Submission to the Senate Economics Legislation Committee

Inquiry into National Radioactive Waste Management Amendment (Site Specification, Community Fund and Other Measures) Bill 2020

Maritime Union of Australia (South Australian branch)

March 2019

The Maritime Union of Australia (SA branch) recommends that the Senate Committee rejects the National Radioactive Waste Management Amendment (Site Specification, Community Fund and Other Measures) Bill 2020 (hereafter the NRWM Amendment Bill).

The Bill is designed to advance a fundamentally flawed radioactive waste management process which should be put on hold until such time as a comprehensive independent inquiry is held to investigate all options for managing radioactive waste.

The Committee should recommend repeal of the unacceptable and draconian overrides of Commonwealth and state laws in the existing National Radioactive Waste Management Act 2012. Further, the Committee should recommend rejection of the NRWM Amendment Bill which would worsen the situation by giving the Federal Government additional sweeping powers to override Commonwealth and state laws.

The Federal Government's own 65% benchmark for 'broad community support' has not been met; only 43.8% of eligible voters in the combined Kimba and Barngarla ballots supported the proposed nuclear waste facility. The Federal Government has not demonstrated 'broad community support' along potential transport corridors or statewide in SA. The proposed nuclear waste facility is illegal under South Australia's Nuclear Waste Facility (Prohibition) Act. Instead of respecting that state legislation, the Federal Government intends to override it and the NRWM Amendment Bill outlines a regulatory mechanism to override SA law and thus to undermine democratic rights.

The proposal to proceed with the nuclear waste facility despite the clear opposition of Barngarla Traditional Owners – and their representative body, the Barngarla Determination Aboriginal Corporate – is unacceptable and must not be allowed to stand. The Committee must reject the Bill and recommend that the proposed waste facility near Kimba should be scrapped in light of the opposition of Traditional Owners. The Committee should also draw attention to, and strongly reject, proposed amendments in the NRWM Amendment Bill which would further disempower Traditional Owners, including by stripping them of appeal rights.

Legal advice in a Feb. 2020 report by the Parliamentary Joint Committee on Human Rights notes that the Bill "would enable native title to be extinguished, without the consent of the

traditional owners", and it raises further concerns about the Bill's intention to permit the acquisition of land for an access route without any Parliamentary oversight or right of appeal.

The Federal Government's actions – including its NRWM Amendment Bill – are inconsistent with the UN Declaration on the Rights of Indigenous Peoples. The United Nations Committee on the Elimination of Racial Discrimination (CERD Committee) in 2017 expressed concern "about information that extractive and development projects are carried out on lands owned or traditionally owned by Indigenous Peoples without seeking their prior, free and informed consent" and recommended that Australia "ensure that the principle of free, prior and informed consent is incorporated into the Native Title Act 1993 and in other legislation as appropriate, and fully implemented in practice".

Instead of accepting the principle of free, prior and informed consent, the Federal Government intends to proceed without the consent of Traditional Owners and to amend legislation to override their rights and interests.

The Maritime Union of Australia (SA branch) endorses the resolution carried at the SA ALP State Conference on 13 October 2018 (noting that the targeted site in the Flinders Ranges is no longer under consideration):
"State Convention acknowledges that radioactive waste management is a complex policy challenge that requires the highest level of transparency and evidence and that the current federal approach to site a national waste facility in regional South Australia is strongly contested.

- *Supports Traditional Owners and community members in the Flinders Ranges and Kimba regions of South Australia in their current struggle to prevent a nuclear waste facility being constructed in their region.*
- *Calls for full transparency, broad public input and best practice technical and consultative standards during the current site nomination and selection process.*
- *Expresses concern at the federal government's continuing focus on finding a single remote site for radioactive waste to be disposed (low level) and stored (intermediate level) to the exclusion of all other waste management options.*
- *Reaffirms its support for the civil society call for the extended interim storage of federal wastes at federal sites pending a broad independent inquiry that examines all options for future responsible radioactive waste, transport and storage and management.*
- *Commits to support communities opposing the nomination of their lands or region for a dump site, and any workers who refuse to facilitate the construction and operation or transport and handling of radioactive waste material destined for any contested facility or sites including South Australian Port communities."*

TRANSPORT ISSUES

The Department's July 2018 "Site Characterisation Technical Report: Napandee" (p.150) names Whyalla Port to take shipments of nuclear fuel reprocessing waste.[1] Two shipments

[1] https://www.industry.gov.au/sites/default/files/2019-04/nrwmf_site_characterisation_technical_report_napandee.pdf

of reprocessed nuclear fuel wastes, in 130 tonne TN-81 casks, are intended within the first two years of operations of an ILW store, with many more over subsequent years and decades. The Department's report also proposes 100 x B-double 50 tonne loads of ILW in the first four years alone (in addition to hundreds of loads of low-level radioactive waste) and it flags the option of shipping ILW from Port Kembla to an SA port such as Whyalla (p.157-158): *"It may be possible to have these containers shipped from Port Kembla to ports such as Whyalla."*

There is no logic behind the proposal to move long-lived intermediate-level waste (ILW) from interim above-ground storage at Lucas Heights to interim above-ground storage at the Kimba site. The proposed double-handling (once to the Kimba site, then at some unspecified time to a disposal site) makes no sense whatsoever, it exposes communities to unnecessary risks, and it exposes workers (including MUA members) to unnecessary risks. Further, ARPANSA's Nuclear Safety Committee has stated that dual handling in transport associated with interim storage "does not represent international best practice" and raises "implications for security".[2]

Additionally, the considerable distances involved create a whole additional level of risk. The more time a truck is on the road the greater the chance of an accident. International best practice is the shortest distance possible for waste transportation to a permanent storage site.

Clearly ILW waste stored at ANSTO's Lucas Heights should remain there until a disposal facility is available. ANSTO has better safety and security arrangements than could possibly apply at the Kimba site; there are no legal or regulatory impediments to ongoing storage at Lucas Heights; and storage at Lucas Heights avoids the unnecessary risks associated with the proposed double handling.

MUA policy is that our members will not be involved in moving nuclear waste. The toxicity of the waste is severe. Even if the chances of an accident were small, there would potentially be very significant, negative consequences for members in the vicinity. On this basis our refusal to handle nuclear waste is easily defensible-and arguably required- under the nationally harmonised Workplace Health and Safety laws.

The Federal Government has made no effort to consult along potential road corridors or targeted port towns such as Port Kembla or Whyalla. This is a long-standing breach of advice from ARPANSA's Nuclear Safety Committee which stresses the "essential" requirement to "clearly and effectively engage all stakeholders, including those along transport routes" in its Nov. 2016 report.[3]

ARPANSA's draft Code for Disposal of Radioactive Waste (Dec. 2017) states that an applicant for an ILW disposal facility would need to satisfy the regulator that safe containment can be demonstrated over a period of "not be less than 10,000 years.[4] Yet the Federal Government

[2] http://www.arpansa.gov.au/pubs/nsc/nsc_iwsadvice.rtf
[3] https://www.arpansa.gov.au/sites/g/files/net3086/f/legacy/pubs/nsc/nrwmf-stakeholder-engagement.rtf
[4] Page 53, https://www.arpansa.gov.au/code-disposal-solid-radioactive-waste-rps-c-3

has made no progress towards disposal of ILW and instead proposes unnecessary and unacceptable movement from above-ground storage at Lucas Heights to less secure above-ground storage at Kimba.

TRANSPORT RISKS

The UK Nuclear Free Local Authorities' May 2016 "Briefing: Nuclear security concerns – how secure is the UK civil nuclear sector?" highlights security threats including the risks from potential attack on a nuclear waste transport or on a nuclear waste storage site.[5] The briefing paper cites nuclear engineer Dr. John Large, who stated:
"Movement of nuclear materials is inherently risky both in terms of severe accident and terrorist attack. Not all accident scenarios and accident severities can be foreseen; it is only possible to maintain a limited security cordon around the flask and its consignment; … terrorists are able to seek out and exploit vulnerabilities in the transport arrangements and localities on the route; and emergency planning is difficult to maintain over the entire route."

The SA Nuclear Fuel Cycle Royal Commission concluded that terrorist attack scenarios are conceivable during the transport of nuclear fuel wastes, with the potential scenario for rocket attack on the transport of nuclear fuel waste reported as having the greatest potential to cause a release of radiation.[6]

Appendix 1 provides detail on nuclear materials transport incidents and accidents. Glib assurances of transport safety are not supported by real-world experience. Incidents and accidents are commonplace, and in some cases the consequences are severe.

Appendix 2, an article by maritime worker and MUA member Natalie Wasley, exposes the poor track record of the shipping company used by the Federal Government to ship spent nuclear fuel from Australia to France for reprocessing and to ship reprocessing waste to Australia. Problems have included losing cargo overboard, failing to follow basic navigation rules, failing safety inspections, and exploiting workers.

APPENDIX 1: NUCLEAR WASTE TRANSPORT SAFETY AND SECURITY RISKS

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<u>Transport incidents and accidents are commonplace</u>

[5] http://www.nuclearpolicy.info/wp/wp-content/uploads/2016/05/A258_NB145_Nuclear_Security_concerns.pdf
[6] See the Commission's Final Report, May 2016, Appendix L - Transport risk analysis Conclusion, p.312, http://assets.yoursay.sa.gov.au/production/2016/05/09/01/36/59/8bf27508-efdb-4bf7-ab16-53b9fb72948d/NFCRC_Final%20Report_Appendix%20L.pdf

A UK government database − RAdioactive Material Transport Event Database (RAMTED) − contains information on 1018 events from 1958 to 2011 (an average of 19 incidents each year) involving all forms of radioactive and nuclear materials, including waste.[7] Of the 38 incidents in the UK in 2011 alone, 11 involved irradiated nuclear fuel flasks (up from eight in 2010). One of those 11 events involved a low-impact collision.[8]

In a report on 806 recorded radioactive transport incidents in the UK from 1958−2004, Hughes et al. found that 111 involved 'residues inc. discharged INF flasks', 101 involved irradiated fuel, and 63 involved (other) radioactive wastes:[9]

MATERIAL TYPE *Source: Hughes et al, 2006*	**NUMBER OF EVENTS (806) FROM 1958−2004**	**PERCENTAGE**
Medical & industrial isotopes	376	46.7
Residues inc. discharged INF flasks	111	13.8
Irradiated fuel	101	12.5
Radiography sources	78	9.7
Radioactive wastes	63	7.8
Uranium ore concentrate	33	4
Other	44	5.5

There were 187 incidents during the shipment of irradiated nuclear fuel flasks from 1958−2004[10] − 23% of the total number of 806 recorded incidents. There is no evidence of safety improvements in the UK:

[7] Some recent annual reviews of transport incidents in the UK are posted at http://webarchive.nationalarchives.gov.uk/20140722091854/www.hpa.org.uk/Publications/Radiation/CRCEScientificAndTechnicalReportSeries/
Some earlier annual reviews are posted at:
http://webarchive.nationalarchives.gov.uk/20140722091854/www.hpa.org.uk/Publications/Radiation/HPARPDSeriesReports/
See also M.P. Harvey and A.L Jones, Aug 2012, 'HPA-CRCE-037 - Radiological Consequences Resulting from Accidents and Incidents Involving the Transport of Radioactive Materials in the UK – 2011 Review',
www.hpa.org.uk/Publications/Radiation/CRCEScientificAndTechnicalReportSeries/HPACRCE037/

[8] M.P Harvey and A.L Jones (UK Health Protection Agency), August 2012, 'Radiological Consequences Resulting from Accidents and Incidents Involving the Transport of Radioactive Materials in the UK − 2011 Review', commissioned by UK Office for Nuclear Regulation,
www.hpa.org.uk/Publications/Radiation/CRCEScientificAndTechnicalReportSeries/HPACRCE037/

[9] J.S. Hughes, D. Roberts, and S.J. Watson, July 2006, 'Review of Events Involving the Transport of Radioactive Materials in the UK, from 1958−2004, and their Radiological Consequences',
http://webarchive.nationalarchives.gov.uk/20140714084352/www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1194947346295

[10] J.S. Hughes, D. Roberts, and S.J. Watson, July 2006, 'Review of Events Involving the Transport of Radioactive Materials in the UK, from 1958−2004, and their Radiological Consequences',
http://webarchive.nationalarchives.gov.uk/20140714084352/www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1194947346295

- In 2008, 18% of recorded incidents (7/39) involved irradiated nuclear fuel flasks.[11]
- In 2009, 24% of recorded incidents (8/33) involved irradiated nuclear fuel flasks.[12]
- In 2010, 27% of recorded incidents (8/30) involved irradiated nuclear fuel flasks.[13]
- In 2011, 29% of recorded incidents (11/38) involved irradiated nuclear fuel flasks.[14]

Transport incidents are also commonplace in France and presumably a comparable percentage involve nuclear wastes. In 2008, the French nuclear safety agency IRSN produced a report summarising radioactive transport accidents and incidents from 1999−2007.[15] The IRSN manages a database listing reported deviations, anomalies, incidents and accidents (known generically as "events") relating to transport. The database lists 901 events from 1999−2007 − on average 100 events annually or about two each week.

In the US, in the eight years from 2005 to 2012, 72 incidents involving trucks carrying radioactive material on highways caused US$2.4 million in damage and one death, according to the Transportation Department's Pipeline and Hazardous Materials Safety Administration.[16]

Costs of accidents

Nuclear transport accidents involving spent nuclear fuel / high-level nuclear waste have the potential to be extraordinarily expensive. Dr. Marvin Resnikoff and Matt Lamb from Radioactive Waste Management Associates in New York City calculated 355−431 latent cancer fatalities attributable to a "maximum" hypothetical rail cask accident, compared to the US Department of Energy's estimate of 31 fatalities. Using the Department of Energy's model, they calculated that a severe truck cask accident could result in US$20 billion to US$36 billion in cleanup costs for an accident in an urban area, and a severe rail accident in an urban area could result in costs from US$145 billion to US$270 billion.[17]

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[11] M. P. Harvey, Aug 2010, 'HPA-CRCE-003 - Radiological Consequences Resulting from Accidents and Incidents Involving the Transport of Radioactive Materials in the UK – 2009 Review', www.hpa.org.uk/Publications/Radiation/CRCEScientificAndTechnicalReportSeries/HPACRCE003/

[12] ibid.

[13] M. P. Harvey and A. L. Jones, 2011, 'HPA-CRCE-024: Radiological Consequences Resulting from Accidents and Incidents Involving the Transport of Radioactive Materials in the UK – 2010 Review', www.hpa.org.uk/Publications/Radiation/CRCEScientificAndTechnicalReportSeries/HPACRCE024/

[14] M.P. Harvey and A.L Jones, Aug 2012, 'HPA-CRCE-037 - Radiological Consequences Resulting from Accidents and Incidents Involving the Transport of Radioactive Materials in the UK – 2011 Review', www.hpa.org.uk/Publications/Radiation/CRCEScientificAndTechnicalReportSeries/HPACRCE037/

[15] IRSN (France), 21 Oct 2008, 'Information report: Incidents in transport of radioactive materials for civil use: IRSN draws lessons from events reported between 1999 and 2007', www.irsn.fr/EN/publications/technical-publications/Documents/IRSN_ni_transports_analysis_20081021.pdf www.irsn.fr/EN/Library/Documents/IRSN_ni_transports_analysis_20081021.pdf www.irsn.fr/EN/Pages/home.aspx

[16] Anna M. Tinsley, 15 April 2012, 'Radioactive waste may soon travel on DFW highways', http://web.archive.org/web/20130504150446/www.star-telegram.com/2012/04/15/3884220/radioactive-waste-may-soon-travel.html

[17] 7 July 2000, www.state.nv.us/nucwaste/news2000/nn10719.htm

An example of a million-dollar accident occurred in Roane County, Tennessee in 2004. A Bechtel-Jacobs truck spilled strontium-90 across nearly two miles of Highway 95. More than five hours after the spill occurred, authorities finally closed the road. Highway 95 remained closed for two days, after sections of the road were cleaned and re-paved. The Department of Energy said the clean-up bill would exceed US$1 million.[18]

Direct and indirect costs associated with the Feb. 2014 chemical explosion underground at the Waste Isolation Plant in New Mexico are estimated at over US$2 billion (A$2.9 billion).[19]

European nuclear waste transport scandal

In the late 1990s, a whistleblower supplied WISE-Paris, an environmental and energy NGO, with information which sparked a major controversy over frequent excessive radioactive contamination of waste containers, rail cars, and trucks.[20] Nuclear waste shipments from German nuclear reactor sites to reprocessing plants in the UK and France were banned, and transport within France was suspended, in the aftermath of the controversy.

WISE-Paris summarised the controversy in mid-1998:[21]
"There are two scandals, both unprecedented. The first lies in the fact that for 15 years the nuclear industry – power plants, transport companies, plutonium factories and nuclear safety institutes in France, Germany, Switzerland and the UK at least – have managed to hide the fact that the international transport regulations for spent fuel shipments have been constantly violated, up to levels exceeding several thousand times the limit. This is all the more stunning as the original recommendation stems from the industry friendly, heavily pro-nuclear International Atomic Energy Agency (IAEA) in Vienna.
"The second scandal derives from the fact that the French nuclear safety authority DSIN has been aware of the problem since autumn 1997, agreed with the French nuclear industry representatives over the wording of a mere "cleanliness problem", and kept silent until a journalistic investigation brought the story to light. The safety authority neither informed its ministers nor its foreign counterparts and, of course, nor did it inform the public. Worse, when the story broke, the authority played the role of the tough transparent State control agency finally cleaning up ... without actually taking any kind of regulatory or disciplinary consequences, while downplaying health consequences and the persistent outrageous violation of regulations.

[18] www.nuclearfiles.org/menu/timeline/timeline_page.php?year=2004
[19] https://www.latimes.com/nation/la-na-new-mexico-nuclear-dump-20160819-snap-story.html
[20] WISE-Paris, Plutonium Investigation, No.6, May-June 1998,
www.wise-paris.org/index.html?/english/ournewsletter/6_7/contents.html
and
www.wise-paris.org/english/ournewsletter/6_7/no6_7.pdf
[21] www.wise-paris.org/index.html?/english/ournewsletter/6_7/editorial.html&/english/frame/menu.html
and
http://www.wise-paris.org/index.html?/english/ournewsletter/6_7/page4.html&/english/frame/menu.html&/english/frame/band.html

"The risk seems rather high that people have been exposed to significant levels of radiation over the period the contaminated transports have crossed countries. Worse, hot particles have been spread into the environment along rail tracks and roads. People might actually continue to get contaminated presently and for a long time to come."

French Environment Minister Dominique Voynet said:[22]
"Beyond the level of contamination, I'm shocked by the fact that as soon as one asks some simple questions to the operators, one realises that this has been going on for years, that the three companies questioned (EDF, Transnucléaire, COGEMA) were perfectly aware of it and that they have not said anything."

Some examples of accidents and incidents

Some examples of accidents and incidents involving the transport of radioactive waste are noted here:

In early 1998, it was revealed that "airtight" spent fuel storage canisters at ANSTO's Lucas Heights site had been infiltrated by water − 90 litres in one case − and corrosion had resulted. When canisters were retrieved for closer inspection, three accidents took place (2/3/98, 13/8/98, 1/2/99), all of them involving the dropping of canisters containing spent fuel while trying to transport them from the 'dry storage' site to another part of the Lucas Heights site. The public may never have learnt about those accidents if not for the fact that an ANSTO whistleblower told the local press. One of those accidents (1/2/99) subjected four ANSTO staff members to small radiation doses (up to 0.5 mSv).[23]

ANSTO has acknowledged that there are 1−2 accidents or 'incidents' every year involving the transportation of radioactive materials to and from the Lucas Heights reactor plant.[24] ANSTO provides no further detail but presumably some of the accidents and incidents involve waste materials.

In October 2014, a ship carrying radioactive waste which was set adrift in the North Sea after it caught fire led to the evacuation of the nearby Beatrice oil platform, part-owned by Ithaca Energy. The MV Parida was transporting six 500-litre drums of cemented radioactive waste from Scrabster in northern Scotland to Antwerp, Belgium, when the fire broke out in one of its funnels. The blaze was put out by the ship's crew. Meanwhile 52 workers were airlifted off the oil platform as a precaution in case the drifting MV Parida struck it. The ship was subsequently towed to a secure pier at the Port of Cromarty Firth by a commercial operator, despite the Aberdeen coastguard sending two emergency tugs to assist. The cargo was reportedly undamaged. The waste was from the Dounreay experimental nuclear power

[22] http://www.wise-paris.org/english/ournewsletter/6_7/no6_7.pdf
[23] Sutherland Shire Environment Centre:
https://nuclearhistory.wordpress.com/2011/03/17/safety-problems-at-antso/
www.ssec.org.au/our_environment/issues_campaigns/nuclear/info_sheets/2002_sep_1.htm
[24] ANSTO, 2003, Submission to NSW Parliament's 'Joint Select Committee into the Transportation and Storage of Nuclear Waste'

plant.[25] Angus Campbell, the leader of the Western Isles Council, said the Parida incident highlighted the need for a second coastguard tug in the Minch. "A ship in similar circumstances on the west coast would be reliant on the Northern Isles-based ETV [emergency towing vessel] which would take a considerable amount of time to get to an incident in these waters."[26]

On 5 February 2014, a truck hauling salt caught fire at the Waste Isolation Pilot Plant (WIPP) in New Mexico. Six workers were treated at the Carlsbad hospital for smoke inhalation, another seven were treated at the site, and 86 workers were evacuated. A March 2014 report by the US Department of Energy identified the root cause of the fire as the "failure to adequately recognize and mitigate the hazard regarding a fire in the underground." In 2011, the Defense Nuclear Facilities Safety Board, an independent advisory board, reported that WIPP "does not adequately address the fire hazards and risks associated with underground operations."[27]

16 January 2014: A driver abandoned his stricken car at a level crossing moments before it was dragged 300 metres down a railway track by an empty nuclear waste train in the UK. The train is used to take spent nuclear fuel to Sellafield but, as it was returning to Cheshire, was empty.[28]

23 December 2013: A rail freight wagon carrying nuclear waste was derailed at a depot in Drancy, 3 km northeast of Paris. The wagon carried spent fuel from the Nogent nuclear power plant destined for AREVA's reprocessing plant at La Hague in Normandy. Although no leakage of radiation was measured at the accident location, the Nuclear Safety Authority

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[25] Andrew Snelling, 9 Oct 2014, 'Oil rig evacuated after radioactive fire', www.energynewspremium.net/StoryView.asp?storyID=826936500&section=General+News&sectionsource=s63&aspdsc=yes
NFLA / KIMO, 8 Oct 2014, 'NFLA and KIMO call for urgent inquiry into Parida nuclear waste transport fire off the Moray Firth', www.nuclearpolicy.info/docs/news/NFLA_KIMO_Parida_incident.pdf
West Highland Free Press 26 July 2014, www.whfp.com/2014/07/25/concern-over-nuclear-waste-shipments/
16 Oct 2014, 'Call for safety review following ship fire', www.fia.uk.com/en/information/details/index.cfm/call-for-safety-review-following-ship-fire
World Nuclear News, 8 Oct 2014, www.world-nuclear-news.org/WR-Dounreay-ready-to-assist-fire-investigation-08101401.html

[26] Herald, 30 July 2014 www.heraldscotland.com/news/home-news/plans-for-radioactive-waste-by-sea-are-criticised.24898732

[27] 6 June 2014, 'Fire and leaks at the world's only deep geological waste repository', Nuclear Monitor #787, www.wiseinternational.org/node/4245

[28] CORE Briefing, 15 Jan 2014, www.corecumbria.co.uk/newsapp/pressreleases/pressmain.asp?StrNewsID=331
www.lancasterguardian.co.uk/news/nuclear-waste-train-in-50mph-smash-1-6376671
Morning Star, 16 Jan 2014, www.morningstaronline.co.uk/a-e91c-Level-crossing-crash-exposes-dangers-of-nuclear-trains
Lancaster Guardian, 16 Jan 2014, www.lancasterguardian.co.uk/news/nuclear-waste-train-in-50mph-smash-1-6376671

(ASN) reported that subsequent testing by AREVA revealed a hotspot on the rail car that delivered a dose of 56 microsieverts.[29]

September 2002: A truck carrying nuclear waste from Idaho to the Waste Isolation Pilot Plant in New Mexico, USA, ran off Interstate 80 in Wyoming. The driver said he felt ill and attempted to pull over, but he blacked out before he made it to the roadside. The truck crossed the median, headed across the westbound lane and left the road. The accident was the second in less than two weeks. On Aug. 25, a truck bound for the WIPP plant near Carlsbad was hit by an alleged drunk driver. Nobody was injured and no contaminants were released in either accident, WIPP officials said.[30]

A serious incident occurred in the UK in 2002.[31] AEA Technology was fined £250,000 for the incident during a 130-mile truck journey. A highly radioactive beam was emitted from a protective flask as it was driven across northern England and it was "pure good fortune" that no-one was dangerously contaminated, Leeds Crown Court was told. The problem arose when a plug was left off a specially-built 2.5-tonne container carrying radioactive material on a lorry. Staff used the wrong packaging equipment and failed to carry out essential safety checks before the radioactive cobalt-60 (decommissioned cancer treatment equipment) was transported from West Yorkshire to Cumbria. The court heard the 8mm-wide beam of radiation escaped through the bottom of the flask, pointing directly into the ground, throughout the three-hour road journey. Had the beam travelled horizontally, anyone within 280 metres would have been at risk of contamination from a beam of gamma rays up to 1000 times more powerful than a "very high dose rate". Radiation experts from the Health and Safety Executive said that anyone exposed to the beam could have exceeded the legal dose within seconds and suffered burns within minutes. One scientist estimated that someone standing a metre from the source and in the direct path of the rays would have been dead in two hours. The judge, Norman Jones, QC, said staff at the firm had acted in a "cavalier and somewhat indifferent" manner with a "degree of arrogance" towards their duties. He said the risk from the leak had been "considerable". In addition to the fine, he ordered the company to pay more than £150,000 in costs to the UK Health and Safety Executive.

3 February 1997 − High-level nuclear waste transport derails. A train carrying three casks with about 180 tons of high-level radioactive waste derailed near Apach (France). The waste was on its way from the nuclear power plant in Lingen (Germany) to Sellafield, UK, where it was to be reprocessed. The train was going at about 30 km per hour, and the casks did not turn over. The incident was not a unique event. On 15 January 1997 a nuclear fuel cask

[29] International Panel on Fissile Materials, 21 Jan 2014, http://fissilematerials.org/blog/2014/01/nuclear_train_accident_in.html
[30] AP, 9 Sept 2002, 'WIPP truck runs off highway in Wyoming', http://lubbockonline.com/stories/090902/upd_075-3941.shtml
[31] UK Health and Safety Executive, 2006, 'Transport case prompts HSE reminder on the importance of radiation protection controls', www.hse.gov.uk/press/2006/e06017.htm
See also: 'Firm fined £250,000 over radioactive leak', The Scotsman, 21 February 2006, http://news.scotsman.com/topics.cfm?tid=112&id=267752006
See also: 'Toxic truck leak a radiation near-miss', 22 February 2006, www.theaustralian.news.com.au/common/story_page/0,5744,18231965%5E2703,00.html

derailed in front of the German nuclear power plant at Krümmel during a track change, and on 3 February 1997 the engine driver of a nuclear waste transport from Krümmel suffered from a faint.[32]

1976, Kentucky, USA: Six drums containing radioactive waste burst open after they rolled off tractor-trailer trucks in Ashfield, Kentucky, USA. Two drivers were slightly injured. When the highway was cleaned, checks indicated radioactivity.[33]

Nuclear transport security issues

Hirsch et al. summarise some of the security risks associated with the transport of nuclear materials:[34]
"During transport, radioactive substances are a potential target for terrorists. Of the numerous materials being shipped, the following are the most important:
1. Spent fuel elements from nuclear power plants and highly active wastes from reprocessing (high specific inventory of radioactive substances)
2. Plutonium from reprocessing (high radiotoxicity, particularly if released as aerosol)
3. Uranium hexafluoride – uranium has to be converted into this chemical form in order to undergo enrichment (high chemical toxicity of released substances, resulting in immediate health effects in case of release).
"Since the amounts transported with one shipment are about several tonnes at most, the releases to be expected will be smaller by orders of magnitudes than those that result from attack of a storage facility – even if the transport containers are severely damaged. On the other hand, the place where the release occurs cannot be foreseen, as attacks can occur, in principle, everywhere along the transport routes. Those routes often go through urban areas; for example at ports or during rail transport. Thus, releases can take place in densely populated regions, leading to severe damage to many people, even if the area affected is comparatively small."

Nuclear transport security issues are discussed in greater detail in section 4.10 (pp.243–250) of the joint submission to the SA Nuclear Fuel Cycle Royal Commission by Friends of the Earth Australia, the Australian Conservation Foundation, and Conservation SA.[35]

Security incidents at ANSTO's Lucas Heights site in southern Sydney include the following[36]:

- 1983: nine sticks of gelignite, 25 kg of ammonium nitrate (usable in explosives), three detonators and an igniter were found in an electrical substation inside the boundary

[32] WISE News Communique #467, February 28, 1997
Die Tageszeitung (FRG) February 5, 1997
Greenpeace press release February 4, 1997
[33] Legislative Research Service Paper, Parliamentary Library, Canberra
[34] Helmut Hirsch, Oda Becker, Mycle Schneider and Antony Froggatt, April 2005, 'Nuclear Reactor Hazards: Ongoing Dangers of Operating Nuclear Technology in the 21st Century', report prepared for Greenpeace International, https://www.researchgate.net/publication/262630918
[35] https://nuclear.foe.org.au/wp-content/uploads/NFCRC-submission-FoEA-ACF-CCSA-FINAL-AUGUST-2015.pdf
[36] Tilman Ruff, 2006, 'Nuclear Terrorism', EnergyScience Coalition Briefing Paper #10, www.energyscience.org.au/FS10%20Nuclear%20Terrorism.pdf

fence. A detonator was set off but did not detonate the main explosives. Two people were charged.

- 1984: a threat was made to fly an aircraft packed with explosives into the HIFAR reactor – one person was found guilty of public mischief.
- 1985: after vandalism of a pipe, radioactive liquid drained into Woronora river, and this incident was not reported for 10 days. In 1986 an act of vandalism resulted in damage to the sampling pit on the effluent pipeline.
- 2000: in the lead-up to the Sydney Olympics, New Zealand detectives foiled a plot to attack the Lucas Heights reactor by Afghan sympathisers of Osama bin Laden.
- 9 October 2001: NSW and Federal police conducted a search following a bomb threat directed at ANSTO.
- December 2001: Greenpeace activists easily breach security at the front gate and the back fence of Lucas Heights, some activists scale the reactor while another breaches the 'secure air space' in a paraglider.
- October 2003: French terror suspect Willy Brigitte deported from Australia and held on suspicion of terrorism in France. He was alleged to have been planning to attack the reactor and to have passed on bomb-making skills to two Australians.
- November 2005: multiple coordinated arrests of terrorist suspects in Sydney and Melbourne. Court documents reveal the Lucas Heights reactor was a potential target. Three of the eight alleged members of the Sydney terror cell had previously been caught near the reactor facility by police in December 2004, each alleged to have given different versions of what they had been doing.
- November 2005: a reporter and photographer were able to park a one-tonne van for more than half an hour outside the Lucas Heights back gate, protected by a simple padlock able to be cut with bolt-cutters, 800 m from the reactor. *The Australian* reported: "The back door to one of the nation's prime terrorist targets is protected by a cheap padlock and a stern warning against trespassing or blocking the driveway."[37]
- A man facing terrorism charges in 2007 had purchased five rocket launchers allegedly stolen from the army. According to a witness statement, the accused purchaser said "I am going to blow up the nuclear place", an apparent reference to Lucas Heights.[38]

Nuclear engineers Alan Parkinson and John Large have warned that Australia's proposed national radioactive waste facility would be attractive to terrorists wanting to make a 'dirty bomb', a radioactive weapon delivered by conventional means. The same risk applies to any comparable store of nuclear materials. When the Howard government was planning a repository in SA, the government envisaged that there would be no on-site security presence whatsoever. When later governments planned a repository and waste store in the NT, it was envisaged that would be a small on-site security presence (two guards at any one time). The more dangerous waste forms (long-lived intermediate-level waste, stored above ground) would be more easily accessible than less dangerous forms (low-level waste buried in a repository).

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[37] Jonathan Porter, 19 Nov 2005, 'Nuclear site left exposed at the back door', *The Australian*.

[38] Sally Neighbour, 2 July 2007, 'Nations linked by blood and Islam', *The Australian*.
Charles Ferguson, 9 Jan 2007, 'Nuclear risk could be an inside job', www.smh.com.au/news/opinion/nuclear-risk-could-be-an-inside-job/2007/01/08/1168104921045.html

A number of problems with Australia's approach to nuclear security issues are discussed in the following article:
'Nuclear security and Australia's uranium exports', 8 April 2014, Online Opinion, http://onlineopinion.com.au/view.asp?article=16197

APPENDIX 2: RESPONSIBILITY OVERBOARD: THE SHOCKING RECORD OF THE COMPANY SHIPPING NUCLEAR WASTE TO AUSTRALIA

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Responsibility overboard: the shocking record of the company shipping nuclear waste to Australia
Natalie Wasley, 14 August 2018,
https://www.onlineopinion.com.au/view.asp?article=19892&page=0

In the very early hours of Sunday July 29 [2018], the federal government carried out a highly secretive transport of spent nuclear fuel. Helicopters and hundreds of police accompanied trucks from the Australian Nuclear Science and Technology's reactor at Lucas Heights to Port Kembla in Wollongong.
The spent fuel was loaded onto the BBC Austria, owned by Briese Schiffahrt, a shipping line condemned across the world for dangerous and illegal practices. The cargo is heading for the La Hague facility in France to be reprocessed, with a contractual agreement for waste generated from this process to be sent back to Australia.
Any transportation of nuclear materials carries risks, but Briese has a particularly terrible safety record, including leaking oil from vessels, losing cargo overboard and failing to follow basic navigation rules. In 2015, French nuclear giant Areva (now Orano) chartered the controversial Briese ship the BBC Shanghai to bring reprocessed spent fuel waste back to Australia. This was despite the ship being recently detained in Australia and Spain, and banned from carrying government cargo in the United States, for failing safety inspections.
The transport occurred during a federal Parliamentary Inquiry into Flag of Convenience ships, where it was revealed that the BBC Shanghai was "owned and operated by a web of German companies, registered in the tiny Caribbean islands of Antigua and Barbuda and crewed by a mix of Russian and Ukrainian seafarers." At the time, independent Senator John Madigan accused the government of "tendering out its national security to the lowest common denominator."
A complex web of ownership and vessel registration allows Briese to circumvent systematic regulation and accountability. Along with safety breaches, vessels have been caught carrying weapons, allegedly intended for war-ravaged nations. Briese is known to have transported Russian and Ukrainian weapons and has an "important functional role" of "heavy weapons shipments to countries with poor infrastructure" as part of the Odessa Network that has allegedly supplied weapons used in Syria. Briese ships have been stopped and crew detained with weapons cargo and tanks "presumably intended" for Sudan and Singapore.
Amnesty International identified a Briese vessel moving cluster bombs between South Korea and Pakistan in 2010, contravening the 2008 Convention on Cluster Munitions. The vessel was not sailing under a German flag, and therefore did not need the permit that would usually be required under German law.

Workers' rights

Briese has a terrible track record on workers' rights. In 2015, the Maritime Union of Australia (MUA) argued that the crew of the BBC Shanghai only signed a binding wage agreement *en route* to Australia after the radioactive waste shipment attracted public scrutiny. International Transport Federation National Coordinator Dean Summers inspected a sister ship at Port Kembla and found the crew was underpaid and working under a "sham" collective agreement.

The MUA has a long held policy of opposition to all aspects of the nuclear industry. The position recognises that handling and transport of radioactive materials is a risk to stevedores, seafarers and other transport and emergency workers. It also expresses support for Traditional Owners and community members resisting imposition of nuclear projects. When the BBC Shanghai docked in 2015, MUA Southern NSW Branch Secretary Garry Keane reiterated: "Our members do not support the nuclear industry. There is no totally safe way to transport or store waste which remains a danger and threatens communities for thousands of years."

Community opposition

The reprocessing waste that returned to Australia was categorised as long-lived intermediate level waste (ILW). The intention was for it to be stored at a purpose built national radioactive waste facility, along with other low and intermediate level waste that would be transported from around the country. However, the attempts of successive federal government to construct such a facility have been thwarted by persistent community campaigns and legal actions. Nominated sites in South Australia (1998-2004) and the Northern Territory (2005-2014) were dropped by the federal government after years of hard fought campaigning.

Significant government resources are currently being thrown at advancing the assessment of three shortlisted sites in South Australia- one on Adnyamathanha country in the Flinders Ranges and two in the Kimba region of the Eyre Peninsula. The SA waste dump plan has caused great anxiety and stress for Traditional Owners and local community members near the sites.

Adnyamathanha Traditional Owner Regina McKenzie describes the Flinders Ranges as "arngurla yarta" (spiritual land). Upon receiving the 2016 Peter Rawlinson environment award, Regina said: "The proposed dumpsite contains thousands of Aboriginal artefacts. Our ancestors are buried there. We don't want a nuclear waste dump here on our country and worry that if the waste comes here it will harm our environment and muda (our lore, creation)."

Communities - including many of Regina's extended family - have campaigned for decades to stop uranium mining and nuclear waste dumps and to fight for compensation for people affected by nuclear bomb tests conducted in the 1950s and 1960s.

The nuclear chain is toxic from start to finish. As we move, albeit slowly, towards creation of long-term, sustainable and safer jobs in renewable industries there will be ongoing need 'for many generations 'to manage the radioactive materials already stockpiled around the world.

Instead of continuing with plans to greatly expand the production and export of radioactive medical isotopes from Lucas Heights, the federal government should start planning to replace the reactor with more benign technologies for scientific and medical applications. A recent conveyor belt breakdown and two spills of radioactive material that affected workers in the past year highlight the risks and vulnerabilities inherent in this industry. Environment

groups, trade union and health organisations have long called for an independent inquiry into the production, transport and management of radioactive waste in Australia that includes all key stakeholders. This is essential to take the discussion around intergenerational management out of the trenches and to the table.
Arthur Rorris from the South Coast Labour Council summarised it well in the lead up to the 2015 transport: "When a shipment of solar panels comes through the port you don't see hundreds of cops blocking highways and a national security operation. Communities the world over want to see the back of the nuclear industry so we don't have to endure these unnecessary risks to public health, the environment and our national security."

Jamie Newlyn
SA Branch Secretary