

NUCLEAR MONITOR

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Editorial

Dear Readers of the WISE/NIRS Nuclear Monitor,

In this issue of the Nuclear Monitor, we have articles on India's troubled fast breeder reactor program; plans for radioactive metal recycling in the US and South Africa; the near-dormant nuclear 'renaissance' in the US; and a round-up of a burst of recent conferences and reports building momentum for nuclear weapons disarmament and non-proliferation. The 'In Brief' section has updates from Fukushima and elsewhere. We also include an invitation to a three-day International Anti-Nuclear Conference & Camp in Austria from May 30 to June 1.

In the next issue of the Monitor, Pete Roche will write about nuclear waste and decommissioning problems in the UK; and Kate Brown, author of 'Plutopia: Nuclear Families, Atomic Cities, and the Great Soviet and American Plutonium Disasters', will write about the Hanford Nuclear Reservation. Feel free to contact us if there are issues you would like to see covered in the Monitor.

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

India's breeder dreams and realities

Along with China, India has currently the most ambitious nuclear power program in the world. In September 2009, while speaking at the inauguration of the International Conference on the Peaceful Uses of Atomic Energy in New Delhi, Prime Minister Manmohan Singh stated that India could have 470 gigawatts (GW) of nuclear power capacity by 2050. To put this in perspective, the current nuclear capacity in the country – more than 60 years after the atomic energy program was established – is just 4.78 GW, a mere 2.25% of the total electricity generation capacity.

M.V. Ramana
Princeton University

759.4295 In addition to the ambition, another noteworthy feature of India's plans for expanding nuclear power is the centrality of fast breeder reactors. Fast breeder reactors are thus termed because they are based on energetic

(or "fast") neutrons and because they produce (or "breed") more fissile material than they use. In the projections put out by the Department of Atomic Energy (DAE), breeder reactors comprise over 90% of the nuclear capacity by mid century. But breeders have been shown to be unreliable in many

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countries and reliance on such a technology makes it likely that nuclear power will never become a major source of electricity in India.

Three phase Program

The DAE's interest in breeder reactors dates back to 1954 at least. By that time, some leading domestic scientists had started criticizing India's establishment for not having constructed any reactors despite relatively large budgets. In response, the DAE resorted to what has become a standard response: painting a glorious future with impressive projections of massive quantities of nuclear electricity. This is in line with nuclear programs elsewhere, although the degree to which the future is stressed in comparison to the present is more extreme in India.

The DAE's plan from 1954 involved what it called the three-phase or three-stage nuclear program. The first phase calls for the use of uranium to fuel heavy water reactors, followed by the reprocessing of the irradiated spent fuel to extract plutonium.

In the second stage, the accumulated plutonium is used in the nuclear cores of fast breeder reactors. If these nuclear cores were to be surrounded by a blanket of uranium, the reactors would produce more plutonium; if the blankets were to use thorium, they would produce uranium-233, another fissile isotope of uranium.

The third stage involves breeder reactors using uranium-233 in their cores and thorium in their blankets. The primary goal was to base the growth of nuclear power on thorium – of which India had plenty – rather than uranium, which is relatively scarce. In turn, the rationale for that goal was to put forth a strategy for building a large nuclear capacity based on indigenous resources – that is, the pursuit of what is often termed energy security these days.

On the basis of this three-phase strategy, the DAE announced that there would be 8 GW of nuclear power in India by 1980. By the early 1970s, the prediction was that by 2000, there would be 43 GW of nuclear capacity, with the bulk of it being constituted by fast breeder reactors. Reality, however,

was quite different. Actually installed capacity was about 0.6 GW in 1980 and 2.72 GW in 2000, with no contribution from breeders. The latest incarnation of these projections is the 470 GW mentioned earlier.

Construction and operating experience

Despite this sixty-year history, there is only one operating breeder reactor in India – the Fast Breeder Test Reactor (FBTR). A Prototype Fast Breeder Reactor (PFBR) is being constructed.

According to the DAE, the “FBTR has provided valuable experience... and the confidence to embark upon construction of” the PFBR. The confidence

*“I don't see much sense in that,” said Rabbit.
“No,” said Pooh humbly,
“there isn't. But there was going to be when I began it.
It's just that something happened to it along the way.”*

A. A. Milne in Winnie the Pooh

is misplaced. The budget for the FBTR was approved in 1971 and it was anticipated that it would be commissioned by 1976. But the reactor finally attained criticality only in October 1985, and the steam generator began operating only in 1993. Not only was the reactor much delayed, but the FBTR's operations have been tarnished by several accidents of varying intensity. Overall, the reactor's performance has been mediocre: it took 15 years before the FBTR even managed 50-plus days of continuous operation at full power and during the first 20 years of its life, the reactor had an availability factor of about 20%.

None of this is exceptional, and breeder reactors around the world have been very unreliable, in part because of their use of liquid (molten) sodium to cool the reactor cores.

The experience with the FBTR confirms the words of Admiral Hyman Rickover, the founder of the US naval

nuclear submarine program, who observed that breeder reactors were “expensive to build, complex to operate, susceptible to prolong shutdown as a result of even minor malfunctions, and difficult and time-consuming to repair.”

Even before the FBTR came on line, the DAE started making plans for the larger PFBR and the first expenditures on the reactor started in 1987-88. Again, the DAE's plans were delayed for technical reasons and construction of the reactor finally began in 2004. The reactor has, like other Indian reactors, experienced severe time and cost overruns. The currently projected start date, as of February 2013, for commercial supply of power is September 2015 (with experimental operations starting a year earlier), five years later than initially anticipated. As of now, the estimated construction cost has increased from Rs. 34.9 billion to Rs. 56 billion.

Safety concerns

There is a fundamental safety problem that is generic to nuclear reactors that use fast neutrons. In thermal reactors, which use slow neutrons, the core is typically in its most reactive configuration when it is operating normally at full power. Any change to this configuration in an accident would therefore decrease the power being produced. For example if the fuel is dispersed, neutrons escape from the core without inducing further fissions, thus reducing the power output. Instead if the fuel collapses into a smaller volume, the resulting decrease in moderation of neutrons makes their energies less suitable for fission and consequently reduces the power.

In fast reactors by contrast, collapsing the fuel into a reduced volume increases the rate at which the chain reaction occurs. If this were to happen quickly enough, the pressure in the fuel would rise fast enough to lead to an explosion (i.e., a rapid release of energy). The mechanism behind such a release of energy is essentially the same as in a nuclear weapon explosion, though the energy releases are very much lower. Such a “core disassembly accident” has therefore been an important concern in the fast reactor design community ever since the first such reactors were constructed.

This concern has been exacerbated by various design choices made by the DAE, in particular its choice of a positive value for what is called the coolant void coefficient. The Chernobyl reactor also had a positive coolant void coefficient and that was one of the underlying reasons for the devastating 1986 accident. As a result, nuclear engineers around the world have preferred reactor designs that have negative void coefficients. Going against that trend, the DAE came up with a design for the PFBR that has a relatively large and positive void coefficient, roughly one and a half to two times that of similar fast breeder reactors.

What's worse, the PFBR's containment design does not protect adequately against severe accidents that could conceivably occur. Equally troubling is the inadequacy of the safety analyses performed by DAE, which utilize very optimistic assumptions. Calculations by a former colleague and I show that if one were to use less optimistic assumptions applicable to severe accidents that are easily conceivable, the resulting pressure on the containment structure would be much higher than what it is designed for, and the containment's integrity would be compromised leading to the escape of radioactivity into the surroundings.

High electricity costs

Economics, not safety, has likely played an important role in the choice of PFBR design. The DAE has argued that imposing the economic cost of a higher plutonium inventory associated with lowering the void coefficient is not justified. Likewise the choice of containment design also appears to be directly linked to cost reduction efforts. In general "minimizing capital cost" was one of the design objectives for the PFBR and the DAE has asserted that "the capital cost of FBRs will remain the most important hurdle" to rapid deployment of breeder reactors.

The irony is that this unsafe breeder reactor is still too costly, and a former colleague and I calculated that electricity will be about 80% more expensive than corresponding costs from the DAE's heavy water reactors. And this is with the original cost estimates, before applying the roughly 60% cost increases that have been reported.

The main reason for higher electricity cost at the PFBR is its requirement for plutonium. The PFBR design requires an initial inventory of about two tons of plutonium in its core and about a ton of plutonium every year for refueling at 75% capacity factor. Because plutonium is about 30,000 times more radioactive than uranium-235, the fissile component of uranium fuel, safety precautions are required during fabrication of fuel. Globally, just fabricating mixed oxide (MOX) fuel containing both plutonium and uranium has proven to be several times as expensive as the total cost of uranium fuel. Therefore, reactors fueled by plutonium are not cost competitive at current uranium prices and breeders do not make economic sense until the price of uranium increases dramatically.

How much of an increase is needed? For the optimistic base case, the PFBR becomes competitive with other nuclear reactors when uranium prices go up by a factor of about seven when compared to today's prices. Significantly larger quantities of (poorer quality) uranium ore will be available at these prices. Regardless of whether an expansion of nuclear power based on high-cost uranium makes sense, our calculations demonstrated that the DAE has not undertaken the most elementary economic analysis necessary to justify the breeder program.

Projection errors

In addition to the risks of catastrophic accidents associated with breeder reactors, and the high cost of electricity that they might generate, these will not constitute a major source of electricity in India anytime in the short or medium term future because the DAE's projections have simply not accounted properly for the future availability of plutonium.

The problem is that the DAE has not taken into account the lag period between the time a certain amount of plutonium is committed to a breeder reactor and when it reappears along with additional plutonium for refueling the same reactor, thus contributing to the start-up fuel for a new breeder reactor. It is simply impossible to construct breeders at the rate the DAE envisions because reactors cannot operate when

they don't have plutonium to fuel them. In addition, the DAE has resorted to various unrealistic assumptions about dealing with radioactive spent fuel and recovering plutonium.

If one were to use a consistent methodology with more realistic assumptions, the projected nuclear capacity would decrease to about 20% of the DAE's projections. Even this estimate assumes that there will be no delays because of infrastructure and manufacturing problems, economic disincentives due to the high cost of electricity, or accidents.

The weapons connection

There may be another reason for the DAE's attraction to breeder reactors – their potential contribution to the nuclear weapons program. This came out quite clearly during the course of negotiations over what was dubbed the US-India nuclear deal, where in an ostensibly civilian agreement, much of the DAE's efforts were aimed at optimizing its ability to make fissile material for the nuclear arsenal within various constraints, especially the shortage of uranium. Most prominently, the DAE's focused a lot of attention on keeping the fast breeder program outside of safeguards. In a prominent interview to a national newspaper, the head of the DAE said: "Both, from the point of view of maintaining long-term energy security and for maintaining the minimum credible deterrent, the fast breeder programme just cannot be put on the civilian list. This would amount to getting shackled and India certainly cannot compromise one [security] for the other."

In parallel, the DAE did not classify its reprocessing plants or its stockpile of reactor-grade plutonium as civilian. This allows for the possibility that breeder reactors like the PFBR are used as a way to "launder" unsafeguarded reactor-grade plutonium, both the historical stockpile as well as future production at unsafeguarded reprocessing plants, into weapon-grade plutonium. While reactor-grade plutonium is consumed in the core of the PFBR, in the radial and axial blankets weapon-grade plutonium is produced. Based on neutronics calculations for a detailed three-dimensional model of the reactor, a colleague and I estimated

that 92.4 kg and 52 kg of weapon-grade plutonium will be generated in the radial and axial blankets (93.7% and 96.5% Pu-239) respectively in the PFBR each year at 75% capacity factor. If the blanket fuel elements are reprocessed separately rather than jointly with the core fuel elements, then the plutonium contained in them can be used for weapons. Such a strategy would increase the DAE's fissile material production capacity several-fold.

Conclusion

The history of breeder reactors in India offers important lessons for other countries. Today, more than five decades after ambitious plans involving breeders were announced, and decades of well-funded and politically-backed research and development, nuclear power constitutes only a trivial fraction of overall electricity generation in India. Some part of the blame for this state of affairs should go to the DAE's obsession with breeders and reprocessing. In the future, there is no reason to expect breeders to operate reliably, produce cheap electricity, or constitute a major fraction of electricity

generation. Even for those favoring nuclear power, breeder reactors make little economic sense.

There are two main reasons why India's nuclear establishment continues to be interested in breeder reactors. The first is that once you ignore the sorry history of these reactors around the world, breeders offer the DAE the ability to promise to produce large amounts of electricity based on limited domestic resources of uranium. As I argue in my book *The Power of Promise*, this ability has been one of the two pillars of the DAE's institutional and political power. The attractiveness of this characteristic is that it serves the interests of India's elite who are looking to unbridled consumption requiring ever-increasing amounts of energy. This is why the DAE has continued to attract high levels of funding for decades despite its many failures.

The second pillar of the nuclear establishment's political and institutional power is its ability to produce the means to manufacture nuclear weapons, wherein, again, breeder

reactors can potentially contribute significantly. This ability to produce nuclear weapons allows the DAE to offer something that no other energy technology offers, and the resultant political power has been used by the DAE to bypass democracy. On many occasions, the DAE has resorted to the argument that, due to national security considerations, it cannot be held accountable by various organs of the government. This has been true not just in India but in many other countries, and constitutes another unattractive feature of nuclear power.

M.V. Ramana is with the Nuclear Futures Laboratory and the Program on Science and Global Security at Princeton University. He is the author of The Power of Promise: Examining Nuclear Energy in India (Penguin Books, 2012). He is a member of the International Panel on Fissile Materials and the Science and Security Board of the Bulletin of the Atomic Scientists. This article is based on numerous technical papers with collaborators and his book.

Nuclear waste threatens metal supply in US and South Africa

Groups in the US and South Africa are joining forces to challenge the threats to radioactive waste entering the metal supply in both countries. In the US, the Department of Energy (DOE) is poised to lift its bans which have stopped radioactive metal going into the commercial metal supply since the year 2000. In South Africa, the National Nuclear Regulator is considering licensing three radioactive waste metal smelter plants at the Pelindaba nuclear complex near Pretoria.

Diane D'Arrigo and Dominique Gilbert
759.4296 The agencies in both countries are proceeding despite clear public opposition and without concern for the health effects of chronic low dose radiation exposures on large populations that would result from their actions. Since metal is one of the most successfully recycled commodities on the planet, radioactive contamination from the US and South Africa could impact people around

the globe, without their knowledge or consent. The US Nuclear Information and Resource Service and Coalition Against Nuclear Energy South Africa are jointly calling on both their governments to stop and prevent radioactive contamination of the world metal supply.

The US Department of Energy (DOE) and its sister agency the National Nuclear Security Administration have

received over 90,000 comments and petition signatures opposing its plan to send radioactive metal into the marketplace to make everyday household and personal use items. (You can still sign on at signon.org/sign/will-the-zipper-on-your). The DOE is ignoring requests from the public to review the comments submitted during the brief comment period from December 2012 to February 2013, and it is failing to respond to requests on the status of the decision.

DOE's preferred option was to do a scanty Programmatic Environmental Assessment (EA-1919, 12/12/12) then begin releasing 14,000 tonnes of metal stored in radiological areas of the DOE weapons complex and laboratories. The steel, iron, aluminum and copper would be sent into the commercial recycling supply to make zippers,

frying pans, beverage containers, cars, baby toys, dental braces, earrings, tableware, keys, belt buckles, anything made from recycled metal. Neither the metal industry nor the general public wants any radioactive contamination in the metal supply. Secretary Chu has resigned as head of the DOE but will stay until replaced. President Obama nominated Ernest Moniz, a strong nuclear advocate. It is not clear who will make the final decision on whether to contaminate the metal supply or not and whether to do a full Environmental Impact Statement.

DOE stopped providing information requested under the Freedom of Information Act on other radioactive materials that it allows out of control into the marketplace because it was too burdensome to make the records public.

The US does not have a legal “clearance” or “radioactive release” level, but DOE makes its own “authorized limits”. The US Nuclear Regulatory Commission, Environmental Protection Agency and DOE have all tried numerous times to adopt a standard but technical concerns and public opposition have prevented setting a national level for radioactive waste materials, property and practices. The State of Tennessee allows private companies that it licenses to process and deregulate nuclear waste. The state adoption of this program was done in secrecy with deliberate intent to keep the public in the dark, using misleading acronyms such as BSFR (Bulk Survey For Release) to conceal the fact that the waste is radioactive. German nuclear waste is being sent to Tennessee to be incinerated by one of the processors, EnergySolutions.

In the absence of a legal “clearance or release” standard, the US agencies use an old 1974 Atomic Energy Commission guidance document originally intended for releasing contaminated rooms or buildings at the lowest levels detectable by instruments of that era. This Regulatory Guide 1.86, never intended to allow radioactive personal items, has been misused to justify release of surface-contaminated materials. In 1999, a committee of nuclear advocates convened under the auspices of the Health Physics Society and

American National Standards Institute (ANSI) to select “allowable” contamination levels for materials radioactive throughout (volumetrically radioactive). A review by the National Academy of Sciences found that the work done to develop the ANSI standard was not traceable and could not be relied upon. Despite this the DOE is using these levels in the Environmental Assessment EA-1919 suggesting allowable release levels for radioactive metal from DOE sites.

South Africa

South Africa is moving to allow radioactive scrap metal waste out into unregulated commerce, considering it as a “resource” rather than material that should remain under radioactive controls. Already, a legacy of mining waste, known as acid mine drainage, is almost unstopably seeping its radiotoxic pollution into the main water sources for potable water in the Johannesburg region’s cities and surrounds. Despite several years of campaigning, the country’s National Nuclear Regulator (NNR) remains largely in denial, and shielded by claiming the releases are ALARA (As Low As Reasonably Achievable) rather than enforcing honest precautionary principles.

To smelt down 14,000 tonnes of radioactive apartheid-era atomic bomb metal scrap, the South African Nuclear Energy Corporation (NECSA) has applied to the NNR to license three radioactive waste metal smelter plants at the Pelindaba nuclear complex near Pretoria. This is despite what was described as flawed environmental impact analysis approval processes and a public outcry during the public hearings of the NNR in October 2012.

If 14,000 tonnes are to be smelted, then three smelters are overkill, and one alone would handle the current waste inside of three years. So one suspects the real plan is to be an importer of radioactive waste from the world, and turn South Africa into a dumping ground.

By smelting and releasing radioactive metal scrap, NECSA will be absolved from responsibility, liability and costs of storing radioactive material on site. Instead, it will rake in profits from selling radioactive metal into the common

market, into household goods, and export vehicles to over 70 countries. So-called “recycling” of radioactive metals is unacceptable and irresponsible. Apart from the above, and airborne radioactive pollution, and fallible filter systems, explosions causing speared radioactive metal at smelter plants are known to have occurred, and killed workers.

South Africa has ratified the African Nuclear-Weapon-Free Zone Treaty – known as the Pelindaba Treaty – and agreed “not to take any action to assist or encourage the dumping of radioactive wastes and other radioactive matter anywhere within the African Nuclear-Weapon-Free Zone.” Treating radioactive waste as a “resource” calls into question South Africa’s commitment to the Treaty, and to internationally-agreed Principles of Radioactive Waste Management set out to protect human health, the environment and future generations. It must therefore denounce any notion of allowing radioactive waste to contaminate metal recycling.

Contacts: Diane D’Arrigo, Nuclear Information and Resource Service
dianed@nirs.org,
www.nirs.org.

Dominique Gilbert, Coalition Against Nuclear Energy South Africa
pelindabanonukes@gmail.com,
www.cane.org.za

Please hold for the US nuclear renaissance ...

It may have been only happenstance that the members of the US Nuclear Regulatory Commission (NRC) chose March 11, the second anniversary of the Fukushima nuclear disaster, to release their decision on the fate of the Calvert Cliffs-3 reactor proposed for Maryland, but it was surely symbolic.

Michael Mariotte, Nuclear Information and Resource Service

759.4297 Once touted as the flagship of the nuclear “renaissance”, in the summer of 2007 Calvert Cliffs-3 became the first reactor project to submit even a partial license application to the NRC in more than 20 years, leading the way for applications for 26 new reactors over the following two years. Nearly six years later, Calvert Cliffs became the first applicant to ever lose a licensing intervention and be denied its license. In the process, it also ended the license hopes for the Nine Mile Point-3 reactor in upstate New York, and almost certainly two new reactors at South Texas (the second project to submit a new license application).

The issue at Calvert Cliffs-3 was “foreign ownership, control or domination,” which is specifically prohibited by the Atomic Energy Act. When the Nuclear Information and Resource Service (NIRS) first submitted a contention on the issue in November 2008, the outcome was not so clear-cut. At the time, Calvert Cliffs-3 was owned by UniStar Nuclear, which was a joint venture of Maryland’s Constellation Energy and Electricite de France (EdF). NIRS argued that EdF was the dominant partner, putting in most of the seed money, and added that since the reactor to be built was an Areva EPR, this gave the French government undue influence and control over the project.

Even before the NRC’s licensing board admitted the contention for hearing, EdF and Constellation took another step closer, with EdF bailing Constellation out of bankruptcy by buying a 49.9% stake in all its existing reactors. That was enough to raise the eyebrows of the licensing board, which agreed

the contention should be heard.

But in late 2010, Constellation saw the economic writing on the wall – that a large new reactor in the deregulated Maryland would never be economically competitive – and abruptly reversed course. The utility turned down a loan guarantee offer from the US Department of Energy and dropped out of the Calvert Cliffs project entirely, selling its share to EdF. EdF was stuck – it now owned 100% of the project and faced a legal challenge based on foreign ownership. Its only way out was to find a US partner, but with the pre-eminent utility in the region bowing out of the project, no US partner was to be found.

Last August, the licensing board finally ruled on the challenge, denying a license for Calvert Cliffs-3. UniStar/EdF appealed the decision to the NRC Commissioners, backed by support briefs from the Nuclear Energy Institute and the South Texas Nuclear Project, which had become owned by Toshiba when its original partner, NRG Energy, had dropped out for similar reasons as Constellation (another original partner of South Texas was TEPCO, which had to drop out after Fukushima).

But even the NRC Commissioners had to admit that it would be impossible to interpret the Atomic Energy Act as allowing a nuclear project that is 100% foreign owned – as much as the industry, and probably some of the Commissioners (exactly how the Commissioners voted is secret), would have liked. The Commissioners did agree to review its existing foreign ownership regulations, but the NRC doesn’t have the power itself to change the underlying law – although perhaps what UniStar/EdF and Toshiba are really looking for is a statement about how little of the project they could get

away with selling and still get a license.

Nuclear ‘renaissance’

So, with that one decision, announced on Fukushima’s anniversary, having knocked out about 15% of the much-vaunted nuclear “renaissance” (admittedly, none of the four reactors passed the economic laugh test and probably would not have been built in the conceivable future anyway), where does the nuclear revival stand in the US?

Not standing at all, but teetering. Four new reactors are under active construction: two at Georgia’s Vogtle site and two at South Carolina’s Summer site. Both states are still regulated, and the Public Service Commissions allow the utilities to collect money from ratepayers while construction is underway. Not many other states allow utilities to treat ratepayers as their private banks – much as the nuclear industry and utilities push for it. In Florida, for example, where a similar law was adopted in 2006, there is a major legislative effort underway to repeal the law, as ratepayers there are being forced to contribute millions of dollars for proposed new reactors (at Levy County and Turkey Point) few believe will actually get built, and even if they do it will be so long that a large percentage of the current ratepayers will be dead before any electricity from them is generated.

And both Vogtle and Summer are experiencing the same kind of construction problems that plagued the first generation of reactors in the US and continue to crop up in Finland, France and elsewhere. Vogtle, for example, received its license the month before Fukushima, and is already believed to be about US\$1 billion over budget (for an allegedly US \$14 billion project – the estimate to build the same AP 1000 reactors at Levy County is now US \$24 billion) and a year behind schedule. Summer, which received its license a few months after Vogtle, is also believed to be a few hundred million over budget.

While non-nuclear construction has

been underway at both sites, it wasn't until last month that both projects began their first pour of nuclear-related concrete, for containment buildings – a milestone the nuclear industry loudly trumpeted to the media.

Back in February 2010, a year before it even received its license, Vogtle was announced by President Obama as the first nuclear recipient of a Department of Energy (DOE) loan guarantee for new reactor construction. More than three years later, that still hasn't happened. Utility officials have been sounding a little more confident lately that they will get the guarantee this year, but they've said that before. It's not clear what, if any, impact the presumed replacement of Energy Secretary Stephen Chu with Ernest Moniz will have on the timing of a final decision, though surely it is something Moniz would prefer not to have on his plate when he starts his job (his Senate confirmation hearing is slated for April 9, and he is likely to be installed in the job before the end of the month). In any case, the real hold-up over the guarantee appears to be originating at the White House's Office of Management and Budget, which has been much more skeptical about the terms, than at DOE.

Beyond Vogtle and Summer, the US nuclear "renaissance" is at a dead end. The NRC cannot even issue new construction licenses (or extend expiring licenses) because of a federal court decision last summer that voided its "waste confidence" rule. The NRC has put the issue on its fast-track, and hopes to complete a new waste confidence rule – that the agency is confident that high-level radioactive waste can and will be stored safely – by the end of 2014, that would allow it to resume licensing.

Not that there are many viable projects to license. In October 2008, the NRC said it had received or would receive a total of 23 license applications for 34 new reactors. Two of those applications (four reactors) were for Summer and Vogtle and have been granted. Five of those applications, for seven reactors, were never even submitted. Of the rest, two (three reactors) have been withdrawn. Three applications (four reactors) were knocked out by

the Calvert Cliffs decision. That leaves 11 applications covering 16 reactors – fewer than half – remaining.

And, while licensing proceedings are either continuing or already have been completed (although final licenses cannot be granted), none of the remaining applications are even close to a license, and all are even farther away from any possible actual construction. With natural gas prices at historic lows, and even wind and solar power challenging the economics of new reactors and some existing reactors alike, the odds of any of the remaining reactors ever being built are quite low.

The industry knows that, and so does

the government. This has led to a new interest in the concept of "small, modular reactors" and the DOE has begun a \$452 million program – and wants more – to develop such reactors. Some utilities have begun to express some interest in the concept and while such reactors remain far off in the future – no designs have even been submitted to the NRC for certification yet. But the new 'Small is Beautiful' approach isn't likely to prove any more effective than the failed 'Bigger is Better' mantra that drove the current "renaissance" into the ground.

Michael Mariotte is the Executive Director of the Nuclear Information and Resource Service.

www.nirs.org, nirsnet@nirs.org

ICAN civil society forum and Oslo conference on humanitarian impact of nuclear weapons

More than 500 campaigners from 70 countries and more than 130 organisations gathered in Oslo, Norway, from March 2–3 for the International Campaign to Abolish Nuclear Weapons' (ICAN) Civil Society Forum, with the aim of ramping up efforts to get a treaty banning nuclear weapons. The two-day forum included presentations by international policy and military experts, the Red Cross and UN representatives. ICAN, launched in 2007, now has 300 partner organisations in 70 countries.

759.4298 Speakers included Martin Sheen, social activist and award-winning actor; Terumi Tanaka, survivor of the Hiroshima atomic bombing; Karipbek Kuyukov, victim of nuclear testing in Kazakhstan; John Dear, Jesuit priest and renowned peace activist; Gry Larsen, Norwegian state secretary; and Ward Wilson, author of *Five Myths about Nuclear Weapons*.

Immediately after the Civil Society Forum, representatives from 127 governments gathered in Oslo on

March 4–5 for the Conference on the Humanitarian Impact of Nuclear Weapons. The conference was organised by the Norwegian government, with ICAN as the civil society partner. Many other NGOs participated including the International Physicians for the Prevention of War, Women's International League for Peace and Freedom and Reaching Critical Will, Red Cross, the World Council of Churches "no-nukes" network, Religions for Peace, Oxfam International, Peace Boat, and many others.

The conference explored three topics: the immediate humanitarian impact of a nuclear weapon detonation, the wider impact and longer-term consequences, and the humanitarian preparedness and response capacity. Speakers included the Norwegian foreign minister, the president of the International Committee of the Red Cross, the UN High Commissioner for Refugees, and the Director of the UN Office for the Coordination of Humanitarian Affairs.

The Red Cross warned that no national or international response capacity exists to respond effectively in the event of even a single nuclear bomb blast let alone a nuclear exchange. Dozens of government participants agreed that the consequences of the use of nuclear weapons would be devastating and that they could never effectively prepare for a nuclear detonation. Many governments acknowledged that elimination of nuclear weapons is the only way to prevent their use, including Austria, Brazil, Costa Rica, Colombia, Cuba, Ecuador, Germany, Iran, Ireland, Jamaica, Mexico, Nigeria, Trinidad and Tobago, Turkey, United Arab Emirates, and Venezuela.

The historic Oslo conference concluded with an announcement of a follow-up meeting, to be hosted by the Mexican government, to help consolidate and build the humanitarian arguments against nuclear weapons and to engage all states in a constructive dialogue to outlaw and eliminate nuclear weapons.

Sadly, only two of the nuclear-armed states, India and Pakistan, attended the conference. The five 'declared' nuclear weapons states did not attend, offering the excuse that Oslo would divert discussion and energy from practical step-by-step non-proliferation work. Dr Bob Mtonga, ICAN Steering Group member and a physician from Zambia, said: "This Conference has shown us that the countries that have renounced nuclear weapons and concluded regional Nuclear Weapons Free Zones, such as Africa and Latin America, are providing important moral leadership to carry forward international efforts to free the world of nuclear weapons and prevent the global public

New reports on nuclear weapons

In the lead-up to the Oslo conference, ICAN UK launched reports by experts on several indicative scenarios relevant to Britain, including a single nuclear weapon detonation on Manchester, the direct and longer-term climatic consequences if the Trident missiles on one nuclear submarine were used, accidents involving UK warheads at AWE Aldermaston and Burghfield in Berkshire, and more. Here's a web shortcut to the reports: tiny.cc/vuhluw

'Unspeakable suffering: the humanitarian impact of nuclear weapons' was published by Reaching Critical Will ahead of the Oslo conference. The report examines the humanitarian impact of nuclear weapons, covering health, environment and agriculture, economy and development, and law and order. It is posted at www.reachingcriticalwill.org

Reaching Critical Will, the disarmament program of the Women's International League for Peace and Freedom, has published a March 2013 edition of its NPT Action Plan Monitoring Report. The report provides factual information on the status of the implementation of the three pillars of the agreed action plan from the 2010 NPT Review Conference outcome document. It also looks at some latest developments concerning the failure to hold a conference on establishing a WMD free zone in the Middle East in 2012, and encouraging progress around discussions of the humanitarian impact of nuclear weapons. The 2013 report (and previous editions) can be downloaded from www.reachingcriticalwill.org

'Nuclear Weapons: The State of Play', the first in a proposed series of reports, describes the progress – or lack of it – on the commitments and recommendations of the 2010 NPT Review Conference, the 2010 and 2012 Nuclear Security Summits, and the 2009 report of the International Commission on Nuclear Non-Proliferation and Disarmament (ICNND). The report, edited by academic Ramesh Thakur and former Australian Foreign Minister Gareth Evans, is available from the website of the Australian National University's Centre for Nuclear Non-Proliferation and Disarmament. <http://cnnd.anu.edu.au/research/index.php>

health disaster that their use would create."

Upcoming events include an ICAN Campaigners Meeting in Geneva on April 20–21, immediately before the NPT Preparatory Committee, and Nuclear Abolition Week from July 6–13.

More information:

ICAN www.icanw.org and www.goodbyenuk.es

Reaching Critical Will has published a report with an analysis of the Oslo conference, highlights from government and other interventions, a brief overview of ICAN's Civil Society Forum, and some additional resources. Reaching Critical Will has also posted full presentations from speakers at the Oslo conference. www.reachingcriticalwill.org/disarmament-fora/others/oslo-2013

Norwegian Department of Foreign Affairs (English language): <http://tiny.cc/p44juw>
International Committee of the Red Cross: www.icrc.org/eng/war-and-law/weapons

Together against nuclear

Invitation for a three-day International Anti-Nuclear Conference & Camp in Austria

30th May – 1st June, 2013

Background: Nuclear power continues to be one of the greatest threats to life on planet earth. We come together under the follow assumption: we all want a nuclear free Europe (meaning: all reactors closed), within an ambitious timeframe. We want to create a new way of collaborating and sharing for anti-nuclear groups by bringing together people from different networks and backgrounds. We want to provide open space for exchange of know-how and ideas but also facilitate the development of a strategy. With this meeting we intend to start of a yearly event, a dynamic process of learning from each other and strengthening our work on national and international scale.

Who we are: We are organisations working against nuclear power, coming from different networks as Friends of the Earth, World Information Service on Energy (WISE), Réseau “Sortir du nucléaire” and others who and have joined forces to strengthen our work.

Who we invite: We invite anti-nuclear activists, experts and campaigners from all over Europe who are interested in sharing their skills and experiences and in joining strategic thinking on issues of nuclear power in an international gathering.

Objectives: The purpose of this meeting will be to assist each other on a national and international level by sharing our know-how and experiences and spark the enthusiasm and motivation to carry on the struggle against nuclear power. We want people to share and gain as much as possible and to feel that we are all part of a larger movement which can grow stronger if we come together, learn from, and respect each other.

Agenda:

The meeting will consist of two parts. The first part will be 2 days of conference in Vienna where there will be space for sharing skills, knowledge and experiences, to get to know each other and the work we are doing, and to let arise and discuss common campaigns. As we aim this meeting to become a dynamic yearly event we want to facilitate its continuity by involving participants in the planning process for 2014.

The second part will be one day focused on the topic of anti-nuclear activism which will take place in form of a camp at NPP Zwentendorf, the Austrian nuclear power station which was never commissioned due to a public referendum in 1978. The camp will offer possibilities of practical capacity building (on social media, crowd-funding, climbing, measuring and interpreting radiation) as well as on theoretical know-how for activism.

At the same time, this site will be the venue for the TOMORROW FESTIVAL, a big anti-nuclear open air festival that you can join after the camp.

You are invited to participate in either or both parts of the meeting, depending on your interests and/or where you would like to focus to enhance your work.

Please send us an email indicating your interest in attending, to receive more detailed information on the agenda and the venue: Daphne Rieder, daphne.rieder@global2000.at

Practical issues:

Accommodation will be at a hostel in Vienna from 30th–31st of May , and camping at the site of the festival.

Food will be provided (thanks to volunteers of GLOBAL 2000)

Transport to the site of the festival on May 31st and back to Vienna on June 1st, and an entry ticket to the TOMORROW FESTIVAL for the 31st of May and 1st of June

Financial: All food, transport and accommodation costs within Austria (as well as entry to the TOMORROW FESTIVAL) will be covered by the organisers.

Since we are aiming for a broad attendance regardless of size and financial resources of each group, we are offering to cover an amount of the international travel costs for people who need financial support. In this case, please contact Daphne Rieder, daphne.rieder@global2000.at

IN BRIEF

20 arrests at Trident nuclear sub base

Twenty peace activists were arrested at a nonviolent protest against nuclear weapons at a US naval base in Silverdale, Washington on March 4. Members of the Pacific Life Community gathered at the Naval Base Kitsap-Bangor in resistance to the continued deployment of the Trident nuclear weapons system.

While maintaining a peaceful vigil along the roadway, six protesters entered the roadway with a banner which they stretched across the entrance lanes. The banner quoted Martin Luther King Jr.: "When scientific power outruns spiritual power, we end up with guided missiles and misguided men." They were charged with "Walking on roadway where prohibited." Meanwhile, another 14 protesters carrying banners and signs calling for the abolition of nuclear weapons crossed the blue line onto the base and knelt in prayer. They were arrested by naval security personnel and charged with trespassing on a military base.

More information: Ground Zero Center for Nonviolent Action, www.gzcenter.org, subversivepeacemaking@gmail.com

Violence against women is integral to war and armed conflict.

Over 100 organisations have endorsed a statement presented to the fifty-seventh session of the Commission on the Status of Women in New York earlier this month. The statement notes that violence against women under the present system of militarised state security is not an aberration that can be stemmed by specific denunciations and prohibitions; it is and always has been integral to war and all armed conflict. It is likely to endure so long as the institution of war is a legally sanctioned instrument of state, so long as arms are the means to political, economic or ideological ends.

The statement identifies many forms of military violence against women including military prostitution, traffic-

king and sexual slavery; random rape in armed conflict and in and around military bases; strategic rape; the use of military arms to inflict violence against women in post-conflict as well as conflict situations; impregnation as ethnic cleansing; sexual torture; sexual violence within the organised military and domestic violence in military families; domestic violence and spouse murders by combat veterans.

The full statement is posted on the website of the International Institute on Peace Education www.i-i-p-e.org/csw

Twelve EU countries promote nuclear power.

The day after the second anniversary of the Fukushima disaster, Bulgaria, Czech Republic, Finland, France, Hungary, Lithuania, the Netherlands, Poland, Romania, Slovakia, Spain and the UK "affirmed their commitment to collaborate in the context of the role that they believe that nuclear energy can play a part in the EU's future low carbon energy mix." The one-page joint statement from the 12 countries calls for 'neutrality of technology' in meeting future European Union decarbonisation targets. The 12 EU member states plan to work together to promote nuclear power, with the Czech Republic to host the next informal Ministerial meeting next year.

The joint statement says "an investment environment must be created taking account of the long term nature of nuclear infrastructure projects in the EU." Justin McKeating from Greenpeace noted that an "investment environment" is spin for fixing the game in the nuclear industry's favour, a fancy way of saying that governments must guarantee the profits of the nuclear companies for decades as well as shielding them from any liability should their reactors cause an accident.

The joint statement is posted at www.gov.uk/government/news/uk-at-fore-front-of-european-nuclear-expansion

3rd International Uranium Film Festival

Finalists for this year's International Uranium Film Festival have been announced. About 150 films were sub-

mitted, of which 48 films from 16 countries have been selected for the festival screenings and competitions. After the launch in Rio de Janeiro in May, organisers hope to take the festival to the US, Germany, the UK, Tanzania, Malawi, South Africa and elsewhere – depending on resources.

www.uraniumfilmfestival.org

India and the nuclear suppliers group.

Diplomats said after a March 20 meeting of the 46-nation Nuclear Suppliers Group that the US, France, Britain and Russia argued to allow India into the Group despite its status as a nuclear weapons state outside the Nuclear Non-Proliferation Treaty (NPT). However, China and smaller European states such as Ireland, the Netherlands and Switzerland had reservations. China stressed the need for equal treatment in South Asia, a reference to Pakistan.

Mark Hibbs from the Carnegie Endowment for International Peace said some "worried that India will use its voice to reverse the NSG's gears and loosen export controls, since India has not demonstrated a firm historical commitment" to its mission. The US strong-armed an India-specific waiver through the NSG after the completion of the 2008 US-India Nuclear Co-operation Agreement. The NSG's annual plenary session will be held in Prague in June. ([Reuters, 20 March 2013](#). 'Nuclear states divided on India joining export control group')

Workers halt production at Chinese uranium mine in Niger

680 workers went on strike at a China National Nuclear Corp (Sino-U) uranium mine in northern Niger on March 19, demanding better wages and conditions. On March 21, it became an indefinite strike. The union said that despite several agreements, CNNC had for four years postponed improved conditions for its workers. Union spokesperson Alassane Idrissa accused CNNC of "paying no respect" to the environment or to the health of its workers. ([Reuters, 20 March 2013](#). 'Workers halt production at Chinese uranium mine in Niger')

