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Editorial

Dear readers of the WISE/NIRS Nuclear Monitor,

Most of this edition of the Monitor deals with the plutonium problem. We begin with a summary, likening the practices of reprocessing and plutonium recycling to the old woman who swallowed a fly – every solution is worse than the problem it was supposed to solve. Martin Forwood from Cumbrians Opposed to a Radioactive Environment writes about the never-ending saga of plutonium management and mismanagement in the UK. We look at Japan − where plans are in train for full commissioning of the Rokkasho reprocessing plant, while another scandal has delayed plans to restart the Monju fast neutron reactor. In the US, the government seems to be rethinking plans for a MOX fabrication plant (the estimated cost has risen four-fold and estimated start-up has slipped from 2007 to 2019), while concerns are being raised about security at the plant.

In the Nuclear News section, Francisco Castejón writes about the ongoing battle concerning Garoña nuclear power plant in Spain, we look at UNSCEAR's latest Fukushima propaganda and celebrate the victory of the grassroots campaign against the San Onofre nuclear power plant in California.

Quite a number of WISE representatives gathered in Vienna from May 29 − June 1 for a gathering of anti-nuclear campaigners from across Europe. Big thanks to WISE International/ Friends of the Earth Austria for organising a very successful event.

In the next issue of the monitor, we hope to include a critique of the soon-to-be-released pro-nuclear film 'Pandora's Promise', John LaForge from Nukewatch writes about human radiation experiments, and Charly Hultén from WISE Sweden writes about a range of problems with radioactive waste management in Sweden
As always we welcome suggestions and content for future issues of the Monitor.

Regards from the Nuclear Monitor editorial team
Email: monitor@wiseinternational.org

Monitored this issue:

The plutonium problem: reprocessing, MOX, and fast neutron reactors

Conventional 'Purex' reprocessing involves dissolving spent nuclear fuel in acid and separating the unused uranium (about 96% of the mass), plutonium (1%) and high-level wastes (3%).

763.4314 Most commercial reprocessing takes place in the UK (Sellafield) and France (La Hague). There are smaller plants in India, Russia and Japan. In addition, a number of countries have military reprocessing plants. Including both civil and military plants, the International Panel on Fissile Materials lists 19 reprocessing plants in nine countries − China, France, India, Israel, North Korea, Pakistan, Russia, the UK and the US.
Reprocessing is arguably the most dangerous and dirty phase of the

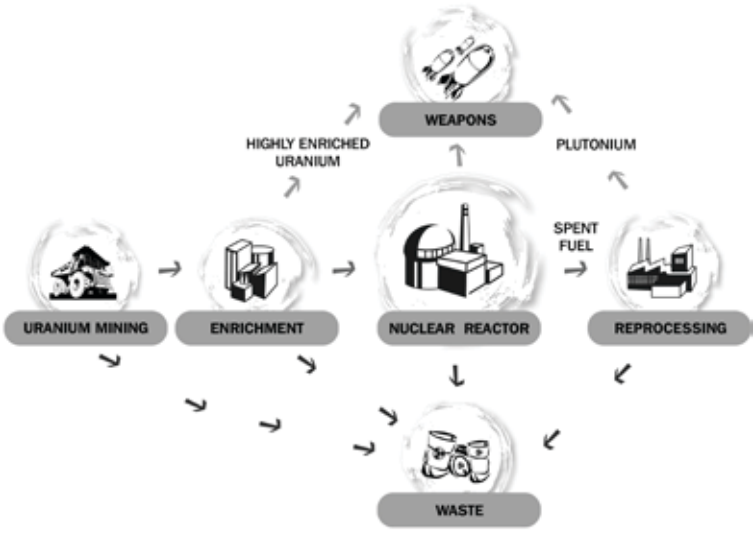
nuclear fuel chain. It generates large waste streams with no management solution and it separates weapons-useable plutonium from spent fuel.
Proponents of reprocessing give the following four justifications:

1. Reducing the volume and facilitating the management of high level radioactive waste.
However reprocessing does nothing to reduce radioactivity or toxicity, and the overall waste volume, including low and intermediate level waste, is increased by reprocessing. Steve Kidd from the World Nuclear Association noted in 2004: "It is true that the current Purex reprocessing technology (used at Sellafield and La Hague) is less than satisfactory. Environmentally dirty, it produces significant quantities of lower level wastes."

2. 'Recycling' uranium to reduce reliance on natural reserves.
However, only an improbably large expansion of nuclear power would result in any problems with uranium supply this century. A large majority of the uranium separated from spent fuel at reprocessing plants is not reused, but is stockpiled. Uranium from reprocessing is used only in France and Russia and accounts for only 1% of global uranium usage [IAEA, 2006]. It contains isotopes such as uranium-232 which complicate its use as a reactor fuel.

3. Separating plutonium for use as nuclear fuel.
However there is very little demand for plutonium as a nuclear fuel. It is used in 'MOX' reactor fuel (mixed uranium-plutonium oxide), which accounts for 2−5% of worldwide nuclear fuel, and in a very small number of fast neutron reactors.

4. Using plutonium as a fuel so that it can no longer be used in nuclear weapons.
However, reactors which can use plutonium as fuel can produce more plutonium than they consume (either by design or modification). Moreover, since there is so little demand for plutonium as a reactor fuel, stockpiles of separated plutonium continually grow and now amount to about 260 tonnes [Fissile Materials Working Group, 2013]. That amount of plutonium would suffice to build around 26,000 nuclear weapons (around 10 kgs of 'reactor grade' plutonium per weapon).



Reprocessing has clearly worsened rather than reduced proliferation risks. Addressing the problem of growing stockpiles of separated plutonium could hardly be simpler – it only requires that reprocessing be slowed, suspended, or stopped altogether.

The main reason reprocessing proceeds is that reprocessing plants act as long-term, de facto storage facilities for spent nuclear fuel. Unfortunately this sets up a series of events which can be likened to the old woman who swallowed a fly – every solution is worse than the problem it was supposed to solve:

1. The perceived need to do something about growing spent fuel stockpiles at reactor sites (not least to maintain or obtain reactor operating licences), coupled with the lack of repositories for permanent disposal, encourages nuclear utilities to send spent fuel to commercial reprocessing plants, which act as long-term, de facto storage sites.
2. Eventually the spent fuel must be reprocessed, which brings with it serious proliferation, public health and environmental risks.
3. Reprocessing has led to a large and growing stockpile of separated plutonium, which is an unacceptable and unnecessary proliferation risk.
4. Reprocessing creates the 'need' to develop mixed uranium-plutonium fuel (MOX) or fast neutron reactors to make use of the plutonium separated by reprocessing.

5. All of the above necessitates a global pattern of transportation of spent fuel, high level waste, separated plutonium and MOX, with the attendant risks of accidents, terrorist strikes and theft leading to the production of nuclear weapons.

None of this is logical or justifiable on non-proliferation, environmental, public health or economic grounds but it suits the short-term political and commercial objectives of those involved.

In a May 6 article in *the Bulletin of the Atomic Scientists,* the Fissile Materials Working Group proposes:
1. Limit the current scale of reprocessing operations and work to decrease it over time.
2. Stop the expansion of current stockpiles and work to reduce them over time.
3. Apply the most stringent standards of safety, security, accounting, and protection of public health to all processes that result in or use separated plutonium, including fuel fabrication.
4. Minimise the number of sites where separated plutonium is used and handled, and the number and length of transports of such material.
5. Pursue options for dry storage of spent fuel, particularly in multilateral cooperative repositories

Current practices worsen the problems in all respects. As the Fissile Materials Working Group notes: "Where is the

plan to reduce the plutonium risk? Negotiations on an international treaty to ban plutonium (and [highly enriched uranium]) production for weapons have been in a stalemate for more than two decades, while states outside the Nuclear Non-Proliferation Treaty − India, Pakistan, and North Korea − are increasing their capacity to separate plutonium for weapons. Although the United States and Russia agreed in 2000 to dispose of 34 tons of excess military stocks under the Plutonium Management and Disposition Agreement, this only constitutes about 15 percent of global military-owned separated plutonium."

The Fissile Materials Working Group further states: "Through the Nuclear Security Summit process initiated in 2010, countries have started securing some of the most vulnerable nuclear materials. But they have largely left plutonium untouched."
At the 2012 Nuclear Security Summit in Seoul, the US was also the only significant plutonium holder to address the material in its national statement to the Summit. Sharon Squassoni, director of the Proliferation Prevention Program at the Center for Strategic and International Security, says that taking up the matter seriously would require leaders to address associated sensitive questions that they might rather avoid, such as how to deal with nuclear waste if not by reprocessing. [Schneidmiller, 2013]

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UK plutonium and MOX experience

Author: *Martin Forwood*
Web: *Cumbrians Opposed to a Radioactive Environment: www.corecumbria.co.uk*
Email: *martin@core.furness.co.uk*

Since the production of plutonium (via the Windscale Pile reactors) for use by the UK's nuclear weapons program of the 1950's, Sellafield's flirtation with the civil use of plutonium has seen little progress and led to technical failure and international embarrassment.

763.4315 From its military origins, plans to permanently deal with the country's ever-growing plutonium stockpile – currently at 118 tonnes, the largest in the world − have remained largely in the background until 2010 when the UK Government launched a Public Consultation on a range of management options. These included its re-use as mixed oxide fuel (MOX), its sale to third parties or its classification as nuclear waste. Given successive Governments' record of unbridled support for the industry, it is unsurprising that the re-use of plutonium in MOX fuel was chosen as the preferred option. Clearly ignoring recent experiences – as the record shows − both Government and industry appear to have fallen into the trap of actually believing their own propaganda.

Sellafield first turned its hand in the 1960s to the 'civil' use of plutonium which was being recovered in increasing amounts through the site's B204 and B205 reprocessing plant – the latter dealing with the spent from the UK's first generation Magnox reactors. The first of these, the Calder Hall reactors, retaining a dual civil/military role until the 1990s.

This new civil era saw the production of 18 tonnes of plutonium fuel for the Prototype Fast Reactor at Dounreay in Scotland, and some 3 tonnes of light-water reactor MOX fuel. Despite this limited experience, but sensing the growing MOX market being tapped into by European fabricators, British Nuclear Fuels Ltd (BNFL) launched its plans for a MOX Demonstration Facility (MDF) that would 'demonstrate BNFL's ability to produce quality MOX fuel'.

With an 8 tonne per year capacity, MDF operated from 1993 to 1999, producing 44 MOX assemblies for pressurised water reactors (around 660 kgs plutonium) for Japanese and European customers. The facility was closed down in 1999 after the quality assurance data for the only fuel to be produced by MDF for Japan was found, on delivery to Takahama, to have been falsified by MDF workers. Returned to the UK in 2002, the falsified fuel has been pond-stored at Sellafield and is scheduled for transport in 2014/15 to France's La Hague for plutonium recovery.

Despite the scandal bringing the resignation of BNFL's Chief Executive and a compensation payment to Japan (whose utilities called a temporary ban on further dealings with BNFL), the embarrassing event made little impression on BNFL's determination to pursue the MOX fuel market. Plans to enter the market – based on 'the wealth of experience gained within BNFL' − had been laid in 1992 (pre MDF operations) with a planning application for the Sellafield MOX Plant (SMP) whose viability rested on winning major business from Japan.

Sellafield MOX Plant

Surviving legal challenges and 5 rounds of public consultation which focussed largely on the plant's increasingly dodgy economic case, the first plutonium was introduced into SMP in

2002. With small orders secured from German, Swiss and Swedish utilities, the expected business from Japan was conspicuous by its absence. The technical complexity of SMP, largely responsible for its eventual downfall, caused problems from the first days of operation.

Using a 'short binderless' powder mixing process unique to BNFL, the production line consisted of pellet production, rod filling and assembly of the rods into a MOX fuel assembly. Early failures in one section of the production line lead to bottlenecks in other sections and after 3 years of operation only one MOX fuel assembly had been produced. With its design production capacity cut from 120 tonnes per year to 72 – and then 40 tonnes − SMP was forced to sub-contract some orders to rival fabricators in Belgium and France.

Against this background, and taking ownership of Sellafield and SMP in 2005, the Nuclear Decommissioning Authority (NDA) almost immediately commissioned independent reports on SMP from consultants Arthur D Little, whose 2006 report exposed the extent of SMP's problems and concluded that 'looked at pessimistically, improvement plans will fail to live up to expectations leading eventually to an irrevocable collapse in the business case and closure'.

By 2009, with an overall total of just nine assemblies produced in seven years of operation, it was clear that a major engineering rescue package was needed, with an NDA technical assessment concluding that SMP could provide neither the capacity nor longevity to be used for the UK civil stockpile.

In a surprise announcement in 2010, Japanese utilities agreed to pay an undisclosed sum for the refurbishment with a promise of trial orders with a revamped SMP. Fate intervened however in the form of the Fukushima meltdowns which resulted in the interest in SMP by Japanese utilities being abandoned.

In August 2011, the NDA announced the closure of SMP – the blame being laid conveniently on Japanese problems. In reality, the over-complex plant which cost the UK taxpayer £1.34 billion and had produced just 13 tonnes of MOX fuel (32 fuel assemblies incorporating around 800 kgs of plutonium) in its 9-year life, was clearly beyond salvation − with or without Japanese help.

SMP's closure rekindled official interest in managing the plutonium stockpile. The Government's public consultation, already launched in 2010, had assessed a number of management options. Ruling out fast-breeder reactors and immobilisation of plutonium as a waste as options that were either technically immature, impractical or too costly, the Government concluded that the re-use of plutonium in MOX fuel remained its preferred option.

Growing plutonium stockpile

The latest official figures show Sellafield's stockpile amounting to 118 tonnes of separated plutonium which includes 24 tonnes of overseas-owned plutonium. Whilst a majority of the 94 tonnes of UK-owned material has arisen from Magnox reprocessing, the overseas-owned plutonium has been recovered largely in the Thermal Oxide Reprocessing Plant (THORP) and, under the terms of the original reprocessing contracts, is destined for return to customers in the form of MOX fuel.

However, in a recent Government U-turn on those contractual requirements, title transfers ('paper swaps') of some overseas plutonium has already seen 7 tonnes taken into UK ownership − 3 tonnes of plutonium of German and Dutch origin being transferred in April 2013 (the German material as repayment to France's manufacture of orders sub-contracted by SMP) and a title transfer of 4 tonnes of German plutonium made in 2012 (to allow MOX fuel for Germany to be produced in France in advance of the German nuclear phase-out).

As it stands, owners of the 24 tonnes of foreign plutonium are Japan (16 tonnes), Germany (3 tonnes), and the balance of around 5 tonnes owned between Switzerland, Italy, Spain and Sweden. Given officialdom's tacit acceptance that exporting weapons-useable plutonium − in dioxide powder form – from Sellafield is no longer an accepted option, more title transfers are likely as overseas customers increasingly seek to rid themselves of plutonium ownership. Indeed, the fate of the Japanese plutonium has already been under discussion between NDA and Japan.

For the stock of UK-owned plutonium, which will continue to rise until the 2020 scheduled end of reprocessing, its conversion to MOX as preferred by Government/NDA would require a new MOX plant to be built. Estimated at £6 billion, it remains unclear who would take on such a financially risky project, especially in the absence of any viable market for the fuel and the recent SMP debacle.

Seemingly impervious to these obstacles, the UK Government sees MOX fuel being used either in the UK's fleet of new-build reactors or in Candu 6 reactors overseas. Whilst the latter is an option belatedly suggested by Candu Energy − and still under consideration by the NDA − the former looks increasingly suspect with the UK new-build 'renaissance' in increasing disarray. Further, both reactor types scrutinised so far under the regulatory Generic Design Assessment (GDA) licensing process – the EPR and Westinghouse AP1000 − were assessed on their use of conventional uranium fuel only, with MOX use specifically excluded. A late addition, Hitachi-GE's ABWR reactor, began its expected four-year GDA process only in April this year.

Raising further doubts on the Government's preferred re-use option, the NDA revealed in June 2012 that it had opened talks not only with Candu Energy but also with GE-Hitachi who had submitted a feasibility proposal for the use of its liquid metal-cooled 'Power Reactive Innovative Small Module' (PRISM) fast-breeder reactor (a.k.a. 'integral fast reactor') as an alternative to MOX.

The PRISM proposal, which involves a 60-year program at Sellafield that would see the UK-owned stockpile of plutonium converted to the spent fuel standard of self-protection and proliferation resistance within the first 5 years, is still being assessed by the NDA with a decision expected this summer. PRISM sceptics rightly point to the earlier rejection of fast-breeders by Government, and the complexity

of an immature technology that is still at design stage and would require not only the construction/operation of PRISM itself but also a conversion plant to convert plutonium dioxide to a metal fuel and a pyroprocessing system to process the spent fuel from PRISM for re-use in the fast reactor. So the jury is still out. Should the decision to approve the PRISM proposal be taken later this year, it would almost certainly mean the end of any future MOX plans at Sellafield. Meanwhile, the UK-owned stockpile of plutonium will remain in storage at a cost of £80 million per year.

Pizza Cumbriana

Eight years after it was produced from material gathered from the West Cumbrian coast near Waberthwaite, a radioactive 'Pizza Cumbriana' was delivered to the Low Level Waste (LLW) facility at Drigg on April 29 for disposal as LLW.

Originally presented by Cumbrians Opposed to a Radioactive Environment in March 2005 to the Italian Embassy in London as evidence of the environmental contamination caused by the reprocessing of Italian and other foreign spent fuel at Sellafield, the condemned pizza has languished with other LLW at the Atomic Energy Research Establishment at Harwell until 22 February 2013 when it was transported by road to its rightful resting place at Drigg.

In advance of its presentation to the Italian Embassy in 2005, analysis of the pizza by Manchester University's Department of Chemistry revealed levels of radioactivity in the pizza topping − comprised of estuary sediment, sea samphire, seaweed and shells − that classified the material as LLW. The levels of radioactivity included 25,000 Bq/kg of Caesium 137, 25,000 Bq/kg of Americium 241 and levels of plutonium up to 15,000 Bq/kg.

Placed in a traditional takeaway pizza box, it was marked with the nuclear waste danger sign and listed its 'traditional Italian ingredients' as 'Caesium, Americium and Plutonium'. The pizza is still 24,392 years within its sell-by date. (www.corecumbria.co.uk, 29 April 2013)

Japan's reprocessing plans

Japan continues to work towards operation of the Rokkasho reprocessing facility in the northern Aomori prefecture.

763.4316 Both the Japan Atomic Energy Commission and Japan Nuclear Fuel have cited October as the start-up date for the facility. However operation is likely to be further delayed in order to meet requirements yet to be set by the Nuclear Regulation Authority, which was created in response to the Fukushima disaster.

Japan's government and private companies have invested more than US$21 billion in the Rokkasho plant since construction began in 1992. The startup of the plant has been delayed 19 times because of technical and financial problems. [Dow Jones Newswire, 2013]

When operating at full capacity, the Rokkasho plant could separate around nine tonnes of plutonium from 800 tonnes of spent fuel annually; sufficient to build around 900 weapons annually. Diversion of, say, 1% of the separated plutonium would be difficult for the International Atomic Energy Agency (IAEA) to detect against the background of routine accounting discrepancies, yet it would provide enough plutonium to build one nuclear weapon every 4−6 weeks.

There have been incidents of large-scale plutonium accounting problems in Japan. The 'Atoms in Japan' publication provides one such example. In 2003 it was discovered that of the 6.9 tons of plutonium separated at the Tokai reprocessing facility in the period from 1977 to 2002, the measured amount of plutonium was 206 kgs less than it should have been. After further investigations, the Japanese government claimed that it could account for some of the discrepancy and reduced the figure to 59 kgs. [Japan Atomic Industrial Forum, 2003.]

Japanese officials argue that the reprocessing program is for civil purposes only and that reprocessing is a necessary step towards using the plutonium as reactor fuel and thus reducing plutonium stockpiles. However in practice the use of mixed uranium/plutonium MOX fuel does not reduce plutonium stockpiles because MOX-fuelled reactors produce more plutonium than they consume. Moreover, only four reactors, including the No. 3 reactor at the stricken Fukushima Daiichi plant, have so far used MOX fuel.

Fast neutron (a.k.a. fast breeder) reactors could reduce plutonium stockpiles − but fast reactor programs have mostly been expensive and accident-prone and have done precious little to reduce plutonium stockpiles. Those problems have been all too evident with the accident-prone, scandal-prone Monju fast reactor in Japan.

In the latest scandal, Atsuyuki Suzuki, President of the Japan Atomic Energy Agency (JAEA), which operates the Monju reactor, has resigned after the Agency admitted that it had neglected to perform safety inspections on almost 10,000 pieces of equipment, some of them critical for safe operation of the reactor. A statement from the Nuclear Regulatory Authority (NRA) said: "The Japan Atomic Energy Agency cannot sufficiently secure the safety of Monju. We see deterioration in its safety culture."

The Monju reactor was first brought online in 1994, but a serious sodium coolant leak and subsequent cover-up by JAEA led to a 15-year shutdown.

In 2010, the reactor was restarted for testing, but an equipment accident ceased operations before the reactor could reach full capacity. As a result of the latest scandal, plans to restart the reactor have been pushed back and preparatory work has been delayed. Japan Times recently editorialised that the NRA should order the permanent shut-down of Monju and noted that "the JAEA has learned nothing from the Fukushima nuclear catastrophe, which was caused in part by lax management."

The contradictions with Japan's plutonium program are still more acute since all but two of the country's reactors are shut-down in the aftermath of the Fukushima disaster. Nevertheless, a shipment of MOX left the port of Cherbourg in northern France in mid-April and is scheduled to arrive in Japan in the second half of June, destined for Kansai Electric Power Co's Takahama plant west of Tokyo.

An editorial in The Asahi Shimbun on April 22 outlined the dilemma that seems to be driving the continued pursuit of Japan's plutonium program: "Still, the government and the electric power industry insist on continuing the fuel recycling program because terminating it would turn spent fuel into radioactive waste, causing them to violate an agreement with Aomori Prefecture, which has accepted the related facilities. There is no justification for continuing the now-unrealistic reprocessing program even if ending it requires a time-consuming process of securing the consent of the local communities through earnest dialogue. It is critical that a realistic road map toward interim storage and eventual direct disposal of spent nuclear fuel is worked out. It would be highly irresponsible to try to operate the reprocessing plant simply because it has been built."

Regional implications of Japan's plutonium program

The US government has reportedly expressed concern about Japan's reprocessing plans. Tatsujiro Suzuki, vice-chair of the Japan Atomic Energy Commission, met in April in Washington with Obama administration officials. Suzuki said he was told that separating and stockpiling large amounts of plutonium without clear prospects for its use as reactor fuel sets a bad example. In particular, Japan's plans complicate efforts to prevent the development of reprocessing in South Korea and Taiwan, and could also encourage an expansion of reprocessing in China.

These problems have been festering for decades. Diplomatic cables in 1993 and 1994 from US Ambassadors in Tokyo described Japan's accumulation of plutonium as "massive" and questioned the rationale for the stockpiling of so much plutonium since it appeared to be economically unjustified. A March 1993 diplomatic cable from US Ambassador Armacost in Tokyo to Secretary of State Warren Christopher, obtained under the US Freedom of Information Act, posed these questions: "Can Japan expect that if it embarks on a massive plutonium recycling program that Korea and other nations would not press ahead with reprocessing programs? Would not the perception of Japan's being awash in plutonium and possessing leading edge rocket technology create anxiety in the region?"

Further raising concerns are calls by hawkish South Korean and Japanese politicians to consider developing nuclear weapons after North Korea began a series of atomic-weapons tests in 2006 (including tests using plutonium produced in an 'experimental power reactor'). Japan's then defence minister Satoshi Morimoto said in 2012 that Japan's nuclear power program is "taken by neighbouring countries as having very great defensive deterrent functions" and former defence minister Shigeru Ishiba said: "Having nuclear plants shows to other nations that Japan can make nuclear weapons." In 2002, Ichiro Ozawa, then leader of the Liberal Party in Japan, said: "It would be so easy for us to produce nuclear warheads – we have plutonium at nuclear power plants in Japan, enough to make several thousand such warheads."

A new US − South Korean nuclear-cooperation agreement, which would allow for the continued sale of US-origin fuel and equipment, was recently deferred for two years. Seoul wants to be allowed to begin enriching uranium and reprocessing spent reactor fuel, but Washington resisted and the two countries agreed to extend the current agreement (which prohibits enrichment and reprocessing in South Korea) while negotiations continue.

"If the Koreans are left with the impression that Japan can do things that South Korea can't, then it's not a sustainable concept," said Christopher Hill, a former American ambassador to Seoul.

It is well within the capacity of the US to take concrete steps to curb the separation and stockpiling of plutonium in Japan. The US has the authority to disallow separation and stockpiling of US-obligated plutonium, i.e. plutonium produced from nuclear materials originally mined or processed in the US. However there has been no suggestion that the US will take such a step.

President Obama cautioned at the 2012 Nuclear Security Summit in Seoul: "We simply can't go on accumulating huge amounts of the very material, like separated plutonium, that we're trying to keep away from terrorists." But it appears to be all talk and no action.

In April, China signed an agreement with French nuclear-power company Areva SA to construct a new reprocessing plant similar in size to Rokkasho. Beijing says the plant will be used only for civilian purposes − but it would inevitably increase China's capacity to separate plutonium for potential use in nuclear weapons.

Henry Sokolski from the Nonproliferation Policy Education Center said: "As a practical matter, if it operates Rokkasho, it will force China to respond to re-establish that it, Beijing, not Tokyo, is the most dominant nuclear player in East Asia. Such nuclear tit-for-tatsmanship could get ugly."

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US MOX plant may get the axe

The Obama administration has reduced funding for the construction of a MOX fabrication plant at the Department of Energy's Savannah River site in South Carolina.

763.4317 The plant is about 60% complete but the Obama administration has asked Congress for US$320 million in its 2014 budget — down more than 25% from the current annual budget of US$435 million. In its budget request, the administration wrote that its high costs "may make the project unaffordable" and pledged to look for different ways to dispose of plutonium.

The Mixed Oxide Fuel Fabrication Facility is being built to carry out a bilateral deal with Russia to dispose of 34 tonnes of plutonium. However there is currently no agreed customer for the eventual MOX fuel, while Russia has decided to incorporate its plutonium into fuel for fast-neutron reactors rather than MOX for conventional reactors.

Planning for a MOX plant at Savannah River was first announced in 1998. The Department of Energy projected the construction and 25-year operating cost at US$1.8 billion to $2.3 billion, with operations starting in 2007. By the time construction began in 2007, the estimated construction cost had climbed to US$4.9 billion and the completion date had slid to 2016. In March, the Government Accountability Office told Congress that the construction cost has increased to at least US$7.7 billion, and the operational date will slip to 2019. Thus the estimated cost has risen from US$1.8 billion to US$7.7 billion, and start-up has slipped from 2007 to 2019. The project has cost US$3.7 billion so far, and the proposed allocation of US$320 million in 2014 represents less than 10% of the estimated US$4 billion required to complete construction.

Robert Raines from the National Nuclear Security Administration said that the project has suffered from rising costs, poor oversight, unrealistic expectations and inadequately designed critical components. He told a House appropriations subcommittee: "There was a tendency towards optimism in developing project estimates, assessing and assigning risks, identifying and locking in project requirements, and evaluating and monetizing the cost and schedule impacts of building a first-of- a-kind Hazard Category 1 nuclear facility."

Meanwhile, a Nuclear Regulatory Commission (NRC) licensing board is reviewing claims that the propsed MOX plant does not include adequate security measures. Watchdog groups, including the Union of Concerned Scientists, Nuclear Watch South and the Blue Ridge Environmental Defense League, argue that "the risk of plutonium theft would be increased to an unacceptable level" if a federal contractor does not make "fundamental changes" to its plans to secure and account for material at the plant.

Shaw Areva MOX Services, which is building the plant, "proposes to rely on a computerized inventory system to meet certain NRC … regulations in lieu of conventional approaches that entail physical verification of plutonium items," the groups said in a statement.

Edwin Lyman, a senior scientist with Union of Concerned Scientists, argued the company "is proposing a cut-rate approach for plutonium accounting that will make it much harder to detect a diversion or theft of plutonium before it is too late." The "computer-heavy approach could also increase the vulnerability of their accounting system to cyber attack," Lyman said.

Shaw Areva MOX Services said its proposed system meets NRC standards requiring "a licensee to verify, on a statistical sampling basis, the presence and integrity of [sensitive nuclear material], with a 99 percent power of detecting losses of five formula kilograms or more, plant wide, within 30 days ..."

Problems associated with plutonium management and accounting were all too evident at the Sellafield plant in the UK in 2005. A broken pipe in the THORP reprocessing plant led to the leaking into a containment structure of 83,000 litres of a highly radioactive liquor containing dissolved spent nuclear fuel. The spill contained 160 kgs of plutonium − enough to build 15-20 nuclear weapons − yet the loss went undetected for at least eight months. The accident was classified as Level 3 ('serious incident') on the 7-point International Nuclear Event Scale. British Nuclear Group Sellafield Limited was fined 500,000 pounds plus costs after pleading guilty to three serious, prolonged breaches of its licence conditions.

The UK Health and Safety Executive concluded: "An underlying cause was the culture within the plant that condoned the ignoring of alarms, the non-compliance with some key operating instructions, and safety-related equipment which was not kept in effective working order for some time, so this became the norm. In addition, there appeared to be an absence of a questioning attitude, for example, even where the evidence from the accountancy data was indicating something untoward, the possibility of a leak did not appear to be considered as a credible explanation until the evidence of a leak was incontrovertible."

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www.world-nuclear-news.org/RS-Rethink_slows_construction_at_US_MOX_plant-1804137.html

UK Health and Safety Executive report:
www.hse.gov.uk/nuclear/thorpreport.pdf

Quotable quotes − reprocessing, proliferation and reactor-grade plutonium

763.4318 "The three practical skill sets common to both nuclear energy and nuclear weapons research programmes are nuclear physics, radiochemistry and metallurgy. High performance computing and fluid dynamics mathemat-ical modelling skills are also useful from a design standpoint. In particular, the same practical metallurgical and radiochemical expertise needed to fabricate and reprocess nuclear fuel rods can be readily applied to the extraction, purification, alloying and shaping of the plutonium component of a nuclear warhead."
− *Ian Jackson, 2009, 'Nuclear energy and proliferation risks: myths and realities in the Persian Gulf', International Affairs, 85:6, pp.1157–1172, http://www.chathamhouse.org/sites/default/files/public/International%20Affairs/2009/85_6jackson.pdf*

"Under NPT rules, there is nothing illegal about any State having enrichment or reprocessing technology − processes that are basic to the production and recycling of nuclear reactor fuel − even though these operations can also produce the high enriched uranium or separated plutonium that can be used in a nuclear weapon. An increasing number of countries have sought to master these parts of the "nuclear fuel cycle", both for economic reasons and, in some cases, as a good insurance policy for a rainy day − a situation that would enable them to develop at least a crude nuclear weapon in a short span of time, should their security outlook change."
− *Then IAEA Director-General Dr Mohamed El Baradei, 25 March 2006, www.iaea.org/NewsCenter/Statements/2006/ebsp2006n004.html*

"Reprocessing provides the strongest link between commercial nuclear power and proliferation."– *US Congress, Office of Technology Assessment, 'Nuclear proliferation and safeguards', June 1977, p.12.*

"As we see it, however, the world is not now safe for a rapid global expansion of nuclear energy. Such an expansion carries with it a high risk of misusing uranium enrichment plants and separated plutonium to create bombs.'"
– *Editorial - Bulletin of the Atomic Scientists, 14 January 2010, www.thebulletin.org/content/media-center/announcements/2010/01/14/it-6-minutes-to-midnight*

"All nuclear fuel cycles involve fuels that contain weapon-usable materials that can be obtained through a relatively straightforward chemical separation process. ... In fact, any group that could make a nuclear explosive with weapon-grade plutonium would be able to make an effective device with reactor-grade plutonium. ... The main alternative to the once-through cycle involves the separation and recycling of the plutonium and uranium in the spent fuel. Not only is separation and recycle more expensive, it increases greatly the opportunities for theft and diversion of plutonium."
− *Steve Fetter, Stanford University's Centre for International Security and Cooperation, 1999, 'Climate Change and the Transformation of World Energy Supply', cisac.stanford.edu/publications/10228*

"At the lowest level of sophistication, a potential proliferating state or subnational group using designs and technologies no more sophisticated than those used in first-generation nuclear weapons could build a nuclear weapon from reactor-grade plutonium that would have an assured, reliable yield of one or a few kilotons (and a probable yield significantly higher than that). ... In short, reactor-grade plutonium is weapons-usable, whether by unsophisticated proliferators or by advanced nuclear weapon states."
− *US Department of Energy, 1997, Office of Arms Control and Nonproliferation, 'Final Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives', www.ccnr.org/plute.html*

"On the basis of advice provided to it by its Member States and by the Standing Advisory Group on Safeguards Implementation (SAGSI), the Agency considers high burn-up reactor-grade plutonium and in general plutonium of any isotopic composition with the exception of plutonium containing more than 80 percent Pu-238 to be capable of use in a nuclear explosive device. There is no debate on the matter in the Agency's Department of Safeguards."
− Hans Blix, then IAEA Director General, 1 November 1990, Letter to the Nuclear Control Institute, Washington DC. See also Nuclear Fuel, 12 November 1990, 'Blix Says IAEA Does Not Dispute Utility of Reactor-Grade Pu for Weapons'.

"There is clear scientific evidence behind the assertion that nuclear weapons can be made from weapons-grade and reactor-grade plutonium."
− US Office of Arms Control and Nonproliferation, US Department of Energy, quoted in Steven Dolley, 28 March 1997, 'Using warhead plutonium as reactor fuel does not make it unusable in nuclear bombs', www.nci.org/i/ib32897c.htm

Nuclear news

Spain: Garoña plant closer to definitive end?

The nuclear power plant of Garoña (Burgos), the oldest of the Spanish nuclear plants, is a hostage of its owner Enterprise Nuclenor (itself owned by the large enterprises ENDESA and Iberdrola). Garoña, whose reactor is identical to Fukushima Daiichi reactor #1, has been used by the Spanish nuclear lobby to press on the Government.
The first part of this struggle, until December 2012, was public and Nuclenor used Garoña to try to stop the new Law on Fiscal Measures that introduced a tax on the spent fuel of Spanish nuclear power plants. The amount of this tax could be of the order of 1.6 euro-cents per kWh. As it was ordered by the European Commission, the tax was not modified and therefore Nuclenor decided to stop the plant and to put all the uranium into the spent fuel pool on 28 December 2012. So Garoña is now stopped with all the fuel in the pool.

The second part of the argument has been hidden and the citizens have had no information on the discussions.
We know that the Industry Minister is preparing a new law covering the electricity sector but we do not know if any of the proposals of the large Spanish electrical enterprises will be taken into account. It is clear, nevertheless, that something has happened since Nuclenor surprisingly asked the Minister to keep Garoña 'frozen' for one more year, thus allowing for the possibility of restarting the plant.
This happened on May 24, only one month and ten days before the definitive closure of Garoña. Minister Soria decided to pass the request directly to the Spanish Regulator, the Consejo de Seguridad Nuclear (CSN). The CSN was heavily pressured by the nuclear lobby and approved an extension of Garoña's licence for one year. Three CSN members voted for the extension, two voted against.
This has damaged CSN's reputation, since it appears as a puppet that is able to approve a request in a very short time under pressure from the nuclear enterprises. Moreover, the CSN gave a new type of authorisation to keep the plant in its present status, with the fuel in the pool, but without starting the decommissioning.

The main spokespeople from Iberdrola, ENDESA and Unesa have been making public declarations that Garoña cannot stop or the investments of these enterprises will move from Spain to other countries like the US if they are not guaranteed by the new law under preparation. The CSN appears ready to accept the schedule imposed by the nuclear lobby.
Once the CSN has given its permission, the Government has only to issue an Order that allows Nuclenor to ask for the prolongation of the life of Garoña. This should have been published before June 6, that is the last day to start studying the documents issued by the CSN to proceed to the definitive stop of Garoña. Strange things happened again, since the Government did not publish such an order! So the CSN sent the documents related to the closure of the plant. Only a very strange and scandalous legal manoeuvre by the Government could avoid the definitive closure of Garoña.

We have a strange contradictory feeling now. On one hand, we are happy since we are closer to the end of this dangerous nuclear plant. On the other hand we have seen how the nuclear lobby is able to modify Government decisions and to press strongly on the regulator. Meanwhile, the public has been excluded from the debate. We would like to start thinking of future development of the area without Garoña.
− Francisco Castejón
Ecologistas en Acción, Spain
www.ecologistasenaccion.org
castejon.francisco@gmail.com

UNSCEAR Fukushima propaganda

Since the last issue of the Monitor, the United Nations Scientific Committee on the Effect of Atomic Radiation (UNSCEAR) has published a media release, based on an as-yet unpublished report, trivialising the long-term cancer death toll from the Fukushima nuclear disaster. UNSCEAR states in its May 31 media release that: "It is unlikely to be able to attribute any health effects in the future among the general public and the vast majority of workers."

That tells us nothing we didn't already know: epidemiological studies are unlikely to produce statistically-significant results given the high incidence of cancers in the general population. As discussed in Nuclear Monitor #758 (15 March 2013, available at wiseinternational.org), early estimates of the long-term cancer death toll range from 130 to 3,000.

The media release says that actions taken to protect the public (evacuation and sheltering) significantly reduced radiation exposures. Wolfgang Weiss from UNSCEAR said: "These measures reduced the potential exposure by up to a factor of 10. If that had not been the case, we might have seen the cancer rates rising and other health problems emerging over the next several decades." Weiss's statement falsely implies that cancer rates will not rise due to Fukushima fallout.

Carl-Magnus Larsson, chair of UNSCEAR, said: "Families are suffering, and people have been uprooted and are concerned about their livelihoods and futures, the health of their children ... it is these issues that will be the long-lasting fallout of the accident." Again, the implication seems to be that radiation exposure is not an issue. Larsson's statement is also an invitation to nuclear apologists and propagandists to trot out tired old lies about how the problem is not radiation itself but fear of radiation. Responding to the UNSCEAR media release, a World Nuclear News item was titled: 'Fear and Stress Outweigh Fukushima Radiation Risk'.

The UNSCEAR media release has still more to offer nuclear apologists and propagandists, noting that additional exposures received by most Japanese people from Fukushima fallout are less than the doses received from natural background radiation. That is certainly true, but UNSCEAR should note that radiation doses below background levels can cause cancer. A 2010 UNSCEAR report states that "even at low doses of radiation it is likely that there is a very small but non-zero chance of the production of DNA mutations that increase the risk of cancer developing. Thus, 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."

The 31 May 2013 UNSCEAR media release is posted at www.unis.unvienna.org/unis/en/pressrels/2013/unisinf475.html

The 2010 UNSCEAR report is posted at www.unscear.org/docs/reports/2010/UNSCEAR_2010_Report_M.pdf

For useful background to UNSCEAR's latest jiggery-pokery, see Dr Ian Fairlie's 25 February 2013 web-post, 'UNSCEAR Attempt to Limit Collective Dose Assessments from Fukushima's Fallout', posted at www.ianfairlie.org/news/unscear-attempt-to-limit-collective-dose-assessments-from-fukushimas-fallout

USA: San Onofre reactors permanently shut down

Both reactors at the San Onofre nuclear power plant in California are being retired after a long battle. "We have concluded that the continuing uncertainty about when or if San Onofre might return to service was not good for our customers, our investors or the need to plan for our region's long-term electricity needs," said Ted Craver from Edison International - the parent company of San Onofre owners Southern California Edison (SCE).

In January 2012, a fault in one of two new steam generators installed as part of an uprate program of reactor #3 resulted in an automatic shut down when radioactive material was detected coming from a worn tube in the steam generator. Reactor #2 was kept off-line after a maintenance outage because it shares the same steam generator design and also suffered from tube wear and vibration issues to a lesser degree.

A review process by the Nuclear Regulatory Commission, incomplete after eight months, will presumably be discontinued in light of the decision by Edison / SCE. The two reactors have licences to operate until 2022.

A well-organised local, state and national campaign fought against the restart of the reactors. Erich Pica, president of Friends of the Earth US, said: "This is very good news for the people of Southern California. We have long said that these reactors are too dangerous to operate and now Edison has agreed. The people of California now have the opportunity to move away from the failed promise of dirty and dangerous nuclear power and replace it with the safe and clean energy provided by the sun and the wind."

The two reactors — situated along the Pacific Coast in the densely populated corridor between San Diego and Los Angeles — are the largest to shut down permanently in the US in the past 50 years. San Onofre's two reactors are the third and fourth reactors to be retired so far this year in the US − Dominion shut its reactor in Wisconsin in May because of unfavourable economics, and Duke said in February that it would not restart Crystal River 3 because mechanical problems were too expensive to fix.

In other shut-downs over the years, the Shoreham plant in New York was completed in 1984 for US$6 billion but never opened because of community opposition. Decaying generator tubes helped push San Onofre's original reactor into retirement in 1992, even though it was designed to run until 2004. In 1993, the Trojan plant in Oregon was closed years earlier than planned because of cracks in steam tubes.

World Nuclear News, Regulatory delay closes San Onofre, 7 June 2013, www.world-nuclear-news.org/C_Regulatory_delay_closes_San_Onofre_0706132.html

Timeline: San Onofre Nuclear Generating Station www.10news.com/home/timeline-san-onofre-nuclear-generating-station

Friends of the Earth to NRC: Operating San Onofre as a Nuclear Experiment Is Not an Option http://www.commondreams.org/newswire/2013/05/24-1

San Onofre insider says NRC should not allow nuclear restart www.10news.com/news/investigations/san-onofre-insider-says-nrc-should-not-allow-nuclear-restart-042513

San Onofre Nuclear Plant at the Brink www.counterpunch.org/2013/05/17/san-onofre-at-the-no-nukes-brink

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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WISE International
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Web: www.wiseinternational.org
Email: info@wiseinternational.org
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