium mines and slag heaps which seem set to multiply across the state?
In reply please quote:
CARO: 45942

Mr. P.J. Langley

PORT WILLUNGA SA 5173

Dear Mr. Langley

Enclosed for your retention are copies of all Quarterly Records - Film Badge Recording Sheets this office holds relating to your service with the Australian Army as:

45942 Temporary Corporal Paul Jeremy LANGLEY.

The information in the enclosures is released pursuant to Australian Military Regulation 770.

Yours sincerely

R. WALLER
SPV CARO ENQUIRIES
for Commanding Officer

18 September 2002

Enclosure:
1. Photocopies of personal service documents

CARO – continuing Army’s commitment to the soldier
The Fate of the Missing Maralinga Hospital Medical Files

For many years the only Maralinga Veteran to have possession of any part of his Maralinga hospital file was Mr. John Hutton. He grabbed a page from his file when doctors were looking the other way and jammed it down his PJs. He was a in-patient of the Maralinga Hospital at the time.

Mr. Hutton had his day in court in the mid 1990s. The Commonwealth called him a drunkard and an unreliable witness. He was dishonest they said. Having spoken to Mr. Hutton previously by telephone, I followed the press and radio reports of his court case. (I was seeking information related to Senator Chaney’s unanswered questions of 1980.)

I recall the characterisation of Mr Hutton, made by the Commonwealth, reported at the time.

Australian authorities do not accept the full extent of what Mr. Hutton reported so long ago and so this witness was characterised in the manner that he was by the Commonwealth of Australia in the course of that court case. This is my recollection and opinion.

Was Mr. Hutton’s action – the taking of a page from his medical file – really theft? Many veterans have confronted the Commonwealth in court, but the veterans do not have access to their medical files, nor to their individual exposure records. A fair-minded person may ask why this should be so.

So where are the Maralinga Hospital files? Does anyone actually know?
A brief account of John Hutton’s hospitalization follows:
“A letter was received by the Department of Veterans Affairs on 3 Nov 2008. Written by John Hutton, spokesperson, Australian Ex-Service Atomic Survivors Association, he states: “In August 1957 a number of the troop became ill with persistent vomiting but were reluctant to seek medical help for fear of being called ‘shirkers’. I was admitted to the Maralinga Village Hospital on 29 August 1957 and did not return to work until after 7th September. I was treated with Largactil, which I now know is used not only for vomiting but psychosis and radiation sickness. I attach a copy of my in-patient record, probably the only copy of a Maralinga hospital record available as all others seem to have completely disappeared.

“Over the years I have worked very hard to make sure that the grave injustice to these Veterans didn’t continue. I even lobbied the schools to have the British Nuclear Tests in Australia included in the curriculum. It is quite remarkable the number of people who are not aware that this travesty of justice happened on our own soil. It was rewarding last year when the National Museum of Australia included this as one of the subjects in their Touring History Agenda. I also appeared before the Royal Commission, but recently I have had to curtail my activities due to ill health and failing eye sight.” (Source: This letter from Mr. Hutton is stored by the Department of Veterans. I accessed the document online on 28 December 2011. At that time the document was viewable as part of the Clarke Review documents at the following web link:

https://docs.google.com/viewer?u=a&q=cache:v82ecAwdudQJ:www.dva.gov.au/pensions_and_rates/clarke_review/Documents/hutton.pdf+maralinga+hospital+records&hl=en&gl=au&pid=bl&srcid=ADGEESj1ajXm8SOceXKHFT8uA111kcoQeI8zKtBO_xfDeU6QRML0I_lip_Oj69MmFecJ6Z80f9qbXHSaGUJyYK3bMEh2DeWqzg7weFs54fLM-DCdv3XFgctP117uMCjVaHB6JySA1&sig=AHIEtbRmGrbwh8_Ju8LqZn2Gy3oGtbzeyQ

The Maralinga Hospital document Mr. Hutton attached to the above letter to the Clark Review of the Department of Veterans Affairs gives the “Firm diagnosis” as “Functional Vomiting”. The record gives Mr Hutton’s age at the time as 20 years, and the date of admission is given as 29 August 1957, the date of discharge as 7 September 1957. The total stay in the hospital is given as ten days. One would think that a “Firm diagnosis” of “functional vomiting” – for ten days – is not a diagnosis but an observation of a sign of a symptom of an undisclosed illness. Pity there was no diagnosis made. Another habit of the relevant culture in my opinion.

The veterans still cannot access their Maralinga medical files. How will the SA government facilitate public discussion of the health impacts on workers and the community if such impacts occur?

The US Radiation Exposure Compensation Act

The 2006 Australian Health Survey publications relating to Australian Nuclear Veterans are not the only documents that reveal the routine dichotomy between the official view of nuclear events and the consequences suffered by subject populations. This dichotomy is universal, in my opinion, and exists anywhere populations and cohorts are subject to military or civilian nuclear activity. Today, after decades of denied justice, the people of the US Down-winder States have access to redress for the sufferings imposed by nuclear fallout generated by US Federal Government actions. The compensation scheme is administered by the US Department of Justice. The scheme can be studied here: http://www.justice.gov/civil/common/reca
The US Radiation Exposure Compensation Act (Dept of Justice) website states: “The United States conducted nearly 200 atmospheric nuclear weapons development tests from 1945 to 1962. Essential to the nation’s nuclear weapons development was uranium mining and processing, which was carried out by tens of thousands of workers. Following the tests’ cessation in 1962 many of these workers filed class action lawsuits alleging exposure to known radiation hazards. The appellate courts dismissed these suits. Congress responded by devising a program allowing partial restitution to individuals who developed serious illnesses after exposure to radiation released during the atmospheric nuclear tests or after employment in the uranium industry: the Radiation Exposure Compensation Act (the Act, or RECA), 42 U.S.C. § 2210 note (2006), was passed on October 5, 1990. The Act’s scope of coverage was broadened in 2000.

The Act presents an apology and monetary compensation to individuals who contracted certain cancers and other serious diseases:

• following their exposure to radiation released during the atmospheric nuclear weapons tests, or
• following their occupational exposure to radiation while employed in the uranium industry during the Cold War arsenal buildup.

This unique statute was designed to serve as an expeditious, low-cost alternative to litigation. Significantly, RECA does not require claimants to establish causation. Rather, claimants qualify for compensation by establishing the diagnosis of a listed compensable disease after working or residing in a designated location for a specific period of time. The Act provides compensation to individuals who contracted one of 27 medical conditions. It covers all states where uranium was mined and processed, as well as specified counties in Nevada, Utah, and Arizona, where significant fallout from the atmospheric nuclear testing was measured.”

source: US Department of Justice website as given above.

The amounts received do not cover the medical bills of the afflicted, but it is an acknowledgment that Americans did suffer due to nuclear fallout.

Further, the most recent determination of the Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation, National Research Council, USA, contained within the document “Health Risks from Exposure to Low Levels of Ionizing Radiation : BEIR VII – Phase 2″ (USA) is clear that there is no totally safe exposure to this radiation. It is clear that there is no beneficial dose to this radiation. In particular, this text states the following: “Adaptation, low-dose hypersensitivity, bystander effect, hormesis, and genomic instability are based mainly on phenomenological data with little mechanistic information…."

“The data suggest enhancement or reduction in radiation effects and in some cases appear to be restricted to special experimental circumstances.” (Source: Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation, National Research Council, USA, contained within the document “Health Risks from Exposure to Low Levels of Ionizing Radiation : BEIR VII – Phase 2″ (USA), page 28.

The US Peak body in nuclear safety research assessment rejects hormesis as the basis for radiation protection regimes. The relevance to the Americans eligible for RECA compensation is this: The radiation exposures they suffered was characterised at the time as being justified and safe. The nuclear authorities claiming safety from the exposures suffered were informed by the US Atomic Energy Commission premier advocate for hormesis,
Marshall Brucer. See “In Memoriam”, obituary to Marshall Brucer, C.C. Harris Journal of Nuclear Medicine, 1994; 35:45A -46A, to quote: “He (Brucer) fought a constant battle with the possibility that hysteria about the hazards of radiation could stifle radiation’s potential for good; he never ceased promoting the idea that radiation is necessary, even good for you. He worried that the result of these fears could be that patients could be “protected from needed diagnosis”. He also never ceased to deliberately over state his case with an irritating but eloquent style that served to command the attention of others and often charmed even his most reactive adversaries”.

The populations of large swaths of the Down winder states of the US recall being told that the fallout would not harm them or their families. To date, RECA has cost the USA over $2billion dollars. A rational study of experiments aimed at finding the facts about the effects of “low dose radiation” will be presented later in this submission.

The Flawed Monitoring of Fallout
A source of error is reported by U.S. nuclear experts in secret in 1954 : “ The percentages of fallout cited below are based on survey meter readings inside a circle of 200 miles radius and gummed paper collections outside this circle. While the gummed paper collections are here assumed to have an efficiency of 100%, the true value is certainly lower, as discussed later....

“... The efficiency of the gummed paper for rainfall collections has been estimated in simulated rainfall experiments to be 80%, 50%, and 20% for particles of 2, 1, and 0.4 micron diameter, respectively, but average efficiency for field conditions is unknown. Since rain occurs during only a small fraction of any specified period at any one place, it may be that cumulative dry fallout is greater than cumulative rainout. ....

“....Cumulative activity in the United States in February 1954, was about 1,000 dpm/ft2 over most of the country, assuming 100% gummed paper collection efficiency....

“The gummed paper is here assumed to have an efficiency of 100%, although probably it is less than 50%.” Source : “Report on Project Gabriel”, U.S, Atomic Energy
Can any nation afford true justice in these matters? The United States cannot, and so created RECA.

If something goes wrong in the nuclear SA of the future how will industry and government respond? Will history repeat as far as open information, full disclosure and duty of care are concerned?

**Hot Particles**

The cleanup criteria of the Maralinga range is described in part as follows:

“The aim of the Maralinga rehabilitation was to ensure that the risk to potential inhabitants from exposure to radioactive contamination would be acceptable. The dividing line between acceptability and unacceptability of risk [TAG, 1990] was determined to be an annual committed dose of 5 mSv, assuming full time occupancy by Aborigines living an outstation lifestyle. This corresponds to an annual risk of fatal cancer following the inhalation or ingestion of contaminated soil of not more than 1 in 10,000 by the fiftieth year of life [TAG, 1990]. The value of 5 mSv is broadly consistent with the intervention level of 10 mSv that has recently been proposed by the International Commission on Radiological Protection [6.1 in ICRP, 1999] and which is under consideration by the International Atomic Energy Agency [IAEA, 2002]. Both of these international bodies are proposing that, in future, a generic reference level of around 10 mSv be set, under which intervention is generally not justified.…..

“When determining the soil removal criteria, MARTAC took into account three dose pathways, inhalation of resuspended dust, ingestion of soil or contaminated food, and wound contamination…..

“The Maralinga Technical Advisory Committee (MARTAC) established three sets of criteria for levels of contamination that were to be permitted to remain following rehabilitation [Cooper et al., 1997; Williams et al., 1998]…

“As for the radioactive material itself, an individual active particle count was derived of “that there be fewer than 1000 particles exceeding 20 kBq 241 Am per hectare“ was used. Particles were then counted …” end quote. Source: “Maralinga”, “Cleanup Criteria”, pp 5-6, and “Post-Remediation Assessment”, pp10, ARPANSA, Australia. Undated At: http://www.arpansa.gov.au/pubs/basics/maralinga.pdf, accessed 2015, July 21 2.04am.

The facts as presented by ARPANSA here are unremarkable and conventional. It is surprising that some nuclear experts dispute the view that hot particles, such as the flecks of material which were of concern to authorities prior to and during the Maralinga cleanup, actually require attention by specialists and suitable removal.

Does this ARPANSA provide a link between the confirmed greatly heightened risk of nuclear veterans – as found by the 2006 Health Survey findings – and a type of radiation exposure? That is internalised radio emitters such plutonium and fission particles. Does any authority claim that in the 1990s Maralinga and specific areas within it were more dangerous than they were at the times of the original contamination? Certainly I hold the opposite view to this. The place should have been clean and fit for human activity and human occupation at all times.
The verification of the need to cleanup Maralinga establishes an abuse of nuclear authorities, including Australian nuclear authorities. The abuse of power by claiming Maralinga was safe with every report from the 1950s, the 1970s, and the first 3 years of the 1980s. So why did it take until the 1990s to commence the proper cleanup? How is the State government to ensure only accurate information is given to South Australian by mining and other nuclear interests, and how can the government prove it will only release accurate information to South Australians in the future? These are difficult questions. They need an answer.

The letter written by Major Alan Batchelor, retired, to the Governor General of Australia, contains technical information which is consistent with the concerns held by government and nuclear experts which led to the belated Maralinga cleanup. The letter is contained in Appendix 1 of this submission.

Pollanen, STUK, has shown that conventional monitoring is inadequate in the case of Hot Particles. Will flecks of radium, polonium and other substances in mining waste heaps in the proposed expanded uranium mining create another situation where exposure causes suffering which experts cannot, with conventional rationale, link to radiation as a cause?

Other authorities confirm the reality of risk associated with discrete, highly active flecks of radioactive material:

“In a state of an acute radiation emergency, the recommended intervention actions such as sheltering and evacuation are based on the measurement of the external dose rate. Basic protective actions against hot particles are presumably appropriate in almost all practical situations. However, the problem that highly active particles may be present in the air although the external dose rate is below the recommended operative action level (for example, the recommended external dose rate limit for sheltering is 100 μSv h⁻¹) is not only theoretical. The management of this situation requires special knowledge and equipment that are not necessarily available to the staff operating in field conditions. The possibility that highly active particles may serve as an additional health threat must be evaluated case by case based on expert judgement by the authorities familiar with radiation protection issues.”

Source:
http://www.stuk.fi/julkaisut/stuk-a/stuk-a188.pdf

“There can be great uncertainty in radiation dose calculated from this approach and we presented a method to compute the 3D dose distributions resulting from ⁹⁰Y SIRT based on ⁹⁰Y positron emission tomography (PET) imaging. ….. (RILD).” Source: Patient dosimetry for ⁹⁰Y selective internal radiation treatment based on ⁹⁰Y PET imaging Sherry C. Ng 1,a, Victor H. Lee 2, Martin W. Law 3, Rico K. Liu 1, Vivian W. Ma 3, Wai Kuen Tso 3, To Wai Leung 1
Department of Clinical Oncology, 1 Queen Mary Hospital, Hong Kong
Department of Clinical Oncology, 2 University of Hong Kong, Hong Kong
Department of Diagnostic Radiology, 3 Queen Mary Hospital, Hong Kong,
The image of the output of a discrete Yttrium 90 particle used as an internal emitter in the treatment for the diseases described is given by this paper:

**Representation of the output of a hot particle.**

*Source: Patient dosimetry for 90 Y selective internal radiation treatment based on 90 Y PET imaging Sherry C. Ng 1,a, Victor H. Lee 2, Martin W. Law 3, Rico K. Liu 1, Vivian W. Ma 3, Wai Kuen Tso 3, To Wai Leung 1, as previously cited. (The representation of a Plutonium fleck would look very little different conceptually. Physically small particle or fleck of material, with a radiation emission of concern.*
“A record number of radioactive hotspots have been found contaminating public beaches near the Sellafield nuclear complex in Cumbria, according to a report by the site’s operator. As many as 383 radioactive particles and stones were detected and removed from seven beaches in 2010-11, bringing the total retrieved since 2006 to 1,233. Although Sellafield insists that the health risks for beach users are “very low”, there are concerns that some potentially dangerous particles may remain undetected and that contamination keeps being found.” Source: “Record number of radioactive particles found on beaches near Sellafield”, Rob Evans, The Guardian, UK, A public notice warns people of radioactive contamination at Dalgety Bay beach. Photograph: Jeff J Mitchell/Getty Images

Removing hot particles from contaminated land is costly. The standards for cleanup criteria set in Australia and other places may well be deemed inadequate in the future. The attempt to sell radiological contamination such as this as an alleged “medical benefit” to populations might result in extremely costly PR campaigns. Indeed where populations do not fit the profile the nuclear elites ascribe to them, such PR campaigns may well create much more public opposition to the concept of nuclear pollution and radiological contamination that would have otherwise been the case. I believe foreign agencies which fund such campaigns need to consider such things as this, and the possible backlash from taxpayers in those funding source nations.
Variables of Dose Response

a. The Oxygen Effect

“Tissues that are well oxygenated have long been recognized as being more radiosensitive than those that are anoxic. ….. The radiosensitivity of a variety of biological tissues has now been shown to depend upon the concentration of oxygen present during the time of irradiation.”  


“It has been reported that exposure to increased oxygen concentrations will enhance the incidence of chemically induced tumors in the lungs of mice. Such effects of oxygen on neoplastic transformation are important in hyperbaric medicine and space programs. To investigate more fully the carcinogenic-enhancing properties of oxygen, we studied the relationship of increased oxygen tensions on radiation-induced mammary tumors in the female Sprague-Dawley rat. The animals were exposed to the following regimen 1 week after 400 rads whole-body irradiation: 1 hour daily, 5 consecutive days a week for 6 weeks to either 1 atmospheres absolute (ATA) air (Po2 152 mm Hg), 3 ATA air (Po2 456 mm Hg), 1 ATA oxygen (Po2 760 mm Hg), or 3 ATA oxygen (Po2 2280 mm Hg). The data indicate that increased oxygen tensions speed up the time of emergence of the primary tumors and enhance the incidence of tumors. Increases in the total number of tumors as well as the number of second tumors per animal were noted. The higher oxygen tensions produced no changes in location or histologic type of tumor. “  


The condition in which the body or part, region or specific tissue of the body suffers an inadequate oxygen supply. The following describes the radio-resistance displayed by tissues suffering an inadequate supply of oxygen:

“Hypoxia exists in solid tumor tissues due to abnormal vasculature, vascular insufficiency, treatment or malignancy related anemia, and low intratumor blood flow.” Source: “Solid tumor physiology and hypoxia-induced chemo/radio-resistance: Novel strategy for cancer therapy: Nitric oxide donor as a therapeutic enhancer”, Hiroyasu Yasuda, Department of Translational Clinical Oncology, Kyoto University Graduate School of Medicine, 54 Shogoin Kawahara-cho, Sakyo-ku, Kyoto 606-8507, Japan
Outpatient Oncology Unit, Kyoto University Hospital, Kyoto 606-8507, Japan
Department of Clinical Design and Management, Kyoto University Hospital, Kyoto 606-8507, Japan, Nitric Oxide, Volume 19, Issue 2, September 2008, Pages 205–216
b. Metabolic Rate and Radiation

“In deep hibernation the metabolic rate is often less than one-fiftieth of that of the awake animal at rest, and the body temperature may be as low as 3°C. In spite of this, the animal maintains a remarkable degree of homeostasis. Although the blood sugar is low in some species during hibernation, it is normal in others. The pH is essentially normal, and pCO2 is low compared to the active animal. In hibernation the respiratory centers remain remarkably sensitive, for an increase of ambient CO2 above 4% will cause an increase in the respiratory rate. The hibernating animal also retains a certain degree of homeothermism. Between ambient temperatures of about 4 and 15°C, the body temperature passively follows the temperature of the environment. If the ambient temperature slowly drops to 0°C or lower, the metabolic rate is increased and body temperature is maintained above the freezing point….

“Animals exposed to radiation during hibernation show little or no cellular damage as long as they remain in the hibernating state. Once they have aroused from hibernation, the cell destruction begins and the length of the animal’s life is only prolonged by the number of days it has been in hibernation. The nature of this “radiation memory” is not understood, and its study may be a help in the clarification of the processes involved in radiation injury.”’ Source: “Hibernation in Animals”, CHARLES P. LYMAN, A.B., M.A., PH.D., Department of Anatomy, Harvard Medical School, Boston, And the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. In: Circulation, Volume XXIV. August 1961. Funded in part by the U.S. Air Force under contract no. AF 41 (657)-190.

c. States of work and states of rest and Radiation Exposure Outcomes

States of work and states of rest following the Atomic bomb detonation as predictors of health outcomes, Hiroshima, 1945:

“Dr. Sasaki and his colleagues at the Red Cross Hospital watched the unprecedented disease unfold and at last evolved a theory about its nature…. Whatever its source, the disease had some baffling quirks. Not all the patients exhibited all the main symptoms. People who suffered flash burns were protected, to a considerable extent, from radiation sickness. Those who had lain quietly for days or even hours after the bombing were much less liable to get sick than those who had been active.”’


d. Radiosensitivity and Cell Age in the Mitotic Cycle

“Cells are the most sensitive in M and G2: survival curves are steep and have no shoulder. Cells in the latter part of S phase (LS) exhibit a survival curve that is less steep, but has a very broad shoulder • The range of sensitivity between the most sensitive cells (mitotic) and the most resistant cells (late S) is of the same order of magnitude as the oxygen effect…. "Variation of radiosensitivity with cell age in the mitotic cycle - Cells are most sensitive at or close to mitosis. Resistance is usually greatest in the latter part of S phase. The increased resistance is thought to be caused by homologous recombination repair between sister chromatids that is more likely to occur after the DNA has replicated. If G1 phase has an appreciable length, a resistant period is evident early in G1, followed by a sensitive period toward the end of G1 • G2 phase is almost as sensitive as M phase • Exceptions to these
Individual Genetics and Vulnerability/Resistance to Radiogenic Disease

“Standard risk estimates attribute 34% of childhood / young adult leukaemia to natural radiation – 20% Beta and gamma radiation, 14% alpha radiation : of this 5% due to Radon, 9% to Polonium 210.” Source: “Radiation – induced Genomic Instability and Bystander Effects : Implications for radiation leukaemogenesis” Eric Wright, Professor of Experimental Haematology, University of Dundee, 2004. Natural radiation is a universal environmental given. In a significant proportion of cases of the disease, the sufferers appear vulnerable to a universal factor, whereas the majority of the age range for the disease escape it. The individual differences between the vulnerable and apparently resistant groups may be based in genetic differences possessed by each individual within a population.

Nuclear authorities have long acknowledged that a given dose equally imposed upon a population will have widely differing consequences for the individuals within that population, as noted by the British Chair of the International Commission On Radiological Protection (ICRP) in the 1950s:

“It is also to be hoped that, in a limited proportion of cases, these mutations (from nuclear radiation from atomic bomb test fallout) will have a favourable effect and produce a child of genius. At the risk of shocking this distinguished company, I affirm that the mutation that will give us an Aristotle, a Leonardo da Vinci, a Newton, a Pasteur, or an Einstein will largely compensate for the ninety nine others, which will have much less fortunate effects.” Sir Ernest Rock Carling, Chair of the ICRP, speaking at the Atoms for Peace Conference, Geneva, 1955. Primary source: Atoms for Peace Conference, Geneva, 1955. Secondary Source: UK OHMS Hansard 803–2005 → 1950s → 1955 → November 1955 → 15 November 1955 → Commons Sitting → MINISTRY OF WORKS Atoms for Peace Conference, Geneva HC Deb 15 November 1955 vol 546 cc173-4 173 in part:

“Mr. Birch The total number of British papers presented to the Conference was 99. I am placing in the Library a list of titles and authors of those papers which were read at the Conference. British scientists attended the Conference as individual experts, and they were not required to submit papers to Her Majesty’s Government for approval of the views expressed.

§ Mr. Mason Could the Minister give an assurance that in the papers presented, particularly by people who have some responsibility to Her Majesty’s Government—for instance, Sir Ernest Rock Carling—no more theories are advanced as fantastically ridiculous as the one which he proposed?

§ Mr. Birch Sir Ernest Rock Carling is not, of course, a member of a Government Department, and I have no need to answer for his views." Sir Ernest was however the Chair of the organisation which laid the requirements of what passed for radiological safety at the time the United Kingdom was bombing Australia with nuclear weapons, all in proclaimed “safety”.

The current ICRP webpage at http://www.icrp.org/icrp_group.asp?id=6 gives the period of Rock Carling’s Chairmanship as extending for the period from 1950, until 1956.

Britain and Australia proclaimed their conformity to the edicts of the ICRP, as issued by the authority of the Chair of the ICRP for the entire period of Rock-Carling’s Chairpersonship of the ICRP. Which roughly corresponds to the period of nuclear weapons tests in Australia.


“We know enough about the mechanism of heredity to be sure that changes will be made in the germ plasm, just as Dr. Pauling has said, and many, very many, probably the great majority of these changes will be damaging. Yet without some changes, evolution would be impossible.” Dr. Edward Teller, KQED-TV, San Francisco, February 1958.

Medical breakthroughs such as the development of the amniocentesis test resulted in governments, including England, most of Western Europe, the United States and Australia allowed governments to offer the option of legal abortion where the genetic related disease – Down Syndrome – was detected.

f. Maternal Age at time of conception - Down’s syndrome and Nuclear Fallout

“A very high rate of necropsies was maintained throughout the survey. Confirmation of diagnosis by chromosome analysis began in 1966. Terminations of pregnancy for antenatal diagnosis of Down’s syndrome were ascertained from the local obstetricians’ records. Amniocentesis was offered to mothers of 38 years and over from 1978 and the first termination was carried out in 1982. The age limit was lowered to 37 years in 1985.

“In summary, it is very unlikely that any baby with Down’s syndrome was not recorded. There were 167 cases, including five stillbirths and eight terminations, in 124,015 total births. Three cases showed a translocation. One set of twins of the same sex both with Down’s syndrome was treated as a single case for this analysis.

“There was significant increase in the prevalence of all cases (of Down’s syndrome) conceived in 1963 and 1964, and a lesser peak in 1958 which did not quite reach statistical significance. There was no evidence that the increased prevalence in 1963-64 was a result of changes in the maternal age distribution in the population. Babies of mothers aged 35 years and over accounted for more of the variation, especially in 1958 when their increase was significant. There was a highly significant association between prevalence and radiation from fallout produced by atmospheric testing of atomic weapons. The 1963-64 peak coincided with the maximum estimated radiation dose. The lesser peak in 1958 also coincided with increased exposure to radiation from fallout, possibly enhanced by ground deposits after a fire at the Windscale reactor in October 1957. CONCLUSION--This study provides further support for low dose ionising radiation as one aetiological factor in Down’s syndrome…..

“The yearly prevalence rates of Down's syndrome by LMP are shown in figure 3. This prevalence reached a maximum in 1963-64, and two other maxima can be discerned in 1958 and 1986. The corresponding births of these babies showed a peak of 2-7 per 1000 total
births in 1959 and 3-3 in 1964, mostly due to the 35 years and over maternal age group in whom the prevalence increased more than twofold.

"Figure 2 shows that the proportion of mothers aged 35 years and over was not increasing in 1958 or in 1963-64. The proportion of mothers aged 40 years and over was not available in 1958, but in 1963 and 1964 it was 0.03 and was unchanged over the next four years.

"Table 1 shows the estimates and deviance differences for the analyses of temporal peaks, both for the total cases, for the total data disaggregated by age group, and separately for the two age groups. In the analysis of the total data, the period of increased prevalence (interims of LMP dates) is estimated to be a 25 month period from October 1962 until November 1964. The simulation study shows that this is significant at the 1% level for the aggregated data, but fails to reach statistical significance when the data are disaggregated by age group, indicating that the two age groups behave somewhat differently. The disaggregated analysis shows the rate doubling for the under 35 age group in this 25 month period (from 7 in 10000 to 14 in 10000 cases) and more than doubling in the 35 and over age group (from 64 in 10000 to 153 in 10000 cases). For the 35 and over age group alone, an 18 month peak is detected from January 1963 until June 1964, whereas for the under 35 age group, a minor peak is detected slightly later, from March 1964 to January 1965.

"The same alternative solution is also detected in all but one of the analyses, giving an estimate of three to six month peak in the late summer and autumn of 1958. This peak has a significance level of 5% for the 35 and over age group, and a significance level of 10% for all cases. The disaggregated analysis shows the rate increasing more than six-fold for the 35 and over age group (from 67 in 10000 to 431 in 10000 births), but barely increasing for the mothers aged under 35 years.

"The 1986 peak in prevalence observed in figure 3 fails to reach statistical significance in any of the analyses but the early part of the year, mainly before the Chernobyl accident, is identified as a peak in the under 35 age group. Five of the nine cases in 1986 have LMP dates after the accident, with four of these in the 35 and over age group.
Source: Down’s syndrome: prevalence and ionising radiation in an area of north west England 1957-91", J P Bound, B J Francis, and P W Harvey Department of Paediatrics, Victoria Hospital, Blackpool., http://www.ncbi.nlm.nih.gov/pmc/journals/ J Epidemiol Community Healthv.49(2); 1995 Apr PMC1060102
This data does not provide any confirmation of any for the genetic and evolutionary benefits claimed for nuclear pollution by the Chair of the International Commission for Radiation Protection (Sir Ernest Rock Carling, 1955.) and the head of the United States Thermo-nuclear Weapons Tests (Dr. Edward Teller.)

This data does however lead one to expect that women covered by national laws aimed reducing the burden of Down’s Syndrome upon individuals, communities and nations may have sought medical advice in the wake of the nuclear disaster at Chernobyl. I shall return to the claims made by the school of Hormesis in regard to this shortly.
The possibility that low doses of radiation may prevent or delay the progression of cancer is being explored by a Flinders University research team led by Professor Pam Sykes (pictured) in a move that runs counter to the widely held perception that exposure to any radiation is harmful. 

“Professor Sykes, recently appointed to the University’s Strategic Professorship in Preventive Cancer Biology in the Flinders Centre for Cancer Prevention and Control says the public panic in response to nuclear accidents such as that at Fukushima in Japan is the result of a general ignorance about radiation….

“We have to ensure that radiation is respected and we have to understand what damage radiation can cause – but radiation is not the poison, the dose is,” Professor Sykes said.  

“We need radiation in our environment, just as we need vitamins and minerals. Too much is a problem, too little is a problem,” she said.

“Chernobyl was obviously a disaster but there was no increase in leukaemia, solid tumours or birth defects among the 335,000 people who were evacuated and who received less than 100 milliSieverts of radiation – that’s five times the dose I’m allowed as a radiation worker.

“There was an increase in thyroid tumours but we’re not sure how much that related to the fact that everyone was screened for thyroid tumours, which wouldn’t normally happen.

“It’s now been accepted that they should not have evacuated so many people because the biggest detriment from Chernobyl was that they were dramatically disadvantaged, both economically and socially. Many suffered depression thinking they were going to die of cancer.

“And the frightening thing is that it's been estimated that throughout Europe there were over 100,000 wanted pregnancies aborted, and these were people who didn’t live anywhere near Chernobyl….” End Quote. Source: “Radiation Response a Meltdown in Reason”, Flinders News, Sykes, P., et. al., Marketing and Communications, Flinders University of South Australia, 14 July 2011 at http://blogs.flinders.edu.au/flinders-news/2011/07/14/radiation-response-a-meltdownin-reason/  The article was first published, with slightly different content, under the heading of “Ignorance Drives Radiation Fears”, in Flinders Journal, June, 2011. See http://www.fmcfoundation.com.au/vital-research/226-cancer-prevention-and-control

Only the first part of the Flinders article is reproduced here. The part dealing with claims for Homesis. The part of the piece deals with a proposed medical method based upon adaptive response.

Shortly after the communication and marketing arm of Flinders University published Prof Sykes’ description of The Goldilocks Dose, the local print media published the following additional contribution to the nuclear debate:

Partial quote: “Addressing the South Australian Chamber of Mines and Energy in Adelaide, chair of the uranium company Toro Energy Erica Smyth said …….that there was a strong argument that some radiation “was good for you” …..” End Quote. Source: Advertiser newspaper, August 13, 2011, page 7.
The Flinders University piece does not give any qualified sources for the claim that the alleged public ignorance and "Meltdown in reason" led to 100,000 voluntary abortions due to groundless fears related to radioactive emissions from the Chernobyl nuclear disaster. From the title of the piece itself and throughout the body of the piece, the stance taken by Flinders Marketing and Communications and the involved staff, seems to be that the general public are ignorant, and given to panic which must be controlled by the entitled nuclear meritocracy of the “right” school.

In order to test the information supplied to South Australians in the article of July 2011 by Flinders University I wish to present qualified papers which report on the variations in terminations of pregnancies before and after the Chernobyl nuclear disaster. I also present papers which report on the variations in spontaneous abortion in Europe before and after the Chernobyl disaster. Spontaneous abortions being those which occur without any human intervention. These findings follow:

A Summary of European and British sources relating to the medical basis for abortions in the light of the Flinders University/Sykes Assertions

a. Down’s Syndrome as a basis for legal abortion in the United Kingdom:
“Terminations of pregnancy for antenatal diagnosis of Down’s syndrome were ascertained from the local obstetricians’ records. Amniocentesis was offered to mothers of 38 years and over from 1978 and the first termination was carried out in 1982. The age limit was lowered to 37 years in 1985…. Our study provides further support for radiation as one aetiological factor in Down’s syndrome.” End quote. Source: “Down’s syndrome: prevalence and ionising radiation in an area of north west England 1957-91”, JP Bound, BJ Francis, and PW Harvey Department of Paediatrics, Victoria Hospital, Blackpool., J Epidemiol Community Health v.49(2); 1995 Apr PMC1060102 http://www.ncbi.nlm.nih.gov/pmc/journals/

Conclusion from this source:
Termination of pregnancy on the basis of confirmation of Down’s Syndrome as a result of the government decision to offer amniocentesis to pregnant women in the vulnerable age range has been a legal option in England since 1978. The first termination as a result of this occurred 4 years later. The paper by Bound et. al. confirms the deposition of fallout from Chernobyl in the UK, as does the British government decision to prohibit the sale of agricultural products from farms in areas affected by the Chernobyl fallout. Flinders University and Sykes/US DOE fail to make any mention of the number of women in the United Kingdom and Europe who returned a positive amniocentesis test for Down’s Syndrome in the fetus prior to electing to terminate their pregnancies under the relevant government Down’s Syndrome screening program. There is no sign hysteria in these findings.

There is no indication women in England convinced doctors to terminate pregnancies on the basis of hysteria or unreasoning fear. There is evidence that English law allows abortion following positive test results for Down’s Syndrome. Radiation is an acknowledged risk for Down’s Syndrome where the maternal age is in the high risk range for Down’s Syndrome. In the case of the relevant public health measures functioning in Britain and throughout Europe
at the time, including the legal facility for abortion in the case of the diagnosis of Down’s Syndrome, the Sykes characterisation of the situation seems extremely inaccurate to me. There is no evidence to suggest that radiophobia causes Down’s Syndrome. This is evidence that even slight increases in radiation exposure increases the risk for Down’s Syndrome in cases of maternal ages in the high risk range.

The consequences of the Chernobyl disaster were due to the fact of that disaster. The consequences of the Chernobyl disaster were not caused by the people who, even though remote (or “nowhere near”, which is a distance of no defined length, many people still walk and don’t fly; some ride bikes. 1 kilometre is a long way when pushing a pram.) from Chernobyl received fallout from it. To such an extent that for 30 years thereafter sheep farmers in the northern parts of Great Britain were not allowed, for health and public safety reasons, were not allowed by law to sell their sheep for meat. Surely the authors of the Flinders University piece of July 2011 know all these things……

To the contrary, the hysteria of Marshall Brucer, promoter of hormesis, was so well known that even his obituary written, by a close friend, C.C. Harris, attests to it. Flinders University seems even to include that in its piece. I call it the hysteria of the Brucerites.

Legal Abortions in Sweden in the wake of Chernobyl
“The number of legal abortions in Sweden increased around the time of the Chernobyl accident, particularly in the summer and autumn of 1986. Although there was no recording of reasons for legal abortions, one might have suspected this increase to be a result of fear and anxiety after the accident.

“However, seen over a longer time perspective, the increase in the number of abortions started before and continued far beyond the time of the accident.

“There was also a simultaneous and pronounced increase in the number of births during the years subsequent to the accident.


c. Legal Abortions in Denmark in the wake of Chernobyl
“During the months following the accident in Chernobyl, Denmark experienced an increasing rate of induced abortion, especially in regions with the largest measured increase in radiation. As the increase in radiation in Denmark was so low that almost no increased risk of birth defects was expected, the public debate and anxiety among the pregnant women and their husbands “caused” more fetal deaths in Denmark than the accident. This underlines the importance of public debate, the role of the mass media and of the way in which National Health authorities participate in this debate.” Legally induced abortions in Denmark after Chernobyl. Knudsen LB. Danish National Board of Health, Sundhedsstyrelsen, Copenhagen K, Denmark. Biomed Pharmacother. 1991;45(6):229-31.
d. Legal and Spontaneous Abortions in Norway in the wake of Chernobyl

“Pregnancy outcome has been studied in terms of legal abortions, early spontaneous abortions and total number of pregnancies (in an ad hoc study covering 6 counties) as well as various perinatal health problems (on the basis of routinely recorded data for epidemiological surveillance from the Medical Birth Registry of Norway). Apparently, no effects were observed in terms of an increased occurrence of legal abortions, while spontaneous abortions increased from 7.2% of all pregnancies during the last 12 months before the accident to 8.3% after the accident [corrected]. At the same time, the total number of pregnancies somewhat decreased. Based on monthly measurements in each municipality of external and internal (food-based) doses, dose-response associations were assessed for a number of perinatal health problems. No associations were observed.” Source: “Pregnancy outcome in Norway after Chernobyl.” Irgens LM1, Lie RT, Ulstein M, Skeie Jensen T, Skjaerven R, Sivertsen F, Reitan JB, Strand F, Strand T, Egil Skjeldestad F. Author information 1Medical Birth Registry of Norway, University of Bergen. Erratum in Biomed Pharmacother 1991;45(9):428. Biomed Pharmacother. 1991;45(6):233-41.

e. Legal abortions in Italy in the Wake of Chernobyl

“After the Chernobyl accident serious concern spread throughout Italy about the possible effects of the consequent exposure to radioactivity on fetuses.

“A reduction of births in the first three months of 1987, and particularly in February (7.2070 reduction in the birth rate), was observed throughout Italy. In April-June 1987 a 4.8 % increase in the number of births was observed. The magnitude of both phenomena varied in different areas of the country. The total number of births in the first six months of 1987 was very similar to the expected (264241 versus 263 659).

“Induced abortions increased in Lombardia (northern Italy) in June (+ 1.6 %) and July of 1986 (+3 . 4 %) and in Campania (southen Italy) in June (+ 12.7 %) and August (+4 . 3 %).

“No increase in legal abortions was detected in Lazio (central Italy). Italian data suggest a voluntary decrease in the number of planned pregnancies and the termination of some of them in the first weeks after the accident as a consequence of post disaster stress.” end quote. BERTOLLINI R, DI LALLO D, MASTROIACOVO P, PERUCCI CA. Reduction of births in Italy after the Chernobyl accident. Scand J Work Environ Health 1990;16:96-101.

f. Outcomes of Pregnancy in Finland in the wake of Chernobyl

“Possible effects of Chernobyl fallout on outcome of pregnancy in Finland were evaluated in a nationwide follow-up study. The outcomes were the rate of live births and stillbirths, pregnancy loss, and induced abortions by municipality. Exposure was assessed based on nationwide surveys of radiation dose rate from the Chernobyl fallout, from both external and internal exposures. Using these measurements, we estimated the monthly dose rate for each of the 455 Finnish municipalities. On average, the dose rate from Chernobyl fallout reached 50 microSv per month in May 1986—a doubling of the natural background radiation. In the most heavily affected area, 4 times the normal background dose rates were recorded. Given the underlying regional differences in live birth, stillbirth, and abortion rates, we used longitudinal analysis comparing changes over time within municipalities. A temporary decline in the live birth rate had already begun before 1986, with no clear relationship to the level of fallout.
“A statistically significant increase in spontaneous abortions with dose of radiation was observed. No marked changes in induced abortions or stillbirths were observed. The decrease in the live birth rate is probably not a biological effect of radiation, but more likely related to public concerns of the fallout. The effect on spontaneous abortions should be interpreted with caution, because of potential bias or confounding. Further, there is little support in the epidemiologic literature on effects of very low doses of radiation on pregnancy outcome.” STUK-Radiation and Nuclear Safety Authority, Helsinki, Finland. Environmental Health Perspectives (Impact Factor: 7.03). 03/2001; 109(2):179-85. DOI: 10.1289/ehp.01109179 Source: PubMed

Spontaneous abortions are not medical interventions, spontaneous abortions occur naturally:

g. Spontaneous Abortions, Finland, Flight Attendants.
“We conducted a retrospective cohort study to investigate whether work as a cabin attendant is related to an increased risk for spontaneous abortion. Data on female cabin crew members were linked to medical records on pregnancies. There were 1751 eligible pregnancies for the final analysis. Flight attendants who worked during early pregnancy had a slightly elevated risk of spontaneous abortion, as compared with attendants who were pregnant outside a time span of active flying (odds ratio [OR] = 1.3; 95% confidence interval [CI], 0.9 to 1.8). During the earliest years of the study period (1973 through 1977), the risk seemed to be decreased (OR = 0.4; 95% CI, 0.2 to 1.1), whereas during the later years (1978 through 1994) the risk was increased (OR = 1.6; 95% CI, 1.1 to 2.4). The results are in agreement with earlier studies, showing suggestive evidence of a slightly increased risk of spontaneous abortion among female cabin crew members.” Spontaneous abortions among Finnish flight attendants. Aspholm R1, Lindbohm ML, Paakkulainen H, Taskinen H, Nurminen T, Tiitinen A. Author information 1Department of Epidemiology and Biostatistics, Finnish Institute of Occupational Health, Helsinki, Finland. J Occup Environ Med. 1999 Jun;41(6):486-91.

h. Spontaneous Abortions in Finland
“The content and technical quality of the Finnish data base on medically diagnosed spontaneous abortions, retrieved from hospital discharges and polyclinic records, are described. The validity and suitability of the data for epidemiological studies is also evaluated. The rate was 8.9 In 1973–83 and it increased from 7.8 to 10.2 during the study period. The rates are at the same level as the data obtained in other register-based studies, and slightly lower than those of the interview studies. A comparison of self-reported spontaneous abortions to those in our data base showed that 20% of all the abortions reported by the nurses, and 17% of those by the solvent-exposed women, were not found in the hospital register. About half of these are likely to be due to erroneous personal identification codes in the records of the patients. The absence of a spontaneous abortion was related to the length of gestation, with early abortions more often missing. Women in different occupational groups confirmed spontaneous abortions retrieved from our data base to a different degree: nurses in 91% of the cases, whereas industrial workers in only about 79% of the cases. Confirmation was also related to time elapsed since abortion. As the nationwide data base on medically diagnosed spontaneous abortions provides data, independent of an individual’s own definition, recognition and reporting, it is a powerful tool in retrospective reproductive studies. Its limitations regarding early abortions need to be recognized, however.” Source: Nationwide
Data Base on Medically Diagnosed Spontaneous Abortions in Finland M-L LINDBOHM and K HEMMINI – Author Affiliations Institute of Occupational Health Topeliuksenkatu 41 a A, SF-00250 Helsinki, Finland Revision received September 1, 1987.


Conclusion

The qualified papers regarding abortions in Europe in the wake of Chernobyl contradict the position taken by Flinders University and Skyes with US DOE backing as promulgated in the paper of July 2011. Authorities in Finland report an increase of spontaneous abortion in the wake of Chernobyl. The Finnish authorities were able to say that: “A statistically significant increase in spontaneous abortions with dose of radiation was observed.” Spontaneous abortions which occurred merely because a woman is no longer to go to work in safety due to dangers injected in to the work and living environments by other parties hundreds of miles away (nowhere near the work place).

The actual qualified information from Europe is glaringly at odds with the thrust and opinions contained within the “Meltdown in Reason Paper” published by Flinders University. The author and the institution must have been stoically unaware of the actual evidence to the contrary.

Particularly troubling are the indications from Finland that Chernobyl fallout was responsible for an increased number of spontaneous abortions. Reports which any serious authority would ponder deeply prior to launching a bombastic defense of nuclear fallout on alleged medical grounds as did Sykes et. al, Flinders University and Toro Energy. The institution and the individuals claiming expert status must surely have known the real situation deviated markedly in the vast bulk of the nations located “nowhere near” Chernobyl but which suffered demonstrated and measured effects from that failed reactor’s fallout.

Three of the reports cited above show that in the wake of Chernobyl, an increased rate of spontaneous abortions were reported in more than one nation.

The Source of the Flinders Piece of July 2011

What is the source of the information Flinders University published into the public debate regarding the expansion of uranium mining in South Australia in July 2011? What is the source for the claim that hysteria drove a huge number of people to terminate pregnancies in response to Chernobyl? Whatever the source is, it is contradicted by very many qualified reports by authorities who can be clearly identified and verified?

I read very similar material in the era prior to 2011. The author of that very similar material being Bobby Scott, Lovelace Respiratory Institute, New Mexico, USA, and also of Los Alamos, New Mexico. I refer the Royal Commission to the online pamphlet “Low Level Radiation and Health”, Bobby Scott, 3 August 2007 at http://dspace.lrlr.org:8080/xmlui/bitstream/handle/123456789/655/http www.radiation-scott.org_Scott_Oakland_regular.pdf?sequence=1 I reproduce a screen grab of page two of this pdf pamphlet:
The evacuation of homes, farms, workplaces, and villages, in Japan 2011 were not rooted in the disability Scott alleges ordinary people suffer from. In relation to the real case of Japan, the evacuations were and remain the result of directives issued by the Japanese government based upon the technical and medical advice it was given by qualified sources. There was no mass panic in March 2011 in Japan in response to nuclear disaster. The photos and news reports from Japan look nothing like people fleeing a collapsing skyscraper in New York, as Scott proposes.

Do Naturally High Background Radiation Areas of the World validate Hormesis and prove the existence of a universally beneficial radiation exposure to all people?

In September 2010 the Journal of the Australasian College of Physical Scientists and Engineers in Medicine published the following article, authored by Dr. Madhava Bhat. The original readership for the piece was not the general public, but qualified peers. Later, the piece, with permission, entered the public domain. The piece contains personal disclosures of experience, knowledge and opinions that are that author’s. I quote a portion of it here for study and to enable a comparison of it with other sources:

“My own experience illustrates that even professional radiation physicists are not spared from radiation phobia. On one occasion I was working near the door of a high dose rate (HDR) brachytherapy room, where the dose rate out of the shielding container is typically 5 uSv/h. My colleague, a physicist, insisted that I move away from that area as they considered the area to be characterized by a ‘high radiation level’. I obliged, as at the time, it was easier than to explain why it was safe for me to work there.

I was born in Kerala where the natural background radiation level is as high as 4 μGy per hour. I was continuously exposed at this dose rate until the age of 24 when I relocated to a different place. HDR treatment exposure has a typical duration of about 5 min and my
presence for the duration of the patient treatment would have lead to an exposure of 0.3 mSv above natural background radiation. If I had attended 100 such procedures in a year my total dose would be 30 mSv. This small occupational radiation dose is well within fluctuations observed in the background radiation level often a result of sunspot activity and cosmic ray intensity. Furthermore this level of exposure represents less than 0.2% of the maximum annual dose limit prescribed for a radiation worker by the statutory radiation protection authority.

Current ionising radiation protection standards are based on the simple Linear-No-Threshold (LNT) hypothesis. The LNT hypothesis states that the dose–response relationship through all bands is linear and that there is no safe threshold level of exposure. The LNT hypothesis was developed on the basis of an extrapolation of our knowledge of pathology at high doses of radiation; e.g. high dose exposure to early radiation workers, impacts of exposure on the survivors of the Hiroshima and Nagasaki atom bomb. It is important to note that the LNT hypothesis is not based on any scientific data at low levels of radiation exposure. I therefore consider the adoption of this model for radiation protection to be based on illegitimate grounds." end partial quote. Source: journal of the Australasian College of Physical Scientists and Engineers in Medicine, September, 2010. ISSN 0158-9938 , Libraries Australia ID as 54273745. Original source of partial quote, and accessible online location of the full quote is http://decarbonisesa.com/2012/02/15/fear-of-radiation-is-frightening-guest-post/

Having read the article I sought to find other sources which explained things further, and which either confirmed or did not confirm the information Dr. Bhat had given. These are presented as follow:

**Media, Academic Papers and Qualified Sources relating to Public Health in Kerala, India.**

The reader is urged to study the original documents at the source links given for each of the following papers. The reader is urged to also fully consider the publications made available by Mortazavi, (which I present shortly) among others.

The people of Kerala have a long life expectancy compared to other parts of India. The findings show Kerala has an advanced and accessible public health system compared to other places, including most of India. In aspects Kerala, being in a unique stage of advancement, might not be directly comparable with the rest of India in terms of expected patterns of disease. There is public, political and medical controversy in Kerala at the moment.

Indian media reports of an apparently sudden public and political awareness the issue of cancer incidence in Kerala:

**“Highest rate of cancer cases in Kerala: Chief Minister Oommen Chandy South I Press Trust of India I Updated: January 27, 2014 20:04 IST”**

**“Thiruvananthapuram, Kerala: In a shocking revelation, Kerala Chief Minister Oommen Chandy today informed the state Assembly that the state has the highest number of cancer patients in the country. Out of every one lakh males, 133 persons suffer from the disease while in the case of females, it is 123 for every one lakh females, he said while replying to a calling attention motion on the necessity to set up a cancer institute in Kochi.”**
“As per statistics, nearly 50 per cent of cancer cases could be cured if the disease was identified in the initial stage itself and treatment started, Chandy said.

On the demand for a Cancer Institute, he said the cabinet had already decided to set up a Cancer Research Institute at the campus of Kochi Medical College hospital, which was taken over by the government from the co-operative sector.

Union Health Minister Ghulam Nabi Azad had, during his recent visit to the state, also sanctioned Rs. 25 crore to set up the institute at Kochi. This amount would be utilised for the proposed project, he added.

“Taking up the issue, S Sarma (CPI-M) said doubts have arisen in the minds of public on the proposed project as no funds had been earmarked for it in the current year’s budget. Sarma demanded that government clarify its position on the matter and speed up the work of the institute.

“Eminent personalities of various walks of life, including jurist V R Krishna Iyer have launched a campaign in Kochi in support of the institute.

Story First Published: January 27, 2014 20:04 IST” end quote.

Source: “Highest rate of cancer cases in Kerala: Chief Minister Oommen Chandy”

South I Press Trust of India I Updated: January 27, 2014 20:04 IST source link:

“Down’s syndrome and related abnormalities in an area of high background radiation in coastal Kerala”

Authors: N. KOCHUPILLAI, I. C. VERMA, M. S. GREWAL & V. RAMALINGASWAMI
Departments of Medicine, Pediatrics (Genetics), Anatomy and Pathology, All-India Institute of Medical Sciences, Ansari Nagar, New Delhi—110016, India

“BOTH point mutations and structural aberrations of chromosomes are induced by ionising radiations, causing genetic variation and abnormalities in man and other organisms. The mutagenic effects are dose dependent and in Drosophila a linear relationship between dose and mutation rate has been shown for doses up to 5 R (ref. 1). Although man accumulates approximately 5 R of radiation from the environment in 30 yr of reproductive life, it is not known whether this is of any radiobiological consequence. Nor is it known whether in man there is a threshold phenomenon at low doses (several hundred or thousand mr. per year), although there is greater repair of mutational or pre-mutational damage after low-dose irradiation.

“In a coastal area of Kerala, South India, the background radiation is 1,500–3,000 mr. Yr due to the presence of thorium-containing monazite mineral in the soil4–7 (Fig.1). A survey of the rat population in this area with respect to several measurable and non-measurable traits and of humans with regard to dermatoglyphics and demographic data such as fertility index, sex ratio and infant mortality rate revealed no mutational effects.

“During an epidemiological study of nodular lesions of the thyroid in this area, we noticed an apparently high prevalence of Down’s syndrome and other forms of severe mental retardation. We therefore made a house-to-house survey of developmental abnormalities in this area and in a comparable control area without high background radiation (Fig. 1).
“We also determined the frequency of chromosome aberrations in a sample of the normal population living in the study and control areas. The observations we report here support the view that radiation-induced genetic anomalies occur with above average frequency in the population living in the area with high background radiation.

“The area surveyed was the southernmost one-fifth of the Chavara-Neendakara strip (Fig. 1). In the thatched huts which constitute 75% of all households, the exposure risk is 1,500–3,000 mr. Yr, and personal exposure, as measured by calcium fluoride dosimeters, closely parallels the exposure risk in the households. The control area consisted of the Purakkade–Punnapura villages, with a background radiation of approximately 100 mr. yr–1 (ref. 7). Households were visited repeatedly to ensure examination of all members. Only gross abnormalities evident on clinical examination were recorded. Cytogenetic abnormalities were scored blind on slides prepared from 64-h micro-blood cultures11. ”

End Quote. Source: Down’s syndrome and related abnormalities in an area of high background radiation in coastal Kerala

N. KOCHUPILLAI, I. C. VERMA, M. S. GREWAL & V. RAMALINGASWAMI
Departments of Medicine, Pediatrics (Genetics), Anatomy and Pathology, All-India Institute of Medical Sciences, Ansari Nagar, New Delhi—110016, India

Source Link: http://www.nature.com/nature/journal/v262/n5563/abs/262060a0.html


2.


Table:

Table 5.1 Morbidity rates from 28th and 52nd rounds of NSS

<table>
<thead>
<tr>
<th>State</th>
<th>28th round</th>
<th>52nd round</th>
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<td>A.P.</td>
<td>49</td>
<td>64</td>
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<td>Assam</td>
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<td>Kerala</td>
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<td>M.P.</td>
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<td>West Bengal</td>
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<td>All India</td>
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"RESULTS: Out of 4271 deaths recorded during 5 years, diseases of the circulatory system contributed 40%. Coronary heart disease was the leading cause of death in men (31.1%) and women (17.6%). Age-standardized cardiovascular disease (CVD) death rates were 490 for men and 231 for women per 100,000 person years. CONCLUSION: The burden of CVD deaths in this community now exceeds that of industrialized countries.”


4. Title and authority: REPORT ON MEDICAL CERTIFICATION OF CAUSE OF DEATH 2008 OFFICE OF THE REGISTRAR GENERAL, INDIA GOVERNMENT OF INDIA, MINISTRY OF HOME AFFAIRS, 2 A, MAN SINGH ROAD, NEW DELHI

“3.6.8 The percentage share of Neoplasms deaths is highest (at) 12.0 per cent in (the) case of medically certified deaths reported from Kerala. The share of this major group in case of Bihar, which has reported the lowest are 0.2 per cent in respective State’s total medical certification of death”. Source link: http://www.censusindia.gov.in/2011- Documents/mccd_Report1/Report%20on%20Certification%202.pdf REPORT ON MEDICAL CERTIFICATION OF CAUSE OF DEATH 2008 OFFICE OF THE REGISTRAR GENERAL, INDIA GOVERNMENT OF INDIA, MINISTRY OF HOME AFFAIRS, 2 A, MAN SINGH ROAD, NEW DELHI


"Abstract. The coastal belt of Karunagappally, Kerala, India, is known for high background radiation (HBR) from thorium-containing monazite sand. In coastal panchayats, median outdoor radiation levels are more than 4 mGy y-1 and, in certain locations on the coast, it is as high as 70 mGy y-1. Although HBR has been repeatedly shown to increase the frequency of chromosome aberrations in the circulating lymphocytes of exposed persons, its
carcinogenic effect is still unproven. A cohort of all 385,103 residents in Karunagappally was established in the 1990’s to evaluate health effects of HBR. Based on radiation level measurements, a radiation subcohort consisting of 173,067 residents was chosen. Cancer incidence in this subcohort aged 30-84 y (N = 69,958) was analyzed. Cumulative radiation dose for each individual was estimated based on outdoor and indoor dosimetry of each household, taking into account sex- and age-specific house occupancy factors. Following 69,958 residents for 10.5 years on average, 736,586 person-years of observation were accumulated and 1,379 cancer cases including 30 cases of leukemia were identified by the end of 2005. Poisson regression analysis of cohort data, stratified by sex, attained age, follow-up interval, socio-demographic factors and bidi smoking, showed no excess cancer risk from exposure to terrestrial gamma radiation. The excess relative risk of cancer excluding leukemia was estimated to be -0.13 Gy⁻¹ (95% CI: -0.58, 0.46). In site-specific analysis, no cancer site was significantly related to cumulative radiation dose. Leukemia was not significantly related to HBR, either. Although the statistical power of the study might not be adequate due to the low dose, our cancer incidence study, together with previously reported cancer mortality studies in the HBR area of Yangjiang, China, suggests it is unlikely that estimates of risk at low doses are substantially greater than currently believed. “


“The Rural Cancer Registry, Karunagappally is a special purpose Cancer Registry to examine whether an association exists between the high natural background radiation and cancer occurrence.” “The Regional Cancer Centre stands tall in the health map of Kerala carrying out innovative and pioneering work in cancer control, treatment, research and training.

http://www.rcctvm.org/Outreachprogrammes.htm Regional Cancer Centre, Thiruvananthapuram, India.

Table overleaf:
Socio-economic factors & longevity in a cohort of Kerala State, India


*Even though Kerala State is well-known for its egalitarian policies in terms of healthcare, redistributive actions and social reforms, and its health indicators close to those of high resource countries despite a poor per-capita income, it is not clear whether socio-economic disparities in terms of life expectancy are observed. This study was therefore carried out to study the impact of socio-economic level on life expectancy in individuals living in Kerala.
At 40 years, men and women were expected to live another 34 and 37 years, respectively. Life expectancy varied across the participants' different socio-economic categories: those from high income households with good housing conditions, materially privileged households and small households, had a 2-3 years longer life expectancy as compared to the deprived persons. Also, those who went to college lived longer than the illiterates. The gaps between categories were wider in men than in women.

Interpretation & conclusions
Socio-economic disparity in longevity was observed: wealthy people from Kerala State presented a longer life expectancy. Kerala State, in south India, is an exception within the Indian subcontinent. Within a few decades, it has achieved major demographic changes that have promoted greater gender equality, education and investment in human resources. Despite having a poor per-capita income, Kerala’s health indicators and life expectancy are close to those of high-resource countries. According to the Kerala Government Statistics Bureau, in 1993-1995, life expectancy at birth in rural Kerala was 70 years for men and 77 years for women. Social reforms have brought low poverty rates in urban and rural areas, accompanied by the highest literacy rate in India (Kerala: 90%, India: 65%), especially among women (Kerala: 88%, India: 54%), and a high average marriage age for women (Kerala: 23 years, India: 20 years in 2003).

However, social and healthcare reforms in Kerala State—the so-called Kerala model or Kerala formula—have presented some challenges such as a high unemployment rate among the educated, a high suicide rate, and a high morbidity rate. Socio-economic and demographic factors are known to influence the longevity within individuals, communities, regions or countries. Although evidence on social inequalities in health comes mostly from high-resource countries, reports from India frequently examine caste associated with health outcome; caste being a marker of socio-economic status. In a recent review, Nayar found that the upper caste group was more likely to use health facilities (for immunization, maternal care, treatments) and had a better health status. Based on Mumbai cancer registry data, Kurkure and Yeole reported that cancer survival and cancer mortality were both associated with levels of occupation and education. Kerala’s social reforms have aimed to equally distribute wealth to the different social strata, therefore, everyone is expected to benefit from the same developments. The objective of the present study was to address the impact of the socio-economic level on their life expectancy, even though social reforms have closed the gap between individuals. End of partial quote. See link for full text. Source: *Socio-economic factors & longevity in a cohort of Kerala State, India* Catherine Sauvaget, Kunnambath Ramadas,* Jean-Marie Fayette, Gigi Thomas,** Somanathan Thara,+ and Rengaswamy Sankaranarayanan Indian J Med Res. 2011 May; 133(5): 479–486.

The people of Kerala, India, contribute to and enjoy an equitable, educated society. The public health system in Kerala is modern and inclusive. The people of Kerala have the highest life expectancy (2000 figures) of all India. In recent times doctors, politicians, media and the public of Kerala have become concerned at what appears to be an excess incidence of disease within the naturally high background radiation area of the State of Kerala. There remains a scarcity of reports, particularly relating to childhood disease, from which to conclude
what the actual cause is for the reported excess disease actually is. The findings I have turned up do not change my mind in the relevant matters, in fact the findings reinforce my views.

Dr. S.M. Javad Mortazavi on the Background radiation reduction since the dawn of Life
I refer to S. M. Javad Mortazavi, Biology Division, Kyoto University of Education, Kyoto 612-8522, Japan. This author provides his Curriculum Vitae at http://www.angelfire.com/mo/radioadaptive/mycv.html as follows, in part:

Occupation: Assistant Professor, Medical Physics Department, School of Medicine,

Rafsanjan University of Medical Sciences
Present Occupation: Secretary, National Committee on High Background Radiation Areas (NCHBRA) National Radiation Protection Department (NRPD), Iranian Nuclear Regulatory Authority (INRA).

Education
B.Sc: Radiology, Shiraz University, Shiraz, Iran, 1994.
M.Sc: Medical physics, Tarbiat Modares University, Tehran, Iran, 1995.
Ph.D: Medical Physics, Tarbiat Modares University, Tehran, Iran, December 1999.

“Humans, animals and plants have been exposed to natural radiation since the creation of life. Interestingly, life evolved in a radiation field that was much more intense than today. The annual effective radiation dose from natural and man-made sources for the world’s population is about 3 mSv, which includes exposure to alpha radiation from radon and its progeny nuclides. Nearly 80% of this dose (2.4 mSv) comes from natural background radiation, although levels of natural radiation can vary greatly. Ramsar, a northern coastal city in Iran, has areas with some of the highest levels of natural radiation measured to date. The effective dose equivalents in very high background radiation areas (VHBRAs) of Ramsar in particular in Talesh Mahalleh, are a few times higher than the ICRP-recommended radiation dose limits for radiation workers….

“Inhabitants who live in some houses in this area receive annual doses as high as 132 mSv from external terrestrial sources. The radioactivity of the high background radiation areas (HBRAs) of Ramsar is due to Ra-226 and its decay products, which have been brought to the surface by the waters of hot springs. There are more than 9 hot springs with different concentrations of radium in Ramsar that are used as spas by both tourists and residents….

“Due to extraordinary levels of natural radiation in these areas, in some cases 55-200 times higher than normal background areas, some experts have suggested that dwellings having such high levels of natural radiation need urgent remedial actions (Sohrabi 1997). In spite of this, many inhabitants still live in their unaltered paternal dwellings….

“The preliminary results of cytogenetical, immunological and hematological studies on the residents of high background radiation areas of Ramsar have been previously reported (Mortazavi et al. 2001, Ghiassi-Nejad et al. 2002 and Mortazavi et al. in press), suggesting that exposure to high levels of natural background radiation can induce radioadaptive response in human cells. Lymphocytes of Ramsar residents when subjected to 1.5 Gy of gamma rays showed fewer induced chromosome aberrations compared to residents in a nearby control area whose lymphocytes were subjected to the same radiation dose. Despite the fact that in in vitro experiments lymphocytes of some individuals show a synergistic effect after pretreatment with a low dose(Mortazavi et al. 2000), none of the residents of high
background radiation areas showed such a response…

“Based on results obtained in studies on high background radiation areas of Ramsar, high levels of natural radiation may have some bio-positive effects such as enhancing radiation resistance. Our preliminary results suggest that prolonged exposure to very high levels of natural radiation could lead to the induction of radiation resistance among exposed individuals, which has interesting implications for many aspects of radiation protection policy…” End partial quote. Source: “High Background Radiation Areas of Ramsar, Iran.” S. M. Javad Mortazavi, Biology Division, Kyoto University of Education, Kyoto 612-8522, Japan.

The paper is a very interesting one. Are the changes observed in the cells of people living in the high radiation areas of Iran protective? What is the pattern of diseases in this area of Iran compared to other areas of Iran? Is the picture of the radiological history sufficiently accurate to justify the claim that we all need more radiation exposure to compensate for background reduction which has occurred since life commenced? The answers to such questions are very important, as industry in South Australia claims similar things as S.M. Javad Mortazavi. (Toro Energy, 2011, Sykes, 2011, Toro Energy, 2011)


High Background Areas of Iran.

“Abstract

The main goal of this study is to lay out the map of the soil radionuclide activity concentrations and the terrestrial outdoor gamma dose rates in the western Mazandaran Province of Iran, and to present an evaluation scheme. Mazandaran Province was selected due to its special geographical characteristics, high population density and the long terrestrial and aquatic borders with the neighbouring countries possessing nuclear facilities. A total of 54 topsoil samples were collected, ranging from the Nour to Ramsar regions, and were based on geological conditions, vegetation coverage and the sampling standards outlined by the International Atomic Energy Agency. The excess lifetime cancer risks (ELCRs) were evaluated and the coordinates of sampling locations were determined by the global positioning system. The average terrestrial outdoor gamma dose rate was 612.38±3707.93 nGy h⁻¹, at 1 m above the ground. The annual effective gamma dose at the western part of Mazandaran Province was 750 μSv, and the ELCR was 0.26×10⁻². Soil samples were
analysed by gamma spectrometry with a high-purity germanium detector. The average 
$^{226}$Ra, $^{232}$Th, $^{40}$K and $^{137}$Cs activities were $1188.50 \pm 7838.40$, $64.92 \pm 162.26$, 
$545.10 \pm 139.42$ and $10.41 \pm 7.86$ Bq kg$^{-1}$, respectively. The average soil radionuclide 
concentrations at the western part of Mazandaran Province were higher than the worldwide 
range. **The excess lifetime risks of cancer and the annual effective gamma doses were 
also higher than the global average.**

End Quote. Source: “Relationship of soil terrestrial radionuclide concentrations and 
the excess of lifetime cancer risk in western Mazandaran Province, Iran”, *Radiat Prot 
Dosimetry*, 1. M. Abbaspour1, F. Moattar2, A. Okhovatian3 and M. Kharrat Sadeghi2, Radiat 

Paper: “Cancer Incidence in Five Provinces of Iran” Ardebil, Gilan, Mazandaran, 
Golestan and Kerman, 1996 – 2000, MAHDI FALLAH. MAHDI FALLAH ACADEMIC 
DISSERTATION, University of Tampere, Tampere School of Public Health Finland, Tehran 
University of Medical Sciences, Digestive Diseases Research Center Iran. Supervised by 
Professor Anssi Auvinen University of Tampere, Professor Risto Sankila University of 
Tampere, Reviewed by Professor emerita Aulikki Nissinen University of Kuopio, Professor 
Elisabete Weiderpass Vainio, Karolinska Institute, Sweden. 
https://tampub.uta.fi/bitstream/handle/10024/67702/978-951-44-6876-6.pdf?sequence=1

Quotes from this paper:
“Cancer is the most common non-injury cause of death after cardiovascular diseases in Iran.

“Estimation of the burden of cancer in terms of incidence, mortality, and prevalence is the first 
step to plan control measures in every country but for almost 40 years there were no 
population-based cancer statistics in Iran to reveal cancer burden.

“This study is designed to ascertain the incidence of cancers in Iran, and develop and test a 
new method to adjust for ascertainment bias in the evaluation of cancer registry data.

“The central national cancer registry was abandoned in 1979 by Iran. It remains intact and 
available. In 1984 Iran re-established cancer registries. Each province maintains its own 
registry. Many of the relevant documents are held in operational departments within local 
hospitals.

“Although Iran has a low cancer incidence compared to developed countries, Iran’s cancer 
incidence is comparable to other nations with similar levels of development.”

“Highest rate of lung cancer found among Mazandaranian men.”

“Esophageal cancer: Golestan Province in northeastern Iran is one of the higher risk 
areas of the world, followed by Mazandaran and Khorasan Provinces.”

“Mazandran Province, in which the famous radium and radon spas are located, has the 
highest incidence of two types of cancer.”

“The incidence rates of gastrointestinal cancers are high in Iran (it is one of the known areas with a high incidence of GI cancers). Breast cancer mainly affects Iranian women about a decade earlier than Western countries and younger cases are affected by an increasing rate of colorectal cancer in Iran, near the Western rates…..

“In Iran, most northern and north western areas are at high risk for gastric cancer, whereas the central and western provinces are at medium risk and the southern regions are at a low risk. Ardabil, a north western province, has the highest incidence of gastric cancer in Iran with an ASR of 49.1 and 25.4 in men and women, respectively….

“The incidence rates of gastrointestinal cancers are high in Iran (it is one of the known areas with a high incidence of GI cancers). Breast cancer mainly affects Iranian women about a decade earlier than Western countries and younger cases are affected by an increasing rate of colorectal cancer in Iran, near the Western rates…..

“In Iran, most northern and north western areas are at high risk for gastric cancer, whereas the central and western provinces are at medium risk and the southern regions are at a low risk. Ardabil, a north western province, has the highest incidence of gastric cancer in Iran with an ASR of 49.1 and 25.4 in men and women, respectively….
“The north and north east regions of Iran are some of the known areas that have a high incidence of esophageal cancer. In one early survey by the Iran Cancer Institute, 9% of all cancers and 27% of gastrointestinal cancers were esophageal carcinoma with a male to female ratio of 1.7:1. Golestan Province in northeastern Iran is one of the higher risk areas of the world, followed by Mazandaran and Khorasan Provinces....

“In Iran, breast cancer ranks first among cancers diagnosed in women, comprising 24.4% of all malignancies with a crude incidence rate and ASR of 17.4 and 23.1 (23.65 in a Mousavi report) per 100,000, respectively. Abundant data on the features of breast cancer are available from industrialized countries, but unfortunately studies that report the clinicopathological features, stages and age distribution of this disease in Iran are rare....

“The few small studies and reports available in Iran suggest that breast cancer affects Iranian women at least one decade younger than women in developed countries, with the mean age ranging from 47.1 to 48.8 years....

“The incidence rates of gastrointestinal cancers are high in Iran (it is one of the known areas with a high incidence of GI cancers). Breast cancer mainly affects Iranian women about a decade earlier than Western countries and younger cases are affected by an increasing rate of colorectal cancer in Iran, near the Western rates....

“In Iran, most northern and north western areas are at high risk for gastric cancer, whereas the central and western provinces are at medium risk and the southern regions are at a low risk. Ardabil, a north western province, has the highest incidence of gastric cancer in Iran with an ASR of 49.1 and 25.4 in men and women, respectively....” End quotes from Shadi Kolahdoozan MD MPH et. al.

People living in the naturally high radiation areas of Iran suffer rates of some types of cancer which are disturbing. The observation that the higher dose of background of radiation experienced by people living such areas imparts protection against cancer is very problematic. The High Background Area of Iran includes Mazandaran Province.

In the papers cited, Iranian and international experts have described the incompleteness in aspects of the available data relating to cancer in Iran.

Similar incompleteness has been reported in the Indian cancer data. For instance, researchers report the following:


On the face of the evidence compared to the claims made, I cannot conclude that the basis for conservative radiological protection standards is illegitimate as Dr. Madhava Bhat suggests. Nor can I conclude, as Dr. S. M. Javad Mortazavi implies, that the high background radiation areas of Iran impart individuals with protection against disease. (Dr. Mortazavi states that “Based on results obtained in studies on high background radiation areas of Ramsar, high levels of natural radiation may have some bio-positive effects such as enhancing radiation-resistance. More research is needed to assess if these bio-positive effects have any implication in radiation protection (Mortazavi et al. 2001).” I take it that protection against diseases such as cancer is one of the results of the claimed “bio-positive” results from living in a high radiation area.
The papers cited appear to contradict the notion of a beneficial dose from the high radiation exposure experienced by the populations living in the high radiation area.

I cannot, on the basis of the findings of these papers agree with Sykes proposition that the extra dose of radiation experienced in the high radiation areas of Iran is “like a vitamin”, affording some benefit to the individuals resident in the areas. If this were so, the cancer reports cited above would not find to the contrary in relation to some types of cancer, which the people living in the high background area suffer to a greater degree than people living elsewhere in Iran.

The claimed health benefits of high radiation areas in relevant areas of both India and Iran are very controversial. In 2014 the Indian press reported great public concern at the prevalence of cancer in the high radiation state of Kerala. The cancer records in both Iran and India are lacking, with a number peer reviewed authors describing a break in mandatory reporting of cancer cases to the Central Iranian registry. In India, despite specific research by authorities, information regarding childhood cancer is reported as being lacking.

The situation is perplexing because various authorities over a number of years have published papers which claim low cancer rates for both the high background radiation areas of India and Iran. Current data from both nations show that lower incidence of the relevant disease did not in all probability exist. Current data shows higher incidence.

On closer study, one finds a number of types of cancers in Iran are most prevalent in the high radiation areas, that the prevalence of some types of cancers reaches Western levels, whereas in developing countries such as Iran is, cancer rates are normally lower. In Iran, breast cancer afflicts women a decade earlier than is commonly the case in the West. This again is a reversal of the expected finding.

I find that the reality of disease on the ground in these two high radiation areas contradict the assertion that the radiation is needed “like a vitamin” in regard to health benefits and protection from disease in the real world.

The Early Earth’s changing Dose Effectiveness: Gradual Decay of Background, Gradual Creation of the Oxygen Rich Atmosphere, the Rise of the Mammalian Species as a Radiosensitive Class of Lifeforms

S. M. Javad Mortazavi raises interesting points in his paper “High Background Radiation Areas of Ramsar, Iran”, located at http://www.angelfire.com/mo/radioadaptive/ramsar.html as previously cited.

In relation to conditions of the early earth he notes: “Humans, animals and plants have been exposed to natural radiation since the creation of life. Interestingly, life evolved in a radiation field that was much more intense than today.” (Source: as given above).

Dr. Mortazavi also points out in this paper that the natural background radiation emitted by the earth varies from place to place in the modern era.

Due to the fact of radioactive decay, it is predictable that at “the creation of life” the background radiation emitted by the earth was greater than it is today. I have previously raised the concept of “The Oxygen Effect” in the matter of dose effectiveness. At the creation of life and indeed at the formation of the earth itself, no oxygen breathers existed in life on earth. This is because very little free oxygen existed as a gas in the early atmosphere.

This is confirmed by conventional science as follows:

“Earth’s early atmosphere contained only small amounts of free oxygen, probably produced
entirely by the reaction of sunlight with water vapour from volcanoes. The oxygen-rich atmosphere that evolved later, and upon which oxygen-breathing life now depends, was result of the origin of photosynthesis. During the Precambrian, vast numbers of single-celled algae and cyanobacteria living in the seas eventually released enough oxygen to transform the environment. The oldest evidence of cyanobacteria dates to 2.7 billion years ago, although oxygen did not begin to build up in the environment until about 2.3 billion years ago.

During the transition from oxygen-poor to oxygen-rich atmosphere, the first banded iron formations may have formed.....

Until all the available iron had been deposited in banded iron formations, oxygen could not build up in the atmosphere. Red beds appeared only after free oxygen was released into the atmosphere, beginning about 2.0 to 1.8 billion years ago. They are still being formed today.”


I find many of the statements made by advocates for Hormesis to deviate quite widely from reality. The claim that the modern earth suffers a lack of background radiation due to factors present at the dawn of life, and which mean, in that view we suffer a lack from a lack of radiation, is in my view dangerous and total bunkum. The view calls for an increase in radiation exposure limits. It also calls for the acceptance of the view that emissions from nuclear sites be considered in the same way vitamin supplements are.

It has been a long time since health authorities around banned the sale of radium based tonics. Radium and similar substances are a primary by product of the mining industry. I believe it is irrational to promote mining slag heaps as being akin to pharmacy outlets. They are in fact accumulated piles of TENORM which must be kept secure and isolated for long periods of time.

The Radio-Sensitivity of the Species.

I have previously shown that radio sensitivity is dependent upon the oxygen present in living tissue. The greater the oxygen tension the greater the radio sensitivity of the cell. I submit that mammals arose, that most radio-sensitive class, precisely at a time when the paradoxical factors of decreasing background radioactivity and increasing gaseous oxygen provided a balance of factors which allowed the survival and adaptation of the class.

It is arguable as to which is most important – the actual background at that time or the radio-sensitivity of the tissue of the class given the variables of metabolic rate, oxygen tension and respiratory factors. The differing responses of various species are given below:
I note particularly the differences between the Mouse and the Human. The mouse is nearly twice as robust as the human in terms of LD50.

Naturally occurring high background radiation areas of the world include the high altitude living environments. Here also claims have been made regarding the alleged benefits of increased exposure to radiation. Recent discoveries show some populations, such as Tibetans, adapted to high altitudes by gaining, via interbreeding with more ancient homo sapiens, certain genetic traits. These result in a much lower demand for and use of oxygen by the body. Source: "Tibetans inherited high-altitude gene from ancient human", Anne Gibbons, 2 July 2014 3:00 pm, American Association for the Advancement of Science, AAAS, on line article, http://news.sciencemag.org/archaeology/2014/07/tibetans-inherited-high-altitude-gene-ancient-human, accessed 5.00pm 18 May 2015.

I have previously presented the findings that radiation effects are diminished by lower oxygen tension, and increased by higher oxygen tensions in tissues. This is well known in oncology.

It is to be expected that high altitude environments might be relatively radio protective due to the oxygen effect. This is confirmed by the following paper:


These authors in the above paper state in the Abstract: “The level of atmospheric oxygen, a driver of free radical damage and tumorigenesis, decreases sharply with rising elevation. To understand whether ambient oxygen plays a role in human carcinogenesis, we characterized age-adjusted cancer incidence (compiled by the National Cancer Institute from 2005 to 2009)
across counties of the elevation-varying Western United States and compared trends displayed by respiratory cancer (lung) and non-respiratory cancers (breast, colorectal, and prostate). To adjust for important demographic and cancer-risk factors, 8–12 covariates were considered for each cancer. We produced regression models that captured known risks. Models demonstrated that elevation is strongly, negatively associated with lung cancer incidence (p < 10\(^{-16}\)), but not with the incidence of non-respiratory cancers. For every 1,000 m rise in elevation, lung cancer incidence decreased by 7.23 99% CI [5.18–9.29] cases per 100,000 individuals, equivalent to 12.7% of the mean incidence, 56.8. As a predictor of lung cancer incidence, elevation was second only to smoking prevalence in terms of significance and effect size. Furthermore, no evidence of ecological fallacy or of confounding arising from evaluated factors was detected: the lung cancer association was robust to varying regression models, county stratification, and population subgrouping; additionally seven environmental correlates of elevation, such as exposure to sunlight and fine particulate matter, could not capture the association. Overall, our findings suggest the presence of an inhaled carcinogen inherently and inversely tied to elevation, offering epidemiological support for oxygen-driven tumorigenesis. Finally, highlighting the need to consider elevation in studies of lung cancer, we demonstrated that previously reported inverse lung cancer associations with radon and UVB became insignificant after accounting for elevation.” End quote. Source: “Lung cancer incidence decreases with elevation: evidence for oxygen as an inhaled carcinogen”, Kamen P. Simeonov, (Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA) Daniel S. Himmelstien (Biological & Medical Informatics, University of California, San Francisco, CA, USA), preferred citation: Simeonov KP, Himmelstein DS. (2015) Lung cancer incidence decreases with elevation: evidence for oxygen as an inhaled carcinogen. PeerJ 3:e705 https://dx.doi.org/10.7717/peerj.705 accessed 8.08pm 15 May 2015.)

The Difference between Cellular Adaptive Response and Hormesis Quote : “Hormesis is a hypothesis that emphasises the possible beneficial effect of low doses of radiation and claims the necessity of a low-dose exposition to get some benefits while excluding any risk. However, this concept is controversial. According to the hormesis model, people should be exposed to low radiation dose unless it is demonstrated with certitude that there is no benefit from such exposure. The possibility of adverse effects is not even considered. We may wonder why the proponents of the hormesis model acknowledge a radiation threshold value for harmful effects, but reject it for beneficial effects. Considering the essentially random interaction between radiation and target molecules leading to unpredictable molecular damage, it appears surprising that at low doses only beneficial effects would occur while noxious effect would require a dose above a certain threshold. To consider hormesis as an argument against actual dose limits would only be valid if the efficacy of hormesis could be demonstrated for the effects against which one wants to protect at low radiation doses, i.e. cancer and genetic damages. Unfortunately this is not yet demonstrated in an unequivocal way. Therefore, the hormesis model is currently not considered in radioprotection.
“Adaptive Response: The theory of “adaptive response”, (not to be confused with hormesis) shows that a low dose can reduce the effect of a higher dose when administered after a short time delay. This theory is based on substantial evidence….“

“…..to reduce a risk appears beneficial, but it does not mean that the risk is eliminated. According to the “adaptive response” model, a first low dose (conditioning dose) is considered to stimulate the DNA repair mechanisms that contribute to reduce the effect of a subsequent higher dose. But the initial low dose can only stimulate the limited number of cells actually hit, the total of which is a function of the dose. This situation never excludes the possibility of a transformation of one of the cells.

“The next higher dose concerns all cells. Some of them having the repair mechanisms stimulated by the first conditioning dose, and may repair the damage more easily. The other cells, that were not previously hit, are not protected. The total damage can be reduced by a factor depending on the number of the cells conditioned but will always be dependent on the total number of the cells exposed to both doses.

“Would the conditioning of all cells solve the question? No, because to reach such a goal we have to increase the conditioning dose and the risk remains proportional to the dose and to the number of cells irradiated. Therefore the adaptive response does not appear to be a relevant mechanism for radiation protection because the (low) conditioning dose that defines it, also generates a risk of transformation. On the other hand the challenging dose is not a low dose.

“We suggest that natural background irradiation and metabolic ROS (reactive oxygen species) are already stimulating toward some adaptive response by a constant stimulation of the repair mechanisms. Then it would appear that there is no need to add to this radiation burden.

“Evolution, in our natural radioactive environment, is often used as an argument to support such beneficial effects of low-dose radiation. We should remember that if Evolution has led to the current scala of successfully living species, the eliminated species are unavailable to analyse the non-beneficial aspect of evolution.” End Quote. Source: Source: Low-dose ionizing radiation exposure: Understanding the risk for cellular transformation” By L. DE SAINT-GEORGES, SCK•CEN, Department of Radiobiology, Mol, Belgium. Published in: Journal of Biological Regulators and Homeostatic Agents Received : May 15, 2004, Accepted : June 26, 2004.

The Advisory Committee on Human Radiation Experiments.

In 1995 a United States government Committee reported to the President on the medical and ethical excess conducted by the nuclear authorities in that nation.

The President reported the committee’s findings to the American people in part, as follows:

“This report I received today is a monumental document in more ways than one. But it is a very, very important piece of America’s history, and it will shape America’s future in ways that will make us a more honourable, more successful and more ethical country.

“What this committee learned I would like to review today with a little more detail than Dr. Faden said, because I think it must be engraved on our national memory. Thousands of government-sponsored experiments did take place at hospitals, universities, and military bases around our nation. The goal was to understand the effects of radiation exposure on the
human body.  
*While most of the tests were ethical by any standards, some were unethical, not only by today’s standards, but by the standards of the time in which they were conducted. They failed both the test of our national values and the test of humanity.*

*In one experiment, scientists injected plutonium into 18 patients without their knowledge. In another, doctors exposed indigent cancer patients to excessive doses of radiation, a treatment from which it is virtually impossible that they could ever benefit.*

*The report also demonstrates that these and other experiments were carried out on precisely those citizens who count most on the government for its help – the destitute and the gravely ill. But the dispossessed were not alone. Members of the military – precisely those on whom we and our government count most – they were also test subjects.*

*Informed consent means your doctor tells you the risk of the treatment you are about to undergo. In too many cases, informed consent was withheld. Americans were kept in the dark about the effects of what was being done to them. The deception extended beyond the test subjects themselves to encompass their families and the American people as a whole, for these experiments were kept secret. And they were shrouded not for a compelling reason of national security, but for the simple fear of embarrassment, and that was wrong.*

*Those who led the government when these decisions were made are no longer here to take responsibility for what they did. They are not here to apologize to the survivors, the family members or the communities who’s lives were darkened by the shadow of the atom and these choices.*

*So today, on behalf of another generation of American leaders and another generation of American citizens, the United States of America offers a sincere apology to those of our citizens who were subjected to these experiments, to their families, and to their communities. When the government does wrong, we have a moral responsibility to admit it. The duty we owe to one another to tell the truth and to protect our fellow citizens from excesses like these is one we can never walk away from. Our government failed in that duty, and it offers an apology to the survivors and their families and to all the American people who must who must be able to rely upon the Untied States to keep its word, to tell the truth, and to do the right thing.*

*We know there are moments when words alone are not enough. That’s why I am instructing my Cabinet to use and build on these recommendations, to devise promptly a system of relief, including compensation, that meets the standards of justice and conscience. When called for, we will work with Congress to serve the best needs of those who were harmed. Make no mistake, as the committee report says, there are circumstances where compensation is appropriate as a matter of ethics and principle.*

*I am committed to seeing to it that the United States of America lives up to its responsibility. Our greatness is measured not only in how we so frequently do right, but also how we act when we know we’ve done the wrong thing; how we confront our mistakes, make our apologies, and take action.*

*That’s why this morning, I signed an executive order instructing every arm and agency of our government that conducts, supports, or regulates research involving human beings to review immediately their procedures, in light of the recommendations of this report, and the best knowledge and standards available today, and to report back to me by Christmas. “I have also created a Bioethics Advisory Commission to supervise the process, to watch over all such research, and to see to it that never again do we stray from the basic values of protecting our people and being straight with them.*
“The report I received today will not be left on a shelf to gather dust. Every one of its pages offers a lesson, and every lesson will be learned from these good people who put a year and a half of their lives into the effort to set America straight. Medical and scientific progress depends upon learning about people’s responses to new medicines, to new cutting-edge treatments. Without this kind of research, our children would still be dying from polio and other killers. Without responsible radiation research, we wouldn’t be making the progress we are in the war on cancer. We have to continue to research, but there is a right way and a wrong way to do it.” end quote. SOURCE: REMARKS BY THE US PRESIDENT IN ACCEPTANCE OF THE HUMAN RADIATION FINAL REPORT, BRIEF EXTRACTS FROM THE FULL TEXT, OCTOBER 3, 1995.


The United States Department of Energy exports aspects of its radiation research to places not covered by Presidential Executive Order 12891 of 1994. One such place is South Australia. The role of nuclear medicine in the promotion of nuclear energy is inappropriate in the US context given the unethical outcomes such an alliance created for that nation.


This limit to the purposes of nuclear expertise, technology and activity imposed by the State Premier enhances the safety of South Australians in the case of an expanded uranium mining industry. Does the radiation research which has been funded by the US Department of Energy, as awarded to South Australian institutes have any military application?

The Purposes of the United States Low Dose Radiation Research Programs

Quote: “The U.S. Department of Energy (U.S. DOE) maintains several programs to study and understand the health and environmental effects of exposure to low levels of energy-related agents. These programs include research to understand the mechanisms of action of agents of concern and to assess the risks associated with exposures of people and ecological systems to these agents. They also include implementing appropriate occupational safety and health standards and remediating waste sites to environmental standards. These programs require that the U.S. DOE pursue a realistic understanding of the effects of exposures to small amounts of energy-related agents. The largest of these programs involves hazardous waste remediation and includes potentially harmful exposures to low levels of numerous agents. The U.S. DOE conducts research to establish the scientific bases for the realistic assessment of risks of exposure to such wastes. As part of the U.S. DOE efforts to understand the risks of low-level exposures to hazardous waste, the Office of Health and Environmental Research and the Office of Environmental Management recently launched a broad cooperative program. It is comprised of research projects in nine general scientific areas and includes research on the health impacts and risk estimation of exposure to low levels of hazardous wastes. Projects for this new cooperative research program were
selected from 610 applications and totalled approximately $47 million in fiscal year 1996. This program marks a new approach by using basic research to reduce cleanup costs and to develop scientific foundations for advances in environmental technologies. The research will also examine the effects of exposure to low levels of chemical and radiological wastes."


**A Specific Example of the Need for Radiation Research in the USA**

The contracts issued by the US Department of Energy for low dose radiation or any other research are freely available under US FIOA laws. In the Australia the same contracts are held as Commercial in Confidence by the recipient DOE contractor organisations.

We have seen one basis for the need to engage in low dose radiation research by the US DOE – the need for the costs of remediation to be As Low As Reasonably Achievable. In this the United States is in a bit of a cleft stick. There is the need to remediate contaminated sites and there is a defence and industrial need to contaminate land, as the following extracts show:

Quote: “(The) Soils Project analyzes contaminated surface and shallow subsurface soils on the Nevada Test Site and the Nellis Test and Training Range, including the Tonopah Test Range. Contamination at these sites is the result of historic nuclear detonations, weapons safety experiments, rocket engine development, and hydronuclear tests.

“The contaminants of concern are primarily americium, plutonium, depleted uranium, and other man-made radioactive materials. In addition, there are sites where metals may be present above regulatory limits. The U.S. Department of Energy Nevada Site Office is working closely with the U.S. Air Force and the State of Nevada to determine what corrective actions may be necessary.” (Source: US Department of Energy, National Nuclear Security Administration, U.S. DOE/NNSA – Nevada Site Office Environment Management, public announcement.)

and

“Since the Department of Interior will retain the ultimate land management for all of the public lands encompassing the Range, they, as well as the Air Force should be consulted concerning the proposal to potentially disperse more than 1.5 tons of Depleted Uranium (DU) and up to 100 pounds of Beryllium on the public lands encompassing the Range.” (Source: Paul J. Liebendorfer, P.E. Bureau of Federal Facilities, State of Nevada, Department of Conservation and Natural Resources Division of Environmental Protection 333 W. Nye Lane, Room 138 Carson City, Nevada 89706-0851, Letter dated July 12 1999 to Mr. George Laskar Assistant Area Manager Department of Energy, Albuquerque Operations office P. O. Box 5400 Albuquerque, NM 87185)

No doubt the United States Air Force will apply the findings of Sykes et. al. as it sees fit both within its firing ranges at Fallon, Nevada, and elsewhere in the United States. Perhaps the findings will be applied in the clean up phase on the foreign fields upon which the United States conducts war. Perhaps this military use of US contracted South Australian nuclear
research has a humane part to it. If the US ever actually does clean up the foreign battlefields it has fought upon to the same level as it is forced under US Law, to date, to cleanup parts of the USA, it will make world news.

The point at issue here is the State Premier’s promise regarding the limitations of use to which South Australian nuclear activity will be put. Radiation research conducted by South Australian institutions of higher learning, which has been ongoing for 15 years or more, has had a dual use capability for a long time. The USA may use the research it has funded in any way it deems fit, and that seems fair enough to me. Cheaper cleanups at the firing range outside Fallon Nevada would be much appreciated by the US Military. Whether the parents of Fallon would share the joy is quite another matter.

**Radiation Responses, variables and outcomes**

Given the variables possibly operating within the context of any radiation exposure, it is to be expected that individual responses will differ. Further the probability is that some effects of low dose, low LET exposure will be detrimental while others will be beneficial. It is the individual outcomes of multiple processes which seem to determine the outcome for the person.

A qualified discussion of the various effects of low dose exposure is given in the paper “Non-targeted effects of ionizing radiation—implications for low dose risk”, Munira Kadhim,† Sisko Salomaa,‡ Eric Wright,§ Guido Hildebrandt,† Oleg V. Belyakov,*, Kevin M. Prise,6 and Mark P. Little7 Mutation Research/Reviews in Mutation Research Volume 752, Issue 2, April–June 2013, Pages 84–98 Wweb link [http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4091999/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4091999/)

Here, the range of processes and possible outcomes is large. A rather long list of negative impacts on the organism is given in this source.

Other research papers such show benefits and harm manifest in bystander cells (non hit cells):

- "Biological effects in unirradiated human tissue induced by radiation damage up to 1 mm away", Oleg V. Belyakov*†, Stephen A. Mitchell*, Deep Parikh‡, Gerhard Randers-Pehrson*, Stephen A. Marino*, Sally A. Amundson*, Charles R. Geard*, and David J. Brenner*§
  *Center for Radiological Research, Columbia University, New York, NY 10032; †Radiation Biology Laboratory, Research and Environmental Surveillance, Radiation and Nuclear Safety Authority, P.O. Box 14, FIN-00881, Helsinki, Finland; and ‡Stuyvesant High School, New York, NY 10282, Edited by Richard B. Setlow, Brookhaven National Laboratory, Upton, NY, and approved August 3, 2005 (received for review June 16, 2005), [http://www.pnas.org/content/102/40/14203.full](http://www.pnas.org/content/102/40/14203.full), accessed 12.53am 19 May 2015. This paper finds, for example, that “Endpoints were induction of micronucleated and apoptotic cells.” While apoptotic cells – the death of damaged cells – is a benefit, micronucleated cells are not. Increased micnucleated cells are associated with early events in carcinogenesis (“Micronuclei frequency in peripheral blood lymphocytes and cancer risk: evidence from human studies”, Bonassi S†, El-Zein R, Bolognesi C, Fenech M. Mutagenesis. 2011 Jan;26(1):93-100. doi: 10.1093/mutage/geq075.

This research was conducted with human skin tissue. This seems most appropriate. People are not mice after all.

**Are some reported outcomes of radiation exposures really psychogenic as claimed?**

The following extracts from research papers show the organic basis for disease suffered by children exposed to Chernobyl fallout. They also show that American astronauts display the same presence of inflammatory factors in blood and tissue after space flights as do radiation
exposed children due to Chernobyl. Nuclear experts dismiss the children as radiophobic. The astronauts however are seen as still having the right stuff. Cytokine inflammatory response is a concern for NASA, while being apparently ignored or discounted by advocates for nuclear industry in relation to the children of Chernobyl.

“Cytokine and chemokine responses after exposure to ionizing radiation: Implications for the astronauts”
by Evagelia C. Laiakis a,*, Janet E. Baulch a, William F. Morgan Radiation Oncology Research Laboratory, University of Maryland School of Medicine, 655 West Baltimore Street, Bressler Research Building Room 7-009, Baltimore, MD 21201, USA Marlene and Stewart Greenebaum Cancer Center, University of Maryland School of Medicine, Baltimore, MD 21201, USA

Abstract
For individuals travelling in space, exposure to space radiation is unavoidable. Since adequate shielding against radiation exposure is not practical, other strategies for protecting the astronauts must be developed.

“Radiation is also an important therapeutic and diagnostic tool, and evidence from the clinical and experimental settings now shows a firm connection between radiation exposure and changes in cytokine and chemokine levels.

“These small proteins can be pro- or anti-inflammatory in nature and the balance between those two effects can be altered easily because of exogenous stresses such as radiation.

“The challenge to identify a common perpetrator, however, lies in the fact that the cytokines that are produced vary based on radiation dose, type of radiation, and the cell types that are exposed. Based on current knowledge, special treatments have successfully been designed by implementing administration of proteins, antibodies, and drugs that counteract some of the harmful effects of radiation.

“Although these treatments show promising results in animal studies, it has been difficult to transfer those practices to the human situation. Further understanding of the mechanisms by which cytokines are triggered through radiation exposure and how those proteins interact with one another may permit the generation of novel strategies for radiation protection from the damaging effects of radiation. Here, we review evidence for the connection between cytokines and the radiation response and speculate on strategies by which modulating cytokine responses may protect astronauts against the detrimental effects of ionizing radiations.

_2006 COSPAR. Published by Elsevier Ltd. All rights reserved._
End quote. Source as given above.

Compare with:


ABSTRACT
Background:
The effect of low dose radiation on immune system is shown. Ionizing radiation can affect cytokine production and polarization of T helper cells.
Objective: The current study focused on ionizing radiation in Ukrainian children residing in a contaminated area with clinical irritable bowel syndrome.

Method:
Our study included 75 rural children population aged 4-18 yrs, who lived in a contaminated area exposed to natural environmental radiation with clinical irritable bowel syndrome (categorized in three groups) and 20 rural children participants aged 5-15 yrs who were living in areas with similar levels of radioactive contamination without clinical irritable bowel syndrome as control group. Internal radiation activity was measured by gamma-ray spectrometry. Serum levels of IL-4 and IFN-γ were measured by enzyme linked immunosorbent assay.

Results:
A trend towards increased levels of IL-4 was observed in children with clinical irritable bowel syndrome. In these children, IFN-γ levels were lower than that of the control group.

Conclusion:
The IBS symptoms in Ukrainian children residing in a contaminated area may have stemmed from Th1 to Th2 immune deviation and differential expression of IL-4 and IFN-γ.”


Two Responses by Australian Nuclear Regulators to Questions from organizations and individuals
The following case studies show very clearly how Australian nuclear regulators go to great extremes to supply information to international organizations. The case studies also show how these same Australian nuclear agencies give very poor service to individual Australian who seek information from them.
These case studies reveal that Australian nuclear safety regulators and the culture they inhabit are not automatically worthy of public trust in their current form.

ARPANSA RESPONDS TO THE CTBTO
The following paper describes the events and findings after the Comprehensive Test Ban Treaty Organisation (CTBTO) detected atmospheric radioactivity at its Monitoring System site in Melbourne, Australia, between November 2008 and February 2009. The CTBTO needed to know the source of the radioactivity:
Quote: “The origin of a series of atmospheric radioxenon events detected at the Comprehensive Test Ban Treaty Organisation (CTBTO) International Monitoring System site in Melbourne, Australia, between November 2008 and February 2009 was investigated. Backward tracking analyses indicated that the events were consistent with releases associated with hot commission testing of the Australian Nuclear Science Technology Organisation (ANSTO) radiopharmaceutical production facility in Sydney, Australia. Forward dispersion analyses were used to estimate release magnitudes and transport times. The estimated 133Xe release magnitude of the largest event (between 0.2 and 34 TBq over a 2 d window), was in close agreement with the stack emission releases estimated by the facility for this time period (between 0.5 and 2 TBq). Modelling of irradiation conditions and theoretical radioxenon emission rates were undertaken and provided further evidence that the Melbourne detections originated from this radiopharmaceutical production facility. These findings do not have public health implications. This is the first comprehensive study of
atmospheric radioxenon measurements and releases in Australia.”

Source: “Evaluation of radioxenon releases in Australia using atmospheric dispersion modelling” Rick Tinker a, Corresponding author contact information, Blake Orr a, Marcus Grzechnik a, Emmy Hoffmann b, Paul Saey c, Stephen Solomon a

a Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), 619 Lower Plenty Road, Yallambie, Victoria, Melbourne 3085, Australia
b Australian Nuclear Science and Technology Organisation (ANSTO), Environmental Monitoring, PMB1, Menai, NSW 2234, Australia
c Vienna University of Technology, Atomic Institute of the Austrian Universities, Stadionallee 2, 1020 Vienna, Austria


ARPANSA Responds to a Question Posed by a Member of the Public
I refer to the Sunshine Coast Daily newspaper of 14 January 2012. That edition of the
newspaper carried an article by Kate Clifford entitled “Radiation cloud ‘not harmful”. The article is reproduced in full below:

Quote: “A RADIOACTIVE cloud lingering off the Sunshine Coast on Sunday was not dangerous, according to the Australian Radiation Protection and Nuclear Safety Agency. Caloundra IT manager Peter Daley picked up the cloud’s radioactivity on his Geiger counter. “The reading was taken at 6.30pm and measured 0.80 microsieverts, which is eight times over the average level of radiation in the atmosphere. “Mr Daley said he was concerned the cloud could have formed from a radioactive fall out from the Fukushima nuclear disaster in Japan. “This may be just a one off but even still, any exposure to an increase in radiation is not good,” Mr Daley said. “He first noticed the hike when his Geiger counter began erratically beeping. He then watched the rise in radiation fluctuate for three hours, peaking for 20 minutes at 0.80. “I was shocked to hear the Geiger alarm going off, I have been recording radiation in the atmosphere for four years and the highest it has ever gone was 0.20 microsieverts.” “Australian Radiation Protection and Nuclear Safety Agency senior environmental scientist Marcus Grezechnik said the reading was unusual but not concerning for the Coast. “It is very unlikely to be caused from Fukushima, but more likely to be caused by a weather change or dust,” Dr Grezechnik said. “It is not seen as a big increase although it is higher than average. To put everyone’s mind at ease, even if you were receiving that dose every hour for a full year you would have less dose than one CAT Scan.” “He said radiation from the Fukushima nuclear disaster had only been recorded in Australia once since the incident occurred in March 11. “All reactors at the Fukushima Dai-ichi site were now in cold shutdown, significantly reducing the likelihood of uncontrolled releases to the environment and associated health impacts,” he said.” End Quote.

ARPANSA was engaged in the official response to this unexpected increase in measured atmospheric radioactivity as logged by members of the public. It can be seen that in fact the representative of ARPANSA who answered the public questions raised by the matter was Marcus Grezechnik. Though the surname of the person is spelt by the newspaper a little differently, this person is probably the same person credited as Marcus Grzechnik by Elsevier, the publisher of the paper Evaluation of radioxenon releases in Australia using atmospheric dispersion modelling tools.”


I refer to thumbnails figure 2 and figure 3 from the paper “Evaluation of radioxenon releases in Australia using atmospheric dispersion modelling tools”..
Given the date of the recording increase in atmospheric radiation detected in Queensland in relation to the scheduled refuelling of the Luca Heights reactor, given the contents and findings of Marcus Grzechnik et. al., in that paper, I, as an ordinary member of public wonder why it was that ARPANSA’S Grzechnik was apparently happy to give only vague references to “weather change or dust” as the source of the transient increase in atmospheric background.

On this occasion ARPANSA was happy to ensure no firm source of the detected radiation emissions were given. Being aware of the paper by Grzechnik et. al., which shows emission due to refuelling of the Lucas Heights reactor reaching parts of Queensland, NSW, Victoria and SA, I consulted the refuelling schedule for the Lucas Heights reactor as follows:

The Lucas Heights nuclear reactor is refuelled on a frequent basis. The Australian Nuclear Science and Technology Organisation (ANSTO) publishes the refuelling schedule on the internet at the following link: http://www.ansto.gov.au/AboutANSTO/OPAL/Operatingcycles/ On 21 January 2012 I accessed this schedule at the ANTSO weblink maintained at that time (http://www.ansto.gov.au/discovering_ansto/anstos_research_reactor/reactor_cycles). The information given at that old link at that time is as follows:

Quote: “Typical operating cycles
OPAL typically operates in cycles of 30-35 days, followed by a short refuelling outage to remove two or three spent fuel elements and replace them with new fuel elements.
“During these types of outages, ANSTO’s Reactor Operations team complete any required inspections and perform preventative and corrective maintenance on the reactor. These refuelling outages currently last around four to six days, although the intention is to reduce this in future.
The Reactor Operations team aims to operate OPAL for 300 days each calendar year.
“Reactor schedule – 2011/2012*
Reactor at power*
CYCLE # FROM TO
32 14.05.2011 13.06.2011
33 1.07.2011 30.07.2011
34 5.08.2011 9.09.2011
35 20.09.2011 17.10.2011
36 23.10.2011 27.11.2011
38 8.01.2012 5.02.2012
39 12.02.2012 18.03.2012
41 6.05.2012 11.06.2012
42 17.06.2012 16.07.2012
*This schedule is subject to revision based on the need to change the heavy water inventory. This schedule is based on a fixed fuel management system.” End quote. Source: ANSTO, at its old weblink, given above. The current weblink for recent refuelling schedules is http://www.ansto.gov.au/AboutANSTO/OPAL/Operatingcycles/

It is clear to me that the emissions detected in Queensland had a high probability of originating from the Lucas Heights reactor. The emissions being released during refuelling.
Reactor refuelling produces spikes in emissions at NPP sites around the world. It seems to me ARPANSA was satisfied that the public continued to believe the radioactive emissions originated from Japan. Indeed world wide speculation continues to this day in this matter. Whereas, the people who detected the Queensland emission were not informed of the evidence presented by the paper regarding Lucas Heights reactor emissions, co authored by the attending ARPANSA officer, nor did he advise the people of the Lucas Heights reactor refuelling schedule.

ARPANSA was quite happy to withhold information which would provide important information to the public about a national source of radiologic emissions. And seemingly quite happy to allow the public to speculate that a distant reactor in the Northern Hemisphere was the cause of the emissions detected locally.

My Experience Seeking Knowledge from the Nuclear Authorities

In the mid 1990s the National Secretary of the Atomic ExServicemen’s Association asked me to conduct research to aid nuclear veterans.

I was asked to find records regarding the monitoring of South Australian drinking water during the period of the British Nuclear Weapons Tests in South Australia. The Association sought the radiological monitoring data of the State’s water storages.

At that time the Liberal Government was in power in South Australia. I wrote a number of letters to Mr. John Olsen, initially in his capacity as Minister for Infrastructure, and later in his capacity as Premier of the state.

I received a number of informative and open letters from Mr. Olsen. I also received two letters from the Chief Executive of SA Water.

My questions were answered in summary by the assurance from Mr. Olsen and also from SA Water, that the data I sought did not exist, as far as was known.

Mr. Olsen and SA Water supplied me with the data for the period from the mid 1960s until the then current time. Mr. Olsen informed me that the filtration of Adelaide Metropolitan drinking water had been completed. The contamination from the period I was concerned with, the 1950s and early 1960s, would have been of no concern in regards to public health from the early 1960s on in any case. However, the reason for my request in the first place was to provide evidence of use by nuclear veterans.

For example, the doses received by veterans is a matter of dispute between nuclear veterans and relevant authorities. We know nuclear authorities actually closely monitored the veterans and the entire Australian environment at the relevant times. This included food and water – but only for those Australians living a European lifestyle.

Contamination of Aboriginal Australian food and water was not examined by nuclear authorities as far as I am aware. If such information does exist its existence has never been advertised by nuclear authorities. See Titterton et. al., Australian Journal of Science, 1962.

The view of the then SA government and SA Water, as communicated to me in writing, was
that the data I sought could not be found. It was the opinion of those authorities at that time that the information I sought did not exist. I do not doubt that this was the honest opinion of the authorities at that time. Missing evidence may exist somewhere.

Given the indications to the contrary I persisted with my private research.

The former Chair of the Atomic Weapons Safety Committee, Prof. Titterton, and others had written a paper that was published in 1962. The most likely source for some data in that paper was from the radiological monitoring of SA water supplies. It is normal to monitor drinking water supplies for quality and contamination from all sources. This is not exceptional. It is routine and has been for many decades. Commonwealth Parliamentary Hansard contains references to high levels of nuclear fallout being found in SA drinking water supplies due to bomb fallout. These are statements made by politicians in parliament. Such people can and so saying anything they like. They do not, of course, provide sufficient proof without verification. The Hansard references are insufficient on their own. Old press reports indicate the same contamination in the 1950s occurred in drinking water storages in N.S.W.

In the early 2000s, I was continuing my research in the matter. I met Dr. Roger Cross, an academic formerly of the University of Melbourne. I discussed the matter with him. Doctor Cross had held a long term interest in these sorts of issues. He decided to lodge a Freedom of Information Request asking for the radiological monitoring data as recorded during the time of the British Atomic Tests in Australia and South Australia. Shortly after Dr. Cross lodged his FOI request, there was an election in South Australia. There was a change in government. The Labor Party, with Mr. Mike Rann as Premier, took office.

Mr. Rann and the Labor Party had run the election campaign with openness in government as one theme. Mr. Rann promised more open government, with less secrecy. Sweeping reform of FOI and secrecy provisions were promised.

Mr. Rann and the Labor Party promised specifically, as I recall, to make information covered by the Radiation Protection and Control Act easier to obtain. Indeed the wording of that Act was changed in this regard and the promise was apparently fulfilled.


Dr. Cross generously kept me informed of his own-cost FOI request, in the matter of the radiological contamination of SA Drinking Water at the time of the nuclear tests in Australia and South Australia.

Tragically, although the relevant laws and regulations were changed, the Cross FOI was lodged under the previous laws. The more restrictive laws. And so the FOI request was refused.
Dr. Cross’ appeal was deemed to be lodged under laws in force prior to the change in the law, even though the law was changed by the time Dr. Cross lodged his appeal. So Dr. Cross even lost the appeal. It was a frustrating experience. I was very disappointed. Dr. Cross informed me that the correspondence from the government in relation to the rejections of his application and appeal confirm that the information we sought does in fact exist. It is not lost. It is subject to the Radiation Protection and Control Act and is held by government. It has been held by the SA government for all the decades during which the veterans and others fought for justice due to their radiation exposures. From that time on, for some period of time, I continued writing to the SA government asking for the release of the information in the public interest. The data would aid veterans in their quest to establish a baseline of environmental effect in the absence of any reliable dose records held by them. By and large, none of the veterans have access to complete dose records. None have any access to any Maralinga Hospital records. These are apparently lost.

The water monitoring data would establish that the bombs did in fact do what such weapons are known to do. How tragic it is that the veterans cannot know their individual doses. How tragic it is that authorities use algebra, instead of reality and the real record, to calculate the reconstructed dose. And so say that they did not suffer because of the bombs. The water data would be interesting and helpful, in the public interest and would in no way cause any current concern.

Even though the law had changed, even though the promises of the then new Rann government came to pass, each time I wrote to the government asking for the data in the spirit of openness and democracy, which the new government had promised prior to being elected, I was refused access to the data. As the Royal Commissioner probably knows, in the interim period, the Australian nuclear veterans failed in their legal bid via the class actions, and were refused consideration by the Australian Human Rights Commission. Apart from individual contests between each nuclear veterans and the Department of Veterans Affairs, the long march to justice by Australia’s Nuclear Veterans is at an end. As I have pointed out before, this situation speaks to, and is descriptive of, the nuclear regulatory and expert culture in this country. It remains relevant to me as I journey through life.

However, the data I was asked to obtain for the nuclear veterans all those years ago (the mid 1990s – two decades ago) could still be of use to the remnant of veterans who continue their claims under the relevant DVA provisions. It is still of use, it is still of interest to the public. The South Australian public are surely interested in the consequences of the time when, yet again, a foreign power induced our troops to enter a theatre of danger, even if the live fire was from a newish weapon which the experts all said at the time, as usual, was “perfectly safe.” And that no one was harmed. I think of Mr. Jones, and what actual dose he received. And I think of all the nuclear veterans, and what dose each one actually received. For the record shows no one knows the actual dose each actually received. So the authorities use algebra instead. And maintain a dose based not on reality, but ideology. The ideology that no one was harmed. I present some documents which record the state of affairs. Surely if a government promises openness in a matter, it will not demand an FOI request before it discloses the facts of history.
to the population. Openness is that state of affairs in which the public’s right to know is paramount in the minds and actions of authorities. Despite repeatedly winning office on the basis of the promise to create open government, successive governments have singularly failed in this undertaking.

Letters from the Relevant Minister:
Thank you for providing a copy of your CD relating to the history of the British nuclear tests in Australia. I trust this information will assist you in making the relevant changes to its introductory comments.

Thank you for your interest in this matter.

Yours sincerely

JOHN HILL

Date: 11/4/03
Mr Paul Langley
PORT WILLUNGA SA 5173

Dear Mr Langley


Your matter is receiving attention and a response will be forwarded to you as soon as possible.

Yours sincerely

Carolyn Lee
Office Manager to the
MINISTER FOR ENVIRONMENT AND CONSERVATION

June 2003

The authorities have been considering my request for information in this matter for a very long time. I have given up hope of ever receiving an accurate response. Whilst I appreciate the Minister's editorial input in regarding the information I have produced to him, the Minister did not get the gig of “Editor and Censor” to me. I suppose the feeling is mutual.

I submit, Royal Commissioner, that the evidence shows there is no basis for trust in nuclear authorities in South Australia, in Australia or indeed, in the United Kingdom.

Please see confirmatory evidence in the form of scans of source documents issued by
nuclear authorities in South Australia and the United Kingdom as follow:

1. Letter to me from National Secretary, Atomic ExServicemen’s Association
2. Letter to me from CEO, SA Water
3. Letter to me from CEO, SA Water
4. Letter to me from John Olsen, MP.
5. Email to me from Dr. R. Cross
TO WHOM IT MAY CONCERN

This is to acknowledge that I have known Paul Langley for a number of years. Paul has been assisting the veterans' community for a long period of time.

In my working relationship with Paul, I have noted the following qualities. He is a very conscientious worker who listens carefully to what is required of him and then proceeds to undertake those tasks without further prompting.

Paul's relationship with the members, customers, etc., which is an important part of any association or business, is very good. He is always courteous and polite to the customer and members and makes a special effort to look after their needs.

I have no hesitation in recommending him to you.

TERRY TOON - NATIONAL SECRETARY
16 February 1996

Mr

PORT WILLUNGA 5173

Dear Mr

I refer to your recent enquiry to the Minister for Infrastructure seeking access to the results of the radiological monitoring of Metropolitan Adelaide water supplies.

All the results obtained from the monitoring program from 1996 to 1995 are attached.

The levels conform with the health related guideline values specified in the National Health and Medical Research Council "Guidelines for Drinking Water Quality in Australia", 1997, and also the draft "Australian Drinking Water Guidelines", 1995. The guidelines apply to long term exposure.

I trust this information meets your requirements.

Yours faithfully

E J PHIPPS
Chief Executive

[Signature]

Document destruction date of original letter.

[Signature]

[Signature]
Mr P Langley

PORT WILLunga 2073

Dear Mr Langley

I refer to your telephone enquiry of 16 April 1996 concerning availability of results of radiological monitoring of Metropolitan Adelaide water supplies during the period 1993 to 1995.

All existing radiological data for Adelaide's water supplies was forwarded in February 1996 in response to your earlier enquiry. Radiological monitoring ceased in 1995. As a consequence no data prior to this date is available.

Yours sincerely,

[Signature]

P J Pears
CHIEF EXECUTIVE

5/7/96
Dear Mr Langley,

I refer to your telephone enquiry of 16 April 1986 concerning availability of results of radiological monitoring of Metropolitan Adelaide water supplies during the period 1932 to 1965.

All existing radiological data for Adelaide's water supply was forwarded in February 1986 in response to your earlier enquiry. Radiological monitoring ceased in 1965. As a consequence no data prior to this date is available.

Yours sincerely,

[Signature]

DEPARTMENT OF COMMUNICATIONS
DEPUTY COMMISSIONER FOR WATER

[Date: 15/5/86]
Mr Paul Langley
PORT WILLUNGA SA 5173

Dear Mr Langley

I acknowledge receipt of your letter dated 10 May 1996 enclosing a copy of a report entitled "The Monitoring of the Radiological Contamination of South Australian Drinking Water", the contents of which have been noted.

Yours sincerely

JOHN OLSEN FNIA MP
Minister for Industry, Manufacturing,
Small Business and Regional Development
Minister for Infrastructure

191196
Dear Paul,

The early optimism about the FOI materials has been dashed now that I have been able to look at it - I have had a lot of requests refused - still we will look at what we have got.

Roger

--
I have shown that over many years the nuclear authorities have steadfastly refused to supply information in an open, full, and timely manner. My search for information has been dedicated and appropriate and has persisted for a period of many years.

The controversy over dose response which actually continues around the world today may well be resolved in the future in a manner which renders any present schema inaccurate. The actual arrangement of facts which research reasonably may confirm might result in insights that renders any new investment in uranium and fission technology uneconomic in future.

Changes in the Incidence of Childhood Thyroid Cancer (Whole of Japan) since the inception of Nuclear Power in Japan


Environmental Consequences of Atmospheric Krypton 85 released by nuclear industry in the Northern Hemisphere

Source: “Simulations of atmospheric krypton-85 to assess the detectability of clandestine nuclear reprocessing" Ross, O. Ahlswede, J., Annewandter, R., Rast, S., Schlünzen, K.H, Kalinowski, M. B. Centre for Science and Peace Research, University of Hamburg, Meteorological Institute, University of Hamburg, Max Planck Institute for Meteorology, Hamburg, IAEA-CN-184/034 available at


South Australia mines uranium, and is considering expanding this activity, in order to supply raw material for the production of fuel for use by the nuclear power industry. Both the operation of nuclear power plants and the production and reprocessing of nuclear fuel produces gaseous radioactive emissions. These gases, such as Krypton 85, present a risk to the stability of factors relating to the earth’s atmosphere.

"Abstract : The study shows that krypton-85 from nuclear fission enhances air ionization and, thus, interferes with the atmospheric-electrical system and the water balance of the earth atmosphere. This is reason for concern: There are unforeseeable effects for weather and climate if the krypton-85 content of the earth atmosphere continues to rise. There may be a krypton-specific greenhouse effect and a collapse of the natural atmospheric-electrical field. In addition, human well-being may be expected to be impaired as a result of the diminished atmospheric-electrical field. There is also the risk of radiochemical actions and effects caused-by krypton-85-containing plumes in other air-borne pollutants like the latters’ transformation to aggressive oxidants. This implies radiation smog and more acid rain in the countries exposed. This study summarizes findings gained in these issues by various sciences, analyses them and elaborates hypotheses on the actions and effects of krypton-85 on the air, the atmosphere and the climate. (orig./HP) " End Quote. Source: “Climate risks by radioactive krypton-85 from nuclear fission Atmospheric-electrical and air-chemical effects of ionizing radiation in the atmosphere”

(Klimarisiken durch radioaktives Krypton-85 aus der Kernspaltung Luftelektrische und luftchemische Wirkungen ionisierender Strahlung in der Atmosphaere), Language: German, Authors : Kollert, R. (Kollert und Donderer, Bremen (Germany)) ; Gewaltfreie Aktion Kaiseraugst, Liestal (Switzerland) ; Corporate author :n Bund fuer Umwelt und Naturschutz Deutschland e.V. (BUND), Freiburg im Breisgau (Germany). Landesverband Baden-Wuerttemberg ; Bund Naturschutz in Bayern e.V., Muenchen (Germany) ; Publication year :
Further:


“Krypton-85 is a radioactive inert gas produced during normal operations of the nuclear fuel cycle. The quantities of krypton-85, that will be produced in the next century, are sufficient, if released, to alter the electrical state of the atmosphere. The principal hypothesis is that an anthropogenic alteration of the electric state of the atmosphere could alter other meteorological phenomena and lead to significant environmental impacts. The goal of this project was to explore some areas of basic science related to the evaluation of that hypothesis. The approach was primarily theoretical. The following topics were addressed: a first approximation model to estimate the effects of krypton-85 on the electrical state of the atmosphere; an analysis of the pathways between krypton-85 production and the atmosphere; an analytical model for fair weather atmospheric electricity; and a dipole model for atmospheric electricity. The results will provide a framework on which detailed models can be built. The results should provide better understanding of some topics in atmospheric electricity.” End quote.

Source: Boeck, W.L., Niagara University, NY, United States, 1979, US Department of Energy

Contract Number EE-77-S-02-4364, OSTI, at http://www.osti.gov/scitech/biblio/5505936/

I refer also to “Meteorological Consequences of Atmospheric Krypton 85 by William L. Boeck, Science, (journal), 16 July 1979, Volume 193, Number 4249.

The claim that nuclear industry does not contribute emissions detrimental to the stability of the earth’s global atmospheric and climate systems is a false one.

Conclusion

The public has received decades of propaganda in response to a valid right to know. I conclude that the withholding of information from the public by Nuclear and Government authorities is dangerous. Dissent is not a disease in a democratic society. Authorities which falsely claim to be open ones await discovery and fear it. I thank the Government of South Australia and the Royal Commission for this opportunity to present my views, opinions and findings.

Yours Faithfully,

Paul Langley

SA 5173
Appendix 1

**Letter from Major Alan Batchelor (retired) to the Governor General of Australia**

Quoted:

“29 March 2011
Her Excellency Ms Quentin Bryce AC
Governor-General of the Commonwealth of Australia
Government House
Dunrossil Drive
YARRALUMLA ACT 2600
Your Excellency

INTRODUCTION

This submission is made to the Governor General in Council in accordance with Australian Military Regulations and Orders as they existed in the 1950s. It requests a review and cancellation of the currently accepted study of the health of Australian nuclear veterans contained in Australian Participants in British Nuclear Tests in Australia by Dr Gun et al. Both the hazardous environments and resulting detriments to the health of many nuclear veterans have been incorrectly assessed in this document, leading to many false exposure and compensation assumptions that also need revision and remedial action.

[Summary is available on page 10]

BACKGROUND

The basis on which the Cancer and Mortality Study was constructed omits several important areas of consideration and makes no effort to explain the effect of these omissions.

- It confined the study to the carcinogenic effects of ionising radiation, ignoring:
  - Non-carcinogenic effects following exposure to internal radioactive emitters with long biological half-lives resulting in:
    - Loss of immune competence,
    - Short and long term sterility, miscarriages, stillbirths, etc,
    - Heredity defects in subsequent generations,
    - Accelerated aging, and/or
    - Psychological damage;
  - Carcinogenic effects of non-ionising materials also present at the tests such as:
    - About 30 kg of beryllium used as a fast neutron reflector in some weapons,
    - Asbestos wool particulate filters used in WW2 gas masks as an expedient in protective clothing;
    - The range of health effects (such as “radiation sickness”) suffered by nuclear veterans during the tests was concealed from the study by the non-production of relevant records from:
      - Operation Hurricane “Health” ship (HMS ZEEBRUGGE);
      - The Emu and Maralinga hospitals and related outstations.
      - RAAF Base Hospital Amberley;
      - RAAF Woomera Hospital.
    - The availability of a dosage document by the UK Government “Listing of Persons at UK Overseas Defence Nuclear Experimental Programmes – Citizens of Australia” (known as the “Blue Book”) has resulted in a lessened appreciation of the hazardous dosages actually present
      - Servicemen working in highly exposed situations have been omitted, eg;
        - Crew of HMAS KOALA responsible for dragging the floor of the Monte Bello Lagoon almost immediately after detonation and many subsequent days,
        - Aircrew, ground-crew and decontamination parties involved with fallout cloud collection sorties after Hurricane and Totem 1 (film badges were not issued);
        - Yellow entry training during inter-trial period at Maralinga;
        - Vehicle mechanics recovering yellow vehicle breakdowns;
        - Buffalo and Antler military engineers engaged on tasks such as telemetry retrieval functions commencing shortly after detonation;
        - Many “Indoctrinee Force” servicemen;
  - No mention was made of doses resulting from inhaled/ingested radioactive material, particularly where long biological half-lives were involved;
  - Many other film badges had not been processed;
In any case, the UK denied responsibility for the document’s content (page (ii)).

- Statistics collected before 1982 were mainly collected from Death Certificates, leaving both cancer and cancer mortality incidence between 1952 and 1981 open to question;
- Work program, re-entry schedule and task allocation documentation have long since disappeared. The linking of individuals to the possibly numerous range of their employments and then summing the total dosage for each individual was well beyond the capabilities of the Dosimetry subcommittee. This resulted in guesswork based on a person’s basic trade, ship’s name, corps designation, etc (limited by the entry in the “job” field of the information spreadsheet);
- An estimated constant gamma dose rate of 0.01 mSv/hr was used for calculations involving gamma exposure. No adjustments were made for weapon yield, distance from GZ, time post detonation or other environmental factors. This formula tends to level out dosages resulting from high exposure situations, particularly Immediate and Early Re-entry tasks involving dusty inhalation/ingestion conditions.
- The above background discussion provides a number of conditions that reduce the viability of the Cancer and Mortality Study and should have, as a minimum, been taken into account in the findings. In addition, Royal Commission Conclusion 201 (15.6.13) goes even further and questions the feasibility of attempting such a study:
  “Because of the deficiencies in the available data, there is now little prospect of carrying out any worthwhile epidemiological study of those involved in the tests nor of others who might have been directly affected by them.”

FACTORS

There are a number of factors that have adversely affected the integrity of the Cancer and Mortality Study.

Scientific Bias. Bias is the act of presenting a partial perspective at the expense of possibly equal or better alternatives. If a study is to be scientifically coherent, it must avoid bias and present facts and other valid points of view that may have a bearing on the outcome. Government influence, including overt and covert censorship, bias in the media, market influence (including the nuclear industry), author selection, etc, are all areas of potential bias. The Cancer and Mortality Study includes references to a number of other studies that provide support in a mutually cyclic manner. They omit mention of many other studies by reputable scientists/organisations that question the methodology adopted by the Cancer and Mortality Study. Some examples are as follows:
- Dr Keith Baverstock, previously head of the Radiation Protection Division of the World Health Organisation and currently Department of Environmental Sciences, University of Kuopia, Finland. In his paper “Science, Politics and Ethics in the Low Dose Debate,” he points out the following problems in the British NRPB study of UK Nuclear Veterans (many references in the Cancer and Mortality Study) and other study areas;
  o When a large excess of leukaemia was found in comparison with the controls, a scientifically unacceptable alternative comparison was made with the general population where the undesirable excess disappeared,
  o Further UK Nuclear Veterans discovered in 1988 were not included in the original NRPB Study, revealing the omission of 30% of multiple myeloma cases,
  o The lack of dosimetric data did not justify the lumping together of exposed and unexposed individual dose assessments,
  o It is clear that the science and associated ethics have been perverted for political ends,
  o Uranium is chemically toxic and its geno-toxicity should be assessed together with its radioactive properties and bystander effects,
- The ICRP routinely uses essentially untested models to determine the risks from internal emitters.
- Professor Shoji Sawada is a theoretical particle physicist and Emeritus professor at Nagaya University. He has written a paper titled “Cover-up of the Effects of Internal Exposure by Residual Radiation from the Atomic Bombing of Hiroshima and Nagasaki” accepted 3 Oct 2006. The paper, based on inadequate dosage assessments, inappropriate comparison groupings and US concealment of weapon effects, disagrees with the epidemiological research carried out by the Radiation Effects Research Foundation (RERF). The ICRP dosage model is identified as being based on the RERF studies where the effects of internal exposures were given little attention. The Protocol for the Cancer and Mortality study places a great deal of reliance on the RERF studies (Vol 2, pp 119-124) as well as the ICRP dosage model.
The following abstract from the Professor’s paper identifies the origin of many of the incorrect findings in the Cancer and Mortality Study and referenced studies:

“The criteria certifying atomic bomb disease adopted by the Japanese government are very different from the actual state of the survivors. The criteria are based on epidemiological research by the Radiation Effects Research Foundation, the successor to the Atomic Bomb Casualty Commission (ABCC). The ABCC studied only the effects of primary radiation from the atomic bombing on the survivors of Hiroshima and Nagasaki, and ignored the damage from residual radiation. Analysis of acute radiation disease, the rate of chromosomal aberrations, and the relative risks of chronic disease among the survivors, shows that the effects of residual radiation from fallout exceeds that of primary radiation in the area more than 1.5-1.7 km distant from the hypocentre of the Hiroshima bombing. The effects of internal exposure due to intake of tiny radioactive particles are more severe than those of external exposure, explaining the difference between the official criteria and the actual state of the survivors.”

• Australian Institute of Criminology. In a book titled “Wayward Governance: Illegality and its Control in the Public Sector,” Chapter 16 is devoted to “A Toxic Legacy : British Nuclear Weapons Testing in Australia”. It provides a brief but comprehensive coverage of the British nuclear tests held in Australia. The Chapter illustrates some of the many ways in which nuclear veterans may have been harmed by the actions of the two governments concerned:
  o Public debate on the costs and risks borne by the Australian public was discouraged through official secrecy, censorship, misinformation and attempts to denigrate critics;
  o D-notices were applied in such a manner that Australian journalists were forbidden from reporting items which had already been published freely in the UK;
  o The Atomic Weapons Tests Safety Committee (AWTSC) was more sensitive to the needs of the British testing program than to its Australian constituents.;
  o The AWTSC was criticised as ‘deceitful’ and having allowed unsafe firing to occur;
  o Agreed with the Royal Commission statement that Professor Titterton (AWTSC) may have been more a de facto member of the British Atomic Weapons Research Establishment than a custodian of the Australian public interest;
  o Committed to the continued mining and export of uranium, Australian officials were disinclined to dwell extensively on the mistakes of the past, or to highlight the risks posed by radioactive substances. Concerned about reducing government expenditure, they sought to minimise outlays for compensation. The generosity which led previous Australian governments to spend millions of dollars to host the British tests had become a thing of the past;
  o The major obstacle faced by claimants was the formidable task of proving that their disability resulted from exposure to radiation produced by the tests. The task was compounded by the fact that in these cases, the ex-service claimants are totally dependent upon their former employer for the evidence necessary to present their case;
  o Cancer has many causes, and to demonstrate conclusively that a particular case was caused by Maralinga exposure and not by smoking, diet, exposure to X-rays, or some inherited predisposition is extremely difficult. The Royal Commission’s recommendation that the onus of proof be borne by the government was not accepted. For this reason, most claims have thus far been unsuccessful;
  o The Commonwealth government, concerned over the possibility of having to defend common law actions alleging negligence in its involvement in the testing program, vigorously contested each claim. Public assurances that the nuclear veterans were being well looked after did not appear to be borne out in the courts and hearing rooms of Australia.
• European Committee on Radiation Risk (ECRR). This Committee was formed in 1997 by the European Parliament to examine the Basic Safety Standards Directive (Directive Euratom 96/29). There were 46 members and advisors whose research and advice contributed to the “2003 Recommendations of the European Committee on Radiation Risk” published as “Health Effects of Ionising Radiation Exposure at Low Doses for Radiation Protection Purposes”. The listing of members contained in Chapter 15 is preceded by the following declaration:
  “At 5th November 2002 the following individuals are members, advisors or consultees of the ECCR. Their inclusion in this list may not mean that they endorse all the contents of the report but does imply that they are convinced that the ICRP system of modeling seriously underestimates the risk from low level ionising radiation from anthropogenic sources.”
The ECCR concluded “that ICRP models have not arisen out of accepted scientific method. Specifically, ICRP has applied the results of external acute radiation exposure to internal chronic exposures from point sources and has relied mainly on physical models for radiation action to support this. However, these are averaging models and cannot apply to the probabilistic exposures that occur at the cell level. A cell is either hit or not hit, minimum impact is that of a hit and impact increases in multiples of this minimum impact, spread over time. Thus, the committee concludes that the epidemiological evidence of internal exposures must take precedence over mechanistic theory based models in assessing radiation risk from internal sources.”

The ICRP risk model makes assumptions that are based on value judgments that do not support its use as the basis for the Dosimetry study. This has resulted in dosage estimates in the Cancer and Mortality study that run counter to actual dosage records and epidemiological results. This is despite the exposure dilution and over-simplification of task identification applied in the dosimetry estimates. The Cancer and Mortality study has not been able to address ionisation density in time and space at the cellular level placing its viability in question.

• Dr Rosalie Bertell Ph. D., GNSH, on 21 Apr 1998, provided testimony to the United States Senate Committee on Veterans’ Affairs. She was a biometrician (specialty in mathematics applied to biomedical problems). In her testimony she addressed two major questions, mainly based on the errors carried forward from the ABCC and RERF studies of the Hiroshima and Nagasaki bomb casualties. Her statement commented on the basic factors used for dose reconstruction in the determination of causality for cancer or other radiation diseases:

  o The atomic bomb study radiation risk factors apply directly only to external radiation, high dose and fast dose rate exposure. This research says nothing about the internal contamination with radio-nuclides experienced by any veteran participating in the Hiroshima and Nagasaki cleanup, in atmospheric weapon testing, or in radium implants. This research says nothing about the incorporation of radio-nuclides into bone with the subsequent long term chronic irradiation of the surrounding tissue;

  o The Atomic Bomb Research was not designed to establish a dose below which exposure was “safe”. Had this been the case, careful examination of the harm from low dose exposures would have been mandatory;

  o The atomic bomb researchers assumed (but did not demonstrate or prove) that below 1 rem exposure from the original bomb blast no radiation related cancer deaths would occur. Therefore this data base can tell us nothing about such low dose exposures because the researchers assumed their exposure was “safe” and did not test for an effect. In philosophy we call this “begging the question” and it results in an invalid “proof”;

  o Atomic bomb research generally assumes that the only damage one should care about (clearly a self-serving judgement not a scientific fact) is direct damage to DNA which results in radiation related death rates. The Hiroshima and Nagasaki research on cancer incidence rates was not published until 1994. A comprehensive report on other chronic disease prevalence has never been forthcoming.;

  o When the un-repaired or mis-repaired damage due to radiation, occurs in the germ cells, sperm (and stem cells which produce sperm) or ovum, that damage will be incorporated into every cell of the offspring made from that damaged DNA. It may show up as a miscarriage, still birth, teen age cancer or mid-life heart disease, but these are not considered to be “detriments” – another value judgment and not a scientific fact;

  o It should be very clear that the Radiation Research which had been done by the ABCC and RERF has never clearly addressed the problems of non-cancer effects of exposure, Instead, they have relied on their earlier judgment that these other biological endpoints were “not of concern” and should not be studied. Cancer incidence rates were not even reported until 1994. Incidence rates for other chronic diseases have not yet even been collected in the data base, which is concerned with first cause of death. A disease like neuralgia is not likely to be the first cause of death;

  o None of this mathematical reconstruction actually measures the dose which really initiated a cancer process. This dose would likely be localised to a few dozen cells in the immediate vicinity of the internal radionuclide, and these cells would constitute a very small part of an organ or tissue. When this concentrated energy release is converted to an average dose to the whole organ, and that organ dose is weighted to give an estimate of effective equivalent whole body dose, the dose appears to be very small, but locally it is significant because of its concentration.
• Professor C D’Arcy J Holman, University of Western Australia, published an article in the Australian and New Zealand Journal of Public Health titled “A Survey of Suppression of Health Information by Australian Governments” (submitted June 2007). He warned that Australia may be slipping from its formerly enviable position of relative freedom from political censorship and official corruption.

It may not have been by chance that Professor Holman undertook his research after completing his participation as a member of the Scientific Advisory Committee for the Cancer and Mortality study. It should also be noted that the Professor did not attend the last meeting of the Scientific Advisory Committee (May 2006) where the Cancer and Mortality Study received its initial approval.

In the results it was stated that “The rates were higher in 2005/06 than in earlier years. No State or Territory was immune from suppression. Although governments most commonly hindered research by sanitizing, delaying or prohibiting publications (66% of events), no part of the research process was unaffected. Researchers commonly believed their work was targeted because it drew attention to failings in health services (48%), the health status of vulnerable groups (26%), or pointed to a harm in the environment (11%). The government agency seeking to suppress the health information mostly succeeded (87%) and, consequently, the public was left uninformed or given a false impression. Respondents identified a full range of participative, cognitive, structural and legislative control strategies. It was concluded that “The suppression of public health information is widely practised by Australian governments.”

International Commission on Radiological Protection (ICRP) In its assessments of internal radiation dosages, the Dosimetry study has placed a great deal of reliance on the tables published by the ICRP. The intended result was to make a retrospective assessment of organ/tissue dose for use in an epidemiological study. The legitimacy of the Dosimetry study using the ICRP risk model for this purpose is placed in serious question by the following ICRP statement (http://www.icrp.org/c2_fl.asp). Statement recently removed without explanation.

“It is not appropriate in all circumstances and guidance is given on when its use is not appropriate, for example in retrospective assessments of organ/tissue dose for epidemiological studies, in individual risk assessments after exposures above dose limits and especially after exposures to high radiation doses.”

The objectivity of the ICRP radiation risk model has been questioned for many years. The following extracts are relevant:

• “Comments by Professor Dr Chris Busby B Sc, Ph D, C Chem, MRSC concerning the death of a soldier exposed to uranium weapons during Gulf War 1;
  o “The area of radiation risk from internal exposures is one of major and polarised scientific controversy. However, more and more evidence is appearing in the peer-review literature and the grey literature also, both from epidemiology and from laboratory experiments or theoretical work, that there are many serious shortcomings with the current risk model, that of the ICRP.”
  o “The ICRP models cancer on a quantity termed ‘absorbed dose’ which is defined as energy per unit mass. This is an average of the ionisation over large amounts of tissue, kilograms, and is a reasonable unit for quantifying the effects of external radiation e.g. from an atom bomb’s gamma rays but is not scientifically justified for internal anisotropic radiations where there are large doses in one place and no dose everywhere else. An analogy would be to compare the same acquired by warming oneself in front of a fire with eating a red hot coal. This ‘hot particle effect’ has been the basis for most of the arguments about cancer and DU (and indeed also plutonium and fuel particles after Chernobyl and the atomic tests and near nuclear power stations).”
  o “To back up their position large sums of money are given to ‘safe’ research scientists to conduct research or to produce reports that back up this position. The veterans have no money for their own research and few scientific advisors. Any other affiliated scientist soon gets to learn the disadvantage of opposing the military, the government or industry (who largely pay for all research, and hence all the wages and mortgages). The bias that exists in the science policy interface is horrifying.”

• In a paper prepared by Dr Rosalie Bertell, “Limitations of the ICRP Recommendations for Worker and Public Protection from Ionising Radiation” she discusses the viability of the data collected from atomic bomb studies (ABCC and RERF) and the closed composition of ICRP:
  o “The atomic bomb studies followed, and did not precede the setting of the radiation protection guidelines recommended by ICRP and followed internationally until 1990. The
main recommendations were set in 1952, and the first doses assigned to A-bomb survivors were not available until 1965. Moreover, the research was designed to determine the effects of an atomic bomb, not the health effects of exposure to ionizing radiation. The research has come too late for standard setting needs, it has focused on cancer deaths, is uncorrected for healthy survivor effect, and is not inclusive of all of the radiation exposures of cases and controls (dose calculations omit fallout, residual ground radiation, contamination of the food and water, and individual medical X-ray), and fails to include all relevant biological mechanisms and endpoints of concern.

It is normally claimed that biological basis of the cancer death risk estimates used by ICRP, is the atomic bomb studies. However, these studies are not studies of radiation health effects, but of the effects of an atomic bomb. For example, the radiation dose received by the Hiroshima and Nagasaki survivors from fallout, contamination of food, water and air, has never even been calculated. Only the initial bomb blast, modified by personal shielding, is included in the US Oak Ridge National Laboratory assigned "dose".

The data base for the Hiroshima and Nagasaki Life Span Study, the basis for the mortality estimates, was first identified in the 1950 Japanese Census. The information was not collected and ready for analysis until around 1957, and because it depends on first cause of death information, it was based on only a small percentage of deaths for the first seven years. It was heavily dependent on the accuracy of death certificates. Deaths in the Hiroshima and Nagasaki population between 1945 and 1950 are not included in the study.

Although the A-bomb scientists have now admitted that more cancers were caused per unit dose of radiation than previously thought, ICRP has now given itself risk reduction factors for slow dose rate and low dose. This introduction of an unsubstantiated "correction factor" gives evidence of the inadequacy of the data base to answer important questions about worker and public exposures, which are almost all at low doses and slow dose rate. It also indicates that the ICRP knows that it is inadequate. There is no supporting human evidence for this reduction of the risk factors, and considerable evidence that it is not warranted.

The ICRP is profoundly undemocratic and unprofessionally constituted. It is self-appointed and self-perpetuated. Certainly a recommending body could be composed of individuals elected from professional societies such as international associations of professionals trained in occupational health, epidemiology, public health, neonatology, pediatrics, oncology, etc.

The ICRP assume no responsibility for the consequences attributable to a country following its recommendations. They stress that the Regulations are made and adopted by each National Regulatory Agency, and it merely recommends. However, on the National level, governments say they cannot afford to do the research to set radiation regulations, therefore they accept the ICRP recommendations. In the real world, this make no one responsible for the deaths and disabilities caused!

Elevated Chromosome Translocations.

North Shore Hospital, Sydney. The Centre for Genetics Education, in a Fact Sheet (7) on chromosome translocations stated that a "Change in the amount or arrangement of the genetic information in the cells may result in problems in growth, development and/or functioning of the body systems;" and these may be inherited from the parent. Miscarriages and infertility were among the outcomes identified.

Western General Hospital, Edinburgh. In 1983/4 this hospital was routinely identifying chromosome damage in patients exposed to ionising radiation from industrial or therapeutic sources. Blood samples had been collected from two British Nuclear Veterans. These had been submitted but not processed on the possibility of the Medical Research Council (MRC) being involved in an epidemiological study (blind analysis of random slides) of nuclear participants. When the National Radiological Protection Board (NRPB) accepted the study, the council went ahead and carried out an analysis of the two blood samples. One of the patients "in fact has quite a high degree of chromosome damage present in his blood cells" and "this would not be inconsistent with having received radiation exposure 20 or more years ago." The MRC, probably on political direction, refused permission to advise the treating physicians, the patient, NRPB or to continue with the epidemiological study.

Massey University Report. This is a study investigating sister chromatid exchange in New Zealand nuclear veterans that has been published under the title of "New Zealand Nuclear Veterans' Study – a Cytogenic Analysis." and accepted for publication by the prestigious journal "Cytogenic and Genome Research." It is an assessment of cytogenic damage in naval
personnel on two New Zealand frigates that were present at the British nuclear tests code named Operation Grapple. “The result show elevated translocation frequencies in peripheral blood lymphocytes of New Zealand nuclear test veterans 50 years after the Operation Grapple series of nuclear tests. The difference between the veterans and the matched controls with this particular assay is highly significant. The total translocation frequency is 3 times higher in the veterans than the controls who showed normal background frequencies for men of this age group. This result is indicative of the veterans having incurred long term genetic damage as a consequence of performing their duties relating to Operation Grapple.”

Note the use of matched controls, not the local country population as used in the Australian study. In the Summary, it is stated that:

“We submit the view that the probable cause of the veterans elevated translocation frequencies is radiation exposure. This view is supported by the observation of a comparatively high dicentric chromosome score in the veterans which is characteristic of radiation exposure.”

In the Pilot Project conducted prior to the Massey University Study, the psychologic impact on the New Zealand Nuclear Veterans produced the following recommendations:

• “these veterans are offered assistance to help them cope with the chronic stress that some of them are experiencing. As long as the situation they find themselves in remains unresolved, stress levels are likely to remain high. There exist a number of useful techniques that could be taught to these men to help them cope with stress.”
• “given the clear evidence that at least some of the Exposed men are living with a compromised quality of life (in comparison to Controls and NZ men of similar age), there is an urgent need to formulate appropriate strategies that addresses these health inequalities.”

The Psychological Impact study of New Zealand nuclear veterans has been reviewed by Dr W Barclay AM MB BS MSc DPM FRANZCP who states that the findings of the report “might be expected to apply equally to Australian Nuclear Veterans.”

The occurrence of chromosomal damage in nuclear test veterans was first recognised in the UK in 1983. The suppression exercised at the time demonstrated knowledge of the potential harm to the health of a vulnerable group that should have been investigated. The much delayed reinforcing discovery by the Massey University demonstrates a health hazard that must not be ignored. The Cancer and Mortality Study requires drastic amendment as a result.

Dosage Anomalies
Tables 6.8 and 7.5. As mentioned earlier, Table 6.8 of the Dosimetry Study has set the figure for external gamma radiation estimations at 0.01 mSv/hr (as explained in the paragraph under the Table). Table 7.5 listing actual gamma readings for a member of the Joint Services Training Unit (JSTU), shows a reading of 20 mSv on D + 67. This was received during a 3 or 4 hour plant collection exercise (details in Lt Jenkinson’s statement to Royal Commission). This is 5 or more mSv/hr and at least 500 times the constant gamma dose rate used for dosimetry estimates. In addition, Jenkinson’s reading was recorded after 67 days of radioactive decay and because it involved plant collection would have been well outside the blast area. Based on their own Tables, the Dosimetry Study external dose rate estimations can not be justified.

Radiogenic Cancers. Certain cancers have been reported by UNSCEAR to be causally associated with ionising radiation (colon, liver, lung, thyroid, stomach, bladder, non-CLL leukaemia and non-melanocytic skin cancer). The Cancer and Mortality Study has identified:
• An SMR of 1.63 for cancer deaths in this group; and
• An SIR of 1.19 for cancers in this group.

These results were hidden from all but a detailed investigation, at the bottom of Tables 5.6 and 10.1. In a study concentrating on cancers “causally associated with ionising radiation,” these results should have received priority treatment in the Main Findings, not left to a chance unearthing.

Inappropriate Comparison Cohort. The study was unable to find an acceptably matched comparison cohort against which it could compare the cancer and cancer mortality statistics of the nuclear veterans. Instead, it was decided to use the readily available general Australian population statistics for this task. The methodology adopted did not make any allowance for the many differences (confounding factors) in the two populations that should have included consideration of the “Healthy Serviceman Effect”. The error involved is demonstrated when a comparison is made with the Vietnam Veteran’s cancer statistics, where the Nuclear Veterans Standardised Incidence Ratio for cancers increases from 1.23 in the Study to 2.95, despite
significantly less confounding factors being involved except for a possible cause of excess cancers resulting from exposure to Agent Orange.

SUMMARY
The criteria on which the Cancer and Mortality Study was based, omitted consideration of:

• The total range of adverse health effects (non-carcinogenic effects of ionising material and carcinogenic effects of non-ionising material) resulting from service in a nuclear weapon test area;

• The lack of data available;

• The errors identified in dosage estimation models, particularly in the area of long term, short range, internally deposited radiation emitters;

• The warning by the Royal Commission that "there is now little prospect of carrying out any worthwhile epidemiological study."

The elimination of hospital records for all operations, in conjunction with the discriminatory British dosage records (Blue Book), where those employed in hazardous situations had been removed, could only further degrade an already dubious study.

The study was conducted without any factual information identifying which individual carried out which function (or range of functions), for how long, location(s), potential for inhalation/ingestion of resuspended hazards or handling of radioactive target response equipments. This lack of estimation data for each individual and the fallibility of other records made it almost impossible to approximate exposure levels for an individual shown in the Cancer Registry (initiated 1982).

Many prestigious scientists and scientific organisations have made it clear that the International Commission on Radiation Protection (ICRP) has made assumptions that are based on value judgements that are not soundly based. These have resulted in study estimates that are counter to epidemiological results and a number of practical dosage records. Even more importantly, the Study has not been able to address ionisation density in time and space at the cellular level. Instead it has converted the concentrated energy release to an average dose to the whole organ, and that organ dose is weighted to give an estimate of effective equivalent whole body dose that appears to be very small. This action conceals the significance of a highly concentrated locally applied dose. This was despite the ICRP not recommending the use of its risk model derivations for retrospective epidemiological studies.

The presence of excessive chromosome translocations caused by ionising radiation in nuclear veterans has been dishonestly concealed by the UK Government since 1984. The Massey University Report has rediscovered and published a similar finding, emphasising the need for investigations into the range of adverse health effects overlooked in the Cancer and Mortality Study.

ARMY HEADQUARTERS DIRECTIVE
AHQ Directive – Nuclear Warfare (DCGS/517). Any country that places its servicemen in harm’s way, particularly when exposure to the effects of nuclear weapons is involved, has a duty of care for their future welfare. The question of whether this exposure involved overseas service, or otherwise, is irrelevant to this undertaking. The responsibility for treating “all aspects” of any detrimental health effects resulting from exposure to the effects of nuclear weapons was made the responsibility of the Adjutant General’s Branch in DCGS/517 dated 22 Feb 1956 in the following terms:

9 (a). “All aspects of treatment of personnel subjected to the effects of nuclear weapons.”

In addition, paragraph 6 of the same Directive states that current policy requires “training personnel of all units in personal protection and in the use of radiac instruments.”

The majority of Australian personnel posted in support of Ministry of Defence operational requirements did not receive training in health physics, protective procedures or use of radiac instruments and did not receive follow-up health checks or treatment.

When this lack of care began to emerge, the Repatriation Medical Authority undertook a study completed 21 Jul 2000 titled Report of the RMA Subcommittee on Ionising Radiation Dose. The report discarded its original “sound medical-scientific evidence” that service personnel “having been within four kilometres of the epicentre of the atomic bomb explosions on either Hiroshima or Nagasaki within the seven days immediately following the explosion on either of those cities” could potentially contract and also die from certain nominated diseases. If these “sound medical-scientific evidence” conditions were applied to Australian nuclear veterans in the British nuclear tests, it would have been applicable to all immediate and early re-entrants.

The RMA report, without making an examination of the British nuclear tests in Australia, determined that certain sarcomas caused by atomic radiation would require a proven dose 10
times higher if peace service (Balance of Probabilities) was the condition of service involved. To state that operational conditions of service (Reasonable Hypothesis) only requires one tenth of the dose required in peacetime to produce the same cancer, or death from this cancer, is not based on sound medical-scientific evidence, a stated requirement in each Statement of Principles (SOP). This biased assessment was further expressed in SOP Bulletin No 42 issued on 3 Oct 2000 and titled “New Atomic Radiation Factors in RMA SOPs Interim Advice.” Paragraph 2 effectively ignores the involvement of Australian servicemen in the British nuclear tests in Australia when it identifies those servicemen with known atomic radiation exposure as:

• “POWs who were in the Nagasaki area on 9 Aug 1945;
• Personnel who served in or visited Hiroshima in connection with the occupation of Japan by the British Commonwealth Occupation Force from February 1946”.

RECOMMENDATIONS
The various strategies that have been employed to conceal the adverse health and genetic detriments of nuclear service have culminated in the Repatriation Commission sponsored study Australian Participants in British Nuclear Tests in Australia. The inaccuracies in this document and all that depends on its content should be acknowledged by the Government and purged from all past and future considerations. After half a century of neglect, nuclear veterans or their widows should be compensated for their relegation to the nuclear scrapheap. To assist in their remaining years, they should also be provided with a proper pension and a supporting gold card.

Note: A more comprehensive coverage is available in my witness statement (132 pages supported by 2,000 plus pages of exhibits).

Yours sincerely

Major Alan Batchelor (Ret’d) MBE AMIET psc

Copies to:
Parliamentary Secretary to the Prime Minister (Senator the Hon Kate Lundy)
Minister for Defence (The Hon Stephen Smith MP)
Minister for Health and Ageing (The Hon Nicola Roxin MP)
Minister for Veterans’ Affairs (The Hon Warren Snowden MP)
Minister for Resources and Energy (The Hon Martin Ferguson AM MP)
> Repatriation Commissioner (Maj Gen Mark Kelly (Ret’d) AO DSC)"

end quote (Source: Major Alan Batchelor.)