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Editorial

Dear readers of the WISE/NIRS Nuclear Monitor,

In this issue of the Monitor:

- We respond to an open letter by conservation scientists which urges environmentalists to rethink their opposition to nuclear power.
- Anna Kireeva writes about problems with nuclear power and nuclear waste management in Russia.
- We discuss the safety and security challenges associated with China's expanding nuclear power program.

The Nuclear News section has reports on the unreliability of aging reactors in the UK; the International Conference on the Humanitarian Impact of Human Weapons; a hike in nuclear waste management fees in Sweden; the recent election in Greenland and the implications for uranium mining; and Washington's efforts to block international initiatives to strengthen nuclear safety standards.

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. We'll be back in late January with the first issue for 2015.

Regards from the editorial team.

Email: monitor@wiseinternational.org

Monitored this issue:

An open letter to nuclear lobbyists in response to their open letter to environmentalists

Author: *Jim Green − Nuclear Monitor editor*

NM796.4437 A group of conservation scientists has published an open letter urging environmentalists to reconsider their opposition to nuclear power.[1] The letter is an initiative of Australian academics Barry Brook and Corey Bradshaw, and has been endorsed by 69 (other) scientists from Australia, Canada, China, Finland, France, India, Indonesia, Italy, Norway, Singapore, South Africa, Switzerland, the UK, and the US.

The co-signatories "support the broad conclusions drawn in the article 'Key role for nuclear energy in global biodiversity conservation', published in *Conservation Biology*."[2] The open letter states: "Brook and Bradshaw argue that the full gamut of electricity-generation sources − including nuclear power − must be deployed to replace the burning of fossil fuels, if we are to have any chance of mitigating severe climate change."

So, here's my open letter in response to the open letter initiated by Brook and Bradshaw:

Dear conservation scientists,

Space constraints prohibit the usual niceties that accompany open letters so I'll get straight to the point. If you want environmentalists to support nuclear power, get off your backsides and do something about the all-too-obvious problems associated with the technology. Start with the proliferation problem since the multifaceted and repeatedly-demonstrated links between the 'peaceful atom' and nuclear weapons proliferation pose profound risks and greatly trouble environmentalists and many others besides.[3]

The Brook/Bradshaw journal article (rightly) emphasises the importance of biodiversity − but even a relatively modest exchange of some dozens of nuclear weapons could profoundly effect biodiversity, and large-scale nuclear warfare undoubtedly would.[4]

As Australian scientist Dr Mark Diesendorf notes: "On top of the perennial challenges of global poverty and injustice, the two biggest threats facing human civilisation in the 21st century are climate change and nuclear war. It would be absurd to respond to one by increasing the risks of the other. Yet that is what nuclear power does."[5]

The Brook/Bradshaw article ranks power sources according to seven criteria: greenhouse gas emissions, cost, dispatchability, land use, safety (fatalities), solid waste, and radiotoxic waste. WMD proliferation is excluded. By all means ignore lesser concerns to avoid a book-length analysis, but to ignore the link between nuclear power and weapons is disingenuous and the comparative analysis of power sources is a case of rubbish in, rubbish out.

Integral fast reactors

While Brook and Bradshaw exclude WMD proliferation from their comparative assessment of power sources, their journal article does address the topic. They promote the 'integral fast reactor' (IFR) that was the subject of R&D in the US until was abandoned in the 1990s.[6] If they existed, IFRs would be metal-fuelled, sodium-cooled, fast neutron reactors.

Brook and Bradshaw write: "The IFR technology in particular also counters one of the principal concerns regarding nuclear expansion − the proliferation of nuclear weapons − because its electrorefining-based fuel-recycling system cannot separate weapons-grade fissile material."

But Brook's claim that IFRs "cannot be used to generate weapons-grade material"[7] is false.[8] IFR advocate Tom Blees notes that: "IFRs are certainly not the panacea that removes all threat of proliferation, and extracting plutonium from it would require the same sort of techniques as extracting it from spent fuel from light water reactors."[9] George Stanford, who worked on an IFR research program in the US, states: "If not properly safeguarded, [countries] could do [with IFRs] what they could do with any other reactor – operate it on a special cycle to produce good quality weapons material."[10]

The presentation of IFRs by Brook and Bradshaw contrasts sharply with the sober assessments of the UK and US governments. An April 2014 US government report notes that pursuit of IFR technology would be associated with "significant technical risk" and that it would take 18 years to construct an IFR and associated facilities.[11] A recent UK government report notes that IFR facilities have not been industrially demonstrated, waste disposal issues remain unresolved, and little can be ascertained about cost.[12]

Brook and Bradshaw argue that "the large-scale deployment of fast reactor technology would result in all of the nuclear-waste and depleted-uranium stockpiles generated over the last 50 years being consumed as fuel." Seriously? An infinitely more likely outcome would be some fast reactors consuming waste and weapons-useable material while other fast reactors and conventional uranium reactors continue to produce such materials.

The Brook/Bradshaw article ignores the sad reality of fast reactor technology: over US$50 billion (€40.2b) invested, unreliable reactors, numerous fires and other accidents, and one after another country abandoning the technology.[13]

Moreover, fast reactors have worsened, not lessened, proliferation problems. John Carlson, former Director-General of the Australian Safeguards and Non-proliferation Office, discusses a topical example: "India has a plan to produce such [weapon grade] plutonium in fast breeder reactors for use as driver fuel in thorium reactors. This is problematic on non-proliferation and nuclear security grounds. Pakistan believes the real purpose of the fast breeder program is to produce plutonium for weapons (so this plan raises tensions between the two countries); and transport and use of weapons-grade plutonium in civil reactors presents a serious terrorism risk (weapons-grade material would be a priority target for seizure by terrorists)."[14]

The fast reactor techno-utopia presented by Brook and Bradshaw is attractive. Back in the real world, there's much more about fast reactors to oppose than to support. And the large-scale deployment of Generation IV reactor technology is further away than they care to admit. The Generation IV International Forum website states: "It will take at least two or three decades before the deployment of commercial Gen IV systems. In the meantime, a number of prototypes will need to be built and operated. The Gen IV concepts currently under investigation are not all on the same timeline and some might not even reach the stage of commercial exploitation."[15]

Creative accounting and jiggery-pokery

Brook and Bradshaw also counter proliferation concerns with the following argument: "Nuclear power is deployed commercially in countries whose joint energy intensity is such that they collectively constitute 80% of global greenhouse-gas emissions. If one adds to this tally those nations that are actively planning nuclear deployment or already have scientific or medical research reactors, this figure rises to over 90%. As a consequence, displacement of fossil fuels by an expanding nuclear-energy sector would not lead to a large increase in the number of countries with access to nuclear resources and expertise."

The premise is correct − countries operating reactors account for a large majority of greenhouse emissions. But even by the most expansive estimate − Brook's[16] − less than one-third of all countries have some sort of weapons capability, either through the operation of reactors or an alliance with a nuclear weapons state. So the conclusion − that nuclear power expansion "would not lead to a large increase in the number of countries with access to nuclear resources and expertise" − is nonsense and one wonders how such jiggery-pokery could find its way into a peer-reviewed journal.

The power−weapons conundrum is neatly summarised by former US Vice-President Al Gore: "For eight years in the White House, every weapons-proliferation problem we dealt with was connected to a civilian reactor program. And if we ever got to the point where we wanted to use nuclear reactors to back out a lot of coal ... then we'd have to put them in so many places we'd run that proliferation risk right off the reasonability scale."[17]

Safeguards

Apart from the their misinformation about IFRs, and their nonsense argument about the proliferation implications of expanding nuclear power, Brook and Bradshaw add one further comment about proliferation: "Nuclear weapons proliferation is a complex political issue, with or without commercial nuclear power plants, and is under strong international oversight."

Oddly, Brook and Bradshaw cite a book by IFR advocate Tom Blees in support of that statement.[18] But Blees argues for the establishment of an international strike force on full standby to attend promptly to any detected attempts to misuse or to divert nuclear materials (p.269). That is a far cry from the International Atomic Energy Agency's safeguards system. In articles and speeches during his tenure as the Director General of the IAEA from 1997−2009, Dr. Mohamed ElBaradei said that the Agency's basic rights of inspection are "fairly limited", that the safeguards system suffers from "vulnerabilities" and "clearly needs reinforcement", that efforts to improve the system have been "half-hearted", and that the safeguards system operates on a "shoestring budget ... comparable to that of a local police department".

Moreover, Blees argues that: "Privatized nuclear power should be outlawed worldwide, with complete international control of not only the entire fuel cycle but also the engineering, construction, and operation of all nuclear power plants. Only in this way will safety and proliferation issues be satisfactorily dealt with. Anything short of that opens up a Pandora's box of inevitable problems." (p.303)

Blees doesn't argue that the nuclear industry *is* subject to strong international oversight − he argues that "fissile material *should* all be subject to rigorous international oversight" (emphasis added).[19]

Of course, the flaws in the nuclear safeguards system are not set in stone.[20] And this gets me back to my original point: if nuclear lobbyists want environmentalists to support nuclear power, they need to get off their backsides and do something about the all-too-obvious problems such as the inadequate safeguards system. Environmentalists have a long record of working on these problems and the lack of support from nuclear lobbyists has not gone unnoticed.

To give an example of a topical point of intervention, Canada has agreed to supply uranium and nuclear technology to India with greatly reduced safeguards and non-proliferation standards, Australia seems likely to follow suit, and those precedents will likely lead to a broader weakening of international safeguards (and make it that much more difficult for nuclear lobbyists to win support from environmentalists and others). The seriousness of the problem has been acknowledged by, among others, a former Chair of the IAEA Board of Governors[21] and a former Director-General of the Australian Safeguards and Non-proliferation Office.[14] It is a live debate in numerous nuclear exporting countries and there isn't a moment to lose.

Nuclear lobbyists should join environmentalists in campaigning for a strengthening of the safeguards system and against efforts to weaken the system. But Brook and Bradshaw have never made even the slightest contribution to efforts to strengthen safeguards, and it's a safe bet that the same could be said of the other signatories to their open letter.

To mention just one more point of intervention, the separation and stockpiling of plutonium from power reactor spent fuel increases proliferation risks. There is virtually no demand for the uranium or plutonium separated at reprocessing plants, and no repositories for the high-level waste stream. Yet reprocessing continues, the global stockpile of separated plutonium increases year after year and now stands at around 260 tons.[22] It's a problem that needs to be solved; it's a problem that *can* be solved.

Endorsing the wishful thinking and misinformation presented in the Brook/Bradshaw journal article is no substitute for an honest acknowledgement of the proliferation problems associated with nuclear power, coupled with serious, sustained efforts to solve those problems.

References:

1. 15 Dec 2014, 'An Open Letter to Environmentalists on Nuclear Energy', http://bravenewclimate.com/2014/12/15/an-open-letter-to-environmentalists-on-nuclear-energy/
2. Brook, B. W., and C. J. A. Bradshaw. 2014. Key role for nuclear energy in global biodiversity conservation. Conservation Biology. http://dx.doi.org/10.1111/cobi.12433
3. www.foe.org.au/anti-nuclear/issues/nfc/power-weapons
4. www.nucleardarkness.org/index2.php
5. Dr Mark Diesendorf, University of NSW, 'Need energy? Forget nuclear and go natural', 14 Oct 2009, www.theage.com.au/opinion/society-and-culture/need-energy-forget-nuclear-and-go-natural-20091014-gvzo.html
6. http://foe.org.au/anti-nuclear/issues/nfc/power/ifrs
7. Barry Brook, 9 June 2009, 'Nuking green myths', The Australian, http://web.archive.org/web/20090611042943/http://www.theaustralian.news.com.au/story/0,25197,25607083-7583,00.html
8. www.foe.org.au/anti-nuclear/issues/nfc/power-weapons/g4nw

9. http://bravenewclimate.com/2009/02/12/integral-fast-reactors-for-the-masses/
10. http://bravenewclimate.com/2010/09/18/ifr-fad-7/
11. US Department of Energy, April 2014, 'Report of the Plutonium Disposition Working Group: Analysis of Surplus Weapon-Grade Plutonium Disposition Options', www.nnsa.energy.gov/sites/default/files/nnsa/04-14-inlinefiles/SurplusPuDispositionOptions.pdf
See also 'Generation IV reactor R&D', www.wiseinternational.org/node/4251
12. UK Nuclear Decommissioning Authority, January 2014, 'Progress on approaches to the management of separated plutonium – Position Paper', www.nda.gov.uk/news/pu-management-approach.cfm
See also: 'Will PRISM solve the UK's plutonium problem?', www.wiseinternational.org/node/4048
13. International Panel on Fissile Materials, 2010, 'Fast Breeder Reactor Programs: History and Status', www.ipfmlibrary.org/rr08.pdf
14. www.aph.gov.au/DocumentStore.ashx?id=79a1a29e-5691-4299-8923-06e633780d4b&subId=301365
15. www.gen-4.org/gif/jcms/c_41890/faq-2
16. http://bravenewclimate.com/2009/11/06/carbon-emissions-nuclear-capable-countries/
17. David Roberts, 10 May 2006, 'An interview with accidental movie star Al Gore', www.grist.org/article/roberts2
18. Blees T. 2008. 'Prescription for the planet: the painless remedy for our energy & environmental crises'. BookSurge, Charleston, South Carolina.
19. http://bravenewclimate.com/2009/02/21/response-to-an-integral-fast-reactor-ifr-critique/
20. www.foe.org.au/anti-nuclear/issues/oz/u/safeguards
21. www.aph.gov.au/DocumentStore.ashx?id=eeed39e8-2c3c-400b-a9ff-4d744da48c41&subId=301939
www.aph.gov.au/DocumentStore.ashx?id=9b3d0478-c3ad-4d97-a1c2-5747f1265ebc&subId=301939
22. Fissile Materials Working Group, 6 May 2013, 'How do you solve a problem like plutonium?', www.thebulletin.org/web-edition/columnists/fissile-materials-working-group/how-do-you-solve-problem-plutonium

Russian reactor power experiments, extended run times, spooking environmentalists

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NM796.4438 Ecologists are getting more uncomfortable with the fact that Russia is tinkering around with the science of extending the usual 30-year operational life span of nuclear reactors. The concern was raised during a joint conference in Oslo on December 10 of the Bellona Foundation and Russian state nuclear corporation Rosatom on 'Russia's Atomic Energy: Conditions, Tendencies and Safety'. The discussion focused on the safety of Russian reactors, especially those in Northwest Russia, closest to Norway; nuclear waste and spent nuclear fuel handling; and safety upgrades to nuclear installations.

Rosatom wishes by 2020 to build nine nuclear power stations, but the plans are dubious. The construction of the so-called Baltic Nuclear Power Plant in Kaliningrad by 2018 provoked a hail of questions. These are issues tied to Rosatom's official roadmap[1] for nuclear power plant construction.

Currently, Russia operates 10 nuclear power stations with a total of 33 reactors, which supply 16% of the country's electricity. Yet, 19 of these reactors are operating on state granted engineering life span extensions, and another four are operating beyond their engineered power parameters, or at more than 100%.

"This isn't Russian 'know how' – many countries do this," said Alexander Nikitin, chairman of the Environmental Rights Center (ERC) Bellona in St. Petersburg. "But Bellona is concerned by the fact that Russian atomic stations operate on excessive power output and extended reactors."

One nuclear power plant experimenting with running reactors beyond capacity is the Kola station, which is such a source of worry to Scandinavia.[2] In October, the Kola station was given the go-ahead to continue running its 30-year-old No 4 reactor for an astonishing 25 more years – an unprecedented license extension in the industry.[3] The extensions means all of the plant's reactors are operating longer than their engineered design limit.

"Extending the resources of the Kola plant, as well as running its reactors beyond their power capacity, is associated with regional power demands, not just because the industry wants to do it," said Sergei Zhavoronkin, secretary of Rosatom's Public Chamber on Safe Nuclear Energy Usage in the Murmansk Region.

But, as Bellona Murmansk has noted many times, the region holds an energy surplus, to which the Kola nuclear plant contributed 60% of the energy, with the remaining 40% coming from hydroelectric stations.

Nuclear power stations are yours, the waste is ours

As of December 1, 2014, Rosatom's portfolio included 27 inter-government agreements for reactor construction abroad.

"It's clear that international agreements are still not contracts, but they already contain certain prescribed requirements for the countries in question," said Alexander Nikitin.

The countries holding agreements with Rosatom for reactor construction include Turkey, Finland, Jordan, India, Bangladesh, China, Vietnam, Hungary, Armenia and Iran.

"All of these agreements stipulate that Russia takes back the spent nuclear fuel [generated by these prospective] plants, which are built abroad," said Nikitin. "No other country behaves this way aside from Russia."

And all this on top of the spent nuclear fuel being returned via the Port of Murmansk from international research reactors built by the Soviet Union.

According to Zhavoronkin, 70 containers of spent nuclear fuel from Russian-built foreign sources were safely offloaded and transported through Murmansk between 2008 and 2014.

Zhavoronkin called "rhetorical" the question of how safely these loads are actually delivered. In 2010, the vessel Puma, having offloaded spent nuclear fuel, nearly sank. And the vessels bringing these nuclear loads are not always rated to carry them.

Regarding the *Puma*, Zhavoronkin said it was "good that the accident happened after and not before" the offloading of spent fuel.

"And that the *Puma* is an old ship is a rhetorical issue," Zhavoronkin said.

What should become of spent nuclear fuel?

According to 2013 figures, Russia has amassed 24,000 tons of spent nuclear fuel. Eleven of its reactors are of the fatally-flawed RBMK-1000 Chernobyl design and produce 550 tons of spent nuclear fuel a year. Onsite storage of spent nuclear fuel at stations running RMBKs has reached 13,000 tons nationwide. Stations running VVER-1000 reactors produce 230 tons of spent fuel annually, and they've piled up a combined 6,800 tons of it.

Russia's six VVER-440 reactors have pumped out 87 tons of spent nuclear fuel, which will continue to be reprocessed at the Mayak Chemical Combine in the Southern Urals. Finally, Russia's fast neutron BN-600 reactor has produced 3.7 tons of spent nuclear fuel.

"Spent nuclear fuel is a big problem for all nuclear countries," said Nikitin. "No one knows in the world knows what to do with it, including Russia."

Abridged and reprinted from Bellona, http://bellona.org/news/nuclear-issues/2014-12-russian-reactor-power-experiments-extended-run-times-spooking-environmentalists

References:

1. http://bellona.org/news/nuclear-issues/nuclear-russia/2013-11-rosatoms-new-roadmap-slashes-number-new-reactors-leaves-loose-ends-shut-downs
2. http://bellona.org/news/nuclear-issues/nuclear-issues-in-ex-soviet-republics/2012-12-extending-the-run-time-of-aged-reactors-at-the-kola-npp-or-build-a-new-plant-decision-due-in-2013
3. http://bellona.org/news/nuclear-issues/2014-10-kola-nuclear-plant-gets-go-ahead-run-4-reactor-record-breaking-25-years

China's nuclear power plans: safety and security challenges

Author: *Jim Green − Nuclear Monitor editor*

NM796.4439 China is pushing ahead with ambitious plans to expand nuclear power, but the risks are daunting.

China's State Council published the 'Energy Development Strategy Action Plan, 2014-2020' in November. The plan envisages an expansion of nuclear power from 19.1 gigawatts (GW) of currently installed capacity to 58 GW by 2020, with another 30 GW under construction by then. It says that efforts should be focused on promoting the use of large pressurised water reactors (including the AP1000 and CAP1400 designs), high temperature gas-cooled reactors, and fast reactors.[1]

Ambitious targets for renewables have also been set: 350 GW of hydro capacity by 2020, 200 GW of wind power capacity, and 100 GW of solar capacity.[1] Thus the renewable target of 650 GW greatly exceeds the 58 GW nuclear target. In 2013, for the first time, China added more new renewable capacity than new fossil and nuclear capacity.[2]

Chinese authorities have a history of failing to meet nuclear power forecasts:

- In 1985, authorities forecast 20 GW in 2000 but the true figure was 2.2 GW (11% of the forecast).[3]
- In 1996, authorities forecast 20 GW in 2010 but the true figure was 8.4 GW (42% of the forecast).[3]
- In late 2012, China revised its plan to have 50 GW of nuclear capacity installed by 2015 down to 40 GW − and the true figure will be around half that.[4]

The Economist noted in a December 6 article that plans for a massive nuclear expansion should be taken with "a big pinch of salt" and added: "It is true that China is the brightest spot in the global nuclear industry, but that is mostly because prospects in other places are bleak."[5]

Claims by industry bodies − such as the World Nuclear Association's forecast of 150 GW of nuclear capacity in China by 2030[6] − should also be taken with a pinch of salt.

In 2010, Chinese officials forecast 130 GW of installed nuclear capacity by 2020 − more than double the current forecast. And the State Council Research Office's 2011 forecast of 70 GW by 2020 has been reduced to 58 GW.[2]

It is unlikely that the 58 GW target can be reached by 2020. It assumes no closures of the 22 operating reactors, completion of all 27 reactors (29 GW) under construction, and completion of 10 GW that has yet to begin construction − all in the space of six years.

Constraints

The *South China Morning Post* noted in a September 2014 article that "China will have to overcome some big hurdles, including conflicts of interest among large state-owned companies, technological uncertainties in new-generation power plants and public concerns about nuclear safety." The newspaper quotes a China Institute of Atomic Energy expert who argues that a shortage of scientists and engineers poses a "major challenge".[7]

Plans for inland nuclear plants have been delayed by public opposition (especially in the aftermath of the Fukushima disaster), water shortages and other problems. Even the latest plan calls for nothing more than feasibility studies regarding inland plants.

A 2011 report from the State Council Research Office stated that nuclear development would require new investment of around US$150 billion (€121b) by 2020, on top of the costs of plants already under construction. The Office noted that new nuclear projects rely mainly on debt, funds are tight, and "investment risks cannot be discounted". Supply chain problems and bottlenecks could result in delays and further cost increases, the report noted.[8]

Safety first?

Numerous insiders have warned about inadequate nuclear safety and regulatory standards in China. He Zuoxiu, a member of the Chinese Academy of Sciences, said last year that "to reduce costs, Chinese designs often cut back on safety".[9]

Li Yulun, a former vice-president of China National Nuclear Corporation, said last year that Chinese "state leaders have put a high priority on [nuclear safety] but companies executing projects do not seem to have the same level of understanding."[10]

Cables released by WikiLeaks in 2011 highlighted the secrecy of the bidding process for nuclear power plant contracts in China, the influence of government lobbying, and potential weaknesses in management and regulatory oversight. Westinghouse representative Gavin Liu was quoted in a cable as saying: "The biggest potential bottleneck is human resources – coming up with enough trained personnel to build and operate all of these new plants, as well as regulate the industry."[11]

In August 2009, the Chinese government dismissed and arrested China National Nuclear Corporation president Kang Rixin in a US$260 million (€209m) corruption case involving allegations of bid-rigging in nuclear power plant construction.[12]

Regulation

In 2011, Chinese physicist He Zuoxiu warned that "we're seriously underprepared, especially on the safety front" for a rapid expansion of nuclear power. Qiang Wang and his colleagues from the Chinese Academy of Sciences noted in 2011 that China "still lacks a fully independent nuclear safety regulatory agency"[13], and they noted that China's nuclear administrative systems are fragmented among multiple agencies; and China lags behind the US, France, and Japan when it comes to staff and budget to oversee operational reactors.[14]

The 2011 report by the State Council Research Office recommended that the National Nuclear Safety Administration "should be an entity directly under the State Council Bureau, making it an independent regulatory body with authority."[8]

China's nuclear safety agency is still not independent. And there are other problems: salaries for regulatory staff are lower than in industry, and workforce numbers remain relatively low. The State Council Research Office report said that most countries employ 30−40 regulatory staff per reactor, but China's nuclear regulator had only 1000 staff.[8]

In 2010, an International Atomic Energy Agency team carried out an Integrated Regulatory Review Service mission and said the review provided "confidence in the effectiveness of the Chinese safety regulatory system."[8] Which just goes to prove that the IAEA sometimes says the silliest things − and in the process implicitly endorses and encourages sub-standard practices.

The Economist argued on December 6: "[T]he headlong rush to nuclear power is more dangerous and less necessary than China's government admits. One of the main lessons of Fukushima was that politicised, opaque regulation is dangerous. China's rule-setting apparatus is also unaccountable and murky, and ambitious targets for a risky technology should ring warning bells."[15]

Nuclear technology options

The Economist points to risks arising from China's approach to nuclear technology options:

"China's approach to building capacity has added to the risk of an accident. Rather than picking a single proven design for new reactors from an experienced vendor and replicating it widely, the government has decided to "indigenise" Western designs. The advantage of this approach is that China can then patent its innovations and make money out of selling them to the world; the downside is that there are now several competing designs promoted by rival state-owned enterprises, none of which is well tested.

"China should slow its nuclear ambitions to a pace its regulators can keep up with, and build its reactors using the best existing technology − which happens to be Western. That need not condemn it to more sooty, coal-fired years. The cost of renewable energy is dropping quickly and its efficiency is rising sharply. Last year, over half of all new power-generation capacity installed in China was hydro, wind or solar. If China wants to accelerate its move away from coal, ramping up those alternatives yet more would be a lot safer."[15]

Liu Baohua, the head of the nuclear office at the National Energy Administration, recently said that key technology and equipment being deployed in China's nuclear program is "still not completely up to standard". Liu said: "The third-generation reactors now under construction still have problems with the pumps and valves, and with the inflexibility of the design. ... We are working to resolve these problems and the overall situation is still under control." He said more needed to be done to improve the regulatory framework and to train nuclear personnel.[16]

The '12th 5-year Plan for Nuclear Safety and Radioactive Pollution Prevention and Vision for 2020', produced by the Ministry of Environment and endorsed by the State Council, said that China needed to spend US$13 billion (€10.4b) to improve nuclear safety at over the three years to 2015. The document states that "China has multiple types of nuclear reactors, multiple technologies and multiple standards of safety, which makes them hard to manage."[8]

China continues to build large numbers of 'Generation II' reactors which lack the safety features of more modern designs. The State Council Research Office report said that reactors built today should operate for 50 or 60 years, meaning a large fleet of Generation II reactors will still be in operation into the 2070s, when even Generation III reactors may have been superceded.[8]

Secrecy

The EPR reactors under construction at Taishan illustrate some of the problems and risks associated with China's nuclear program. "It's not always easy to know what is happening at the Taishan site," Stephane Pailler from France's Autorite de Surete Nucleaire (ASN) said in an interview this year. "We don't have a regular relationship with the Chinese on EPR control like we have with the Finnish," she said, referring to Finland's troubled EPR reactor project.

Philippe Jamet, one of ASN's five governing commissioners, testified before the French Parliament in February. "Unfortunately, collaboration isn't at a level we would wish it to be," he said. "One of the explanations for the difficulties in our relations is that the Chinese safety authorities lack means. They are overwhelmed."[17]

In March, EDF's internal safety inspector Jean Tandonnet noted problems evident during a mid-2013 visit to Taishan, including inadequacies with large components like pumps and steam generators which were "far" from the standards of the EPR plants in Finland and France.[17]

Tandonnet urged corrective measures and wrote that studies "are under way on tsunami and flooding risks."[17] Oilprice.com has assessed nuclear plants most at risks from a tsunami. Globally, it found that 23 nuclear power plants with 74 reactors are in high-risk areas. The riskiest country is China − of the 27 reactors under construction, 17 are located in areas considered at risk of tsunamis.[18]

Little information has been published about the Taishan reactor project − and the same could be said about many others. Albert Lai, chairman of The Professional Commons, a Hong Kong think tank, said this year that the workings of China's nuclear safety authority are a ''total black box'' and ''China has no transparency whatsoever.''[17]

Insurance and liability arrangements

The Economist recently noted that Communist leaders are "keenly aware that a big nuclear accident would prompt an ugly − and, in the age of viral social media, nerve-wrackingly unpredictable − public backlash against the ruling party."[5]

The backlash would be all the more virulent because of grossly inadequate insurance and liability arrangements. Chinese authorities are slowly developing legislation which may improve the situation. Currently, liability caps are the lowest in the world. Nuclear plant operators must have insurance that covers financial losses and injuries up to 300 million yuan (US$48.5m; €39m). If a legitimate claim exceeds that amount, the central government may provide up to 800 million yuan (US$129m; €104m) extra.[19]

Closing the fuel cycle, increasing the risks

China's attempt to develop a closed fuel cycle will increase safety and security risks as discussed in an October 2014 paper by Hui Zhang, a physicist and a research associate at Harvard University's Belfer Center for Science and International Affairs.[20]

In 2010, China conducted a 10-day hot test at its pilot reprocessing plant, where it is also building a pilot MOX fuel fabrication facility. The China National Nuclear Corporation plans to build a medium-scale demonstration reprocessing plant by 2020, followed by a larger commercial reprocessing plant.

Hui Zhang notes that the pilot reprocessing plant lacks an integrated security system. He notes that the 2010 hot test revealed problems: "Although reprocessing operations stopped after only ten days, many problems, including safety and security issues, were encountered or identified. These included both a very high amount of waste produced and a very high measure of material unaccounted for or MUF."

If the closed fuel cycle plans proceed, the long-distance shipment of MOX fuels and metal plutonium fuels will pose major security concerns.

Hui Zhang argues that "China has no convincing rationale for rushing to build commercial-scale reprocessing facilities or plutonium breeder reactors in the next couple of decades, and a move toward breeders and reprocessing would be a move away from more secure consolidation of nuclear materials."

China ranks poorly in the NTI Nuclear Materials Security Index − it is in the bottom fifth of the countries ranked. The NTI summarises: "China's nuclear materials security conditions could be improved by strengthening its laws and regulations for the physical security of materials in transport to reflect the latest IAEA nuclear security guidelines, and for mitigating the insider threat, particularly by requiring personnel to undergo more stringent and more frequent vetting and by requiring personnel to report suspicious behavior to an official authority. China's nuclear materials security conditions also remain adversely affected by its high quantities of weapons-usable nuclear materials, political instability, governance challenges, and very high levels of corruption among public officials."[21]

References:

1. WNN, 20 Nov 2014, 'China plans for nuclear growth', www.world-nuclear-news.org/NP-China-plans-for-nuclear-growth-2011144.html

2. World Nuclear Industry Status Report, 2014, www.worldnuclearreport.org/WNISR2014.html#_Toc268768720

3. ACF, 2012, 'Yellowcake Fever: Exposing the Uranium Industry's Economic Myths', www.acfonline.org.au/resources/yellowcake-fever-exposing-uranium-industrys-economic-myths
4. Keith Bradsher, 24 Oct 2012, 'China Slows Development of Nuclear Power Plants', www.nytimes.com/2012/10/25/business/global/china-reduces-target-for-construction-nuclear-power-plants.html?_r=0
5. 6 Dec 2014, 'Promethean perils', www.economist.com/news/business/21635498-after-hiatus-nuclear-power-set-revival-china-promethean-perils
6. World Nuclear Association, 9 December 2014, 'Nuclear Power in China', www.world-nuclear.org/info/Country-Profiles/Countries-A-F/China--Nuclear-Power/
7. Stephen Chen, 14 Sept 2014, 'China plans to be world leader in nuclear power by 2020', South China Morning Post, www.scmp.com/news/china/article/1591984/china-plans-be-world-leader-nuclear-power-2020
8. World Nuclear Association, 9 December 2014, 'Nuclear Power in China', www.world-nuclear.org/info/Country-Profiles/Countries-A-F/China--Nuclear-Power/
9. He Zuoxiu, 19 March 2013, 'Chinese nuclear disaster "highly probable" by 2030', www.chinadialogue.net/article/show/single/en/5808-Chinese-nuclear-di
10. South China Morning Post, 7 Oct 2013, 'China nuclear plant delay raises safety concern', www.scmp.com/business/china-business/article/1325973/china-nuclear-plant-delay-raises-safety-concern
11. Jonathan Watts, 25 Aug 2011, 'WikiLeaks cables reveal fears over China's nuclear safety', www.guardian.co.uk/environment/2011/aug/25/wikileaks-fears-china-nuclear-safety
12. Keith Bradsher, 15 Dec 2009, 'Nuclear Power Expansion in China Stirs Concerns', www.nytimes.com/2009/12/16/business/global/16chinanuke.html?_r=2&
13. David Biello, 16 Aug 2011, 'China's nuclear ambition powers on', www.abc.net.au/environment/articles/2011/08/16/3293802.htm
14. 22 June 2011, 'China needs improved administrative system for nuclear power safety', www.eurekalert.org/pub_releases/2011-06/acs-cni062211.php
15. 6 Dec 2014, 'China's rush to build nuclear power plants is dangerous', www.economist.com/news/leaders/21635487-chinas-rush-build-nuclear-power-plants-dangerous-make-haste-slowly
16. Reuters, 5 Dec 2014, 'China's new nuclear technology not yet fully up to standard, energy official says', www.scmp.com/news/china/article/1655799/new-nuclear-tech-not-yet-fully-standard-china-energy-official-says
17. Tara Patel and Benjamin Haas, 20 June 2014, 'Nuclear Regulators 'Overwhelmed' as China Races to Launch World's Most Powerful Reactor', www.bloomberg.com/news/2014-06-18/french-nuclear-regulator-says-china-cooperation-lacking.html
18. Oil Price, 4 Nov 2014, http://oilprice.com/Alternative-Energy/Nuclear-Power/8-Countries-With-Nuclear-Power-Plants-Most-At-Risk-Of-Tsunamis.html
19. 26 April 2014, 'What if China has a Fukushima?', www.globaltimes.cn/content/856971.shtml
See also WNN, 16 Sept 2014, 'Insurers can help improve the image of nuclear', www.world-nuclear-news.org/RS-Insurers-can-help-improve-the-image-of-nuclear-1609201401.html
20. Hui Zhang, 8 Oct 2014, 'The Security Risks of China's Nuclear Reprocessing Facilities', http://nuclearsecuritymatters.belfercenter.org/blog/security-risks-china%E2%80%99s-nuclear-reprocessing-facilities
21. NTI Nuclear Materials Security Index, 2014, http://ntiindex.org/countries/china/

NUCLEAR NEWS

UK: Report outlines unreliability of aging nuclear reactors

The UK Nuclear Free Local Authorities (NFLA) published a report on December 9 which details the unreliability of the UK's aging nuclear power stations. The report, written by NFLA Policy Advisor Pete Roche, found that in the three years from 2012−2014, 62 outages were reported, over three-quarters of which were unplanned. These reported outages do not include routine refuelling closures. The list of outages is not comprehensive as EDF Energy does not provide comprehensive data on reactor performance.

At its lowest point, on 20 November 2014, less than half (43%) of UK nuclear power capacity was available due to shutdowns. Seven out of 15 reactors were offline.

Unplanned shutdowns cause serious problems for electricity supply regulation and planning. A major likely reason for poor performance is that most reactors are over 30 years old and past their use-by dates, some by considerable margins. The increasingly decrepit state of UK nuclear power stations also presents a serious safety issue. UK nuclear regulatory agencies are aware of the continual reduction in safety margins resulting from graphite loss and crumbling in the moderators of AGR reactors.

Nuclear Free Local Authorities, 9 Dec 2014, 'NFLA concerns over the reliability of aging nuclear reactors in the UK', www.nuclearpolicy.info/publications/briefings.php

www.nuclearpolicy.info/docs/briefings/A241_%28NB127%29_Aging_nuclear_reactor_concerns.pdf

International Conference on the Humanitarian Impact of Human Weapons

On December 8−9, over 1000 people flocked into the grand ballroom of Holfsburg Palace, Vienna, to consider the humanitarian impacts of nuclear weapons. Delegations representing 158 nations were present, as well as nuclear survivors, civil society, media, and researchers.

This was the third International Conference on the Humanitarian Impact of Human Weapons − the first was in Norway in 2013, the second in Mexico in February 2014. The latest conference is intended to 'jump-start' the Nuclear Non-Proliferation Treaty (NPT) deliberations at the UN in May 2015 with a call to proceed with complete disarmament in a global, legally binding form.

The meeting resulted in a vehicle for nations to "sign on" to the Austrian Pledge. This document calls on parties to the NPT to renew their commitments under that treaty and to close any gaps that undermines prohibition and elimination of nuclear weapons.

The Austrian Pledge contains this remarkable provision: “Austria calls on all nuclear weapons possessor states to take concrete interim measures to reduce the risk of nuclear weapon detonations, including reducing the operational status of nuclear weapons and moving nuclear weapons away from deployment into storage, diminishing the role of nuclear weapons in military doctrines and rapid reductions of all types of nuclear weapons ...”

This provision was all the more remarkable since, for the first time, nuclear weapons states were present: the US and Britain, both of which made statements to the assembly confirming that they were not listening.

Invited to speak during the session on the Medical Consequences of Using Nuclear Weapons, I originally declined since my work has focused on energy and the environment, not the military side of nuclear. The invite was made more precise by Ambassador Alexander Kmentt: please speak on the disproportionate impact of radiation on girls and women. Such a direct invitation offered an opportunity to share information that is under-reported.

The fact that atomic bombs were dropped on two cities in Japan almost 80 years ago is no longer being widely taught. Most people don’t know that a long-term study was initiated by the US to count the cancers in the survivors. Among those who were under five years old in 1945, for every boy who got cancer at some point in their lives, two girls got cancer.

The room was full of people, including Hibakusha from Japan, survivors from the US tests in the Marshall Islands, from the British tests in Australia, and from Utah (downwind of the Nevada Test Site). It was a great place to share this information.

Information on Atomic Radiation and Harm to Women is posted at:

www.nirs.org/radiation/radhealth/radhealthhome.htm

− Mary Olson, Nuclear Information and Resource Service (US)

Sweden: Regulator calls for hike in nuclear waste fees

The Swedish Radiation Safety Authority (SSM) has recommended yet another increase in the per kWh-fee on nuclear power to cover predicted costs of decommissioning reactors and the processing and storage of nuclear waste. The proposal raises the fee from an average SEK 0.022/kWh to around 0.040/kWh (US 0.5 c/kWh).

From right to left: Mary Olson, Sue Coleman-Haseldine (Ceduna, South Australia − south of the Maralinga test site), Abacca Anjain-Maddison from the Marshall Islands, and a member of Abacca’s family.

Swedish law requires the industry-owned nuclear waste management company SKB to submit an estimate of projected costs to SSM at three-year intervals. After examining the estimate and consulting other sources, SSM submits its recommendation to the government, which then sets the fee for the next period, in this case 2015−2017.

Over the past couple of terms, SSM's estimates have differed substantially from those of the industry's nuclear waste company. This time, SSM finds that SKB's estimate is short by at least SEK 11 billion (US$1.44, €1.16b). SSM bases its conclusion on a study commissioned from the National Institute of Economic Research (a state body). The conclusion is also seconded by the National Council for Nuclear Waste, an academic reference group, and the National Debt Office, whose comments call for greater transparency as to how SKB arrived at its estimates.

Principal differences concern the estimated future cost of goods and services relating to decommissioning and waste storage, and the cost of necessary reinvestments in existing waste management facilities. SSM states that SKB underestimates cost rises by as much as 12%. Sagging financial returns accruing to the Nuclear Waste Fund – a consequence of the broader economic downturn – also contribute to the gap.

Another discrepancy is that SKB bases its calculations on reactor lifetimes of 50-60 years, yet the Financing Ordinance stipulates that a lifetime of 40 years be used. The advantage from the industry's point of view is obvious: positing a 20−50% longer period of production raises the total sum deposited into the Waste Fund, thereby permitting a lower fee.

The law provides that SSM may, "should circumstances so demand," reject the industry's prognosis and fix an interim fee until satisfactory estimates are on the table. SSM is doing just that. The current recommendation will be for 2015 only, and SKB has been instructed to produce a revised estimate within the next few months.

Shortly after the general election in September 2014, the new government stated as an overall principle that nuclear energy should cover a greater share of its costs to society – which suggests that SSM's proposals would be favourably received.

But there is a catch. The government – a minority coalition – failed to gain parliamentary approval of its budget in December and has announced new elections for March 2015. A change of government before the proposal can be considered is likely, and no one can say what the political constellation after the elections will be.

− *Charly Hultén / WISE Sweden*

Greenland: Pro-uranium coalition forms government

The Inuit Ataqatigiit party was expected to win Greenland's November 28 election, after which it would call a referendum on the controversial issue of uranium mining.

However the pro-uranium Siumut party narrowly won the most votes and has formed a coalition with two other pro-uranium parties − Atassut and Demokraatic. The three parties hold a combined 17 seats in the new parliament while two anti-uranium parties − Inuit Ataqatigiit and Partii Naleraq − hold 14 seats.

Just before the election, a poll showed that 71% of Greenlanders want a national referendum on whether to reinstate the uranium ban. Inuit Ataqatigiit and Partii Naleraq had called for a referendum.

Before the election, former Prime Minister Aleqa Hammond announced in Parliament that if a mining permit was issued to the Australian mining company Greenland Minerals and Energy Ltd. for the Kvanefjeld uranium / rare earths project, a referendum on the project would be held in southern Greenland. That promise might still be kept ... or it might not.

The only uranium project that might be developed in the foreseeable future is the Kvanefjeld project. A feasibility study is due for completion in 2015. It could take 2−3 years before environmental assessment processes are complete.

US blocks international nuclear safety initiatives

The US was exposed at an international meeting of parties to the Convention on Nuclear Safety on December 4.[1] A European proposal would have led to greater efforts to prevent accidents and, should they occur, mitigate the effects of radioactive contamination. The proposal would likely have forced upgrades at existing plants.

Russia scaled back its opposition to European proposals, leaving the US as the main dissenter. Russia was prepared to endorse some of the European proposals though it balked at accepting proposals that would require retrofits of old reactors.

Defending their indefensible position, US diplomats said their opposition to the European initiative was driven by concern that an attempt to amend the convention could weaken it, because some governments would be slow to ratify changes.

Former US Nuclear Regulatory Commission member Victor Gilinsky told Bloomberg: "People in the U.S. don't realize that in many ways our nuclear safety standards lag behind those in Europe. The German and French containment structures are generally more formidable than ours and those reactors generally have more protection systems."[1]

Created in response to the 1986 Chernobyl disaster, the Convention on Nuclear Safety has struggled to improve safety standards. The group's secrecy has often undermined its objectives. A former French envoy, Jean-Pierre Clausner, said that the opacity of the organisation was "shocking" according to documents obtained under a Freedom of Information request.[2]

1. www.bloomberg.com/news/2014-12-10/russian-concessions-on-nuclear-safety-put-focus-on-u-s-reactors.html
   http://au.ibtimes.com/articles/575834/20141213/u-s-convention-nuclear-safety-russia-europe.htm
2. www.bloomberg.com/news/2014-12-01/russia-u-s-face-off-against-europe-on-nuclear-safety.html

South Africa and Russia: 'Pay More for Nuclear' reports

Earthlife Africa has commissioned and released four significant reports in the second half of 2014 in a series titled 'Pay More for Nuclear'. The first report is titled 'Nuclear Technology Options for South Africa'. Prof. Steve Thomas writes: "South Africa's call for tenders for nuclear power plants [in 2008] failed because the costs were high and because the requirements to obtain funding were not politically acceptable. The response to this failure seemed to be that pursuing a wider range of technical options and partners would produce a cheaper and more readily financed offer. The new options mooted include reactors from Korea, China and Russia. The perception that these options will be cheaper is likely to be an illusion. In addition, the designs are unproven and raise serious issues of verifying that they meet the required safety standards."

The second report is titled 'Funding Nuclear Decommissioning – Lessons for South Africa'. Thomas writes: "Current policy and practice on funding nuclear power plant decommissioning in South Africa lags far behind international best practice. It risks bequeathing future generations with a hazardous and expensive task that will have to be paid for by future taxpayers."

The third report is titled 'What Does It Take To Finance New Nuclear Power Plants?'. Thomas writes: "Unless the South African government is prepared to require electricity consumers to sign what will effectively be a blank cheque to the developers of a nuclear power the current attempt to order nuclear power plants for South Africa will fail again and several more years will have been wasted pursuing an option, nuclear power, that is not financeable."

The fourth report is titled 'Russian Nuclear Industry Overview'. Report author Vladimir Slivyak covers problems with ageing reactors, planned new reactors, Russia's fast breeder program, its reactor export program, and inadequate nuclear waste and decommissioning programs. Of particular interest is the section on corruption in the Russian nuclear industry, and the role of NGOs Ecodefense and Transparency International in exposing that corruption.

The four 'Pay More for Nuclear' reports are posted at:

http://earthlife.org.za/2014/12/pay-more-with-nuclear-report-4/

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.

The WISE / NIRS Nuclear Monitor publishes information in English 20 times a year. The magazine can be obtained both on paper and as an email (pdf format) version. Old issues are (after 2 months) available through the WISE homepage: www.wiseinternational.org

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