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

In this issue of the Monitor:

- Charly Hultén from WISE Sweden writes about the Swedish nuclear regulator's recommendation to proceed with a high-level waste repository.
- We write about the tortuous reactor restart process in Japan.
- We summarize key points from the World Nuclear Industry Status Report 2016.
- Doug Weir from the International Coalition to Ban Uranium Weapons writes about the UK's refusal to accept responsibility for its use of depleted uranium munitions, and an upcoming debate in the UN General Assembly on the use of DU weapons.

The Nuclear News section has reports on high-level nuclear waste disposal plans in Germany; highly elevated radiation readings along Fukushima rivers; a raid on EDF offices by French finance authorities; revelations from whistleblowers inside the Canadian Nuclear Safety Commission; and international grassroots initiatives promoting nuclear disarmament.

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

Regards from the editorial team.

Email: monitor@wiseinternational.org

Monitored this issue:

Swedish regulator recommends approval of nuclear waste storage plan

Author: *Charly Hultén – WISE Sweden*

NM827.4570 The Swedish Radiation Safety Authority, SSM, has recommended the Swedish government give the go-ahead to KBS-3, the nuclear power industry's plans for a final repository for nuclear fuel waste at Forsmark, north of Stockholm. The statement is only a recommendation; it does not constitute approval of the application.

The application for permission to construct KBS-3 is being assessed concurrently by the Environmental Court and by SSM. The Court examines the application against the requirements of the Environmental Code; SSM examines it against the Act on Nuclear Activities and the Radiation Protection Act. Because of the SSM's expertise, the Court also solicits comment from SSM as input into the EIA process mandated under the Environmental Code. It is in this latter context that SSM submitted comments to the Court on June 29.

The June 29 recommendation came amidst mounting concerns as to the ability of the envisaged copper canisters to contain fuel waste in the longer term. Other outstanding issues concern the industry's failure to study alternatives to the chosen KBS-3 method, notably storage in deep boreholes, and the siting process.

Swedish environmental law requires applicants seeking permission to undertake hazardous projects to justify

their choice of site, method and technology including a thorough study of alternative options. This, to ensure the "best possible" solutions. The requirement is not present in the legislation SSM normally deals with. That may explain why SSM contents itself with "good enough" – as has the applicant, SKB, for many years. SKB is a company formed specifically to develop a system for final storage of nuclear fuel waste; it is wholly owned by operators of nuclear reactors in Sweden.

Critics of the KBS-3 scheme advocate siting in a region of hydrological influx toward the repository, rather than outflow from it. Both the sites that SKB chose to study are coastal, where outflow predominates. The regulator is content with the fact that the bedrock at the selected site is drier than it is at the other site.

As to method, environmental groups have pointed to the advantages of a deeper repository, 2–3 km deep into the bedrock, as opposed to the 400–500 meter depth envisaged in the KBS-3 system. For over 30 years SKB has consistently resisted the thought of any alternative to KBS. The regulatory authority uses a painfully circular argument to defend SKB's choice: neither system is proven. The KBS system has been studied for almost 40 years; the alternative, deep boreholes, has only been worked on for a decade or so, and not at all in Swedish bedrock. Ergo, the KBS concept is superior.

And, perhaps most crucial, the viability of the copper canister – the first line of defense in preventing leakage of radioactivity – might just as well be assessed later on in the process, says SSM.

MKG, the environmental organization, regularly submits solicited comment, most recently at the end of May. There, they argue that SKB's application should be rejected, the prime reason being increasing concern among chemists and radiation scientists that the copper canisters may not stand up to the heat and radiation that their contents give off. 'Creep deformation' of the copper shell is one principal concern; corrosion of the metal in the harsh climate of the repository is another.

Democratic insight at risk

MKG demands that possible weaknesses in the canister be investigated fully in the course of the ongoing EIA process. Postponing consideration of the issue until after the KBS-3 system has received government approval, they point out, will remove the issue from all democratic insight and accountability. Once the government approves the scheme, the open EIA process, in which several non-governmental organizations participate, will end. And no longer will the government have a say – resolving outstanding issues will then be a matter between the waste company and the regulator, which is what SKB has wanted from the start.

How has SSM reached such industry-friendly conclusions, and why break off the vetting process now? Only they can say. But they haven't.

One thing the spokesperson did say, repeatedly and with emphasis, is that management and storage of nuclear waste, fuel waste included, is "the industry's responsibility". Not the regulator's, not the government's, but the industry's. This is no news to anyone in Sweden – but the emphasis may be a clue.

The entire repository project is financed by a fee charged to reactor owners or operators, based on the electricity their reactors deliver. Since 2008, these fees may be complemented by fixed sums levied on licensed operators that no longer produce nuclear energy. The fees are paid into the Nuclear Waste Fund, from which SKB finances its R&D efforts.

The nuclear fuel waste storage project is vastly underfinanced, and the government has announced a sizable increase in the waste management fees to be charged to the remaining reactors – a move SSM itself has long advocated. Even so, some analysts still predict a sizable shortfall.

Recent months have seen definite decisions on the part of power companies to decommission four (of ten) Swedish reactors, plus a threat on the part of state-owned power giant Vattenfall to shut down all five of its remaining reactors unless the government repealed the capacity tax. (The government has set about repealing it.) But the fact is, not a single Swedish reactor is producing electricity at competitive prices just now, capacity tax or no capacity tax.

Perhaps SSM is merely trying to ensure that a solution is arrived at while there are still functioning reactors around to pay the cost of the repository. This is sheer conjecture, but the puzzle pieces do fit.

For a catalogue of environmentalists' principal complaints regarding KBS-3 see Nuclear Monitor #706, 2010, https://wiseinternational.org/nuclear-monitor/706/nuclear-fuel-waste-storage-end-road-swedish-solution

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– *MKG: 'Strålsäkerhetsmyndigheten tillstyrker slutförvar, trots olösta säkerhetsproblem', Nyhetsbrev 2/2016, www.mkg.se/nyhetsbrev-22016*

– *SNF/MKG. Yttrande i sak till Mark- och miljödomstolen ... avseende Svenk Kärnbränslehantering AB:s ansökan enligt miljöbalken rörande ett slutförvarssystem för använt kärnbränsle ... . Stockholm, 2016-05-31. www.mkg.se/uploads/Yttrande_MMD_(M_1333-11)_SSM_i_sak_Naturskyddsforeningen_och_MKG_160531.pdf. (An English translation will be available in September.)*

Reactor restarts in Japan

Author: *Jim Green – Nuclear monitor editor*

NM827.4571 According to the World Nuclear Association, Japan has 43 'operable' power reactors (they are 'operational' according to the IAEA), 3 under construction, 9 'on order or planned', and 3 'proposed'.[1] The numbers suggest that Japan's nuclear industry is finally getting back on its feet after the Fukushima disaster – but nothing could be further from the truth.

Before considering the industry's current problems, a little historical context from the World Nuclear Industry Status Report 2016:[2]

"[I]t has been 17 years since Japan's nuclear output peaked at 313 TWh in 1998. The noticeably sharp decline during 2002-2003, amounting to a reduction of almost 30%, was due to the temporary shutdown of all 17 of Tokyo Electric Power Company's (TEPCO) reactors – seven at Kashiwazaki Kariwa and six at Fukushima Daiichi and four at Fukushima Daini. The shutdown was following an admission from TEPCO that its staff had deliberately falsified data for inclusion in regulatory safety inspections reports. During 2003, TEPCO managed to resume operations of five of its reactors.

"The further noticeable decline in electrical output in 2007 was the result of the extended shutdown of the seven Kashiwazaki Kariwa reactors, with a total installed capacity of 8 GWe, following the Niigata Chuetsu-oki earthquake in 2007. TEPCO was struggling to restart the Kashiwazaki Kariwa units, when the Fukushima earthquake occurred."

Nuclear power accounted for 29% of electricity generation in Japan in 2010, down from the historic peak of 36% in 1998, and plans were being developed to increase nuclear's share to 50%.3 But all of Japan's reactors were shut down in the aftermath of the Fukushima disaster. Reactors didn't power a single light-bulb from September 2013 to August 2015.

Japan had 55 operable reactors before Fukushima (including the ill-fated Monju fast reactor). In addition to the six reactors at Fukushima Daiichi, the permanent shutdown of another six reactors has been confirmed – all of them smallish (<559 MWe) and all of them aging (grid connections between 1969 and 1977): Kansai Electric's Mihama 1 and 2, Kyushu Electric's Genkai 1, Shikoku's Ikata 1, JAPC's Tsuruga 1, and Chugoku Electric's Shimane 1.

So Japan now has 43 'operable' or 'operational' reactors, and it isn't hard to identify some with little or no prospect of ever restarting, such as the four Fukushima Daini reactors (or Monju for that matter).

Two reactors at Sendai in Kagoshima Prefecture were restarted in August and October 2015. And that's it – only two of Japan's 43 'operable' or 'operational' reactors are actually operating. Moreover an anti-nuclear candidate, Satoshi Mitazono, was elected governor of Kagoshima Prefecture in early July 2016 and he announced that he will seek the shut-down of the two Sendai reactors – he can prevent their restart after they shut down for inspection later this year.[4]

As of 1 July 2016, 11 utilities had applied to the Nuclear Regulatory Authority (NRA) for safety assessments of a total of 26 reactors, including seven reactors that have completed the assessment process. Apart from whatever hurdles the NRA might put in their way, there are other obstacles: citizen-led lawsuits; local political and public opposition; economic factors, in particular the questionable economics of large investments to upgrade and restart aging reactors; and the impact of electricity deregulation and intensified market competition.[2]

It's anyone's guess how many reactors might restart, but the process will continue to be drawn out – the only strong candidate for restart this year is the Ikata 3 reactor in Ehime Prefecture.

Energy policy

The government's current energy policy calls for a 22–24% nuclear share of electricity generation by 2030. That is less than half of the pre-Fukushima plans for future nuclear growth (the 50% target), and considerably lower than the 29% nuclear share in 2010. Currently, nuclear power – the two Sendai reactors – account for less than 1%.

To reach the 20–22% target would require the operation of around 35 reactors by 2030, which seems highly improbable.[5]

The use of both fossil fuels and renewables has increased since the Fukushima disaster, and energy efficiency has made the task considerable easier – national power consumption in 2015 was 12% below the 2010 level.[2]

The World Nuclear Industry Status Report comments on energy politics in Japan:[2]

"Japanese utilities are insisting on, and the government has granted and reinforced, the right to refuse cheaper renewable power, supposedly due to concerns about grid stability – hardly plausible in view of their far smaller renewable fractions than in several European countries – but apparently to suppress competition. The utilities also continue strenuous efforts to ensure that the imminent liberalization of the monopoly-based, vertically integrated Japanese power system should not actually expose utilities' legacy plants to real competition.

"The ability of existing Japanese nuclear plants, if restarted, to operate competitively against modern renewables (as many in the U.S. and Europe can no longer do) is unclear because nuclear operating costs are not transparent. However, the utilities' almost complete suppression of Japanese wind power suggests they are concerned on this score. And as renewables continue to become cheaper and more ubiquitous, customers will be increasingly tempted by Japan's extremely high electricity prices to make and store their own electricity and to drop off the grid altogether, as is already happening, for example, in Hawaii and Australia."

Safety concerns – the case of Takahama

The restart of the Takahama 3 and 4 reactors in Fukui Prefecture is indicative of the nuclear industry's broader problems.6 Kansai Electric Power Company (KEPCO) first applied to the NRA for permission to restart the reactors in July 2013. In February 2015, the NRA gave its permission for KEPCO to make the required safety upgrades. The restart process was delayed by an injunction imposed by the Fukui District Court in April 2015, but the ruling was overturned in December 2015.

Takahama 3 was restarted in late January 2016, and TEPCO was in the process of resolving technical glitches affecting the start-up of Takahama 4, when the Otsu District Court in neighboring Shiga Prefecture ruled on 9 March 2016 that the reactors must be shut down in response to a petition by 29 citizens. The court found that investigations of active fault lines and other safety issues were not thorough enough, it expressed doubts regarding the plant's ability to withstand a tsunami, and it questioned emergency response and evacuation plans.[7,8]

Citizens and NGOs also questioned the use of arbitrary figures in KEPCO's safety analysis, and fire protection.[6]

Nuclear Engineering International reported on 2 February 2016: "While there are plans on paper to evacuate some Fukui residents to Hyogo, Kyoto, and Tokushima prefectures, many municipalities there have no detailed plans for receiving evacuees. Kyoto Governor Keiji Yamada said he did not feel adequate local consent had been obtained, citing concerns about evacuation issues. Shiga Governor Taizo Mikazuki said there was a lack of sufficient disaster planning."[9]

On July 12, the Otsu District Court rejected KEPCO's appeal and upheld the injunction preventing the operation of Takahama 3 and 4.[10] KEPCO plans to appeal the decision to the Osaka High Court.

Meanwhile, KEPCO is considering whether it is worth investing in upgrades required for the restart of the Takahama 1 and 2 reactors. The NRA controversially approved 20-year lifespan extensions for the two reactors (grid connected in 1974 and 1975), but citizens have initiated a lawsuit to keep them shut down.[11]

Broader safety concerns

While safety and regulatory standards have improved in the aftermath of Fukushima, there are still serious problems. Citizens and NGOs have raised countless concerns[12], but criticisms have also come from other quarters. When the NRA recently approved lifespan extensions for two Takahama reactors, a former NRA commissioner broke his silence and said "a sense of crisis" over safety prompted him to go public and urge more attention to earthquake risks. Kunihiko Shimazaki, a commissioner from 2012 to 2014, said: "I cannot stand by without doing anything. We may have another tragedy ..."[13]

Prof. Yoshioka Hitoshi, a Kyushu University academic who served on the government's 2011–12 Investigation Committee on the Accident at the Fukushima Nuclear Power Stations, said in October 2015:[14]

"Unfortunately, the new regulatory regime is ... inadequate to ensure the safety of Japan's nuclear power facilities. The first problem is that the new safety standards on which the screening and inspection of facilities are to be based are simply too lax. While it is true that the new rules are based on international standards, the international standards themselves are predicated on the status quo. They have been set so as to be attainable by most of the reactors already in operation. In essence, the NRA made sure that all Japan's existing reactors would be able to meet the new standards with the help of affordable piecemeal modifications – back-fitting, in other words."

An International Atomic Energy Agency (IAEA) review in early 2016 made the following recommendations (among others) regarding the NRA:[15]

- To attract competent and experienced staff, and develop competencies relevant to nuclear and radiation safety.
- To amend relevant legislation with the aim of allowing NRA to improve the effectiveness of its inspections. The NRA inspection programme "needs significant improvement in certain areas. NRA inspectors should be legally allowed to have free access to any site at any time. The decision process for initiating reactive inspections should be shortened."
- To strengthen the promotion of safety culture including a questioning attitude.
- To give greater priority to the oversight of the implementation of radiation protection measures.
- To develop requirements and guidance for emergency preparedness and response in relation to radiation sources.

The IAEA further noted that the NRA's enforcement provisions are inadequate:

"There is no clear written enforcement policy in place at the NRA. There is no documented process in place at NRA for determining the level of sanctions. NRA inspectors have no power to enforce corrective actions if there is an imminent likelihood of safety significant event. They are required to defer to NRA headquarters. ... NRA processes for enforcement are fragmented and some processes are not documented. NRA needs to establish a formal Enforcement Policy that sets forth processes clearly addressing items such as evaluation of the severity level of non-conformances, sanctions for different levels of non-conformances, processes for issuance of Orders, and expected actions of NRA inspectors if significant safety issues develop."

Improvements?

The narrative from government and industry is that safety and regulatory standards in Japan are now adequate – or they soon will be once teething problems with the new regime are sorted out. NRA Chair Shunichi Tanaka claims that Japanese regulatory standards are "the strictest in the world."[16]

But Japan's safety and regulatory standards aren't strict. Improvements are ongoing – such as NRA actions in response to the IAEA report, and reports that legislation will be revised to allow unscheduled inspections of nuclear sites.[13] But improvements are slow, partial and piecemeal and there are forces pushing in the other

direction. An Associated Press report states that nuclear laws will be revised in 2017 but not enacted until 2020.[17]

Reactor lifespan extensions beyond 40 years were meant to be "limited only to exceptional cases" according to then Prime Minister Yoshihiko Noda, speaking in 2012. Extensions were considered an emergency measure against a possible energy crunch. But lifespan extensions have been approved in the absence of an energy crunch, and more will likely follow.[18]

If Japan's nuclear history is any guide, already flawed safety and regulatory standards will be weakened over time. Signification elements of Japan's corrupt 'nuclear village' are back in control just a few years after the Fukushima disaster.[19] Add to that aging reactors, and utilities facing serious economic stress and intense competition, and there's every reason to be concerned about nuclear safety in Japan.

Tomas Kåberger, Professor of Industrial Energy Policy at Chalmers University of Technology in Sweden, noted in the foreword to the latest edition of the World Nuclear Industry Status Report:[2]

"A nuclear industry under economic stress may become an even more dangerous industry. Owners do what they can to reduce operating costs to avoid making economic loss. Reduce staff, reduce maintenance, and reduce any monitoring and inspection that may be avoided. While a stated ambition of "safety first" and demands of safety authorities will be heard, the conflict is always there and reduced margins of safety may prove to be mistakes."

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Around 200 people attended the Lizard Bites Back protest at the 'Gates of Hell' in early July: the largest uranium deposit in the world at Olympic Dam in South Australia, operated by BHP Billiton. The three-day 'protestival' was organised to oppose any further expansion of the nuclear industry in South Australia, showcase renewable alternatives, and to build solidarity with Aboriginal custodians opposing the expansion of the nuclear industry. *www.lizardbitesback.net*

World Nuclear Industry Status Report 2016

NM827.4572 In the last issue of the *Nuclear Monitor* we wrote about the World Nuclear Association's lamentable attempt to undermine the World Nuclear Industry Status Report (WNISR) with the production of its own report, called the World Nuclear Performance Report. Since then, the latest version of the annual WNISR has been released.

As with previous editions, WNISR-2016 provides a detailed global overview of nuclear power, as well as a comparison between the trajectory of nuclear versus renewables. This year's edition also details the economic problems facing nuclear utilities.

Special chapters are devoted to the aftermath of the Chernobyl and Fukushima disasters. A comparison of the two disasters concludes: "Under practically all criteria, the Chernobyl accident appears to be more severe than the Fukushima disaster: 7 times more cesium-137 and 12 times more iodine-131 released, 50 times larger land surface significantly contaminated, 7–10 times higher collective doses and 12 times more clean-up workers."

Here we reprint some of the key findings of WNISR 2016.

2015 in a nutshell:

- Nuclear power generation in the world increased by 1.3% in 2015, entirely due to China.

Early closures, phase-outs and construction delays:

- Early closure decisions for eight reactors taken in 2015 in Japan, Sweden, Switzerland, Taiwan and the U.S.
- Nuclear phase-out announcements in California and Taiwan.
- In nine of the 14 countries building reactors, all projects are delayed, mostly by several years. Six projects have been listed for over a decade, three of them for over 30 years. China is no exception, at least 10 of 21 units under construction are delayed.
- With the exception of UAE and Belarus, all potential newcomer countries delayed construction decisions. Chile suspended and Indonesia abandoned nuclear plans.

Reactor operation:

- 31 countries operate a total of 402 reactors – an increase of 11 units compared to mid-2015, but four less than in 1987 and 36 fewer than the 2002 peak of 438.
- Total installed nuclear capacity increased over the past year by 3.3% to reach 348 gigawatts (GW), comparable to levels in 2000. Installed capacity peaked in 2006 at 368 GW.
- Annual nuclear electricity generation reached 2,441 terawatt-hours (TWh) in 2015 – a 1.3% increase over the previous year, but 8.2% below the historic peak in 2006. The 2015 global increase of 31 TWh is entirely due to production in China where nuclear generation increased by 30% or 37 TWh.

Share in energy mix:

- The nuclear share of the world's power generation – 10.7% in 2015 – has remained stable over the past four years, after declining steadily from a historic peak of 17.6% in 1996.
- Nuclear power's share of global commercial primary energy consumption also remained stable at 4.4%.

Reactor age:

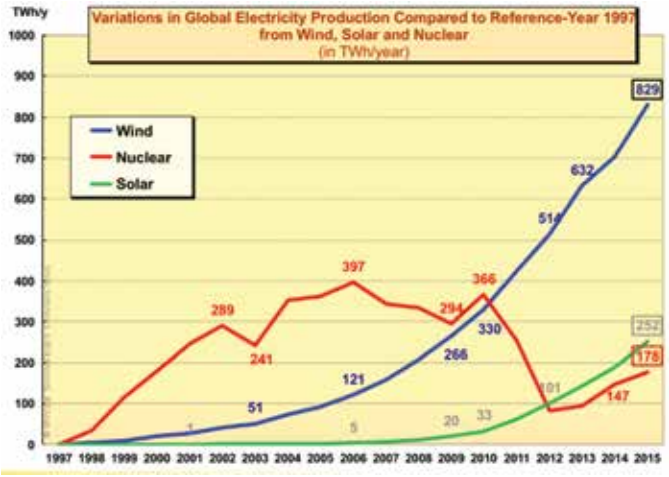
- The average age of the world operating nuclear reactor fleet continues to rise, and by mid-2016 stood at 29 years. Over half of the total, or 215 units, have operated for more than 30 years, including 59 that have run for over 40 years, of which 37 are in the U.S.

Construction starts, delays, time, cancellations:

- Ten reactors started up in 2015 – more than in any other year since 1990 – of which eight were in China.
- As in recent years, 14 countries are currently building nuclear power plants. As of July 2016, 58 reactors were under construction – 9 fewer than in 2013 – of which 21 are in China.
- All of the reactors under construction in 9 out of 14 countries have experienced delays, mostly year-long. At least two thirds (38) of all construction projects are delayed. Most of the 21 remaining units under construction, of which eleven are in China, were begun within the past three years or have not yet reached projected start-up dates, making it difficult to assess whether or not they are on schedule.
- Between 1977 and 2016, a total of 92 (one in eight) of all construction sites were abandoned or suspended in 17 countries in various stages of advancement.
- The number of reactors under construction is declining for the third year in a row, from 67 reactors at the end of 2013 to 58 by mid-2016.
- In 2015, construction began on 8 reactors, of which 6 were in China and one each were in Pakistan and the UAE. This compares to 15 construction starts in 2010 and 10 in 2013. Construction starts in the world peaked in 1976 at 44. Between 1 January 2012 and 1 July 2016, first concrete was poured for 28 new plants worldwide – fewer than in a single year in the 1970s. No construction starts in the world in the first half of 2016.
- The average construction time of the latest 46 reactors in ten countries that started up since 2006 was 10.4 years with a very large range from 4 to 43.6 years. The average construction time increased by one year compared to the WNISR-2015 assessment.

Newcomer program delays / cancellations:

- Only two newcomer countries are actually building reactors – Belarus and UAE.



Source: World Nuclear Industry Status Report 2016

- Further delays have occurred over the year in the development of nuclear programs for most of the more-or-less advanced potential newcomer countries, including Bangladesh, Egypt, Jordan, Poland, Saudi Arabia, Turkey, and Vietnam.
- Chile and Lithuania shelved their new-build projects, whereas Indonesia abandoned plans for a nuclear program altogether for the foreseeable future.

Nuclear utilities in crisis:

- Many of the traditional nuclear and fossil fuel based utilities are struggling with a dramatic plunge in wholesale power prices, a shrinking client base, declining power consumption, high debt loads, increasing production costs at aging facilities, and stiff competition, especially from renewables.
- In Europe, energy giants EDF, Engie (France), E.ON, RWE (Germany) and Vattenfall (Sweden), as well as utilities TVO (Finland) and CEZ (Czech Republic), have all been downgraded by credit rating agencies over the past year. All of the utilities registered severe losses on the stock market.
- French utility AREVA has accumulated €10 billion (US$10.9 billion) in losses over the past five years. Share value 95% below 2007 peak value. Standard & Poor's downgraded AREVA shares to BB+ ('junk') in November 2014 and again to BB- in March 2015. The company is to be broken up, with French-state-controlled utility EDF taking a majority stake in the reactor building and maintenance subsidiary AREVA NP will then be opened up to foreign investment. The rescue scheme has not been approved by the European Commission.
- The AREVA rescue scheme could turn out to be highly problematic for EDF as its risk profile expands. EDF struggles with US$41.5 billion debt, downgraded by S&P, shares lost over half of their value in less than a year and 87% compared to their peak value in 2007.
- RWE shares went down by 54% in 2015.
- In Asia, the share value of the largest Japanese utilities TEPCO and Kansai was wiped out in the aftermath of the Fukushima disaster and never recovered. Chinese utility CGN (EDF partner for Hinkley Point C), listed on the Hong Kong stock exchange since December 2014, has lost 60% of its share value since June 2015. The only exception to this trend is the Korean utility KEPCO that operates as a virtual monopoly in a regulated market.
- In the U.S., the largest nuclear operator Exelon has lost about 60% of its share value compared to its peak value in 2008.

Nuclear power vs. renewable energy deployment:

- Global investment in renewable energy reached an all-time record of US$286 billion in 2015, exceeding the 2011 previous peak by 2.7%.
- Since 2000, countries have added 417 GW of wind energy and 229 GW of solar energy to power grids around the world. Taking into account the fact that 37 GW are currently in long-term outage, operational nuclear capacity meanwhile fell by 8 GW.
- Brazil, China, Germany, India, Japan, Mexico, the Netherlands, Spain and the U.K. – a list that includes three of the world's four largest economies – now all generate more electricity from non-hydro renewables than from nuclear power.
- In 2015, annual growth for global generation from solar was over 33%, for wind power over 17%, and for nuclear power 1.3%, exclusively due to China.
- Compared to 1997, when the Kyoto Protocol on climate change was signed, in 2015 an additional 829 TWh of wind power was produced globally and 252 TWh of solar photovoltaics electricity, compared to nuclear's additional 178 TWh.
- In China, as in the previous three years, in 2015, electricity production from wind alone (185 TWh), exceeded that from nuclear (161 TWh). China spent over US$100 billion on renewables in 2015, while investment decisions for six nuclear reactors amounted to US$18 billion.
- In India, wind power (41 TWh) outpaced nuclear (35 TWh) for the fourth year in a row.
- Of all U.S. electricity, 8% was generated by non-hydro renewables in 2015, up from 2.7% in 2007.
- In the European Union from 1997–2014, wind produced an additional 303 TWh and solar 109 TWh, while nuclear power generation declined by 65 TWh.

The WNISR authors summarize:

"In short, the 2015 data shows that renewable energy based power generation is enjoying continuous rapid growth, while nuclear power production, excluding China, is shrinking globally. Small unit size and lower capacity factors of renewable power plants continue to be more than compensated for by their short lead times, easy manufacturability and installation, and rapidly scalable mass production. Their high acceptance level and rapidly falling system costs will further accelerate their development."

Mycle Schneider, Antony Froggatt et al., 2016, World Nuclear Industry Status Report 2016, www.worldnuclearreport.org or direct download: www.worldnuclearreport.org/IMG/pdf/20160713MSC-WNISR2016V2-HR.pdf

Chilcot: UK insists it has 'no long-term legal responsibility to clean up DU from Iraq'

The Chilcot report reveals that the UK has disclaimed any duty to decontaminate the toxic, radioactive ash left behind by its depleted uranium (DU) munitions, or even monitor the impacts on human health, writes Doug Weir, coordinator of the International Coalition to Ban Uranium Weapons (www.bandepleteduranium.org). But Iraq and other countries are working towards a UN Resolution this October that would hold contaminating governments like the UK and the US legally accountable for DU pollution.

NM827.4573 Hidden in the Chilcot report: a previously classified Ministry of Defence (MoD) paper setting out the UK Government's thinking on depleted uranium (DU) munitions. In it, the clearance of unexploded ordnance and DU is considered and the MoD argues that it has "no long-term legal responsibility to clean up DU from Iraq". Instead it proposes that surface lying fragments of DU only be removed on "an opportunity basis" – i.e. if they come across them in the course of other operations.

In other words, the UK's stance is that chemically toxic and radioactive DU 'ash' from spent munitions is strictly the problem of the country in which the munitions were used, in this case Iraq – and that the UK, which fired the DU shells, has no formal responsibility of cleaning up the mess.

The question is examined in Section 10-1 of the Chilcot inquiry which briefly considers DU in the context of the UK's obligations as an occupying power.[1] The MoD had submitted the paper[2] to the then newly established Ad Hoc Group on Iraq Rehabilitation.

Unlike landmines and cluster munitions, there is no treaty to ensure that affected countries receive international assistance or are themselves obligated to protect their own people. Nor is anyone required to record the impact of the weapons on individuals and communities.

Vehicles contaminated by DU – for example destroyed tanks, armoured personnel carriers - pose a particular risk to civilians, both to workers in the scrap metal industry[3] and to children who may play on them. Levels of contamination can be high and, because the interiors are not exposed to the elements, DU may remain in the vehicles for long periods.

Just how high these levels can be was a question of scientific interest to the MoD at the time and, while tanks suspected of being struck by DU would be marked, this would be "pending examination by an MoD-led team scientific team for research purposes." The MoD gave no guarantees that vehicles identified as contaminated would be dealt with appropriately.

DU in the UN General Assembly this October

This October, governments at the United Nations General Assembly will be debating a sixth resolution on DU weapons. Thanks to the experiences of Iraq – who in 2014 called for assistance from the international community in dealing with contamination, and for a global ban on DU weapons[4] – attention is increasingly being focused on the lack of obligations on nations that use DU weapons to clean up the areas they contaminate.

These same governments are often extremely conscious of the financial and technical burden of clearance as they have domestic firing ranges that are contaminated. Earlier this year, the US Army lost a long-running battle with the Nuclear Regulatory Commission over legacy DU contamination at 15 of its facilities. Meanwhile in the UK, the Scottish government continues to oppose further test firing into the Solway Firth.[5]

The cost and complexity of dealing with DU contamination at home is not the only issue focusing minds on how governments and their militaries should be obliged to address DU following its use in conflicts. New research that has revealed the presence of DU in people 30 years after they were exposed is also showing how urine testing could identify civilians affected by the UK and US's use of DU in Iraq in 1991 and 2003.

Between 1958 and 1982, Colonie, a suburb of Albany, New York was home to National Lead Industries (NLI), a factory that manufactured products containing DU. The plant made penetrators for DU munitions, counterweights for aircraft and vehicles, and shielding for medical devices.

Lax controls on the facility meant that waste was burnt in a furnace on site, which routinely operated without filtration controls. Over the period, it is believed that more than 5,000 kg of DU oxide escaped the facility in the form of micron-sized particles, to be dispersed in a plume over the surrounding community, as well as contaminating the factory itself.

For eight of those years, NLI also processed enriched uranium from fuel for experimental reactors.

Persistent US contamination akin to that in conflict zones

If the uncontrolled dispersal of DU particles into residential areas sounds familiar, it should, and the studies from Colonie have been viewed by some as analogous to the use of DU weapons in conflict settings.

Research into the shape and composition of the Colonie particles has demonstrated that they are similar to those produced by DU weapons when they hit hard targets. A UK study published in 2014 agreed that these kinds of particles are persistent in the environment, in that case surviving unaltered for 30 years in the wet conditions of a firing range in southern Scotland.[6]

That the contamination occurred in the US itself should in theory have made the environmental and health monitoring studies that followed easier to undertake than would be the case a post-conflict setting.

However this would prove not to be the case, largely thanks to the US Agency for Toxic Substances and Disease Registry (ATSDR) – the government public

health body dealing with exposures to hazardous substances. The local community would have to fight tooth and nail for recognition and research into the risks posed by the site following its closure, including collecting evidence from their friends and neighbours on the rates of health problems, which included rare cancers and immune disorders.

In 2007, and thanks to a campaign from the community that had lasted 25 years, the results of a study[7] combining forensic environmental studies with urine analysis were published, garnering international media coverage.[8]

The study was led by Professor Randall Parrish, then of Leicester University in the UK. All five of the former workers that they tested revealed uranium in their bodies 23 years after production had ceased, meanwhile 20% of the residents they tested were also excreting DU and, although the human sample size was small, their environmental analysis also revealed the presence of DU in homes and gardens at concentrations exceeding US intervention levels.

The publication of the results coincided with the conclusion of the main remediation programme at the NLI, which was managed by the US Army Corps of Engineers after the site was transferred to the government for a token US$10. The project cost US$190m, involved the removal of 150,000 tons of uranium, thorium and lead contaminated soil and debris, extracted from depths of up to 40ft, which was then sent 2,000 miles by rail to an underground radioactive waste facility in the Rockies.

Failings in the official response delayed health research

Prior to the remediation work, and Parrish and colleagues' research, an initial study by the ATSDR had already concluded that there was a real and significant health risk to the public from past DU emissions from the plant. However it had decided not to pursue any environmental surveying or health surveillance activities.

The ATSDR had been coming under pressure[9] over the quality and independence of its work for many years and in 2009, Randall Parrish and other experts would provide evidence[10] to a congressional committee on the ATSDR's conduct in relation to the Colonie case. In his testimony, Parrish argued that "In most respects other than providing information on toxins, [the ATSDR report] failed to deliver its remit for the Colonie site."

This April, a follow-up study on exposure rates among workers and residents was finally published.[11] It had a larger sample size than Parrish's 2007 study, analysing the urine of 32 former workers and 99 residents. For the workers, 84% showed DU exposure, with a further 9% showing exposure to both DU and enriched uranium, whereas just 8% of the 99 residents tested were excreting DU.

One of the arguments used by the ATSDR when it had failed to act on community concerns was that too much time had passed for DU to be detected. Parrish's 2007 study was the first to show that DU was still detectable after 20 years. The latest study shows that even after 30 years it is still possible to detect the signs of DU exposure.

Just as important are the techniques they used, which can differentiate between the different isotopes of uranium, provide valuable clues to the original source of the exposure – although ascertaining how much people have been exposed to remains difficult.

Persistent particles and pernicious politics

The refusal of the ATSDR to act in the interest of the local community in the Colonie case has parallels with the behaviour of the governments who employ DU weapons in conflicts.

This is often characterised by a lack of transparency over where the weapons are fired, what they are fired at and in the quantities used. This is data that is crucial for not only determining the risk to civilians from the use of the weapons but also to facilitate the management of contamination after conflicts. It is therefore no coincidence that these themes come up time and again in United Nations' resolutions.

There has also been, and continues to be, a studied disinterest on behalf of the DU weapon users in supporting civilian exposure studies of the kind seen in Colonie. They argue that assessing harm, and the costly and technically challenging task of clearance, is the sole responsibility of the affected state – arguments they also used to make for land mines and cluster bombs.

When the United Nations last discussed DU two years ago, 150 governments recognised the need for states to provide assistance to countries like Iraq.[12] This October, our Coalition will add our voice to those of the states affected by DU weapons in calling for an end to the use of DU weapons and for the users to finally accept responsibility for their legacy.[13]

Colonie eventually got its exposure studies and remediation, Iraq is still waiting.

Reprinted from The Ecologist, 11 July 2016, http://tinyurl.com/doug-weir

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NUCLEAR NEWS

German nuclear waste commission submits final report

After more than two years of work, a commission considering the storage of Germany's high-level nuclear waste has submitted its final report to the government. The 32-member commission was established in May 2014 to develop criteria and processes to select a repository site. The commission's report says that site selection should be determined in a three-phase process accompanied by extensive public participation. The repository could be located in salt, clay or granite.

The commission hopes that a decision on a site can be reached by 2031 and the repository opened in 2050. But even that decades-long timetable was described by commission president Michael Mueller as "ambitious". The commission's report says that the repository might not open until "the next century".

Vitrified high-level wastes arising from reprocessing are held in above-ground stores facilities at Gorleben and Ahaus. The commission said the "controversial" Gorleben rock salt formation in Lower Saxony has not been excluded as a potential repository site. On July 5, the day the commission's report was released, environmentalists protested near the chancellor's office in Berlin, and Wendland farmers drove their tractors to the capital, calling for Gorleben to be excluded.

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Protest against nuclear waste dumping at Gorleben.

Radiation along Fukushima rivers 200 times higher than Pacific Ocean seabed

Radioactive contamination in the seabed off the Fukushima coast is hundreds of times above pre-2011 levels, while contamination in local rivers is up to 200 times higher than ocean sediment, according to results from Greenpeace Japan survey work released on July 21.

Ai Kashiwagi, Energy Campaigner at Greenpeace Japan, said: "These river samples were taken in areas where the Abe government is stating it is safe for people to live. But the results show there is no return to normal after this nuclear catastrophe."

Riverbank sediment samples taken along the Niida River in Minami Soma, measured as high as 29,800 Bq/kg for radiocaesium (Cs-134 and 137). The Niida samples were taken where there are no restrictions on people living, as were other river samples. At the estuary of the Abukuma River in Miyagi Prefecture, which lies more than 90 km north of the Fukushima Daiichi plant, levels measured in sediment samples were as high as 6,500 Bq/kg.

The lifting of further evacuation orders in March 2017 for areas that remain highly contaminated is a "looming human rights crisis and cannot be permitted to stand", Greenpeace said. The vast expanses of contaminated forests and freshwater systems will remain a perennial source of radioactivity for the foreseeable future, as these ecosystems cannot simply be decontaminated.

The report is online: Greenpeace, 2016, 'Atomic Depths: An assessment of freshwater and marine sediment contamination The Fukushima Daiichi nuclear disaster – Five years later', www.greenpeace.org/japan/Global/japan/pdf/20160721_AtomicDepths_ENG.pdf

EDF raided by French authorities

French finance authorities have raided the offices of energy utility EDF.[1] Investigators from the Financial Markets Authority (AMF) raided EDF's Paris headquarters on July as part of a probe into EDF's disclosure of information to the market. Investigators are said to be concerned about the reporting of its domestic nuclear maintenance costs as well as the plans to develop new nuclear reactors in the UK.

Meanwhile, the EDF Board will meet on July 28 to make a decision on the Hinkley Point reactor project in the UK. It is expected that the Board will agree to move ahead with the project but with a delayed project commencement date of mid-2019, leaving time for EDF to sort out its own financial problems, to lock in funding for the project ... and perhaps to back out of the project if further problems emerge before the 2019 commencement date.[2]

The EDF Works Council (trade unions) recently initiated new legal action to delay the decision on whether to proceed with Hinkley Point, with a Paris court hearing scheduled for August 2. The works council had already

filed a separate legal action to force EDF to release confidential documents about the project.[3]

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Canada: expert whistleblowers call for safety inquiry

Experts at the Canadian Nuclear Safety Commission have released a letter detailing allegations of inadequate safety standards. Writing anonymously, because of inadequate whistleblower protections, the experts point to five separate cases in which the commission's staff sat on relevant information about risk or non-compliance that might have called the safety of a nuclear plant into question.

They say nuclear hazards have been underestimated, plant operators have been permitted to skip requirements of the licensing regime, and assessments outlining what could happen in the event of a major nuclear disaster have been withheld from the commissioners and the public.

The whistleblowers' letter is posted at: http://tinyurl.com/cnsc-whistle

For more information on the problems with nuclear regulation in Canada see http://m.greenpeace.org/international/en/base/news/Blogs/nuclear-reaction/nuclear-safety-depends-on-who-you-ask/blog/44663/

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http://thetyee.ca/News/2016/07/21/Canadian-Nuclear-Safety-Warnings/

Chain Reaction for nuclear disarmament

Chain Reaction 2016, a series of events and actions at nuclear-weapons and nuclear-disarmament related sites around the world, was launched earlier this month in Sydney, Australia during an International Peoples' Tribunal on Nuclear Weapons and the Destruction of Human Civilisation.

Chain Reaction 2016 includes a range of creative actions around the world from July until October. A number of international peace, religious, environment and law networks are participating through fasts, vigils, exhibitions, bike rides, walks, symposiums, parliamentary lobbying days, symbolic events and other actions to demonstrate that people around the world are calling for nuclear abolition.

Chain Reaction 2016 is highlighting a number of international opportunities to make progress on nuclear disarmament, including a case lodged in the International Court of Justice by the Marshall Islands against the nuclear-armed States, the UN Secretary-General's Five Point Proposal for Nuclear Disarmament, a UN Open Ended Working Group on Taking Forward Multilateral Nuclear Disarmament Negotiations, and a UN High Level Conference on Nuclear Disarmament to take place in 2018.

http://www.unfoldzero.org, www.PeaceAndPlanet.org, www.facebook.com/peaceandplanet

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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