

Climate Health WA Inquiry

About your submission

Are you responding on behalf of an organisation or group?

No

Yes

If yes, please identify the organisation:

Your contact details

The following information will not be published without your permission but enables the Inquiry to contact you about your submission if required.

First name Ivan

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Email

Publication of submissions

Submissions will be published with the name of the submitter unless otherwise indicated below. Do you consent to be identified in the published submission?

Yes, I / my organisation agree to be identified

No, I / my organisation request to remain anonymous

Terms of Reference

You are encouraged to address at least ONE of the Terms of Reference as listed below. Please select which item/s you will address:

1. Establish current knowledge on the implications of climate change for health in Western Australia (WA) and recommend a framework for evaluating future implications.
2. Identify and recommend a program of work to manage the implications of climate change for health in WA, which will protect the public from the harmful health impacts of climate change.
3. Identify and recommend a program of work to manage the implications of climate change for health in WA, which will strengthen the preparedness and resilience of communities and health services against extreme weather events, with a focus on the most vulnerable in the community.

- 4. Identify and recommend a program of work to manage the implications of climate change for health in WA, which will reduce the contribution of WA health services to climate change and other detrimental impacts.
- 5. Identify and recommend a program of work to manage the implications of climate change for health in WA, which will enable WA Health services to implement change, including energy efficiency, to a more sustainable model.
- 6. Evaluate the likely benefits (health and wellbeing, social and economic) arising from climate change mitigation strategies, with a focus on WA health services.
- 7. Define the role of the Department of Health in leading public policy on climate change and health.
- 8. Recommend the Terms of Reference, scope and preferred methods for undertaking a climate change vulnerability assessment for the health sector.
- 9. Recommend the Terms of Reference, scope and preferred methods for developing a Climate Change Adaptation Plan for the health sector.

Submissions response field

Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).

Submission to Sustainable Health Review WA

I will address Item 5. Ways to drive improvements in safety and quality for patients, value and financial sustainability, including cost drivers, allocative and technical efficiencies; specifically “financial sustainability, including cost drivers” And 9. Any further opportunities concerning patient centred service delivery and the sustainability of the WA health system. And “Opportunities to reduce environmental impacts.”

The main driving force behind evolution is radiation and radioactivity. It has been going on for millions of years. The more radioactivity in the biosphere the greater the rate of genetic mutation and incidence of leukaemia, cancer and other disease.

In nature the vast bulk of radioactive material is trapped underground; exposures are only possible if contaminated groundwater, that is circulating through the deposit, is used for drinking. Radon is of no concern for deep deposits, though it can travel through underground fissures, since it decays before it can reach the surface.

The situation changes completely, when the deposit is mined: Radon gas can escape into the air, through created fractures in the rock, from gas leaks, waste water evaporation ponds, slurry and ore dust and Radon gas can be blown by the wind decaying as it goes into solid highly radioactive materials and contaminants can be leached and seep into surface water bodies and groundwater.

Radon gas is the heaviest gas and so stays close to the surface of the atmosphere. It has a half life of 3.8 days or 91 hours. In a 10 km/ hr wind it will travel 912 km and there will still be half of it left to travel further. As it travels the radon gas decays into Lead210 and Polonium which is more radioactive than

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Plutonium 239 used in nuclear reactors and weapons. The Polonium 210 coats grass, leaves, soil and water and is absorbed by plants and animals alike thus transferring to the food chain and often being further concentrated along the way in milk, meat, sea food, fruit and vegetables.

Lead with the isotope signature of the Broken Hill deposits has been found across the entire continent of Antarctica, in ice cores dating back to the late nineteenth century.[6]

Lead weighs 8 times more than sand or dust. The wind did not blow it to Antarctica. Radon gas was blown to Antarctica and then decayed into lead and Polonium.

During processing of the solution, large amounts of the radon contained escape into the atmosphere, while the other decay products are transferred to the waste solutions. Those solutions are evaporated in ponds, resulting in a concentrated waste slurry. This practice allows the Radon to enter the atmosphere. Once released it cannot be recovered. The genie is out of the bottle!

In undersea gas wells it is easy to detect leaks of gas from well heads and piping by observing the trail of bubbles. It is much more difficult to detect natural and/or radon gas leaks from on land gas wells or mine tailings dumps .

Fracking will increase the release of radon gas by many orders of magnitude and vastly increase the distribution of radioactive and carcinogenic materials in the biosphere and the food chain.

Alpha particles emitted by polonium will damage organic tissue easily if polonium is ingested, inhaled, or absorbed, Wearing chemically resistant and intact gloves is a mandatory precaution to avoid transcutaneous diffusion of polonium through the skin

An interesting fact is that 98% of the radiation emitted from some Uranium ores is actually coming from the tiny (less than 1%) Radium impurity in the ore, not from the Uranium not as you would expect. This is why Uranium ore is much more radioactive than pure Uranium metal

Uranium SubDirectory

http://ccnr.org/radon_chart.html

In the chart on page 1 showing Radon progeny note that the Polonium progeny emit alpha particles at between 5.36 and 7.69 Mev. That is Million electron volts! Plutonium239 which is used in atomic bombs emits alpha particles at 5.244 Mev. Which makes Polonium even more dangerous in so far as the damage that the 5.36 or greater Mev emission can do to living cells causing genetic mutation, leukaemia and cancer .

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Polonium-210 has a *half-life** of 138 days, and it decays to stable lead-206 by emitting an *alpha particle* (an alpha particle has two protons and two neutrons). With a specific activity of 166 TBq/g, one microgram of ingested polonium would deliver a *committed effective dose equivalent* of approximately 40 Sv (4,000 rem). This value is based on human and animal studies conducted in the 1950s that showed that approximately 10 percent of ingested polonium is absorbed by blood (Harrison et al. 2007).

A milligram of ^{210}Po emits as many alpha particles per second as 5 grams of Radium 226Ra.[1] A single gram of ^{210}Po generates 140 watts of power.[2] ^{210}Po is extremely toxic, with one milligram being enough to kill the average adult (250,000 times more toxic than hydrogen cyanide by weight). $\frac{1}{2}$ life 138.376 Days. $X 10 = 1383$ days (3.78 years) for 99% of it to have decayed into stable lead 206. It should not be thought that after 3.78 years that is the end of the story. That applies only to the Polonium210 created today. Polonium210 created tomorrow or this day next year will again last for 3.78 years and so on for as long as Uranium, Thorium and Radon exist on the surface of the planet.

Every last gram of Uranium in the earth's crust will go through this decay process. The question is whether this will happen securely sequestered under- ground or on the surface of the planet?

Naturally Occurring Radioactive Materials (NORM) are not normal radiation as it has been removed from its secure location under-ground.

The United States Environmental Protection Agency (EPA) says that radon is the number one cause of lung cancer among non-smokers.[78]

The Surgeon General of the United States has reported that over 20,000 Americans die each year of radon-related lung cancer.[81]

Note that it says nothing about radon progeny or daughters such as Polonium which have been consumed by humans eating contaminated meat, fish, vegetables, fruit and dairy products.

The Union of Concerned Scientists states:

"The drilling and extraction of natural gas from wells and its transportation in pipelines results in the leakage of methane, primary component of natural gas that is 34 times stronger than CO₂ at trapping heat over a 100-year period and 86 times stronger over 20 years [3]. Preliminary studies and field measurements show that these so-called "fugitive" methane emissions range from 1 to 9 percent of total life cycle emissions [4]."

Union of Concerned Scientists <https://www.ucsusa.org/clean-energy/coal-and-other-fossil-fuels/environmental-impacts-of-natural-gas#.WpptfWZL3Jy>

Radon in Natural Gas from Marcellus Shale Page 1 Marvin Resnikoff, Ph.D.

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Marcellus Shale is 8 to 32 times background (radiation). This compares to an average radium-226 in surface soil in New York State of 0.81 picoCuries per gram (pCi/g)⁵ Using this range of radium concentrations and a simple Fortran program that simulates the production of radon in the well bore, and transit to the wellhead, we calculate a range of radon concentrations at the wellhead between 36.9 picoCuries per liter (pCi/L) to 2576 pCi/L. These wellhead concentrations in Marcellus shale are up to 70 times the average in natural gas wells throughout the U.S. The average was calculated by R.H.Johnson of the US Environmental Protection Agency in 1973 (pre-fracking) to be 37 pCi/L to a maximum of 1450 pCi/L.

37 pCi = 1.369 Bq/L. 2576 = 95.3Bq/L 1450 =53.65Bq/L (disintegrations per second)

http://www.radonleaders.org/sites/default/files/Marcellus_Radon.pdf

Now 318 billion M³ containing 1369 Becquerel's/M³ of alpha particles = 435 Trillion potentially cancer causing bullets and 70 times more if the gas emits 95.3 Bq/litre

Unlike the gaseous radon itself, radon daughters are solids and stick to surfaces, such as dust particles in the air. If such contaminated dust is inhaled, these particles can stick to the airways of the lung and increase the risk of developing lung cancer.[4]

In addition contaminated dust particles settle on leaves grass and fruit.

Radon gas in US often regarded as 37 pCi/L =1369 Becquerel's per Cubic meter

Health Physics Society --Specialists in Radiation Safety

Isotope	½-Life	Spec Activity (TBq/g)	Decay Mode	Alpha (α) Energy (MeV)
Polonium-208	2.9 yr	21.8	α	5.1
Polonium-209	103 yr	0.63	α	4.9
Polonium-210	138 days	166	α	5.3

g = gram and MeV = million electron volts

Bq or Becquerel. The unit of radioactive decay equal to one disintegration per second

So 1 millionth of a gram of Polonium 210 will have a specific activity of 166 (MBq) = million decays per second and each decay will produce 5,300,000 electron volts.

<https://hps.org/documents/po210factsheet.pdf>

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1 millionth of a gram is invisible to the naked eye.

Most people have heard of Cesium137 and fear it greatly because of its ability to cause genetic mutation, leukemia and cancer. Radioactivity of Caesium 137 is 34TBq per gram =34,000 GBq per gram which is 3,400 times more than 50 year old High level nuclear waste.

Polonium 210 at 166 TBq per gram is 4.88 times more dangerous than Caesium 137.

Health consequences

Embryos 50 times more vulnerable to genetic mutation than adults

Children; 10 times more vulnerable to genetic mutation than adults

Latency period for tumour formation and leukaemia shorter in children than in adults. And shorter still in embryos.

Genetic mutations passed on to succeeding generations.

Permissible releases of radioactive material and decay products or progeny cumulative on grass, leaf vegetables, grain, fruit, berries, tobacco leaves, soil and water.

Bio accumulation and concentration by animals in milk and flesh.

Bio accumulation and concentration in fish, crustaceans and mammals.

Bio accumulation and concentration in plants.

Hayfleck limit and Telomere shortening. Average cell replication = 52 times

Average life expectancy in Ukraine and Belarus has REDUCED 4 yrs to age 68

Each year 6000 babies are born with "Chernobyl Heart" Half of them die!

Alpha particles can rip through 2000 DNA Helixes, 200 nerve cells & 39 sperm cells.

Beta particles can rip through 43 Human egg cells, 838 sperm cells, 4,300 nerve cells and 43,000 DNA helixes!

Gamma Radiation is worse still.

Additional cases of cancer, leukaemia and genetically induced disease.

Treatment paid for by Taxpayers or additional private health premiums.

Sickness benefit paid for by Taxpayers or increased insurance premiums.

Carer benefit paid for by Taxpayers.

Hormesis. Kerala India; Natural background radiation 80mSv. Indigenous people.

Coronary heart disease 3 to 6 times higher than Japanese or rural Chinese.

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See full text "Nuclear Why Not" attached

Poisoned Power Gofman & Tamplin Ch2 p57

(f) Age an important factor

No factor is of greater importance in considering the implications of delivery of radiation to humans than is age. Direct evidence has been provided by Dr. Alice Stewart of Oxford, England that developing embryos are vastly more sensitive to the cancer and leukaemia producing effects of radiation than are adults. In fact, a given amount of radiation increases the risk of future cancer or leukaemia 50 times more if delivered to the embryo during gestation than if delivered to adults. Next to the sensitivity of the fetus in utero are children, and then come adults.

Unfortunately, even the sensitivity of adults to cancer production by radiation is 10 to 30 times more than "expert" bodies of scientists thought up until the last few years.

The embryo presents other special problems too. Radiation, received at a time where the various organs are being formed, can cause a whole organ system to be deformed. For example, early radiation can lead to serious brain injury with resultant mental infirmities. This was seen in Hiroshima.

"Hot" particles are very small dust-like particles that are made up of alpha-emitting substances. One of the prominent ones, plutonium-239, is widely heralded as the "nuclear fuel of the future." Fine particles of pure plutonium-239 oxide (formed when plutonium burns) are very intense sources of alpha particles.

Geesaman and Tamplin have shown that such fine particles, referred to as "hot" particles because of their extremely high alpha particle emission in a localized region, may be 10 to 1000 times more effective in producing cancer than would be expected if the same number of rads were delivered in a more diffuse manner to an organ, such as the lung.

It is this "hot" particle problem associated with plutonium-239 that makes the contemplated, future, widespread use of this radionuclide as a fuel in the nuclear-electricity-generation plants such an unmitigated nightmare for mankind. Not only may the hot particles of plutonium oxide be super-cancer producers, but with a half-life for plutonium-239 of 24,000 years, such plutonium oxide can be spread about the earth, re-suspended in air, and produce lung cancers in generations of humans for 100,000 to 200,000 years.

Manufacture of plutonium-239 and its widespread use in nuclear electric power may represent man's most immoral act.

<https://ratical.org/radiation/CNR/PP/chp2.html>

As is release of Polonium into the air and biosphere.

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As long as it is contained and controlled within vessels, equipment, and piping, radon is not generally a health hazard to employees and the public.
<https://www.ogj.com/articles/print/volume-88/issue-26/in-this-issue/production/radioactive-materials-could-pose-problems-for-the-gas-industry.html>

Contained is the operative word. How can Radon gas be contained if the surrounding rock is fractured and fissures are opened up?
How can Radon gas from Uranium or Thorium open cut mines and tailings dumps be prevented from escaping to the atmosphere?

Time

It is vitally important to appreciate that it took 170 years for humanity to start to realize that we could not add Co₂ from sequestered fossil fuels to the natural and normal carbon cycle with impunity. Fortunately we can desist from this practice. If the world stopped burning fossil fuel today then in 100 years time it would be recovering quite well from our misadventure with burning fossil fuels and increasing Co₂ in the atmosphere.

Similarly, it will take 22 years + 3.8 days for half of the Radon and daughter Lead 210 to decay into Polonium 210. With an ever increasing incidence of genetic mutation, leukemia and cancer we must urgently recognize that we cannot increase the background radiation and radioactivity on the surface of the planet with impunity.

In 100,000 years time the planet would still not have recovered from Mayak, Chernobyl, Doenreagh, Hanford, Rocky flats, Marshall Islands, Montebello, Maralinga and Fukushima; to name a few.

In addition there is all the Radon gas from mine tailings and oil and gas extraction which is leaking into the atmosphere and blown by the wind and depositing progeny or daughters such as Lead 210 and Polonium210 which contaminates grass, leaves, berries, fruit, soil and water. Every last gram of Uranium in the earth's crust will decay into Radon and Polonium at some stage. If it is deep underground, fine and as nature intended. In the biosphere and the food chain it will undoubtedly cause an increased amount of genetic mutation, leukaemia and cancer with increased cost to our healthcare system.

As shown below our health has already been impacted by the release of radioactive materials into the atmosphere and onto the land and water.

Burden of disease

- Between 1982 and 2010, the number of new cancer cases in Australia more than doubled (from 47,388 to 116,580 cases).¹
- While cancer incidence rates have increased (from 382.8 to 487.7 cases per 100,000 between 1982 and 2010), cancer mortality rates have fallen (from 209.0 to 172.5 deaths per 100,000 between 1982 and 2011).¹

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- In 2010, the five most commonly diagnosed cancers in Australia were prostate cancer (19,821 cases), bowel cancer (14,860 cases), breast cancer (14,308 cases), melanoma (11,405 cases) and lung cancer (10,296 cases).1,4
- In 2010, prostate cancer was the most commonly diagnosed cancer among men and breast cancer was the most commonly diagnosed cancer among women.1,4

Variations between population groups

In the 5 years from 2004 to 2008, the age-standardised incidence rate of all cancers combined was:

- significantly higher for Aboriginal and Torres Strait Islander Australians than their non-Indigenous counterparts (461 and 434 per 100,000 respectively) (New South Wales, Queensland, Western Australia and the Northern Territory).3,5
- higher for people living in lower than those in higher socioeconomic status areas.3
- significantly higher in *Inner regional* (504 per 100,000) than other remoteness areas.3

Burden of disease

- In 2012, cancer was estimated to be the leading cause of burden of disease in Australia, accounting for approximately 19 per cent of the total disease burden.3

I

- In 2012, cancer was estimated to account to 551,300 disability adjusted life years (DALYs*) in Australia; of these, 457,400 were years lost due to premature death and 93,900 were years of healthy life lost due to disease, disability or injury.3

*DALYs are years of healthy life lost, either through premature death or through living with disability due to illness or injury. This is the basis unit used in burden of disease or injury estimates.3

In 2013–14, governments were responsible for \$105 billion, or nearly 68% of total health expenditure of \$155 billion in Australia. Of the government contribution, the Australian Government contributed \$63.5 billion, or 41% of total health expenditure, and state and territory governments contributed \$41 billion,

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Cancer and other neoplasms \$3,000 million

Source: AIHW disease expenditure

Australian Institute of Health and Welfare 2016. Australia's health 2016. Australia's health series no. 15. Cat. no. AUS 199. Canberra: AIHW
<https://www.aihw.gov.au/getmedia/3be568f2-d938-4575-bf1f-8742bad4d2ce/ah16-2-2-how-much-does-australia-spend-on-health-care.pdf.aspx>

Economic benefits of mining uranium

About 1200 people are employed in uranium mining, at least 500 in uranium exploration, and 60 jobs are in regulation of uranium mining.

Uranium mines generate about A\$ 21 million in royalties each year (in 2005: Ranger \$13.1 million, Beverley \$1.0 million and Olympic Dam \$6.9 million attributable to uranium). Corporate taxes amount to over \$42 million per year.

<http://www.world-nuclear.org/>

So, a 2.1% increase in the incidence of cancer will totally negate Government revenue from Uranium mining and the mining will provide that revenue for at most a few decades but the health consequences from Polonium will continue for hundreds of thousands of years.

Do not be fooled; uranium mining and gas fracking is merely a conduit to the contamination of our hinterland for all time.

Here is a brief record of contamination of the planet by humans that have and are impacting on human health and health care costs.

Lead in paint

Childhood lead poisoning was linked to lead-based paints in 1904. Several European countries banned the use of interior lead-based paints in 1909. ... Finally, in 1971, lead-based house paint was phased out in the United States with the passage of the Lead-Based Paint Poisoning Prevention Act.

1923 Feb - first commercial sales of leaded gasoline in Dayton, Ohio. (Kovarik 2011)

1984 - City of Chicago first to order end of all leaded gasoline sales since New York City ended ban on leaded gasoline in 1928. (Kovarik 2011)

Many vehicles built before 1986 were designed to operate on leaded fuel. However due to environmental and health concerns leaded fuel was withdrawn from the Australian market.

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60 years later

Australia to ban leaded petrol

Updated 23 March 2012, 14:05 AEDT

DDT's insecticidal action was discovered by Swiss chemist Paul H. Müller in 1939

The publication in 1962 of Rachel Carson's *Silent Spring* stimulated widespread public concern

Banned for agricultural uses worldwide by the 2001 Stockholm Convention on Persistent Organic Pollutants, *40 years later*

Recently, Carson's work has again been targeted by conservative groups. Capitalizing on the iconic status of DDT, these groups are promoting widespread use of the chemical for malaria control as part of a broader effort to manufacture doubt about the dangers of pesticides, and to promote their anti-regulatory, free market agenda while attempting to undermine and roll back the environmental movement's legacy.

Plastic bottles were first used commercially in 1947 but remained relatively expensive until the early 1950s when high-density polyethylene was introduced. *60 years later we are finally recognizing the problem.*

It is taking far too long for contaminants and the health consequences to be recognised and effective action to be taken.

Some industries are going around lighting fires and the health industry is frantically running around trying to put them out. This is unsustainable. The fire lighting has to be nipped in the bud.

Might I suggest the establishment of an Environmental Contaminants agency or watchdog within the health department and health industry whose job it will be to look over the fence of their neighbouring departments and keep tabs on what is happening and how it can impact on health and healthcare costs.

Thank you for your time.

Yours Sincerely

Ivan Quail

Please complete this sheet and submit with any attachments to: Climate Health WA Inquiry