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A PUBLICATION OF WORLD INFORMATION SERVICE ON ENERGY (WISE)
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Dear readers of the WISE/NIRS Nuclear Monitor,

In this issue of the Monitor, the last for the year:

- Charly Hultén from WISE Sweden writes about a cover-up concerning the risks associated with spent fuel disposal.
- Nuclear propagandists like to make specious comparisons between the radiation doses from eating bananas and living near a nuclear plant – but what's the 'Banana Equivalent Dose' of catastrophic nuclear accidents?
- Sue Coleman-Haseldine writes about the impacts of nuclear weapons tests on Aboriginal Australians and the awarding of the Nobel Peace Prize to the International Campaign to Abolish Nuclear Weapons.
- A report commissioned by the UK government finds that power from small modular reactors will be 30% more expensive than power from large reactors.
- Yukio Yamaguchi from Japan's Citizens Nuclear Information Center writes about plans to restart boiling-water reactors at TEPCO's Kashiwazaki-Kariwa nuclear plant.
- A report on the weapons proliferation risks associated with light water reactors.
- Hartmut Winkler from the University of Johannesburg writes about the South African president's last-ditch effort to ram through a nuclear power deal.

The Nuclear News section has reports on the CEO of Exelon Corp. questioning the future of nuclear power; a book on Britain's nuclear weapons tests in the Pacific; indigenous opposition to the nuclear industry in Canada; and a data falsification scandal in Japan.

Feel free to contact us if you have feedback on this issue of the Monitor, or if there are topics you would like to see covered in future issues.

Regards from the editorial team.

Email: monitor@wiseinternational.org



Monitored this issue:

Senior engineer at Swedish Radiation Safety Authority censored – Charly Hultén	2
The Banana Equivalent Dose of catastrophic nuclear accidents	3
My people are still suffering from Australia's secret nuclear testing – Sue Coleman-Haseldine	5
UK: Power from SMRs 30% more expensive than large reactors	6
Can TEPCO's Kashiwazaki-Kariwa units 6 and 7 be restarted? – Yukio Yamaguchi	7
The myth of proliferation-resistant nuclear power	8
South African president's last-ditch effort to ram through a nuclear power deal – Hartmut Winkler	10
Nuclear News:	12
– Storage steals the spotlight at nuclear power's birthday party	
– Grappling with the bomb – Britain's Pacific H-bomb tests	
– Canada: Indigenous demonstrators urge governments to stop using nuclear power	
– Japan: Data falsifications by Kobe Steel uncovered	

USA: Stop the Nuclear and Coal Bailout!

December 11 – Today was the deadline set for a decision on Trump's massive nuclear-and-coal bailout. And this morning we won a reprieve. The Federal Energy Regulatory Commission (FERC) is going to take an extra 30 days to consider what to do. No bailout today is good, but it's not good enough.

Please act now! Tell FERC: no dirty energy bailout! Send a statement to FERC via the Nuclear Information & Resource Service (NIRS) website: www.tinyurl.com/nirs-no-bailout

Thanks for all you do!

Tim Judson – Executive Director, NIRS

Senior engineer at Swedish Radiation Safety Authority censored

Author: Charly Hultén – WISE Sweden

NM855.4693 The Swedish nuclear regulatory authority SSM suppressed one of its senior engineer's doubts about the safety of the proposed scheme for storage of Swedish nuclear waste fuel, which he had set out in a memorandum in June 2016.

Earlier this year, SSM signalled a green light for the KBS-3 scheme to proceed to the next phase of the approval process. Whereas the organization claimed that its favorable finding was unanimous, a document leaked to Sweden's principal environmental organization shows that Björn Dverstorp, the engineer directly responsible for assessing the long-term safety of the scheme, had expressed serious concerns about the viability of the copper canisters in which the fuel waste is to be loaded and stored.

Dverstorp is not alone in his concerns. Issues relating to the choice of copper for the canisters have also been raised by a number of senior researchers at the Royal Technological University in Stockholm.

The criterion for approval is that the canisters may be presumed to remain intact for 100,000 years. Referring to the risks of creep strain, stress corrosion and hydrogen-induced embrittlement of the copper, Dverstorp warns that, at worst, the canisters might fail in the first 300 years after their interment. (Failure of the primary barrier at that stage could mean a 41-fold increase in radiation emissions from the repository.) He therefore urged his colleagues to demand that SKB, the nuclear industry-owned company charged to develop the scheme, do further testing and produce evidence that supported the canisters' integrity, before giving a go-ahead.

Dverstorp's concerns were apparently ignored when SSM gave its approval, and they are not reflected in the documents the agency subsequently submitted to the Environmental Court. What is more, SSM's statements to the Court and the general public suggest total agreement within the agency: "It is our policy to give everyone who has taken part in an evaluation an opportunity to express divergent opinions. But no one had any," stated the agency's communication director in an interview.

For his part, Björn Dverstorp does not know exactly when or on what grounds his views were rejected. He was not consulted.

No less worrying is an assurance SSM put forward when Dverstorp's dissent was made known: "SSM believes that SKB will be able to solve these problems [embrittlement and creep strain] at a later stage by one or another means."

Björn Dverstorp advised against making such assurances already in his memorandum of June 2016: "It is not reasonable for SSM to assume responsibility

for [the supposition that] improvements in the canister design will resolve identified problems relating to premature canister failure due to creep, etc. That is something that SKB should have to demonstrate."

Sweden is a small country, and the nuclear community here is close-knit. All share a commitment to the technology, and many have sat side-by-side on the same school bench. That makes regulating difficult. Many who have read all of SSM's text production can point to 'telling' passages, where collegiality seems to have interfered with, or at least taken the edge off, regulatory duty.

The fact that the KBS-3 method has been under development for roughly 40 years can, for example, be interpreted differently. SSM takes it as reason to be cautious: "Considering that more than 40 years of work have been invested in the KBS-3 project, we have to make sure that we can explain exactly why we find that SKB's proposal might not meet the criteria [of approval]."
(*Sveriges Radio Ekot, 11 October 2017*)

By contrast, Björn Dverstorp puts the burden of proof on SKB: "Developing the canister is a complex and time-consuming task. SKB has been working on it for over thirty years, and so, it is hardly convincing when SKB 'makes guesses' about what further development of the canister design may be able to resolve."
(*Memorandum 13 June 2016*)

The Environmental Court heard testimony, oral and written, from all concerned parties during five weeks in October and November. The panel of jurists will review the material in coming weeks and make a determination as to whether the project is mature enough to be presented to the government for a final decision. At the time of writing, their 'verdict' is expected on 23 January 2018.

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The Banana Equivalent Dose of catastrophic nuclear accidents

Author: Jim Green – Nuclear Monitor editor

NM855.4694 The ‘Nuclear for Climate’ lobby group recently attended the UN COP23 climate conference armed with bananas, in order to make specious comparisons between radiation exposures from eating bananas and routine emissions from nuclear power plants.

One of the reasons the comparison is specious is that some exposures are voluntary, others aren’t. Australian academic Prof. Barry Brook said in the aftermath of the Fukushima disaster: “People don’t understand that they live in an environment that is awash with radiation and they make decisions every day which affect their radiation dose – they hop on an airplane or eat a banana or sit close to the TV.”¹ True – but people choose to hop on an airplane or eat a banana or sit close to the TV, whereas radiation doses from nuclear plants and nuclear accidents are usually involuntary.

Another reason why the comparison made by ‘Nuclear for Climate’ is specious is that it ignores spikes in radioactive emissions during reactor refueling. Radiation biologist Dr Ian Fairlie notes that when nuclear reactors are refueled, a 12-hour spike in radioactive emissions exposes local people to levels of radioactivity up to 500 times greater than during normal operation.² The spikes may explain infant leukemia increases near nuclear plants – but operators provide no warnings and take no measures to reduce exposures.²

The specious comparison between bananas and nuclear power plants also ignores the spike in emissions and radiation doses following catastrophic accidents. So, what’s the Banana Equivalent Dose³ (yes, that’s a thing) of the Chernobyl and Fukushima disasters?

According to the IAEA, the collective effective dose from Chernobyl was 600,000 person-Sieverts.⁴ The UN Scientific Committee on the Effects of Atomic Radiation estimates radiation exposure from the Fukushima disaster at 48,000 person-Sieverts.^{5,6}

Combined, exposure from Chernobyl and Fukushima is estimated at 648,000 person-Sieverts. Exposure from eating a banana is estimated at between 0.09–2.3 microSieverts.³ Let’s use a figure of 0.1 microSievert per banana. Thus, exposure from Chernobyl and Fukushima equates to 6,480,000,000,000 Banana Equivalent Doses – that’s 6.48 trillion bananas or, if you prefer, 6.48 terabananas or 6,480 gigabananas.

End-to-end, that many 15-cm (6-inch) bananas would stretch 972 million kilometres – far enough to reach the moon 2,529 times over, or the sun 6.5 times over.

Potassium cycle

Another reason the comparison made by ‘Nuclear for Climate’ is specious is explained by Dr Gordon Edwards from the Canadian Coalition for Nuclear Responsibility.⁷



[T]he body already has a lot of “natural” potassium including K-40 [which is unavoidable], and any new “natural” potassium ingested is balanced by eliminating a comparable amount of “natural” potassium to maintain the “homeostasis” of the body. In other words the body’s own mechanisms will not allow for a net increase in potassium levels – and therefore will not allow for an increase in K-40 content in the body.

“Here’s what the Oak Ridge Associated Universities has to say; (ORAU was founded in 1946 as the Oak Ridge Institute of Nuclear Studies.): ‘The human body maintains relatively tight homeostatic control over potassium levels. This means that the consumption of foods containing large amounts of potassium will not increase the body’s potassium content. As such, eating foods like bananas does not increase your annual radiation dose. If someone ingested potassium that had been enriched in K-40, that would be another story.’

“The same argument does not work for radioactive caesium, or for any of the radioactive pollutants given off by a nuclear power plant, because most of these materials do not exist in nature at all – and those that do exist in nature are not subject to the same homeostatic mechanism that the body uses to control potassium levels. Consequently any foodstuffs or beverages containing radioactive caesium or other man-made radioactive pollutants will cause an additional annual dose of ionizing radiation to the person so exposed.”

Likewise, Linda Gunter explained in a 16 November 2017 article:⁹

“At the COP23 Climate Talks currently underway in Bonn, a group calling itself Nuclear for Climate, wants you to slip on their false banana propaganda and fall for their nonsensically unscientific notion that bananas are actually more dangerous than nuclear power plants! I am not making this up. Here is the picture.

"The oxymoronic Nuclear for Climate people are handing out bananas complete with a sticker that reads: "This normal, every-day banana is more radioactive than living near a nuclear power plant for one year." ...

"If you smell something rotten in this banana business, you are right. So let's peel off the propaganda right now. In short, when you eat a banana, your body's level of potassium-40 doesn't increase. You just get rid of some excess potassium-40. The net dose of a banana is zero.

"To explain in more detail, the tiny radiation exposure due to eating a banana lasts only for a few hours after ingestion, namely the time it takes for the normal potassium content of the body to be regulated by the kidneys. Since our bodies are under homeostatic control, the body's level of potassium-40 doesn't increase after eating a banana. The body just gets rid of some excess potassium-40.

"The banana bashers don't want you to know this and instead try to pretend that the potassium in bananas is the same as the genuinely dangerous man-made radionuclides – such as cesium-137 and strontium-90 – that are released into our environment from nuclear power facilities, from atomic bomb tests and from accidents like Fukushima and Chernobyl.

"These radioactive elements, unlike the potassium-40 in bananas, are mistaken by the human body for more familiar elements. For example, ingested radioactive strontium-90 replaces stable calcium, and ingested radioactive cesium-137 replaces stable potassium. These nuclides can lodge in bones and muscles and irradiate people from within. This is internal radiation and can lead to very serious, long-lasting and trans-generational health impacts."

An unfortunate incident in Goiania, Brazil in September 1987 illustrates the hazards of cesium-137, a fission product. Two people stole a radiotherapy source from a disused medical clinic. A security guard did not show up to work that day; he went instead to the cinema to see 'Herbie Goes Bananas'.¹⁰ The radiotherapy source contained 93 grams of cesium-137. It was sold to a junkyard dealer.

Many people were exposed to the radioactive cesium and they spread the contamination to other sites within and beyond the town. At least four people died from exposure to the radiation source and, according to the IAEA, "many others" suffered radiation injuries.¹¹ Those injured included eight patients who required surgical debridements, amputation of the digital extremities and plastic skin grafts.¹² The incident was rated Level 5 ('Accident with Off Site Risk') on the 7-point International Nuclear Event Scale.

Terrorists don't arm themselves with bananas

Bananas – and the potassium in bananas – are of no interest to nuclear weapons proliferators. There's no Treaty on the Non-Proliferation of Bananas, no Comprehensive Banana Test Ban Treaty. Kim Jong-un and Donald Trump aren't threatening each other with bananas; not yet, at least. Conversely, there is a long history of nuclear power plants being used directly and indirectly in support of nuclear weapons programs.¹³

Nuclear historian Paul Langley notes that terrorists don't arm themselves with bananas:¹⁴

"The potassium cycle in humans is no excuse for nuclear authorities anywhere on the planet to claim any benefit or natural precedent for the marketing of nuclear industry emissions contaminated food.

"The fission products are not nutrients. Do not eat them. The nuclear industry promises to keep its radioactive sources sealed. When the industry invariably fails in this undertaking, it turns around and claims that the residue of its pollution is like a banana. Crap. The residue is like the residue of a rad weapon. Fact. It's the same stuff. Terrorists do not attempt to arm themselves with bananas. They are not dangerous.

"Radio Strontium, Radio Iodine, Radio cesium have NO PLACE in food. Nuke is not clean, it is not green and it relies on lies it has concocted over decades. ... The more the nuclear industry claims eating plutonium, strontium, cesium, iodine and other fuel and fission products is OK because bananas exist and because the potassium is a needed nutrient, the more I consider them to be blatant liars."

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My people are still suffering from Australia's secret nuclear testing

This is an extract of Sue Coleman-Haseldine's speech in Oslo marking the awarding of the Nobel Peace Prize to the International Campaign to Abolish Nuclear Weapons. Sue is an indigenous Kokatha woman who lives in Ceduna, South Australia, and a member of the Australian Nuclear Free Alliance (www.anfa.org.au).

NM855.4695 My name is Sue Coleman-Haseldine. I was born into poverty on the margins of Australian society on the Aboriginal mission of Koonibba in 1951. At this time my people were not allowed to vote and we had very few means to be understood, let alone be heard.

I was born into one of the oldest living cultures known on Earth and into a place that I love – a dusty, arid paradise on the edge of a rugged coastline. Our land and waters are central to our outlook and religion and provide the basis for my people's health and happiness.

And I was born just before the desert lands to our north were bombed by the deadliest weapons on Earth in an extensive, secretive and devastating manner by the Australian and British governments.

In the 1950s, areas known as Emu Fields and Maralinga were used to test nine full-scale atomic bombs and for 600 other nuclear tests, leaving the land highly radioactive. We weren't on ground zero, but the dust didn't stay in one place. The winds brought the poison to us and many others.

Aboriginal people, indeed many people at that time, knew nothing about the effects of radiation. We didn't know the invisible killer was falling amongst us. Six decades on, my small town of Ceduna is being called the Cancer Capital of Australia. There are so many deaths in our region of various cancers. My grand-daughter and I have had our thyroids removed, and there are many others in our area with thyroid problems. Fertility issues appear common.

But there has been no long-term assessment of the health impacts in the region and even those involved in the botched clean-ups of the test sites have no recourse because they cannot prove their illness is linked with exposure to nuclear weapons testing.

The impact of the Maralinga and Emu Fields testing has had far-reaching consequences that are still being felt today. Ask a young person from my area, "What do you think you will die from?" The answer is, "Cancer, everyone else is".

I have lived my life learning about the bomb tests and also learning that the voice of my people and others won't always be understood or heard. But I learnt from old people now gone that speaking up is important and by joining with others from many different places and backgrounds that our voices can be amplified.

Through these steps I found the International Campaign to Abolish Nuclear Weapons (ICAN), or perhaps ICAN found me. ICAN – as an organisation, as a collective of passionate, educated people working for a clear goal – has been so important to me. To know that my story and my voice helps bring recognition to the past and can shape the future of nuclear prohibition has strengthened my resolve.



Being involved in ICAN has been a double-edged sword. On one hand and for the first time in my life, I no longer feel alone or isolated. I have met others from many parts of the globe who have similar stories and experiences and who are passionate advocates for a nuclear-free future.

But the flip side of this is my understanding of just how widespread and just how devastating the nuclear weapons legacy is across the globe. To learn that so many weapons still exist sends fear to my heart. ICAN is a worthy winner of the Nobel Peace Prize – in a short time we have gathered support for a treaty to finally outlaw nuclear weapons and help eliminate the nuclear threat.

The vision was reached in part with so many nations adopting the Treaty on the Prohibition of Nuclear Weapons in July 2017. And we should celebrate this win and the opportunity to work together to stop the suffering and assist countries to make amends to nuclear weapons victims by acknowledging the permanent damage done to land, health and culture.

Unfortunately, the Australian government, along with other first world nations, didn't even participate in the treaty negotiations, and they haven't signed the treaty yet, but over time we feel confident they will.

A lot has changed since I was born. Aboriginal people now have the right to vote in Australia, but still we battle for understanding about our culture and the Australian nuclear weapons legacy. My home is still remote and most of my people still poor. But we are also no longer alone. We have the means and the will to participate – to share and to learn and to bring about lasting change.

ICAN's work is not done, our work is not done. We will continue to work together. A world without nuclear weapons is a world we need and are creating. I stand here in hope and gratitude for the opportunity to participate. I stand here with pride and I stand here for our future and the generations to come.

UK: Power from SMRs 30% more expensive than large reactors

Author: Jim Green – Nuclear Monitor editor

NM855.4696 Electricity from the first small modular reactor (SMR) in Britain would be 30% more expensive than power from large reactors according to a report by the consultancy Atkins for the UK Department for Business, Energy and Industrial Strategy, because of reduced economies of scale and the costs of deploying first-of-a-kind technology.^{1,2}

The Atkins report said there is “a great deal of uncertainty with regards to the economics” of the smaller reactors.² The report estimates that the levelized cost of electricity for an SMR based on a pressurized water reactor design would be £86–124/MWh with a central estimate of £101/MWh, and adds this caveat: “However it is recognised that SMR is a new technology and there is a substantial risk that these costs will be higher than this if costs accumulate during development or if financing costs are initially higher than they are for large nuclear.”²

Chris Lewis from the consultancy EY said: “While the study recognises that the economics to build SMRs are challenging, measures can be taken to achieve greater cost reduction through the standardisation of technology, greater modularisation, and the ability to standardise design and repeat manufacturing.”¹

The Department for Business, Energy and Industrial Strategy announced on December 7 that it is making available up to £56 million over the next three years to support R&D into SMRs and to assess their feasibility and accelerate the development of promising designs.³

The government support is a small fraction of the funding required to develop SMRs. Nearly US\$500 million was wasted on the mPower SMR project in the US – including US\$111 of government funding – before the project was abandoned.⁴

And the £56 million on offer in the UK is a small fraction of support promised in 2015, when chancellor George Osborne said that at least £250m would be spent by 2020 on an “ambitious” programme to “position the UK as a global leader in innovative nuclear technologies”.⁵

Industry sources told the *Guardian* that the government funding is a relatively small sum and they are unsure whether it will be enough to make a difference. “It’s a pretty half-hearted, incredibly British, not-quite-good-enough approach,” one said.⁴ An energy industry source questioned how credible most of the SMR developers were: “Almost none of them have got more than a back of a fag packet design drawn with a felt tip.”⁵

Paul Dorfman, a research fellow at University College London, said: “The real question the government must ask is this: given the ongoing steep reduction in all renewable energy costs, and since SMR research and development is still very much ongoing, by the time SMRs comes to market, can they ever be cost competitive with renewable energy? The simple answer to that is a resounding no.”⁵

Pete Roche wrote in September:⁶

“We now know thanks to Andy Stirling and Philip Johnstone of Sussex University that the government wants to use the civilian nuclear programme to generate expertise, and technology, for military use, especially reactors for Trident nuclear submarines. Lord Hutton gave the game away in his introduction to the SMR Consortium report when he wrote: ‘A UK SMR programme would support all 10 ‘pillars’ of the Government’s Industrial Strategy and assist in sustaining the skills required for the Royal Navy’s submarine programme.’

“Senior civil servants revealed that the government’s decision to build a new generation of civil nuclear power stations starting with Hinkley Point is linked to maintaining enough skills to keep Britain’s nuclear deterrent. The disclosure came at a hearing of the Commons Public Accounts Committee looking at the huge cost of building Hinkley Point power station which critics see as uneconomic and not properly costed.

“Stephen Lovegrove told the committee ‘I was in regular discussion with Jon Thompson, former Permanent Secretary at the MOD, to say that as a nation we are going into a fairly intense period of nuclear activity ... We are building the new SSBNs (nuclear armed nuclear submarines) and completing the Astutes ... We are completing the build of the nuclear submarines which carry conventional weaponry. We have at some point to renew the warheads, so there is very definitely an opportunity here for the nation to grasp in terms of building up its nuclear skills.’

“With regard to Hinkley, Stirling and Johnstone say there is a ‘remarkable persistence and intensity of UK Government attachments to what is increasingly recognised as an economically untenable project.’ The persistence of this nuclear attachment looks to be at least partly due to a perceived need to subsidise the costs of operating and renewing the UK nuclear-propelled submarine fleet.”

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Can TEPCO's Kashiwazaki-Kariwa units 6 and 7 be restarted?

Author: Yukio Yamaguchi – Co-Director, Citizens Nuclear Information Center

NM855.4697 Japan's Nuclear Regulation Authority (NRA) finalized the draft of its inspection documents regarding the Application Form for Approval of Changes to Nuclear Facilities for Tokyo Electric Power Co.'s (TEPCO's) Kashiwazaki-Kariwa (KK) Nuclear Power Station on October 4, and solicited public comments for a 30-day period from October 5 to November 3. According to news reports, 904 comments were received. Since the March 11, 2011 earthquake and tsunami, when all of Japan's nuclear power plants (NPPs) were shut down, five have been restarted, all of which are pressurized water reactors (PWRs). This will be the first time for the NRA to decide on restarting a boiling water reactor (BWR), which is what TEPCO's Fukushima Daiichi NPP used. How can the NRA respond to all these views from across Japan?

History of Niigata's NPPs

Niigata is a prefecture known for its frequent earthquakes. In the past half-century alone, it experienced one large and two medium-sized earthquakes. Those were the Niigata earthquake of 1964 (magnitude M7.5), in which considerable liquefaction was noted in urban areas; the Chuetsu earthquake of 2004 (M6.8); and the Chuetsu offshore earthquake of 2007 (M6.8).

Moreover, KK was the world's first NPP to be hit directly by an earthquake. The Chuetsu offshore earthquake of 2007 resulted in leakage of radioactive substances into the environment, outbreaks of fire and uneven ground at the site, with 3,762 defects resulting.

Built straddling Kashiwazaki City and the adjacent Kariwa Village, the TEPCO-owned KK brought its Unit 1 reactor into operation in September 1985, and Unit 7, in July 1997. The combined capacity of its seven units is 8,200 MW, making it the world's largest single nuclear generating station. Units 6 and 7, in particular, are "advanced boiling water reactors" (ABWR) with capacities of 1,356 MW each and recirculation pumps contained within them.

Japan's largest electric power company TEPCO has owned and operated a total of 17 nuclear reactors in Japan (six at Fukushima Daiichi, four at Fukushima Daini and seven at KK). The electricity generated by these is all transmitted to the Greater Tokyo Area. None is supplied to either of the prefectures where it is produced.

In August 2002, however, it was revealed that TEPCO had altered data from its own inspections, concealing problems in 29 cases. It continued asserting that safety was its "top priority," but that was clearly a lie. In September 2002, Niigata Prefecture, Kashiwazaki City and Kariwa Village all rescinded their agreement for "pluthermal" (MOX) plans at the plant. The following year, in April 2003, operation of all 17 of TEPCO's nuclear reactors was halted.

Viewing TEPCO's concealment of problems as a serious issue, Niigata Prefecture established the "Technical Committee on Nuclear Power Safety Management in Niigata Prefecture" (hereinafter, the "Technical Committee") in February 2003 with the aim of increasing the prefecture's technical ability when checking KK for safety and hazards. Nevertheless, they were unable to prevent the disaster resulting from the Chuetsu offshore earthquake in July 2007. During that earthquake, Units 2, 3, 4 and 7 were running, and they shut down automatically. The other units, 1, 5 and 6, were out of operation for regular inspections.

Two subcommittees

Niigata Prefecture added six new members to the Technical Committee in March 2008 to enhance it, giving it 14 members in all. In addition, it organized two subcommittees under the Technical Committee. They were the "Subcommittee into Equipment Integrity, Earthquake Resistance Safety" (with eight members) and the "Subcommittee into Earthquake and Ground Condition" (with six members). Each subcommittee has several members that take a cautious approach to nuclear power, or are even downright critical of it – a stance worthy of special mention. Indeed, this situation is without parallel.

The effect of this became more notable the more the discussions of the subcommittees proceeded. At the time, the Nuclear and Industrial Safety Agency and the NRA were Japan's regulatory institutions for nuclear energy, but while they were rather lenient toward TEPCO in their reviews, both subcommittees questioned TEPCO severely, occasionally even getting the national government to amend its decisions. It was also the prefectural government's policy to have the views of Niigata's citizens and residents reflected by the Technical Committee and its two subcommittees.

On March 11, 2011, right when the Subcommittee into Earthquake and Ground Condition was convening, wouldn't you know it, the venue underwent prolonged, major shaking. That was the M9.0 Tohoku earthquake and tsunami off Japan's Pacific coast.

Fukushima Daiichi nuclear accident verification work

Niigata's Technical Committee has turned its discussion for the time being to Fukushima nuclear accident verification work. It has augmented its membership and continues these discussions even now. For safe management of KK, it decided that what needed highest priority was clarifying the causes and results of the Fukushima nuclear accident. The four committees investigating the accident, from the Diet, the national government, TEPCO and private citizens, submitted their own respective reports, wrapping up their investigations, but Niigata Prefecture was not satisfied with that, and has been trying to clarify all aspects of the Fukushima nuclear accident.

The two subcommittees are taking a temporary break from their discussions because the Technical Committee has put forward six topics and divided its members into groups of a few people that are continuing to discuss these. The six topics are (1) the effects of seismic motion on important equipment, (2) critical decisions made, such as to inject seawater, (3) TEPCO's earthquake-response management, (4) the state of information sharing on issues such as the meltdowns, (5) work under high radiation conditions, and (6) severe accident countermeasures. Six and a half years after the

earthquake, these discussions are finally shedding light on the course of events that delayed public admission of the meltdowns. The discussion of topic (1) has come to a climax. Facts are being brought to light about damage that the enormous tsunami fails to explain.

Newly elected Governor Yoneyama's policies

Ryuichi Yoneyama became Niigata's newest governor in October 2016, replacing Gov. Izumida, who had served three consecutive terms. Gov. Yoneyama is continuing his predecessor's policies. He says: "While verification of the Fukushima accident is still incomplete, we will not even begin to discuss restarting the Kashiwazaki-Kariwa Nuclear Power Station." Furthermore, he says verification work for the Fukushima nuclear accident will take another three to four years to complete. What this means is that even if the NRA gives the go-ahead for restarting the plant, Niigata Prefecture, as the locality of the nuclear power plant, will conduct its own deliberations independently of the national government and draw its own conclusions.

In addition, Gov. Yoneyama has conferred the status of "Verification Committee" upon the Technical Committee (which currently has 15 members), whose duty it will be to clarify the causes of the accident. He has also established two new verification committees. They are the "Committee to Consider the Effects from Nuclear Accidents on Health and Livelihood of a Nuclear Power Plant Accident" (five members in the subcommittee on health and four in the subcommittee on livelihood) and the "Committee to Consider Evacuation Methods in Nuclear Disasters" (nine members). To oversee all three of the verification committees, a "Verification Supervisory Committee" is to be formed.

While the committee system which has been set up is to be highly commended, it reflects only the view of experts. One wonders what kind of input Niigata's citizens and residents will be given and how their proactive views and arguments can also be incorporated. I think that is an important question for the future.

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The myth of proliferation-resistant nuclear power

Author: Jim Green – Nuclear Monitor editor

NM855.4698 One of the most significant nuclear developments of 2017 has been the open acknowledgement by some prominent nuclear insiders and advocates of the connections between nuclear power and weapons. That's a 180-degree about-face from the usual denial of the power-weapons connections. Those acknowledgements (covered in detail in Nuclear Monitor #850¹) are most obvious in the US and the UK: the contribution of the civil nuclear industry to maintaining

the weapons industry is being used as a justification to increase government support for the civil industry.²

There are still some hold-outs. Michael Shellenberger from the fake environment group 'Environmental Progress' claims that "one of FOE-Greenpeace's biggest lies about nuclear energy is that it leads to weapons"³ and – to further emphasize his stupidity and dishonesty – Shellenberger recently told an IAEA

conference that “nuclear energy prevents the spread of nuclear weapons”.⁴ Likewise, Ted Nordhaus, another self-styled ‘pro-nuclear environmentalist’, argues that to conflate nuclear power with nuclear weapons is “extremely misleading” because they involve different physics, different technologies and different institutions, and because “nuclear weapons today involve fusing two atoms together in an uncontrolled explosion.”⁵ But there is plenty of overlap between the physics, technologies and institutions of nuclear power generation and weapons production⁶; and all nuclear weapons are either based on fission or they use fission to trigger fusion.

Pro-nuclear commentator Dan Yurman has written an interesting piece about the efforts of disgraced former US National Security Advisor Mike Flynn to broker deals between nuclear power vendors and potential clients in the Middle East.⁷ ACU Strategic Partners, a consulting firm that Flynn worked for, claimed that it could address fears about nuclear proliferation in the Middle East by deploying a “proliferation resistant” light water reactor, but, as Yurman notes, “there is no such thing when it comes to “light water reactors” like the Russian 1000 MW VVER which is what they offer to export customers.”⁷

There is no such thing as a proliferation-resistant light water reactor, period. And there is no such thing as a proliferation-proof nuclear fuel cycle. The UK Royal Society noted in a 2011 report: “There is no proliferation proof nuclear fuel cycle. The dual use risk of nuclear materials and technology and in civil and military applications cannot be eliminated.”⁸

Earlier this year, Victor Gilinsky, Marvin Miller, and Harmon Hubbard updated an important 2004 report on the proliferation dangers of light water reactors.⁹ Here are the conclusions and recommendations of the updated report:

Conclusions

The Light Water Reactor (LWR), the standard power source for most nuclear power stations around the world and the likely design for future ones, is not nearly so “proliferation resistant” as it has been widely advertised to be. From a proliferation point of view the LWR is generally preferable to other types of power reactors but the differences are more blurred than was previously appreciated.

With today’s technology small, difficult to find, clandestine enrichment facilities or reprocessing plants could provide the reactor’s owners with militarily significant quantities of nuclear explosives.

We need therefore to revise the conventional wisdom that LWRs are a safe proposition for siting in just about any country so long as there are no accompanying commercial uranium enrichment facilities or reprocessing facilities.

The principal “front end” concern relates to gas centrifuge enrichment plants. It is now widely understood that even if such plants are safeguarded and designed to produce low enriched uranium (LEU) for LWR fuel, their owners could convert them quickly to produce highly enriched uranium (HEU) for bombs. It is less appreciated that if the owners divert some of the LEU produced by the declared plant and used as feed for a clandestine enrichment plant, they can

reduce the needed plant capacity by a factor of five. Moreover, such LEU feed need not rely on the existence of an LEU plant; it could come from processing the fuel pellets of a fresh LWR fuel reload. The possibility of using centrifuges to produce HEU for bombs has been enhanced by recent revelations regarding Pakistan’s spread of this technology to Iran, Libya, and North Korea, and possibly others, with the fabrication of parts in a number of other countries.

It is also widely understood that reprocessing plants that separate plutonium from LWR spent fuel for later use as fuel could also provide plutonium for bombs. What is less understood, and emphasized in this report, is that small, clandestine reprocessing plants could provide the reactor’s owners with militarily significant quantities of nuclear explosives. Such technology is well within the capabilities of countries like North Korea or Iran.

Clandestine reprocessing is only half of the plutonium concern. The other is that contrary to conventional wisdom LWRs can be copious sources of near-weapons grade plutonium that can be used to make powerful nuclear weapons. The widely debated issue of the usability for weapons of plutonium from LWR fuel irradiated to its commercial limit has diverted attention from the capacity of an LWR to produce large quantities of near-weapons grade plutonium from partially irradiated spent fuel. The characteristics of bombs based on this material would not be significantly different than those based on weapons grade plutonium.

Recommendations

We need to reassess the role of LWRs in international programs: They are not for everyone and we should be cautious about promoting their construction in worrisome countries. This is not a benign technology. At a minimum we should not support such technology where it is not clearly economic.

Clandestine enrichment and reprocessing: The IAEA and national intelligence has constantly to be on the lookout for clandestine plants because they can rapidly change the security equation. There needs to be much closer accounting of LEU fuel in view of its significance as possible feed for clandestine enrichment.

IAEA inspection of LWRs: IAEA inspection activities for LWRs to check on fuel inventories and refueling need adjustment upward in countries of concern from the point of view of potential bomb-making to take account of possible undiscovered clandestine reprocessing. Because of inevitable IAEA resource limitations it is necessary for the agency to concentrate the inspection where they are most important. It would help to gain support for such a system if it were possible to develop some objective way of defining “countries of concern.” The IAEA should take greater account of the presence of weapons-grade plutonium or near weapons-grade plutonium in spent fuel pools and storage in devising its inspections. At the very least, the Agency should press for wider acceptance of near-real time surveillance of light water reactor fresh and spent fuel storage areas.

Enforcement: The NPT members must enforce the IAEA inspection system. An important purpose of IAEA

safeguards is to deter nuclear weapons activities – of would-be nuclear weapon countries – by the threat of early detection. This assumes there will be a strong reaction

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to such an early detection of illicit activity. If would-be bomb-makers conclude they have nothing to fear because the international community is not likely to react to their violations, the whole system of control falls apart.

South African president's last-ditch effort to ram through a nuclear power deal

Author: Hartmut Winkler – Professor of Physics, University of Johannesburg

NM855.4699 South African President Jacob Zuma's term of office has been characterised by an absence of vision and associated initiatives.¹ Zuma is instead known for his inaction and overt stalling tactics.² Examples include delays in setting up the State Capture Commission of Inquiry³, announcing a new board for the state broadcaster⁴, and delaying the release of a report on the future of university fees.⁵

His recent dramatic push to fast-track an expensive and highly controversial nuclear power station build is therefore very much out of character.⁶ But Zuma's advocacy of the nuclear build needs to be understood in terms of another hallmark of his presidency – state capture.⁷ This expression refers to the systematic takeover of state institutions by presidential allies and the resulting exploitation of institutions for commercial advantage and profit by his benefactors.

It's already become clear who is likely to benefit from South Africa pursuing the option to build nuclear power stations. The list includes the Gupta brothers⁸ and Zuma's son Duduzane through their links to the Shiva uranium mine.⁹

And then there's Zuma himself. Speculation about why the president appears to be favouring a deal with Russian company Rosatom ranges from allegations of grand scale individual kickbacks¹⁰ to alleged commitments linked to funding for the African National Congress.¹¹

The controversy around the nuclear power option was precipitated three years ago when it emerged that the government had signed an agreement with Russia that paved the way for the use of Russian technology in planned new nuclear power stations.¹² The problem was that there'd been a complete lack of due process – no costing, no public consultation, no proper proclamation and no competitive bidding.¹³ It was no surprise that the courts declared the awarding of the nuclear build to Russia illegal.¹⁴

On top of this a very strong case has been mounted against South Africa pursuing nuclear power. Reasons include the fact that it can't afford it¹⁵, and doesn't need nuclear in its energy mix.¹⁶

Despite all of these developments, and the growing controversy and mounting opposition to the deal, Zuma appears determined to get it done before his term as president of the ANC ends in December. In the last of the reshuffles he appointed one of his closest allies, David Mahlobo, to the energy portfolio.¹⁷ This is generally seen as a last-ditch attempt to roll out the nuclear build in the face of now massive opposition.

Reports suggest that this reshuffle was occasioned by Russian displeasure over what they see as a broken promise to award the building contract to Rosatom.¹⁸

The energy minister's next steps

Mahlobo appears to have devoted his first few weeks in office entirely to furthering the nuclear project. He has been active in the media declaring the nuclear build as a given – and necessary.¹⁹

Mahlobo's next steps are likely to be:

- He is reported to be planning to release – in record time – a new energy plan.²⁰ This, some suspect, will be biased towards nuclear.²¹
- Heightened public lobbying. This could include verbal attacks on nuclear critics as already initiated by the President.²²
- The issuing of a request for proposals to build the nuclear plants to potential developers like Rosatom. Most observers expect the evaluation to favour Rosatom regardless of the merits of the other bidders.

- Signing an agreement with Rosatom. This could mirror the US\$30 billion deal Russia signed with Egypt which, on the surface, will appear attractive because it would offer favourable terms such as annual interest of only 3% and the commencement of repayments after 13 years.²³ But when scaling the 4.8 GW Egyptian agreement up to the 9.6 GW envisioned for South Africa, the total cost then already exceeds R1 trillion. Annual repayments from year 14 to year 35 then amount to about 5% of South Africa's annual fiscus. Any cost overruns, which are common in many other nuclear builds²⁴, would vastly increase the debt further.

What's changed

The global energy landscape has changed dramatically since South Africa first mooted the idea of supplementing its power mix with more nuclear. Major developments and changes include:

- Growing mistrust in nuclear energy in the wake of the 2011 Fukushima disaster²⁵;
- A dramatic fall in the cost of renewable energy²⁶ and;
- Lower than expected growth in energy demand in South Africa.²⁷
- Not even government's own recent energy plans have promoted nuclear. A 2013 draft energy plan argued against immediate nuclear growth. (The plan was never formally adopted.²⁸) The last draft plan released in 2016 went as far as declaring new nuclear unnecessary until 2037.²⁹

Will it happen?

Nuclear plants are major long-term investments, and these projects will not survive lengthy construction and operation periods without broad public support. There is definitely a lack of public support in South Africa.

The Zuma-Mahlolo work plan will face major opposition by other parties, civil society and even critics within the ruling party.³⁰ Lengthy court challenges will query the validity of the energy plan process, the public consultation, the regulatory aspects, the site selection and the constitutionality of the entire process. Public protests, highly effective in other spheres, would now be directed against the nuclear build.³¹ The ruling party would probably abandon the scheme if it proves politically costly.

The danger is, however, that huge funds will have been wasted in coming to this realisation.

The stakes are high. Zuma's efforts to promote this unpopular nuclear project are weakening him politically.³² Even party comrades perceived to be in his inner circle – like newly appointed Finance Minister Malusi Gigaba – recognise that going ahead with the programme at this stage would cripple the country economically.³³ Repeated ministerial reshuffles to sideline his critics has further damaged Zuma's standing in the ruling party and in broader society.³⁴

Reprinted from The Conversation, <https://theconversation.com/south-african-presidents-last-ditch-effort-to-ram-through-a-nuclear-power-deal-87018>

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NUCLEAR NEWS

Storage steals the spotlight at nuclear power's birthday party

It was nuclear power's birthday bash but Chris Crane, president and CEO of Exelon Corp., the largest nuclear operator in the US, named energy storage the most promising technology of the future, one that could render nuclear power unnecessary.

"In our view the long-term viable technology that will drive a cleaner future is economic storage," Crane said at 'Reactions: New Perspectives on Our Nuclear Legacy', the University of Chicago's commemoration of the first man-made nuclear reaction 75 years ago under the stands of its abandoned football stadium.

Crane's comments departed from those of former Energy Secretary Ernest Moniz, who, delivering the event's closing keynote, insisted the United States must continue to pursue nuclear energy for reasons of both climate and national security.

Crane still defended his company's 24 existing nuclear plants, because he contends energy storage hasn't arrived yet. Even though the cost of lithium-ion batteries has dropped precipitously and promises to continue to do so, Crane contends storage hasn't arrived because lithium-ion does not provide all the features the energy market needs. "Storage is becoming much more economic, but those are one-hour and four-hour discharges, and they only have a life cycle of so long," he said. "We need days of discharges."

So Crane is betting on whatever the national labs develop for next-generation energy storage. "What we need to do is continue with the labs and continue the research that's going on: what is life beyond lithium ion, what is the storage mechanism that we can harness more renewable energy in that form?" he said. In the meantime, existing nuclear plants should be kept open, with license renewals and fairer financial terms, he said, but with the understanding that they are "transition assets."

Both Crane and Moniz concede new nuclear plants are unlikely to be built, at least new nuclear plants that resemble the ones Exelon operates today. "In this country it seems very unlikely today that we will see another 1,000 Watt-plus plant being built, at least in my lifetime, it would seem," Moniz said. "So we need some innovation here if nuclear power is to play a role in this very low carbon environment."

Moniz and Crane both also expressed uncertainty about the prospects of the likely form that innovation will take: small modular reactors. "I don't know if all of this will come together to give an effective, attractive source, but we're never going to find out if we don't get there," Moniz said. "It's the kind of thing that we've got to find out if that dog hunts. Is it going to perform economically? It's got great safety characteristics. There are reasons to be optimistic from the point of view that if you have a much smaller plant you don't have the capital at risk. You may get better financing."

Abridged from: Jeff McMahon, 2 Dec 2017, 'Battery Storage Steals The Spotlight At Nuclear Power's Birthday Party', www.forbes.com/sites/jeffmcmahon/2017/12/02/battery-storage-steals-the-spotlight-at-nuclear-powers-birthday-party/

Grappling with the bomb – Britain's Pacific H-bomb tests

Grappling with the Bomb is a history of Britain's 1950s program to test the hydrogen bomb, code name Operation Grapple. In 1957–58, nine atmospheric nuclear tests were held at Malden Island and Christmas Island in the British Gilbert and Ellice Islands Colony – today, part of the Pacific nation of Kiribati.

Nearly 14,000 British troops travelled to the central Pacific for Operation Grapple. They were joined by hundreds of New Zealand sailors, Gilbertese labourers and Fijian troops. Today, decades later, survivors suffer from serious illnesses they attribute to exposure to hazardous levels of ionising radiation.

On the 60th anniversary of the tests, *Grappling with the Bomb* details regional opposition to Britain's testing program in the 1950s, with protests from Fiji, Cook Islands, Western Samoa, Japan and other nations.

Based on archival research and interviews with nuclear survivors, Nic Maclellan's book presents portraits of i-Kiribati woman Sui Kiritome, British pacifist Harold Steele, businessman James Burns, Fijian sailor Paul Ah Poy, English volunteers Mary and Billie Burgess and many other witnesses to Britain's nuclear folly.

The book can be ordered – or downloaded for free – at <http://dx.doi.org/10.22459/GB.09.2017>

Nic Maclellan, 'Grappling with the Bomb – Britain's Pacific H-bomb tests', ANU Press, Canberra, 2017.

Canada: Indigenous demonstrators urge governments to stop using nuclear power

A large demonstration at Queen's Park called on Canadian governments to phase out nuclear power and opt for renewable energy sources instead. First Nations people and environmentalists from around Ontario joined in solidarity on November 9. Initially, they had gathered to attend a panel discussion on Wednesday at the University of Toronto.

Some held placards baring the words "Protect the sacred." They formed a drum circle at one point. Activists say waste generated by nuclear energy must be regulated more efficiently, and that future production of nuclear power will only lead to more waste, so it should be terminated in order to safeguard human and environmental health.

"Collectively, we're addressing the nuclear industry and what is to be done with the waste afterwards," said Quinn Meawasige, 24, a member of Bawating Water Protectors, a grass-roots organization. "We're raising awareness. We don't want to burden our future generations with this problem. We need to act now."



The Smoke Trail Singers perform at a demonstration at Queen's Park.

First Nations remain steadfast in their opposition to a waste repository at the Bruce nuclear facility, located near Lake Huron. The federal government has yet to sign-off on the project proposed by Ontario Power Generation.

"There's no burial or transportation of radioactive waste without the free, prior and informed consent of the Indigenous communities, the First Nations who would be impacted," Meawasige said. "We need to be working toward a renewable future."

Anishinabek Nation Grand Council Chief Patrick Madahbee is focused on the solution, he said, which starts with individual environmental stewardship. "You can write letters to the editors of papers. You can write letters to your member of parliament, petition environmental ministers," he said. "Would you poison your mother? That's really what we're doing when we poison mother earth. We're saying we got to stop this nonsense."

Abridged from: Julien Gignac, 9 Nov 2017, www.thestar.com/news/gta/2017/11/08/indigenous-demonstrators-environmentalists-urge-governments-to-stop-using-nuclear-power.html

Japan: Data falsifications by Kobe Steel uncovered

Kobe Steel admitted on October 8 to rewriting inspection certificates for some of its products and other misconduct. Since then, one scandal after another has come to light, affecting many more of its products. In fact, the company appears to have been falsifying data or cheating in other ways for decades.

Deliveries to nuclear power facilities have also been affected by these scandals. One case, revealed on October 13, involved replacement pipes that were scheduled to be used in a heat exchanger of a residual heat removal system at Fukushima Daini Unit 3 (BWR, 1,100 MW). Another came to light on the 25th regarding centrifuge parts that had not yet been used at the Rokkasho uranium enrichment plant. Components produced by Kobe Steel include items like radiating fins on fuel transport casks and welding materials used in feed water heaters, the upper lids of PWR pressure vessels, moisture separation superheaters, light water reactor fuel cladding tubes, nuclear reactor pressure vessels, and so on. As of November 15, however, no improprieties involving these items had been reported.

Japan's Nuclear Regulation Authority (NRA) has called for the electric power companies to ensure that the components in question are not being used. The electric power companies are requesting similar confirmation from the plant makers. Leaving this up to such voluntary measures, however, is no way to pursue the truth. Related businesses should be asked to conduct a thorough investigation and report the results.

Citizens Nuclear Information Center, Nuke Info Tokyo No.181 Nov./Dec. 2017, www.cnic.jp/english/?p=4007

WISE/NIRS Nuclear Monitor

The World Information Service on Energy (WISE) was founded in 1978 and is based in Amsterdam, the Netherlands.

The Nuclear Information & Resource Service (NIRS) was set up in the same year and is based in Washington D.C., US.

WISE and NIRS joined forces in the year 2000, creating a worldwide network of information and resource centers for citizens and environmental organizations concerned about nuclear power, radioactive waste, proliferation, uranium, and sustainable energy issues.

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