

Investigation into Radioactive Waste Repository at Kimba

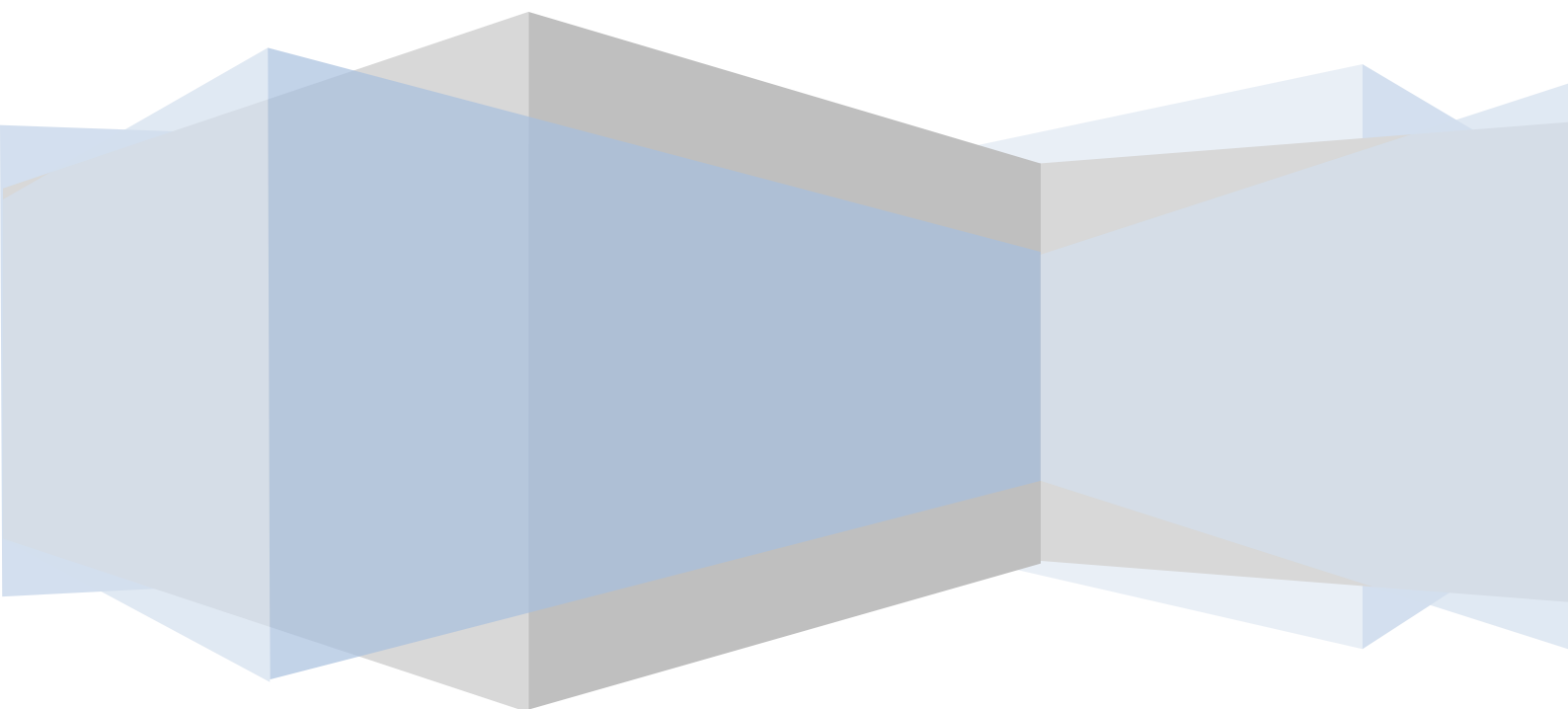
Buckleboo Ag Bureau - Agricultural Tour of Sydney and Canberra – October 2017

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This report is my view and experience with this topic.

I'm not interested in debating minute details that will be worked out over time if the facility in fact goes ahead.

This report has been written largely to provide my perspective to the EP Ag Advisory Group who report to RDAWEP. But I do hope it provides some comfort to those who have made themselves sick with worry over this proposal.

Introduction

Before joining BFIG on their trip to Canberra and Sydney, I had no definitive opinion about Radio Active Waste Storage. I knew Europe was well indoctrinated in the storage of radioactive waste and have been to France and Belgium many years ago.

This trip was an amazing education for me on Class 7 Dangerous Goods. I have a Diploma in Occupational, Health & Safety so my usual day is spent investigating Class 3, 6 and 8 Dangerous Goods in my consulting role assisting farmers with their farm safety and compliance. I also research Regulation affecting Agriculture extensively and then take action to change any requirements that no longer suit modern agricultural needs.

I'm well aware of the emotional debate this proposal has created in Kimba and surrounds and feel deeply saddened that community anxiety has gotten so out of hand.

For the record.....those of you who know me should be well aware that no one will hold influence over my thoughts or decisions except me.

Like many, my concerns around radioactive waste were for our local health, safety and grain and livestock markets:

I had several pages of questions and consider they were all very valid concerns that myself and others needed answers to.

Being that I had only just started investigating this subject, I certainly appreciated the 2 day tour to establish a firm opinion on any adverse affects this would create for Kimba and the whole of Eyre Peninsula. I was very happy with my fast tracked education via the places we visited and the experts we were allowed to meet and ask questions of.

Thank you for this opportunity, I found it fascinating and it has totally opened my eyes to nuclear processes, medicine and the presence of natural radiation all around us.

Who did we meet? What did we learn?

Hefin Griffiths - ANSTO – *Head of Nuclear Services and Chief Nuclear Officer at ANSTO. Responsible for all radioactive waste management activities at ANSTO and directs the provision of radiological safety advice and training to commercial entities. Prior to this role, he spent over 20 years working in both the civil and military fields of the nuclear industry in the UK with the focus on nuclear safety and emergency planning*

We had a full tour of the nuclear reactor at Lucas Heights, in the middle of Sydney. We met Hef at a large shed where hundreds of drums of waste are stored and managed.

<http://nuclearrc.sa.gov.au/app/uploads/2016/02/GRIFFITHS-Hefin-1299-1315.pdf>

Justin Davies - ANSTO - *currently manages a range of cobalt-60 irradiation facilities that provide low- and high-dose irradiation and dosimetry capabilities.*

Essentially, Justin ‘zaps’ (irradiates) fruit to sterilise it for fruit fly, or other bugs as this process can destroy any insects and helps with export market access. New Zealand now accepts irradiated Mangoes.

Irradiation assists with plant breeding, freeing bee hives of pests and can **give Strawberries an extended shelf life of 2 weeks**. In Nigeria, Justin explained the irradiation process is helping breed drought tolerant and stem rust tolerant wheat. **Irradiation does not induce radiation in the material, it induces chemical changes.**

The question was raised by the group to Justin “**what can you do about snails**”? I’m sure BFIG will follow this up with Justin to see if anything along these lines can be done to assist us with these pests.

Andrew Barrett - *Geoscience Australia - Branch Head, Resources Advice & Promotion – Resources Division*

Geoscience Australia is a Government Body and is the **custodian of data and knowledge**, so they keep together what is learned by everyone. Like a research database to maintain geosciences knowledge in one place.

Leo Lymburner - *Geoscience Australia, Canberra - National Earth Observation Group Geography, Geoinformatics (GIS), Remote Sensing - PhD in remote sensing of riparian zone structure and function*

Leo is involved with NRM Spatial Hub which has now morphed into Farmmap4D which has the **potential to allow farmers to detect anomalies in our paddocks from space**. They are working towards making all of their data available in an Ag context in almost ‘real time’.

<https://www.farmmap4d.com.au/>

More up to date maps than Google Maps are available from:

www.nationalmap.gov.au

www.sarig.sa.gov.au

Daniel Jaksa - Chairman ICSM GDA Modernisation Implementation Working Group, ICSM/Geoscience Australia

Dan explained the **Geocentric Datum of Australia** and the **modernisation of this Datum Point** due to the fact that Australia moves 5mm/month and has the fastest moving tectonic plate on earth.

So in order for our GPS in the tractor to have correct positioning and navigation, we need to adjust this Datum Point very soon to correct it's movement in regards to the current Datum Point.

Dan was also a wealth of information on earthquakes and said **there is a risk of earthquake 'anywhere', there is no comprehensive way to predict an earthquake**. Eyre Peninsula sits on a middle plate, it does not sit on any significant fault line.

<http://www.ga.gov.au/news-events/events/public-talks/public-talks-archive/Moving-Australia-into-the-Future-with-Geodesy>

Dirk Mallants - Senior Principal Research Scientist at CSIRO, based in Adelaide.

Dr Mallants was previously the head of Performance Assessments Unit at the Belgian Nuclear Research Centre, SCK-CEN, and in this role he oversaw the safety and assessment studies which were carried out for the Belgian repository 15 for low level radioactive waste.

I got a great deal out of our discussion with Dirk. His knowledge of the Belgium & Spanish scenarios was frank and factual with 60% of Belgium being powered by nuclear power. He described his involvement with a '3rd generation' surface waste repository in Belgium that was surrounded by Dairy Farms and sat above the main aquifer.

Dirk described the competitive process in Belgium for communities to win the rights to these facilities. We asked what the results of the survey in that particular location were and he casually replied "Oh, one hundred percent".

His advice was "**any breach of radionuclides is extremely unlikely** and these facilities are heavily monitored within the facility itself as a first line of defence".

<http://people.csiro.au/M/D/Dirk-Mallants>

<https://naldc.nal.usda.gov/download/32354/PDF>

http://metronu.ulb.ac.be/npauly/art_2014_2015/mallants_2001.pdf

Dugald MacLachlan

Director, Residues and Microbiology Policy, Department of Agriculture & Water Resources

Previous Role as – Acting Assistant Secretary, Exports, Department of Agriculture

Previous Role as - AQIS (Australia Quarantine Inspection Service), Chemical Residues, Residues and Food Safety

<https://www.researchgate.net/publication/303713672> *Arsenic cadmium cobalt copper lead mercury molybdenum selenium and zinc concentrations in liver kidney and muscle in Australian sheep*

<https://www.researchgate.net/publication/270813819> *A review of potential contaminants in Australian livestock feeds and proposed guidance levels for feed*

Dr Rashid Qaisrani

Grain & Seed Exports Program, Plant Export Operations, Department of Agriculture and Water Resources

Dr. Rashid Qaisrani from Australia visited Jilin University (China):

On September 22, 2014, Dr. Rashid Qaisrani, the member of ISBE and official of Department of Agriculture, Australia, visited the Key Laboratory of Bionic Engineering, Ministry of Education, Jilin University, P. R. China and gave an academic report on “Conservation Farming-A View from the Farm” to the teachers and students in the lab. Dr. Rashid Qaisrani made a detail introduction of the Conservation Farming in Australia and had a discussion with the teachers and students in the lab. After the report, Dr. Rashid Qaisrani visited the laboratory.

<http://storedgrain.com.au/wp-content/uploads/2013/06/06.pdf>

http://www.worldscientific.com/doi/abs/10.1142/9789814704496_0013

A real turning point in my mind, were the discussions we had with **Dugald MacLachlan** and **Dr Rashid Qaisrani**, from the Department of Agriculture.

During our question and answer session, I felt significantly reassured that this radioactive waste facility was not going to adversely affect our grain and livestock markets.

Bangladesh are the only export country that request a radioactive statement from Australia for grain and several African countries request a radioactive statement for Livestock, which we supply with no issues. **The only issue encountered for Livestock was due to Lead levels.**

Their advice was unless there was some nuclear incident like Fukushima; it’s just not an issue.

The biggest risk being currently dealt with is chemical residues! China is the main country monitoring residues, particularly Flutriofol and Haloxifop.

Comparing Radioactive Waste to what we have and use on farm

Everyone experiences background radiation from the world around us. The average radiation level experienced by everyone in Australia is 1.5 mSv (milli sieverts) per year.

<http://www.world-nuclear.org/focus/radiation/what-are-health-risks-from-ionising-radiation.aspx>

But what are the chances of developing cancer from low doses of radiation? The prevailing assumption is that any dose of radiation, no matter how small, involves a possibility of risk to human health. However there is no scientific evidence of risk at doses below about 50 millisievert in a short time or about 100 millisievert per year. Dose rates greater than 50 mSv/yr arise from natural background levels in several parts of the world but do not cause any discernible harm to local populations. At lower doses and dose rates, up to at least 10 millisievert per year, the evidence suggests that beneficial effects are as likely as adverse ones.

Some comparative whole-body radiation doses and their effects	
2.4 mSv/yr	Typical background radiation experienced by everyone (average 1.5 mSv in Australia, 3 mSv in North America).
1.5 to 2.5 mSv/yr	Average dose to Australian uranium miners and US nuclear industry workers, above background and medical.
Up to 5 mSv/yr	Typical incremental dose for aircrew in middle latitudes.
9 mSv/yr	Exposure by airline crew flying the New York – Tokyo polar route.
10 mSv/yr	Maximum actual dose to Australian uranium miners.
10 mSv	Effective dose from abdomen & pelvis CT scan.
20 mSv/yr	Current limit (averaged) for nuclear industry employees and uranium miners in most countries. (In Japan: 5 mSv per three months for women)
50 mSv/yr	Former routine limit for nuclear industry employees, now maximum allowable for a single year in most countries (average to be 20 mSv/yr max). It is also the dose rate which arises from natural background levels in several places in Iran, India and Europe.

In trying to put risk and toxicity into perspective, if we think about our farms, many still have Asbestos, which is indefinitely hazardous.

- There is no safe level of Asbestos exposure
- In developing countries, farmers are still being poisoned by Agri Chemicals, often Paraquat (Gramoxone)
- Some are deliberately ingested (suicide), but some are not
- Instances exist of death where Paraquat has not been ingested at all; **exposure was via extended skin contact or broken skin as a pathway.**

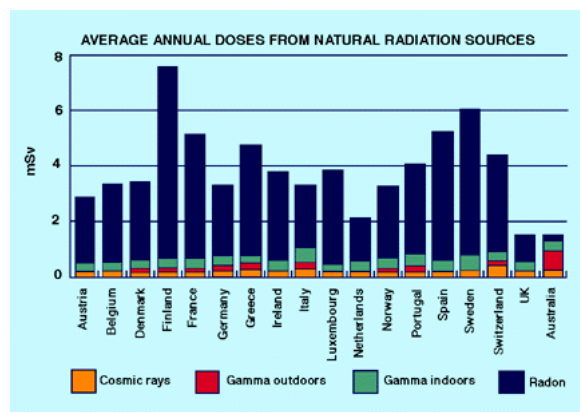
In Australia, we have more robust regulations limiting the purchase and use of Dangerous Goods like Paraquat to those trained in Chemical application. We have cost effective and easily accessible PPE options that reduce our risk of exposure. Regulation affecting our packaging and storage also reduces the risk of exposure.

The Nuclear Industry follows even stricter guidelines for Class 7 Dangerous Goods, with every aspect of the nuclear process and final waste storage/disposal heavily regulated. I feel very confident they are adhering to the protocols they are required to meet, their visitation procedures were, quite frankly.....fastidious!

Some of my Questions and Answers

1. Would I be happy to have such a facility on our farm or nearby? I wasn't so sure.
 - *Yes, I would be happy to have this facility due to the extremely low risk of any adverse affects and the money on offer is life changing for any area who participates.*
2. Why can't this waste be stored in the middle of Australia or back at Roxby Downs?
 - *A repository needs a workforce so must be located within reasonable proximity to services, available housing and a ready workforce.*
 - *Roxby and surrounds is still an ongoing mining affair so does not meet site criteria*
 - *Woomera is not privately owned land so does not meet site criteria*
3. Are traffic movements going to be affected surrounding such a facility?
 - *No, there is no need for any changes to road movement around the facility.*
 - *I assume there may be moments where they are trucking in infrastructure during the build but otherwise, I don't expect any changes*
4. Are we opening the door to higher level waste and what control do the community have over any proposed increases in storage level?
 - *No, absolutely not. If any change is proposed to the designated level of storage, this whole ARPANSA process must be gone through again in total. Any decision like that cannot be made without a full consultation process being undertaken again.*
5. Do the state government receive any of the royalties or does Kimba receive the lot?
 - *No, Kimba get the lot. There will be a Board of local people set up to manage the 'eternity fund'*
6. What is the earthquake risk?
 - *There is a risk of earthquake anywhere in Australia. The building must be constructed to a certain standard which is heavily regulated and has taken into account the risk of earthquake.*
7. Are we going to have radioactive grain or sheep?
 - *No, not from this facility.*
 - *We already have grain on the same belt as mineral sands at Thevenard, sands that contain low level radioactive elements. Uranium is also shipped out of Adelaide and so is grain.*

<http://www.informationisbeautiful.net/visualizations/radiation-dosage-chart/>



Barnaby Joyce

The highlight for me of this trip was meeting with Barnaby Joyce (while he was still Deputy PM!). His message to us was that this facility is of no risk and if you want to steer clear of radiation, then don't walk into a hospital as that is where a lot of this waste is already present. If this was going to adversely affect Agriculture, he wouldn't allow it.

The question was put to him "what do you see as the biggest risk to the South Australian grains industry"? His answer "the no GM moratorium, SA is being left behind".

Some helpful links

<http://www.world-nuclear.org/information-library/safety-and-security/radiation-and-health/nuclear-radiation-and-health-effects.aspx>

<http://www.ansto.gov.au/>

<https://www.arpansa.gov.au/>

Conclusion

- After much thought and research, my opinion is that any potential threats to health & safety posed by this facility are extremely remote
- Department of Agriculture advice is that there is no risk to agriculture markets. We already have mineral sands on the same belt as grain at Thevenard, and uranium out of Adelaide, along with grain
- It would be helpful if the Department of Agriculture would make an 'official' confirmation of there being no issues with product grown nearby to this facility
- The word 'perception' was bandied about at length during this trip. I think the biggest risk to our markets is people running around sprouting that Kimba has radioactive grain, when in fact it doesn't and it won't. It's simply not true!
- I would be happy to have this type of facility nearby to our farm. This education has however informed me that our property is too far from services to host this facility
- I accept the explanations from scientists and support their continued improvement to next generation facilities for storage of radioactive waste
- Regulation abounds with this type of facility. There are strict engineering and building standards that regulate its build. Every 'risk' scenario is assessed when building a facility of this type, this includes fire and earthquake
- More Regulations surround the packing, storage and transport of such product, the health of workers, the exposure times and levels, everything
- Obviously the money on offer is life changing for any community and there will be ongoing employment at the facility and during the build phase
- I feel far more comfortable about the safety of this radioactive waste facility than I do with some of the chemicals we use on farm and the complacency that surrounds their risk
- The facility will only use 40ha of the 100ha block. BFIG will be able to crop the unused 60ha and can undertake their own testing of the grain for monitoring
- The Department of Industry don't want this to drag out, it's either going to happen or it's not

Recommendations

- ❖ If the facility goes ahead in Kimba, then the agreement to host the facility should be mapped out with as much specific detail as is reasonably practicable so as to reassure the community
- ❖ RDAWEP should consider providing some mediation and counselling services for the Kimba community to try and heal the intense division that has unnecessarily manifested over this proposal