

# NUCLEAR MONITOR

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## Editorial

Dear readers of the WISE/NIRS Nuclear Monitor,

In this issue of the Monitor,

- Dr. Ian Fairlie writes about the latest UNSCEAR report on radiation exposure from the Fukushima disaster. For all its predictable faults, the UNSCEAR report does at least provide collective radiation dose estimates, from which Dr Fairlie deduces an estimated long-term cancer death toll of around 5,000.
- Nuclear Monitor editor Jim Green writes about the cancellation of plans for two new reactors in the Czech Republic.
- Michael Mariotte from the Nuclear Information and Resource Service writes about the siege mentality of the nuclear power industry in the US.
- Jim Green untangles the debates over the Chernobyl death toll.

The Nuclear News section has reports on disputed plans for uranium mining on Lakota land in South Dakota, USA; insider nuclear threats; the latest set-back for 'small modular reactors'; criticisms of Rio Tinto's activities in Namibia, Australia and elsewhere; the gradual erosion of nuclear safeguards; and more.

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](mailto:monitor@wiseinternational.org)



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## New UNSCEAR Report on Fukushima: Collective Doses

**NM785.4385** Below is Dr Ian Fairlie's preliminary response to a recent report by the UN Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), focusing in particular on the issue of collective radiation doses from the Fukushima disaster. Dr Fairlie, a radiation biologist and independent consultant, is currently examining the report in more detail.

On April 2, UNSCEAR published its long-awaited Report on Fukushima.<sup>1</sup> Of prime importance are its estimates of collective doses to the Japanese population. Page 60 of Annex A of the UNSCEAR report

contains the following table 8 on estimated collective effective doses and collective absorbed doses to the thyroid for the population of Japan (approximately 128 million in 2010):

Exposure duration	Over first year	Over ten years	Up to age 80 years
Collective effective dose	18,000 man-Sieverts (Sv)	36,000 man-Sv	48,000 man-Sv
Collective absorbed dose to thyroid	82,000 man-Gy	100,000 man-Gy	112,000 man-Gy

These estimates are slightly higher than in the draft UNSCEAR report in November 2013. For example, the 80 year whole body dose was 41,000 man-Sv and thyroid dose was 110,000 man-Sv in last year's draft.

In an early preliminary view, these are realistic collective doses, as they are relatively consistent with some independent estimates in Europe. For example, the most detailed model used by the Report published by IPPNW Germany in late March 2013 estimated 95,000 man-Sv<sup>2</sup>: i.e. the UNSCEAR 48,000 man-Sv estimate is within a factor of two of this, which is good agreement given the uncertainties in the IPPNW's methodology and in this area generally.

My own estimate in early March 2013 for Fukushima Prefecture (the most contaminated region) alone was 34,000 man Sv.<sup>3</sup> If I were to add an estimate for the rest of Japan of ~13,000 man-Sv<sup>4</sup>, this would total 47,000 man-Sv – very close to UNSCEAR's estimate of 48,000 man-Sv. In fact, the agreement is slightly unnerving!

In terms of the fatal cancers these doses would cause, the new UNSCEAR estimates imply (via the Linear No Threshold theory) that in future ~5,000 people in Japan will

die from Fukushima's fallout, if we applied a fatal cancer risk of 10% per Sv. (This is because the UNSCEAR report, like the previous WHO reports, no longer applies a dose rate effectiveness factor of 2 to risk estimates.)

However a more detailed scrutiny will be required of the methodologies and assumptions used in the new UNSCEAR report before a final view can be given.

P.S. The UNSCEAR report on page 60 adds that "The collective effective dose to the population of Japan due to a lifetime exposure following the [Fukushima] accident is approximately 10-15% of the corresponding value for European populations exposed to radiation following the Chernobyl accident. Correspondingly, the collective absorbed dose to the thyroid was approximately 5% of that due to the Chernobyl accident." From this, one can work out what UNSCEAR now thinks the whole body collective dose to Europe was from Chernobyl: i.e. 320,000 to 480,000 man-Sv, leading to ~32,000 to ~48,000 fatal cancers. This has never been stated before by UNSCEAR. These estimates are close to the 2006 independent TORCH report's estimates of 30,000 to 60,000 fatal cancers.<sup>5</sup>

#### References and notes:

1. [www.unscear.org/docs/reports/2013/13-85418\\_Report\\_2013\\_Annex\\_A.pdf](http://www.unscear.org/docs/reports/2013/13-85418_Report_2013_Annex_A.pdf)
2. [www.fukushima-disaster.de/](http://www.fukushima-disaster.de/)
3. [www.ianfairlie.org/news/assessing-long-term-health-effects-from-fukushimas-radioactive-fallout](http://www.ianfairlie.org/news/assessing-long-term-health-effects-from-fukushimas-radioactive-fallout)
4. UNSCEAR estimates the average whole body dose to the rest of Japan outside Fukushima Prefecture was ~0.1 mSv. Multiplied by 126,000,000 people outside Fukushima gives a collective dose of 12,600 or 13,000 to two significant figures.
5. [www.chernobylreport.org](http://www.chernobylreport.org)

## Czech Republic: Temelin expansion cancelled

**Author:** Jim Green – Nuclear Monitor editor

**NM785.4386** CEZ, the Czech utility 70% owned by the government, cancelled a tender to expand the Temelin nuclear plant on April 10, citing low wholesale power prices and the government's refusal to provide price guarantees. CEZ hoped to build two 1,200 MW reactors. The previous day, cabinet reiterated its opposition to providing price guarantees for power generated by the new reactors.<sup>1</sup>

The Czech Republic has six nuclear power reactors at two sites: four VVER-440/V-213 reactors at Dukovany and two VVER-1000 reactors at Temelin. Nuclear power produces about one-third of the country's electricity. Earlier plans for two more VVER reactors at Temelin were put on hold in 1990 but there have been periodic attempts to revive the project since then.

A tender process for two additional Temelin reactors was launched in August 2009. Bids were submitted by

Areva; Westinghouse; and a consortium comprising Škoda JS, AtomStroyExport and OKB Hidropress. However, CEZ informed Areva in October 2012 that its bid for its EPR design had been disqualified. Areva challenged the decision in the Czech courts, and also lodged a complaint with the European Commission, which oversees competition rules in the EU. The legal challenge and the EC investigation were still ongoing at the time of the April 10 announcement of the decision to cancel the tender.<sup>2</sup> Areva has since withdrawn its appeal lodged with Czech courts.<sup>3</sup>

CEZ chief executive Daniel Benes said on April 10: "While originally the project was fully economically feasible given the market price of electricity and other factors, today all investments into power plants, which depend for revenues on sales of electricity in the free market, are threatened. In the future it will be necessary

to cooperate closely with the state in order to secure further development of nuclear energy.” CEZ shares rose 3.1% following the news.<sup>1</sup>

Petr Bartek from Erste Bank said: “The cancellation of the tender... [is] positive in our view in the current environment of depressed wholesale power prices.”<sup>4</sup> Jan Ondrich of Candole Partners, a Prague-based economic advisory firm, said: “CEZ should have made the decision to cancel the project a long time ago. It would have saved tens of millions of euros of shareholders’ money as well as the time and energy the bidders had to put in. There is overcapacity in Europe and there is no need for large baseload generators.”<sup>4</sup>

Ondrich added that the Czech government would do well to focus on making the Czech grid smarter, better interconnected and more robust: “Then consumers will be able to profit from cheap German wind and solar power rather than to try to subsidize inflexible baseload generators.”

Georgi Vukov from Candole Partners wrote in a November 2013 report that the Temelin expansion “would destroy value in a state-owned company, CEZ, and fund the destruction of €4.5 billion [US\$6.2b] of taxpayer money.” Vukov accurately predicted that the project would be cancelled.<sup>5</sup>

Critics of the Temelin project have pointed out that the Czech Republic already exports about 20% of its electrical output. Former deputy prime minister Martin Bursik noted in the *Aspen Review* in December 2013 that the Czech Republic exported more than 17 terrawatt-hours of electricity in 2012, more than the annual production of the Temelin or Dukovany nuclear plants and more than the consumption of all Czech households combined.<sup>6</sup>

In recent years, growth in demand for electricity in the Czech Republic has stagnated. Moreover, the potential for profitable export of electricity from new reactors has greatly diminished as the wholesale market price for electricity has fallen well below the level necessary to make the Temelin expansion a viable project. Another complication is uncertainty regarding European energy and climate change policies and the future shape of the power market.<sup>7</sup>

Czech Prime Minister Bohuslav Sobotka said the future development of energy markets “is unpredictable to a maximum extent, and the government can hardly pledge to guarantee electricity prices.” He also said: “We have clearly declared that we currently refuse any type of state guarantee. Nobody should be surprised at this

considering the experience we have had with support to renewable sources, above all to solar power plants.”<sup>8</sup>

CEZ was the main beneficiary of an overgenerous solar subsidy scheme, dubbed the ‘solar siphon’, which failed to account for significantly reduced production costs for solar systems. Martin Bursik notes that the ‘solar siphon’ triggered a wider backlash: “The government’s failure has ignited a fierce campaign against all kinds of renewable sources of energy. One legislative amendment followed another, backed by strong words from the so-called independent regulator (the same one that failed to regulate solar energy).”<sup>6</sup>

Norman Eisen, the US ambassador to Prague, registered one of the few critical responses to the decision to abandon the Temelin tender: “The United States Government is deeply disappointed to learn of the decision to cancel the Temelin tender. ... As close friends and allies, we are also concerned about the signal this may send to U.S. and international investors.”<sup>9</sup>

Czech president Milos Zeman has called for another tender to be launched for the supply of the two new Temelin units. He has said that he would like to see Areva and South Korea participate in a new tender. At the April 9 Cabinet meeting, a decision was taken for the minister of finance and the minister of trade and industry to jointly prepare a plan on the development of nuclear energy in the Czech Republic.<sup>8</sup> A feasibility study for a new reactor at Dukovany is in progress, and CEZ has said it is likely to ask for an environmental assessment when it is completed.<sup>10</sup>

As with every other nuclear power-producing country, no solution to high-level waste management is in sight. Acting on behalf of the Czech government, the Administration of Radioactive Waste Disposal Sites has been looking for a suitable disposal site for years. But residents of seven selected localities have rejected the proposal in a total of 27 local referendums. The estimated cost of building a high-level nuclear waste repository has more than doubled but compulsory levies on nuclear power operators have not been adjusted since the late 1990s.<sup>6</sup>

### More information:

A history of opposition to the Temelin plant is posted on the Nuclear Information and Resource Service website: [www.nirs.org/mononline/temelinblockade.htm](http://www.nirs.org/mononline/temelinblockade.htm)

A short history of the campaign against Temelin, by Paxus Calta, is posted at:

<http://funologist.org/2014/04/11/temelin-3-and-4-are-dead/>

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5. <http://candole.com/files/Temelinomics%202.pdf>
6. [www.aspeninstitute.cz/en/magazine/december-2013/](http://www.aspeninstitute.cz/en/magazine/december-2013/)
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# The US nuclear power industry thinks it's under siege

**Author:** Michael Mariotte, President of the Nuclear Information and Resource Service

**NM785.4387** We couldn't have written a better headline ourselves: 'Nuclear power industry under seige, FirstEnergy exec warns'.<sup>1</sup> Never mind the misspelling of 'siege' – newspapers are having a hard enough time these days.

The article leads off: "The nuclear power industry finds itself buffeted by financial concerns, political pressure and increased scrutiny because of the Japanese disaster that could lead to the closures of more plants in the United States, a Western Pennsylvania utility executive said Tuesday."

It then quotes FirstEnergy CEO Peter Sena III warning of "rolling blackouts" if more nuclear reactors close. FirstEnergy owns the two-unit Perry reactors in Ohio and Beaver Valley reactors in western Pennsylvania. Sena laments that no new reactors will be built in either Pennsylvania or Ohio because, as the article states, "utilities can't recover the multibillion-dollar construction costs from ratepayers." Duh. In a deregulated marketplace, with far cheaper electricity sources readily available, multi-billion power plants of any kind can't recover their construction costs – much as backwards utilities like FirstEnergy pine for the old days when they could spend billions of dollars on behemoth power plants and then charge ratepayers for them plus a hefty profit on their investment. And back then the bigger the investment the greater the profit. In most of the US, those days are gone.

The thing is, it was the utilities, especially nuclear utilities, that fought for this deregulated market in the first place. They wanted to be able to run their reactors as hard as they could, with as little ongoing maintenance and improvement investment as they could get away with, and reap the benefits of selling all that "low-cost" electricity. A lot of us were skeptical about deregulation back then, especially since the nuclear utilities asked for – and mostly received – billions of dollars in so-called "stranded costs" to pay for the nuclear construction costs they hadn't yet recovered before deregulation began. In California alone, those stranded costs amounted to some US\$25 billion (€18 billion) added to everyone's electricity bills, whether they chose to buy their electricity from a nuclear utility or a clean energy competitor.

It seemed to the nuclear utilities like a brilliant idea at the time. What they didn't realize is that they were digging their own grave. They didn't foresee a host of factors that have brought the industry to the knees, to the point where it is basically begging policy-makers for help.

Those factors: the advent of natural gas fracking and the huge increase in gas supply, which drove down gas prices and is keeping them low (not that fracking is a good thing, it's not); the plunging costs and increasing availability of renewables, especially wind and solar power, the latter of which, at the rooftop level, is enabling millions of homeowners to power their own homes more affordably

than buying power from utilities; and Fukushima, which is increasing costs to nuclear utilities for upgrades and modifications (even if the Nuclear Regulatory Commission is doing its darnedest to keep those costs as low as possible for the utilities, far lower than is warranted from the NRC staff's own safety analyses). Indeed, Sena warns that post-Fukushima safety efforts could themselves lead to more reactor closures.

But the point is, if the nuclear industry is indeed under siege, it's the industry itself that led the charge to the barricades. And now that the barricades have fallen the industry suddenly realizes that its emperor (the deregulated marketplace) has the wrong clothes for the changing electricity climate. It's no coincidence that the nuclear "renaissance" of a few years ago has dwindled to four reactors in still-regulated southeastern states where the regulators remain controlled by the utilities and ratepayers are held hostage to them both.

Now that the nuclear industry has understood it miscalculated, it's full court pressure to somehow force ratepayers to subsidize it once again. And that's also why the industry has created the new front group 'Nuclear Matters' ([www.nuclearmatters.com](http://www.nuclearmatters.com)). Former Senators Evan Bayh of Indiana and Judd Gregg of New Hampshire were the first figureheads enticed to lead the charge (by how much nuclear green we don't know). Now Nuclear Matters has announced that former White House chief of staff Bill Daley (a lifelong friend of Exelon, one of the utilities with the most to lose in the current climate) and former Department of Energy Secretary and Michigan Senator Spencer Abraham (who spent his time at DoE doing whatever the nuclear industry asked).

Exactly who is behind Nuclear Matters isn't clear. The group isn't exactly transparent and doesn't seem to have a physical address or actual staff; rather it appears to be largely a creation of the public relations firm Sloane and Company ([www.sloanepr.com](http://www.sloanepr.com)) which lists Exelon as its only utility / nuclear industry client.

For its part, Exelon isn't exactly staying in the background. An article on Fierce Energy cites an Exelon honcho complaining that "flawed market rules and the current patchwork of state and federal energy policies subsidizing renewable energy do not properly compensate nuclear for its reliability and 24/7 emissions-free energy."<sup>2</sup> The exec, Kenneth Cornew, who heads Exelon's generation unit, added: "The economic viability of these highly reliable, low-carbon generation sources [nuclear reactors] is at risk, not because they can't compete in the marketplace, but because they can't compete when the playing field is uneven," he said

That last sentence is a subtle upgrade from their previous messaging in the argument that "the playing field is uneven." In fact, if you take out that clause and the word "not" before "compete," the statement is exactly

correct: the plain and simple fact is that aging and expensive nuclear reactors increasingly cannot compete with lower-cost alternatives, and the disparity is only going to grow as nuclear faces increased safety costs and continually falling renewables prices and reliability.

Neither Exelon, nor its other most-threatened colleague Entergy, nor Nuclear Matters have laid out publicly the policy prescriptions they would like to see – rather, they’ve just focused on the argument that the market they created somehow has to change to favor nuclear power. The details, we presume, they’re explaining to policymakers in back rooms. But the one thing that is certain is that if any of their policy ideas were to be adopted, the result would be higher electricity prices for

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## The Chernobyl death toll

**Author:** Jim Green – Nuclear Monitor editor

**NM785.4388** The never-ending debate over the Chernobyl cancer death toll turns on the broader debate over the health effects of low-level radiation exposure.

The overwhelming weight of scientific opinion holds that there is no threshold below which ionising radiation poses no risk. Uncertainties will always persist. In circumstances where people are exposed to low-level radiation, public health (epidemiological) studies are unlikely to be able to demonstrate a statistically-significant increase in cancer rates. Cancers are common diseases and most are multi-causal. Other complications include the long latency period for some cancers; and limited or uneven data on cancer incidence and mortality. The upshot is that cancer incidence and mortality statistics are being pushed up and down by a myriad of factors at any point in time and it becomes impossible or near-impossible to isolate any one factor.

While the overwhelming weight of scientific opinion holds that there is no threshold below which radiation exposure is harmless, there is less scientific confidence about how to quantify the risks. Risk estimates for low-level radiation exposure are typically based on a linear extrapolation of better-understood risks from higher levels of exposure.

This ‘Linear No Threshold’ (LNT) model has some heavy-hitting scientific support. For example a report in the Proceedings of the National Academy of Sciences states: “Given that it is supported by experimentally grounded, quantifiable, biophysical arguments, a linear extrapolation of cancer risks from intermediate to very low doses currently appears to be the most appropriate methodology.”<sup>1</sup> Likewise, the 2006 report of the US National Academy of Sciences’ Committee on the Biological Effects of Ionising Radiation (BEIR) states that “the risk of cancer proceeds in a linear fashion at lower doses without a threshold and ... the smallest dose has the potential to cause a small increase in risk to humans.”<sup>2</sup>

ratepayers – and that’s never a popular move for elected officials. Their added conundrum is that those higher rates would lead to even faster adoption of rooftop solar, further accelerating the nuclear utilities’ decline.

Yes, the nuclear industry is indeed under siege – one they set upon themselves more than a decade ago. And, at this point, it appears the industry may have no way out.

Meanwhile, Goldman Sachs says that by 2033 homeowners will no longer need to be on the grid in the US because of declining prices of solar plus battery storage.<sup>3</sup> And in recent months, five Entergy execs have sold off large portions of stock they hold in their employer – perhaps they’re investing in solar instead.<sup>4</sup>

Nonetheless, there is uncertainty with the LNT model at low doses and dose rates. The BEIR report makes the important point that the true risks may be lower or higher than predicted by LNT – a point that needs emphasis and constant repetition because nuclear apologists routinely conflate uncertainty with zero risk. That conflation is never explained or justified; it is simply dishonest.

The UN Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and the International Commission on Radiological Protection recommend against using collective dose figures and risk estimates to estimate total deaths. The problem with that recommendation is that there is simply no other way to arrive at an estimate of the death toll from Chernobyl (or Fukushima, or routine emissions from the nuclear fuel cycle, or weapons tests, or background radiation, etc). Indeed UNSCEAR itself used that approach to estimate around 4,000 long-term cancer deaths among the people who received the highest radiation doses from Chernobyl.<sup>3</sup> And UNSCEAR doesn’t claim that low-level radiation exposure is harmless – its 2010 report states that “the current balance of available evidence tends to favour a non-threshold response for the mutational component of radiation-associated cancer induction at low doses and low dose rates.”<sup>4</sup>

The view that low-level radiation is harmless is restricted to a small number of scientists whose voice is greatly amplified by the nuclear industry (in much the same way as corporate greenhouse polluters and their politicians amplify the voices of climate science sceptics). In Australia, for example, uranium mining and exploration companies such as Cameco, Toro Energy, Uranium One and Heathgate Resources have sponsored speaking tours by Canadian junk scientist Doug Boreham, who claims that low-level radiation exposure is beneficial to human health. Medical doctors have registered opposition to this dangerous quackery and collusion.<sup>5</sup>

About 50 people died in the immediate aftermath of the Chernobyl accident. Beyond that, studies generally don't indicate a significant increase in cancer incidence in populations exposed to Chernobyl fallout. Nor would anyone expect them to because of the data gaps and methodological problems mentioned above, and because the main part of the problem concerns the exposure of millions of people to low doses of radiation from Chernobyl fallout.

For a few fringe scientists and nuclear industry insiders and apologists, that's the end of the matter - the statistical evidence is lacking and thus the death toll from Chernobyl was just 50. (If they were being honest, they would note an additional, unknown death toll from cancer and from other radiation-linked diseases including cardiovascular disease). But for those of us who prefer mainstream science, we can still arrive at a scientifically defensible estimate of the Chernobyl death toll by using estimates of the total radiation exposure, and multiplying by an appropriate risk estimate.

The International Atomic Energy Agency estimates a total collective dose of 600,000 person-Sieverts over 50 years from Chernobyl fallout.<sup>6</sup> Applying the LNT risk estimate of 0.10 fatal cancers per Sievert gives an estimate of 60,000 deaths. Sometimes a risk estimate of 0.05 is used to account for the possibility of decreased risks at low doses and/or dose rates (in other words, 0.05 is the risk estimate when applying a 'dose and dose rate effectiveness factor' or DDREF of two). That gives an estimate of 30,000 deaths.

On the other hand, LNT may underestimate risks. The BEIR report states that "combined analyses are compatible with a range of possibilities, from a reduction of risk at low doses to risks twice those upon which current radiation protection recommendations are based." Likewise the BEIR report states: "The committee recognizes that its risk estimates become more uncertain when applied to very low doses. Departures from a linear model at low doses, however, could either increase or decrease the risk per unit dose." So the true death toll could be lower *or higher* than the LNT-derived estimate of 60,000 deaths.

A number of studies apply that basic method - based on collective radiation doses and risk estimates - and come up with estimates of the Chernobyl cancer death toll varying from 9,000 (in the most contaminated parts of the former Soviet Union) to 93,000 deaths (across Europe).

UN reports in 2005-06 estimated up to 4,000 eventual deaths among the higher-exposed Chernobyl populations (emergency workers from 1986-1987, evacuees and residents of the most contaminated areas) and an additional 5,000 deaths among populations exposed to lower doses in Belarus, the Russian Federation and Ukraine.<sup>7</sup>

The estimated death toll rises further when populations beyond those three countries are included. For example, a study by Cardis et al reported in the International Journal of Cancer estimates 16,000 deaths.<sup>8</sup> Dr Elisabeth Cardis, head of the Radiation Group at the World Health Organization's International Agency for

Research on Cancer, said: "By 2065 (i.e. in the eighty years following the accident), predictions based on these models indicate that about 16,000 cases of thyroid cancer and 25,000 cases of other cancers may be expected due to radiation from the accident and that about 16,000 deaths from these cancers may occur. About two-thirds of the thyroid cancer cases and at least one half of the other cancers are expected to occur in Belarus, Ukraine and the most contaminated territories of the Russian Federation."<sup>9</sup>

UK radiation scientists Dr Ian Fairlie and Dr David Sumner estimate 30,000 to 60,000 deaths.<sup>10</sup> And as Dr Fairlie notes in his article in this issue of the Nuclear Monitor, recent statements by UNSCEAR indicate that it believes the whole body collective dose across Europe from Chernobyl was 320,000 to 480,000 Sv, from which an estimate of 32,000 to 48,000 fatal cancers can be deduced (using the LNT risk estimate of 0.10).<sup>11</sup>

According to physicist Dr. Lisbeth Gronlund: "53,000 and 27,000 are reasonable estimates of the number of excess cancers and cancer deaths that will be attributable to the accident, excluding thyroid cancers. (The 95% confidence levels are 27,000 to 108,000 cancers and 12,000 to 57,000 deaths.) In addition, as of 2005, some 6,000 thyroid cancers and 15 thyroid cancer deaths have been attributed to Chernobyl. That number will grow with time. Much lower numbers of cancers and deaths are often cited, but these are misleading because they only apply to those populations with the highest radiation exposures, and don't take into account the larger numbers of people who were exposed to less radiation."<sup>12</sup>

A 2006 report commissioned by Greenpeace estimates a cancer death toll of about 93,000.<sup>13</sup> According to Greenpeace: "Our report involved 52 respected scientists and includes information never before published in English. It challenges the UN International Atomic Energy Agency Chernobyl Forum report, which predicted 4,000 additional deaths attributable to the accident as a gross simplification of the real breadth of human suffering. The new data, based on Belarus national cancer statistics, predicts approximately 270,000 cancers and 93,000 fatal cancer cases caused by Chernobyl. The report also concludes that on the basis of demographic data, during the last 15 years, 60,000 people have additionally died in Russia because of the Chernobyl accident, and estimates of the total death toll for the Ukraine and Belarus could reach another 140,000."

Those are the credible estimates of the eventual death toll from Chernobyl. Another defensible position (or non-position) is that the long-term cancer death toll is unknown and unknowable because of the uncertainties associated with the science. The third of the two defensible positions, unqualified claims that the death toll was just 50, should be rejected as dishonest or uninformed spin from the nuclear industry and some of its scientifically-illiterate supporters ... and from every last one of the self-proclaimed pro-nuclear environmentalists - James Hansen, Patrick Moore, Mark Lynas, George Monbiot, James Lovelock, etc.

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## The Long Shadow of Chernobyl

Pictured below is the control room of the stricken #4 reactor at Chernobyl. *Gerd Ludwig/INSTITUTE*

Gerd Ludwig's photo-book 'The Long Shadow of Chernobyl' is a culmination of his 20 years of coverage of the aftermath of the disaster. "I am driven by the duty to act in the name of these victims," says Ludwig, "to give them a voice through my pictures in this book. I have met many people who allowed me to expose their suffering in the hope of preventing tragedies like Chernobyl in the future."

The book has four sections, covering the compromised reactor; the abandoned town of Pripjat; contaminated villages farther out; and the medical and emotional impact of the disaster in places like Belarus and Ukraine. An essay by Mikhail Gorbachev reflects on

the historical and political significance of the disaster. Redacted CIA documents, quotes from the book 'Voices from Chernobyl' by Belarusian writer Svetlana Alexievich, and detailed captions give readers a broader understanding of the tragedy. The text is in English, German, and French. The publisher is Edition Lammerhuber in Vienna, Austria (<http://edition.lammerhuber.at/en>)

More information:

[www.gerdludwig.com/kickstarter](http://www.gerdludwig.com/kickstarter)  
[www.longshadowofchernobyl.com](http://www.longshadowofchernobyl.com)



# NUCLEAR NEWS

## US NRC issues uranium license on Lakota Indian land

On April 8, the US Nuclear Regulatory Commission (NRC) issued an operating license to the Powertech Uranium Corp for its proposed in-situ leach (ISL) uranium mine in the Black Hills region of South Dakota. The move came four months ahead of a public hearing scheduled to hear from opponents of the project. The proposed mine still needs final approval from the South Dakota Board of Minerals and Environment, the South Dakota Water Management Board, and the US Environmental Protection Agency before it can begin operations.

At least eight other uranium companies are known to be targeting the Black Hills. Lilia Jarding of the Black Hills Clean Water Alliance told *The Ecologist*: "We're afraid that if this project goes through ... we'll end up with a ring of uranium mines around the Black Hills.

Activists say that Powertech is working to minimise oversight of its operations. In 2011, Powertech secured the passage of legislation effectively barring South Dakota's Department of Environment and Natural Resources from regulating ISL projects, leaving the state with direct oversight only of water-use and waste-disposal issues. The company has also defeated several measures aimed at increasing oversight, including, a bill that would have required Powertech to demonstrate its ability to restore groundwater quality before opening the new mine.

Over a period of two decades beginning in the early 1950s, about a thousand open-cut uranium mines were opened in and around the Black Hills region. The last mine closed in 1973, but the region remains littered with radioactive debris.

*He Sapa*, the Black Hills, is a sacred site to the Lakota and numerous other Western Tribes who have long gone to the area for ceremony, hunting game, harvesting medicines and for spiritual renewal. Despite the 1980 Supreme Court ruling in *United States v. Sioux Nation*, that ruled the US illegally stole the Black Hills from the Lakota, the government has refused to return the lands to the Lakota and it remains a continued central source of conflict between the Lakota and the U.S. government.

The proposed uranium mine is opposed by Indian groups, ranchers, environmentalists and the Rapid City Council. Debra White Plume, an Oglala Lakota activist, said: "We're all standing together. This ain't just a handful of little Indians out on the prairies that you can run over ... this is a broad array of resistance to uranium mining. If they close every door to us, then the only door open to us is direct action. You've got to walk through that door if you're serious about protecting yourself and Mother Earth."

Lakota activists fought off a similar uranium-mining project in 2007, and Debra White Plume says she's determined to see off Powertech.

<http://lastrealindians.com/u-s-nuclear-regulatory-commission-issues-uranium-mining-operating-liscense-in-the-black-hills/>

[www.theecologist.org/News/news\\_analysis/2299391/protect\\_our\\_sacred\\_water.html](http://www.theecologist.org/News/news_analysis/2299391/protect_our_sacred_water.html)

More information:

*The Black Hills Clean Water Alliance*

[www.sdcleanwateralliance.org/](http://www.sdcleanwateralliance.org/)

*Defenders of the Black Hills* [www.defendblackhills.org/](http://www.defendblackhills.org/)

*Dakota Rural Action* <http://dakotarural.org/>

## Protecting against insider nuclear threats

Matthew Bunn and Scott Sagan have written a useful paper on insider nuclear threats – 'A Worst Practices Guide to Insider Threats: Lessons from Past Mistakes'. The paper is part of a larger project on insider threats under the Global Nuclear Future project of the American Academy of Arts and Sciences.

A recent example was the apparent insider sabotage of a diesel generator at the San Onofre nuclear plant in the United States in 2012; the most spectacular was a 1982 incident in which an insider placed explosives directly on the steel pressure vessel head of a nuclear reactor in South Africa and detonated them – thankfully the plant had yet to begin operating. All known thefts of plutonium or highly enriched uranium appear to have been perpetrated by insiders or with the help of insiders. Similarly, most of the sabotage incidents that have occurred at nuclear facilities were perpetrated by insiders.

Bunn and Sagan look at past disasters caused by insiders and draw from them 10 lessons about what not to do. The lessons are as follows:

- #1: Don't assume that serious insider problems are NIMO (Not In My Organization)
- #2: Don't assume that background checks will solve the insider problem
- #3: Don't assume that red flags will be read properly
- #4: Don't assume that insider conspiracies are impossible
- #5: Don't rely on single protection measures
- #6: Don't assume that organizational culture and employee disgruntlement don't matter
- #7: Don't forget that insiders may know about security measures and how to work around them
- #8: Don't assume that security rules are followed
- #9: Don't assume that only consciously malicious insider actions matter
- #10: Don't focus only on prevention and miss opportunities for mitigation



Matthew Bunn and Scott Sagan, April 2014, 'A Worst Practices Guide to Insider Threats: Lessons from Past Mistakes', Occasional Paper, American Academy of Arts & Sciences,

[www.amacad.org/content/publications/publication.aspx?d=1425](http://www.amacad.org/content/publications/publication.aspx?d=1425)

### Small reactor prospects diminishing

World Nuclear News reported on April 14 that Babcock & Wilcox will slash its spending on the 'mPower' small modular reactor project, having failed to find customers or investors. B&W's mPower design was prioritised for deployment under a five-year cost-matching agreement with the US Department of Energy (DoE), and with the Tennessee Valley Authority (TVA) named as the lead customer. The three of them supplied a budget of US\$150 million [€109m] per year to develop mPower, hoping to build the first unit by 2022. Six units had been pencilled in for TVA's Clinch River site at Oak Ridge, Tennessee.

With the DoE arrangement now one year old, B&W hoped to have secured a number of utility customers for the small reactor as well as investors keen to take a majority share in its development. Spokesperson Aimee Mills said: "There was interest from customers and interest from investors, but none have signed on the dotted line." B&W President E. James Ferland said: "While we have made notable progress in developing a world-class technology, there is still significant work involved in bringing this climate-friendly technology to reality."

B&W has decided to reduce its spending on mPower to a maximum of US\$15 million [€10.9m] per year and has begun negotiating with TVA and the DoE to find a workable way to restructure and continue the project.

POWER Magazine notes that "air seems to be leaking out of the SMR balloon lately." In February, Westinghouse announced it would end its 225 MWe Small Modular Reactor project, after a decade of development and many millions of dollars of investment. Westinghouse failed to secure R&D funding from the DoE. CEO Danny Roderick said "The problem I have with SMRs is not the technology, it's not the deployment – it's that there's no customers."

In the US, DoE-subsidised R&D continues into the 45 MWe NuScale reactor concept. Elsewhere in the world, construction is underway on the 27 MWe CAREM reactor in Argentina, though claims that small reactors will reduce costs are looking increasingly fanciful – the CAREM reactor equates to US\$17.84 billion (€13.0 billion) per 1000 MWe. Work continues on two 105 MWe HTR units at Shidaowan in China; and in Russia, plans are in train for a floating nuclear power plant with two 35 MWe reactors mounted on a barge.

[www.world-nuclear-news.org/C-Funding-for-mPower-reduced-1404141.html](http://www.world-nuclear-news.org/C-Funding-for-mPower-reduced-1404141.html)

[www.babcock.com/news-room/Pages/BW-Announces-Restructuring-of-Small-Modular-Reactor-Program.aspx](http://www.babcock.com/news-room/Pages/BW-Announces-Restructuring-of-Small-Modular-Reactor-Program.aspx)

[www.powermag.com/worldwide-nuclear-commerce-good-news-and-bad-news/](http://www.powermag.com/worldwide-nuclear-commerce-good-news-and-bad-news/)

### Rio Tinto under fire

The Labour Resource and Research Institute and Earthlife Namibia have released a report on the health of workers at Rio Tinto's Rössing uranium mine in Namibia.<sup>1</sup> The report was produced as part of the project Environmental Justice Organisations, Liabilities and Trade ([www.ejolt.org](http://www.ejolt.org)). The study is based on 44 questionnaires carried out with current and former mine workers. The recommendations are:

Rio Tinto should perform a large-scale epidemiology study with independent medical experts to examine those workers who started working in the 1970s or early 1980s.

The Ministry of Health and Social Services must get unrestricted access to all medical reports of all workers employed by Rössing.

All mine workers should be able to have access to their own medical reports.

Historically, the Rössing mine supplied uranium for US and UK nuclear weapons. Workers faced dangerous conditions, poor regulations, and high levels of dust. During the early years of operation, Rössing operated with a migrant labor system which the International Commission of Jurists declared illegal and said was similar to slavery.

The Rössing mine was in the news last year because of the December 3 collapse of one of the 12 leach tanks in the mine's processing plant. Just days later, a similar spill occurred at Rio Tinto's Ranger uranium mine in the Northern Territory of Australia.

The company is also being criticised for failing to guarantee the rehabilitation of Ranger unless its plans to expand operations at the site are approved. The latest annual report of Energy Resources of Australia (majority owned by Rio Tinto) states that "... if the Ranger 3 Deeps mine is not developed, in the absence of any other successful development, ERA may require an additional source of funding to fully fund the rehabilitation of the Ranger Project Area."<sup>2</sup> And at Rio Tinto's London AGM on April 15, executive Sam Walsh distanced the parent company from responsibility for rehabilitation, saying: "This is a public Australian company and clearly that is an issue for them."

Justin O'Brien from the Gundjeihmi Aboriginal Corporation, which represents the Mirarr Traditional Owners, said: "The attitude of Rio and ERA demonstrates little has changed in the more than three decades since Galarrwuy Yunupingu described talks over the Ranger mine as 'like negotiating with a gun to my head'. The mining giants have made enormous profits at the expense of Mirarr traditional lands and are now holding the Word Heritage listed area to ransom. It is inconceivably thoughtless and arrogant of any mining company to manage its corporate social responsibilities in this way and regrettably brings to mind the comment made by Mirarr Senior Traditional Owner Yvonne Margarula in 2003: 'The promises never last, but the problems always do'.<sup>2</sup>

Dave Sweeney from the Australian Conservation Foundation said: “Only hours after the complete collapse of the tank ERA – owned by the UK based mining giant Rio Tinto – released a statement high on bravado but low on evidence claiming all contaminants had been contained and that ‘there is no impact to the environment’. This predictable and premature assurance highlighted ERA’s desire to at least retain control over its perception, if not its pollution. A subsequent site review commissioned by ERA recently confirmed the long held concerns of many stakeholders that the aging plant is at full stretch and raised serious questions about the adequacy of both infrastructure and management systems at Ranger, finding that the mine had 35 other failed or at risk pieces of critical plant infrastructure or equipment with the potential for major human safety or environmental impacts in operation at the time of the tank collapse. The report recommended that processing not resume until these items have been repaired or retired while a further 48 critical assets were recommended to be serviced, repaired or retired within 6-12 months of any future plant restart.”<sup>3</sup>

On the day of the London AGM, IndustriALL Global Union released a report, ‘Unsustainable: The Ugly Truth about Rio Tinto’, highlighting the multinational’s global practices.<sup>4</sup> The report exposes Rio Tinto’s poor performance in relation to environmental, economic, social and governance issues. Workers from numerous countries staged a protest outside the AGM. Kemal Özkan, assistant general secretary of IndustriALL, said: “Rio Tinto’s blind pursuit of profit at any cost has caused disputes with numerous unions as well as environmental, community and indigenous groups. IndustriALL has launched a campaign working with civil society organizations to defend against Rio Tinto’s abuses. Through demonstrating that Rio Tinto does not operate in a sustainable manner, we aim to force the company to live by its own claims.”<sup>4</sup>

1. Bertchen Kohrs and Patrick Kafuka, April 2014, ‘Study on low-level radiation of Rio Tinto’s Rössing Uranium mine workers’, [www.criirad.org/mines-uranium/namibie/riotinto-rossing-workers-EARTHLIFE-LARRI-EJOLT.pdf](http://www.criirad.org/mines-uranium/namibie/riotinto-rossing-workers-EARTHLIFE-LARRI-EJOLT.pdf)

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3. [www.onlineopinion.com.au/view.asp?article=16200&page=0](http://www.onlineopinion.com.au/view.asp?article=16200&page=0)

4. [www.industriall-union.org/exposing-the-uggly-truth-about-rio-tinto](http://www.industriall-union.org/exposing-the-uggly-truth-about-rio-tinto)

## Eroding nuclear safeguards

The April 16 edition of Canada’s ‘Embassy’ newspaper discusses the gradual erosion of safeguards requirements associated with uranium exports.<sup>1</sup> Previously, Canada required that nuclear material exported to China could only be held in facilities in China named in a ‘Voluntary Offer’ list that Beijing had agreed to with the International Atomic Energy Agency (IAEA). Such facilities can be inspected by the IAEA – albeit the case that IAEA inspections in nuclear weapons states are few and far between.

Under Canada’s revised policy, uranium oxide can be (and has been) exported to a conversion plant in China that has not been placed on the Voluntary Offer list.

Instead, if material is transferred to a facility that is not on the IAEA list, an “administrative arrangement” kicks in, requiring China to “provide additional reporting to Canada on the uranium.” But the administrative arrangement, and others like it, “are considered protected documents and are not available publicly” according to the Canadian Nuclear Safety Commission.

Shawn-Patrick Stensil from Greenpeace Canada drew a parallel with Canada’s nuclear exports to India: “We’ve now been moving to selling uranium to markets that have bomb programs, and our non-proliferation policy is dying a death by a thousand cuts. I think this will eventually come back to bite us.”

Reuters reported on April 14 that the US, UK, Czech Republic and the Netherlands submitted a paper to a meeting of the Nuclear Suppliers Group (NSG) calling on the NSG – a voluntary, 48-country group – to relax its rules to allow nuclear exports to countries such as Israel.<sup>2</sup> The paper, seen by Reuters, is a masterpiece of obfuscation. Instead of talking about nuclear exports (to a nuclear weapons state outside the Nuclear Non-Proliferation Treaty), it talks about “facilitated export arrangements”.

And this is the indecipherable rationale for weakening nuclear export norms: “With technology progressing at an ever increasing rate, globalised supply chains, and more and more countries developing nuclear and dual use capabilities, the possibility of trade in nuclear related goods between governments not participating in the NSG is becoming more and more likely. ... In order to stay ahead of the curve, the NSG’s goals – to control the export of nuclear sensitive goods – might be best served by an open-minded approach aimed at cooperation with non-NSG members and promoting transparency of the NSG guidelines.”

A former Israeli nuclear official told Reuters that Israel for years had tried to get the NSG to recognise it as a so-called adherent country “on the strength of the justified truth that Israel is a responsible state”, but a number of NSG member states have objected.

There is an ongoing push from the US, UK and others to include India as a member of the NSG. India was granted a “clean waiver” by the NSG in 2008, an important step towards opening up nuclear trade despite India’s status as a rogue nuclear weapons states that refuses to sign the NPT or the Comprehensive Test Ban Treaty and is expanding its nuclear weapons arsenal.

Islamabad is also lobbying to be included in the NSG and for an end to prohibitions on nuclear trade with Pakistan.<sup>3</sup> China is already using the US-India precedent to expand nuclear exports to Pakistan.

1. [www.embassynews.ca/news/2014/04/16/canada-knew-nuclear-deal-with-china-could-be-seen-as-%E2%80%98weak%E2%80%99-docs/45423](http://www.embassynews.ca/news/2014/04/16/canada-knew-nuclear-deal-with-china-could-be-seen-as-%E2%80%98weak%E2%80%99-docs/45423)

2. [www.reuters.com/article/2014/04/14/us-nuclear-trade-israel-idUSBREA3D0T320140414](http://www.reuters.com/article/2014/04/14/us-nuclear-trade-israel-idUSBREA3D0T320140414)

3. <http://tribune.com.pk/story/686790/pakistan-looking-forward-to-cooperation-in-civil-nuclear-energy-nawaz/>

## **Kazakhstan nuclear company head arrested for corruption**

Valery Shevelyov, the executive director of Kazakhstan's major uranium producer and nuclear-fuel cycle operator KazAtomProm, was arrested on April 1 on corruption charges. An investigation regarding the construction of new KazAtomProm facilities named Shevelyov as a suspect in the embezzling US\$710 million [€514m], according to Kazakh State Anti-corruption Agency. Shevelyov's predecessor Muhtar Dzhakishev has been in prison since 2009 on similar charges.

[www.worldbulletin.net/world/132602/kazakhstan-nuclear-company-head-arrested-for-corruption](http://www.worldbulletin.net/world/132602/kazakhstan-nuclear-company-head-arrested-for-corruption)

## **European Parliament calls for action on depleted uranium**

The European Parliament has called on the EU's Council of Ministers to ensure that all member states support an upcoming UN General Assembly resolution on depleted uranium (DU). The resolution will be tabled in October. Each year the European Parliament provides recommendations to the EU's Council of Ministers on positions that EU member states should take during voting. This year the parliament has called on member states to develop a common EU position that better reflects the overwhelming and repeated calls by the parliament for a global moratorium on the weapons.

At present the EU is split on the topic, with DU users the UK and France opposed during UN votes – two of only four states worldwide to oppose the resolutions, along with the US and Israel – while the rest of the EU votes in favour or abstains. While the number of EU states

abstaining each time has been decreasing, continued abstentions by the likes of Sweden and Denmark have been a source of frustration for national campaigns. Globally, 155 states supported the most recent UN resolution on DU in 2012, and the split position within the EU is something of an anomaly in the face of an emerging global consensus.

[www.bandedpleteduranium.org/en/european-parliament-unga-recommendations](http://www.bandedpleteduranium.org/en/european-parliament-unga-recommendations)

[www.theecologist.org/News/news\\_analysis/2355834/european\\_parliament\\_demands\\_action\\_on\\_du\\_munitions.html](http://www.theecologist.org/News/news_analysis/2355834/european_parliament_demands_action_on_du_munitions.html)

## **Renewable energy potential in Europe**

An analysis for Greenpeace suggests that it is possible to get 77% of Europe's electricity from renewable sources by 2030 with the help of smart grids, demand management, gas backup and big changes in how the power grid works. The model suggests that by taking a European approach (rather than planning by country) and using a (relatively) new type of power cable the cost of integrating new renewables into the grid can be significantly cut. The report suggests that by 2030 Europe's grid will be able to absorb a renewable share of 77% with some countries, such as Spain, getting all their power from renewable sources. The UK would be on 70%. Around half of Europe's power (53%) would come from wind and solar PV panels.

[www.greenpeace.org.uk/newsdesk/energy/analysis/report-how-can-you-build-lots-renewables-and-keep-lights-without-spending-too-much-money](http://www.greenpeace.org.uk/newsdesk/energy/analysis/report-how-can-you-build-lots-renewables-and-keep-lights-without-spending-too-much-money)

# 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](http://www.wiseinternational.org)

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**Web:** [www.wiseinternational.org](http://www.wiseinternational.org)

**Email:** [info@wiseinternational.org](mailto:info@wiseinternational.org)

**Phone:** +31 20 6126368

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