

# NUCLEAR MONITOR

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## MONITORED THIS ISSUE:

## URENCO: WASTE DUMPING IN RUSSIA

Late January a report by Dutch radio "discovered" the dumping of depleted uranium by (the British, German and Dutch consortium) Urenco in Russia. Although well known and publicized by the international anti-nuclear movement for about 10 years it became suddenly a public discussion in The Netherlands, with parliamentary questions being asked.

(653.5787) **WISE Amsterdam** - Urenco simply states it has a contract for re-enriching the uranium to natural levels, but fact is that over 80% stays behind at the enrichment plants in Russia. A smart way to get rid of the waste. According to the Dutch Environmental minister 20% of the material is transported back to Urenco, however, this figure is a high estimate. WISE-Uranium calculated in 2004 that percentage only to be 16%, and since Urenco is underfeeding its plants, it means even less U-235 remains in the depleted uranium (see below).

In the last few years German, Dutch and Russian organizations raised awareness of the Urenco transports, sometimes by direct actions. One of the three plants in Siberia re-enriching the Urenco uranium is at Angarsk. (see story somewhere else in this NM)

Another 1,000 tons of depleted uranium left the Urenco enrichment plant at Gronau (Germany) on February 1, heading for Russia. Anti-nuclear activists were able to find out the train's departure times, triggering spontaneous protests. The load of depleted uranium passed the border into neighboring The Netherlands and is shipped from Rotterdam to St. Petersburg. Next transport will likely be at the end of March. Further protests are being organized..

Meanwhile, WISE-Uranium published a paper (called "*Underfeeding*

*at Urenco's Gronau uranium enrichment plant results in reasons for tails exports to Russia becoming obsolete*") in which it argues that the justification for sending uranium to Russia has become obsolete. Urenco Deutschland GmbH has disclosed that it is underfeeding its Gronau uranium enrichment plant since 2004: while from 1991 to 2002, the natural uranium feed consumption of the plant virtually followed the continuous capacity increase of the plant, the feed consumption no longer followed the capacity increase from 2004 - it even began to decline. Urenco explains this with changes in product and/or tails assays, without giving any details.

Given the rapid increase of the price of fresh uranium, underfeeding may make sense, since it allows to reduce natural uranium consumption at the expense of increased separation work. A closer analysis shows that the observed decline in feed consumption must be mainly caused from a reduced tails assay.

As most of Urenco's depleted uranium tails are exported to Russia for re-enrichment, a reduced assay of the tails exported has serious consequences on the viability of any re-enrichment of these tails. It turns out that the assay of the tails delivered to Russia comes close to the assay that Urenco most likely has contracted with Russia for re-enrichment

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on Urenco's behalf. Therefore, unless the contractual arrangements have been changed, almost nothing remains to be re-enriched in Russia on these tails on Urenco's behalf, and the amount of recovered natural uranium sent back to Urenco tends towards zero.

This means that the official justification for sending the tails to Russia (recovery of usable uranium from the tails) has become obsolete. Since the transfer of tails to Russia rather continues, this can be seen as a further hint on the true reason for these exports: to provide a cheap tails disposition route to Urenco.

**Sources:** Dutch EO-Radio, 29 January 2007 / Indymedia (NL), 2 February 2007 / WISE-Uranium, 27 February 2007

**Contact:** WISE uranium

# MONOPOLIZING THE FUEL SUPPLY: THE GNEP, GNPI AND FUEL BANK INITIATIVES

**One of the most urgent problems the nuclear community has to 'solve' before a relapse of nuclear energy is possible is the proliferation issue. Nuclear energy makes the nuclear bomb possible in many ways: know-how and skills, materials, technologies, processes and methods. The difference lies only in the intention.**

**One of the ways the nuclear society wants to 'solve' this is to monopolize the nuclear infrastructure and technology and restrict access to nuclear fuel. Internationally, several initiatives are currently being developed.**

**But all these initiatives are undermining Article IV of the Non Proliferation Treaty-- and with that the entire NPT, because Article IV is the 'carrot' in the NPT-'stick'.**

**Even if proposals to limit the accessibility of technology and nuclear fuel could somehow be brought into force, it would still not result in eliminating the proliferation risks associated with a (foreseen) large expansion of nuclear power.**

**(653.5788) Laka Foundation** - Some of the global (potentially armed) conflicts in recent years (Iraq, North-Korea and currently Iran), are a direct result of nuclear power programs. Proliferation of nuclear technology is a major problem and control is not able to solve that problem, as ElBaradei IAEA Director-General stated in 2004: *"The technical barriers to mastering the essential steps of uranium enrichment - and to designing nuclear weapons - have eroded over time, which inevitably leads to the conclusion that the control of technology, in and of itself, is not an adequate barrier against further proliferation"*.

## **Enrichment**

Enriched uranium fuel is required by almost all nuclear reactors in use around the world today. However, as we all know, enriched uranium is also used in nuclear weapons. The difference

between bomb fuel and reactor fuel is the level of enrichment.

Because the technology used to enrich uranium to the levels used to fuel power plants is essentially the same as the technology required to produce highly enriched uranium for nuclear weapons - the difference lies mostly in the time required to enrich the fuel -- any technology used to enrich uranium fuel for power plants is inherently "dual-use." Since Article IV of the nuclear Non-Proliferation Treaty ensures access to peaceful uses of nuclear technology for non-nuclear weapon states, the technology for uranium enrichment must be permitted to all states under the current nonproliferation regime. Countries like Iran could therefore, in principle, develop their enrichment technology up to a certain point under the cover of a "peaceful" nuclear energy program before dismissing the peaceful-

use pretense and rapidly developing nuclear weapons -- a scenario often described as a "break out."

Following India's nuclear test of 1974, concerns about such a "break-out" scenario led many states that possessed enrichment technology to band together to form the Nuclear Suppliers Group (NSG- currently about 45 member states) and create stringent rules for themselves to prevent the transfer of sensitive (enrichment) technology. The 2006 US-India nuclear agreement breaks those rules: India is not a signer of the NPT and thus does not comply under the rules of the NSG and should therefore be excluded from nuclear dual-use technology transfer. It was feared that the US-India agreement would set a precedent, and indeed recently Russia signed an agreement with India for the construction of nuclear reactors and China may also seek

similar exemptions for Pakistan.

Since developing, maintaining, and operating enrichment facilities is quite expensive, for decades recipient states were mostly content to buy their fuel from NSG members. However, recent events -- including the attacks of Sept. 11, 2001, the revelation of A.Q. Khan's black market trade in nuclear technology, North Korea's nuclear test, and suspicions about Iran's nuclear ambitions -- have raised worries that a future political crisis could interrupt the steady supply of nuclear fuel. This, further, has led to concerns that more countries will pursue enrichment technologies themselves, to ensure a continued supply of fuel.

### GNPI

Many hope that this clear proliferation danger (the spreading of enrichment technology) can be addressed by giving states that currently forego indigenous enrichment capabilities incentives to continue doing so, by strengthening guarantees that supplier states will not cut off fuel shipments for political reasons. "Multilateralization" of certain aspects of the fuel cycle may have the potential to address this issue. The city of Angarsk gives the most concrete example of such a proposal to date. Angarsk is a city of about 270,000 in southeastern Siberia, Russia, and the home of the Angarsk Electrolyzing and Chemical Combine, a plant created to enrich uranium for the Soviet nuclear program. Throughout its history, the plant has been a restricted area - closed to all foreign visitors. On November 28, 2006, however, the Russian news agency ITAR-TASS reported that the Russian government had decided to remove the Angarsk plant from its list of restricted areas. Soon, according to the report, Angarsk will become the site of the world's first "international uranium enrichment center" (IUEC). The aim of the center is to provide a guaranteed supply of uranium fuel for countries which do not enrich uranium themselves, including for countries under international sanctions such as Iran, India and others. In February it was announced that Russia and Japan were close to signing an agreement allowing Japanese reprocessed uranium to be sent to Russia for enrichment. Although

Japan has an enrichment plant, the plant's capacity is only a fraction of Japan's total demand. Furthermore, Angarsk is re-enriching Urenco's depleted uranium to natural levels. Many see this as dumping nuclear waste in Russia.

Interested states will (in theory) be able to ensure their access to nuclear fuel from the Angarsk IUEC by meeting "established non-proliferation requirements" in exchange for assured access to the fuel produced by the center. Russia envisions its IUEC will have "equal, non-discriminatory membership for all," "transparency," and "involvement of the IAEA in [the fuel center's] activities," but otherwise the details of the arrangement remain vague. In any case, Russia will retain exclusive control of all sensitive enrichment technology, so the exact nature of "membership" remains an open question. It could mean anything from a contractual relationship to some role in physically managing the facility. It is also unclear how such a facility, situated in Russian territory, will provide any further assurance that nuclear fuel shipments will not be interrupted.

The IUEC in Angarsk is the first specific proposal resulting from Russian President Vladimir Putin's Global Nuclear Power Infrastructure (GNPI), an initiative announced on January 25, 2006, that aims at establishing a network of international centers (it is unclear whether they will all be based in Russia) to provide nuclear fuel cycle services, including uranium enrichment, on a non-discriminatory basis and under the supervision of the IAEA. GNPI is one of two major "multilateral" fuel cycle initiatives in development today; the other is the United States' Global Nuclear Energy Partnership (GNEP).

### GNEP

Unveiled by the Bush administration February 2006, the Global Nuclear Energy Partnership (GNEP) is advocated by the US through which the country (and international partners) would develop a fuel services program to supply developing nations with reliable access to nuclear fuel in exchange for a commitment to forego the development of uranium enrichment and plutonium reprocessing

technologies.

The proposal set off strong protests in anti-nuclear and non-proliferation camps, because it reintroduced the reprocessing of spent reactor fuel to the U.S. nuclear landscape.

Although much attention so far is focused on reprocessing as an important issue of the GNEP-initiative, monopolizing nuclear infrastructure (and supplying fuel) is an important incentive of the program. (for more on GNEP see *Nuclear Monitor* 642). In January 2007, 11 communities (all in the US) have been awarded a total of US\$16 million in study grants by the U.S. Department of Energy to be used to determine if they would be suitable sites for the GNEP.

Welcoming local and regional authorities are just part of what senior Harvard nuclear researcher Matthew Bunn describes as a large and "unwieldy coalition" that has kept the GNEP proposal afloat despite serious questions about its technical feasibility, concerns over its potential to spread nuclear weapons material, doubts that nuclear "have-not" nations will submit to a Western fuel and technology monopoly and a lack of funding from Congress. That coalition includes the national nuclear labs, which see the potential for billions in research funding, and some players in the industry, who hope for lucrative contracts as part of GNEP and the general growth of the nuclear power industry that they expect will accompany it.

GNEP is instituting a global two-tier fuel cycle regime in which (1) only fully trustworthy states (which in the current political situation means: allies of the U.S.) will be able to operate enrichment and reprocessing facilities, and all other countries will be guaranteed access to nuclear fuel and reactors in exchange for their commitment not to pursue development of fuel cycle facilities of their own; and (2) developing "proliferation-resistant" reprocessing and fuel recycle technologies that, unlike the conventional PUREX process, do not produce "separated plutonium." (see article: "*Proliferation-resistant reprocessing*")

Essentially, GNEP would be a more

complete sharing of technology among a very limited set of partners, while GNPI would be a very limited sharing of responsibility with any interested countries. Both, however, promise to supply nuclear fuel to all countries which agree to forego pursuit of enrichment capabilities.

GNEP attempts to address the flip side of NSG members' attempts to keep enrichment technology from spreading: fears among recipient states that such proposals are thinly veiled attempts to revoke their "inalienable right" to peaceful nuclear technology. These fears may even be spurring more countries to pursue nuclear enrichment technology, in hopes that they can achieve significant capability before any new international agreement solidifies and locks them out of the club. Tellingly, all "multilateral" fuel cycle initiatives put forward at a Special Event organized at the IAEA General Conference in 2006 were proposed by actual or potential nuclear suppliers.

#### Fuel Bank

Unsurprisingly for proposals pushed by current nuclear suppliers, most such initiatives aim to create backup-only supplies that would be available only in the event that the existing market for nuclear fuel fails and thus would not affect prices on the nuclear fuel market. In September 2006, the Nuclear Threat Initiative, a US public charity founded by Ted Turner and former Senator Sam Nunn, pledged US\$50 million to the IAEA (on the condition that one or more member states contribute an additional \$100 million in funding) to help create a low-enriched uranium stockpile to support nations that make the sovereign choice not to build indigenous nuclear fuel cycle capabilities. Such a stockpile is referred to as the IAEA Nuclear Fuel Bank.

Rather than producing fuel like Russia's IUEC, the fuel bank would simply store a reserve which would assure a back-up supply ("at competitive market prices") for power reactors throughout the world on a non-discriminatory, non-political basis. This would reduce the need for countries to develop their own uranium enrichment technologies at a time when concerns about nuclear proliferation are growing. Both the US

and Russia have announced their willingness to make nuclear material available for a fuel bank, under such a scheme. An IAEA administered fuel bank was a key proposal made by an Expert Group in 2005, tasked with finding options to improve controls over fuel enrichment, reprocessing, spent fuel repositories and spent fuel storage.

If the idea moves forward, the IAEA will decide how the fuel bank will operate and, presumably, who would have access to the fuel and which consortiums are producing the fuel, and de-facto are controlling the enrichment market.

#### Monopoly

The fact that most such initiatives are simply backup proposals -- combined with the questionable benefits of "multilateralization", the general indifference of countries that purchase nuclear fuel toward such proposals, and the historically rare interruptions of nuclear fuel supply -- means it is unlikely they will deter countries truly interested in pursuing their own enrichment capabilities. Upon close examination, GNEP and GNPI are not even truly multilateral initiatives -- Russia will maintain control of the nuclear technologies used under GNPI, while the United States and existing nuclear suppliers will do the same under GNEP.

The status of have's and havenot's was formalized in the Non Proliferation Treaty but these initiative are a further step and actually undermine the NPT's, Article IV ('free access to nuclear energy technology for peaceful purposes') and with that the entire NPT, because Article IV is the 'carrot' in the NPT-'stick' .

These proposals to create national or international monopolies on the nuclear fuel cycle are very unlikely to be acceptable. The implication of these proposals is, in effect, that certain countries can be trusted with the fuel cycle while no one else can. And the use of punitive sanctions or (the threat of) military intervention in order to enforce restrictions on access to fuel cycle technologies, would add greatly to the unacceptability of such proposals. These kinds of actions would

further increase the discriminatory nature of these strategies. Specifically, the five acknowledged nuclear weapons states, which are also the five permanent members of the Security Council, along with their allies would be shielded from any negative consequences. The embracing of "preemptive" military strikes by powerful states like the U.S. and Israel (which have both demonstrated their willingness to carry out such a policy in defiance of international opinion), further erodes the acceptability of such proposals.

Apart from all other arguments, nuclear power is a very unattractive option if the direct result of that option, the proliferation of nuclear weapons, is restrained by increased regional tension, sanctions that most directly hurt ordinary people, and a heightened risk of conventional war.

**Sources:** Eric Hundman: *"Nuclear Fuel Supply Proposals Aimed at Weakness in Nonproliferation Regime"* published on [www.cdi.org](http://www.cdi.org) 21 December 2006 / *"US plan for nuclear cartel faces reality check"*, MSNBC, 24 January 2007 / Brice Smith, *"Insurmountable Risks"*, Brice Smith, IEER, 2006 / *IAEA Bulletin*, September 2006 / Nuclear Threat Initiative, at <http://www.nti.org> / Press Release by Green Action (Kyoto), Citizens' Nuclear Informaton Center (Tokyo) and Ecodefense (Moscow), 28 February 2007

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# PROLIFERATION-RESISTANT REPROCESSING

**(653.5789) LAKA Foundation** - GNEP's promoters paint the program as a nonproliferation initiative. They argue that GNEP would dramatically reduce the threat of proliferation worldwide by instituting a global two-tier fuel cycle regime in which (1) only fully trustworthy states will be permitted to operate enrichment and reprocessing facilities, and all other countries will be guaranteed access to nuclear fuel and reactors in exchange for their commitment not to pursue development of fuel cycle facilities of their own; and (2) developing "proliferation-resistant" reprocessing and fuel recycle technologies that, unlike the conventional PUREX process, do not produce "separated plutonium."

## Contradiction

However, there is a fundamental contradiction between these two objectives. If reprocessing facilities are only going to be located in fully trustworthy states that pose no proliferation concerns, then why is it necessary to develop "proliferation-resistant" recycle technologies? And conversely, if the "proliferation-resistant" technologies that are under study have such potential to reduce proliferation and nuclear terrorism risks, then why are they too dangerous to be widely exported?

Countries like South Korea that are already pursuing similar technologies are not likely to understand why they would be asked to give them up under the GNEP regime.

The only consistent way to resolve these contradictions is to conclude that no one really believes that the proliferation-resistance of these systems is going to be effective. In fact, it appears that DOE is using the "proliferation-resistance" moniker merely to "brand" GNEP for sale to the public, just like the other banal and oversimplifying adjectives like "clean," "safe" and "secure" which appear in DOE's GNEP promotional materials.

## UREX+

The claim that GNEP will advance non-proliferation through the development of "proliferation-resistant" reprocessing technologies that do not produce "separated plutonium" has little justification. In fact, there does not appear to be a common definition of "separated plutonium" in either a formal or an operational sense. DOE has at different times proposed three variants of the UREX+ process, producing Pu+Np, Pu+Np+other minor actinides, or Pu+minor actinides+lanthanides, as well as the Pu+MAs+Ce-144 product of electrometallurgical treatment ("pyroprocessing") as meeting this definition. Japan has asserted that the mixture of plutonium and uranium to be produced at the Rokkasho Reprocessing Plant (RRP) - a 50%-50% blend - is not separated plutonium. France is claiming that an "integrated recycling plant" that produces conventional MOX fuel as an end-product does not produce "separated plutonium." But these approaches are merely superficial modifications to conventional reprocessing that would have no significant impact on the ability of skilled adversaries to divert or steal weapon-usable material from the nuclear fuel cycle and build nuclear weapons within the accepted IAEA conversion times.

There is little question that a simple blending of plutonium with uranium without introducing a high external radiation barrier, even in the form of a bulky MOX fuel assembly, affords little proliferation resistance relative to separated plutonium, and would not affect the intensity of safeguards applied by the IAEA or physical protection measures called for by international standards.

On the other hand, blending with sufficient quantities of highly radioactive fission products in principle could be effective, but the product and fresh fuel would be so cumbersome and dangerous to handle that the cost and risk of generating nuclear power could increase dramatically. These and other proposals to modify the nuclear fuel cycle to reduce the accessibility of plutonium have been discussed for decades, yet it has been falsely asserted that the Carter moratorium on reprocessing was instituted because such options were not available. For instance, on February 27, 1978, within a year after the Carter policy statement (banning commercial reprocessing), U.S. and U.K. scientists announced the development of Civex, "a method of reprocessing spent fuel from atomic power plants that would not produce pure plutonium, which could be used to make atomic bombs."

The statement went on to say that "in the Civex process, spent fuel would be treated so that it could be reused as fuel ... but the plutonium in it would not at any stage be purified to the extent that it could be used for a bomb ... the fuel, at every stage of the process, would be so highly radioactive that it could not be handled directly by human beings, a fact that would presumably deter terrorists from attempting to steal the material."

Sound familiar? This is exactly the same wording used today by promoters of UREX+ and pyroprocessing. But the Carter Administration was fully aware of the proposal and expressed interest. The U.S. General Accounting Office reviewed the proliferation-resistance characteristics of Civex and similar approaches at the time and found that they would have little impact on diversion by states, although they would provide enhanced protection against terrorist theft.

Plutonium in spent fuel is relatively inaccessible to terrorists because it is mixed with fission products, some of which-notably 30-year half-life cesium-137-emit penetrating gamma rays when they decay. The radiation dose rate one meter from a 50-year-old spent fuel assembly would be high enough to deliver a fatal dose within half an hour. As a result, a spent fuel assembly, which contains about 4 kilograms of plutonium, will be "self-protecting" by the standards of the IAEA for more than 100 years. In contrast, the penetrating-radiation dose rate from separated plutonium is so low that it can be safely carried in

a light airtight container

But the products of the various UREX+ processes would be far less self-protecting than the Civex product, which would retain some cesium-137. Neither the UREX+1a or pyroprocessing flowsheets result in a plutonium product that is "so highly radioactive that it could not be handled directly by human beings." In March 2006, DOE has conceded this point by saying that "The plutonium mix from UREX+ would not meet the self-protection standard of spent fuel and, therefore, the physical protection measures and safeguards associated with the process will need to be stringent."

But DOE de-emphasizes the importance of this admission, stating that "the GNEP model works because only the supplier states will be engaged in the recycling of spent fuel. These are states with strong non-proliferation records ... and in most cases are nuclear weapons states." This response recalls the question asked earlier: why then do we need to develop more proliferation-resistant reprocessing technologies at all?

When DOE officials are questioned on this point in private conversations, they say that these technologies will provide enhanced protection against subnational threats. Yet they have provided no evidence that these approaches would be effective. It has already been well-established that the UREX+1a product, a mixture of plutonium and minor actinides (neptunium-237, americium and curium), does not have a significantly greater resistance to theft than does the plutonium itself. The bulk barely increases and the radiation barrier at 1 meter remains below 1 rem per hour; a dose-rate far below the IAEA's threshold for "self-protection" (i.e. a level of radioactivity making even short exposures to the material very hazardous to human health). That IAEA criterion is 1 Sievert (100 rem) p/h at 1 meter. But even this dose is not nearly high enough to interfere with completion of the mission by incapacitating the participants. For that objective, the fuel would have to be able to maintain a dose rate on the order of 10,000 rem/hr, a rate unlikely to be achieved by any nuclear power reactor spent fuel.

A response to the fact that UREX+1a does not meet even the 100 rem/hour standard is to suggest that instead of using UREX+1a, UREX+1 should be used instead. UREX+1 separates a mixture of plutonium, minor actinides and lanthanides. Of all the lanthanide fission products, only cerium-144 (actually its short-lived daughter, Pr-144) and europium-154 are relatively long-lived and generate significant external dose rates from hard gamma emission. With lanthanides included, the dose rate of the UREX+ mixture would be between 15 rem/hour and 100 rem/hour at 1 meter; again, below the IAEA self-protection standard and the NRC and DOE definitions of highly irradiated material. But adding lanthanides into the mixture would add even more complications to the proposed GNEP fuel cycle: it would require additional refining capability at each "advanced fast-burner" reactor site, costing many billions more.

Moreover, if the goal is to reduce the attractiveness of the reprocessing product (to Level D), there is a far easier way and less hazardous way: simply blend the plutonium with uranium to a plutonium concentration below 10%.

In fact, this is consistent with the French claim that light-water reactor MOX fuel is not "separated plutonium". However, both approaches would be completely ineffective in reducing the vulnerability of the closed fuel cycle to terrorist theft.

Another paradoxical aspect of the GNEP proposal is that although it carries an implicit criticism of conventional reprocessing programs that separate pure plutonium, it refuses to address the threat posed by these programs. As a result, the quantity of separated plutonium in the world is likely to increase, rather than decrease, over the next several decades.

There is no sign that DOE is willing to actually do anything to address the current proliferation risk associated with existing plutonium stockpiles. Soon after GNEP was rolled out in February 2006, the Rokkasho Reprocessing Plant (Japan) began active testing with spent fuel, which will ultimately result in the separation of about four metric tons of plutonium. When the plant reaches full-scale operation, it will produce about eight metric tons per year. But Japan has already accumulated a plutonium stockpile in excess of forty tons, in contradiction to its 1997 pledge that its nuclear fuel cycle was based on the principle of "no surplus plutonium". There is every indication that countries that now utilize PUREX, including France, Japan, the U.K., Russia and India, regard GNEP as an endorsement, not a rejection, of their current practices.

**Sources:** *"The Global Nuclear Energy partnership: Will it advance nonproliferation or undermine it?"* (July 2006), Edwin S. Lyman, Union of Concerned Scientists / *"Is U.S. Reprocessing Worth The Risk?"* (Sept.,2005), Steve Fetter & Frank von Hippel, Arms Control Today / *"Terror risks of nuclear fuel"*, CS Monitor, 16 March 2006

# USA: URANIUM BOOM IN THE WEST NEW RUSH GAINS STEAM

**Late last year, the Bush administration delivered two big gifts to the nuclear power industry, signing deals to help India produce more energy from nuclear reactors and for Westinghouse to build four new reactors in China. Those countries are half a world away from Colorado, but the worldwide resurgence of interest in nuclear power runs risks for the state's public lands, health and safety.**

**(653.5790) Environmental Working Group** - The nuclear industry's efforts to recast itself as a supposedly clean source of energy - a spin echoed by the US administration - has helped spark a uranium boom in the American West. Interior Department records show a sharp increase in mining claims on Western public lands since 2002, driven by a seven-fold increase in the price of uranium.

As recently as 2004, no uranium interests were among the largest mineral claimholders in the West. Now, government data show that uranium interests are among the biggest claimholders across the region - in Colorado, Arizona, New Mexico, Oregon, South Dakota, Utah and Wyoming.

According to Interior records, mining interests staked just 300 claims for uranium in Colorado in fiscal year 2004. But in the two years since, uranium interests have staked almost 3,500 claims in the state. The new claims are concentrated near the historic uranium towns of Nucla and Naturita in Montrose County, and in Rio Blanco and Moffat counties in the state's northwestern corner.

The Colorado Division of Reclamation, Mining and Safety says several older uranium mines in the state could be producing soon.

The Cotter Corp. has four mines near Naturita that were active until about a year ago. The mines closed in part due to rising fuel prices for transporting the ore to Colorado's lone uranium mill in Cañon City.

International Uranium also has about three or four mines in Disappointment Valley in southwestern Colorado. The mines have permits and are being readied for production.

Beyond Colorado, public land snatched up in this new land rush includes 365 claims staked within 5 miles of the Grand Canyon, many for uranium. A company that has staked dozens of these claims, Quaterra Resources of Canada, has already proposed to drill exploratory holes for uranium just north of the canyon. The operation would include a helicopter pad to carry mining supplies and ore in and out.

The idea of helicopter flights of radioactive material near America's greatest natural treasure, already crisscrossed by dozens of tourist flyovers a day, is disconcerting. But there are broader impacts from uranium mining. Colorado and other Western states are littered with radioactive waste sites that are legacies of previous uranium booms during the 1950s and the 1970s, when nuclear power plants sprouted across the nation and the price of uranium soared.

The Department of Energy has begun a decade-long project to clean up 12 million tons of radioactive uranium mine waste near Moab, Utah, that have contaminated land near the Colorado River. The waste is a threat that could pollute drinking water for millions. Cleanup estimates range between US\$412 million and US\$697 million (between Euro 308-520).

In a recent series, the Los Angeles Times found that abandoned uranium mines on the Navajo reservation in the Four Corners have led to deaths from lung cancer and a degenerative disease that's come to be called Navajo neuropathy. Among other routes of exposure, the Navajo had unknowingly drunk water from abandoned mine pits and had constructed some of their homes from the radioactive mine waste.

The *Grand Junction Daily Sentinel* recently reported that residents of Monticello, Utah, have unusually high rates of cancer they believe were caused by a now-closed uranium mill. Residents recalled replacing their screen doors because the metal mesh would become yellow and corroded. Schools used ground-up uranium waste in kids' sandboxes.

Also complicating the matter is the antiquated federal mining law, written in 1872, that governs much of the new uranium mining. Under the law, filing a claim for as little as US\$1 an acre allows companies to mine on federal land - a right the government has rarely challenged despite the fact that metals mining is the nation's leading source of toxic pollution.

Mining interests routinely leave behind multimillion-dollar cleanups, yet - unlike timber, oil and gas and every other extractive industry operating on public land - they pay no royalties to taxpayers. There is no federal fund to clean up abandoned metal mines.

Mining uranium is not the only concern heightened by the nuclear resurgence. We still have no answer to the problems of disposing of the waste from nuclear reactors.

Even if the government's designated national nuclear waste dumpsite at Nevada's Yucca Mountain is opened, storing waste there will mean 50 years of cross-country nuclear waste shipments through major cities. We should ask if spending billions of dollars to subsidize the nuclear industry is a better choice than investing our tax dollars in clean renewable energy and energy efficiency.

Mining is a necessary part of a modern economy. But before permanently

scarring some of our most treasured places to feed the nuclear industry, we should first dig deeper into the empty promise of nuclear power.

**Source:** Denver Post, January 27 2007. (re-printed with permission). See

also EWG's "Uranium Fever Fuels Sharp Rise in Mining Claims" at [www.ewg.org](http://www.ewg.org). Also see EWG's <http://www.ewg.org/reports/nuclearwaste/> for "How Close Are You?" to a high-level radioactive waste transport route to Yucca Mountain, Nevada in the

continental U.S.

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# THORP: DELAY AFTER DELAY; RE-OPENING NOW UNLIKELY UNTIL MID 2007 AT THE EARLIEST

**British Nuclear Group (BNG) at Sellafield who operate the Thermal Oxide Reprocessing Plant (THORP) under contract to the Nuclear Decommissioning Authority (NDA) has admitted that there will be yet a further delay to the return to full operation of the plant.**

**(653.5791) CORE** - As mentioned briefly in the last *Nuclear Monitor*, following recent confirmation from BNG that, although receiving consent to restart operations from the Nuclear Installations Inspectorate (NII) on January 10, this year, THORP was unlikely to re-open until April when checks on downstream equipment associated with the liquid high level wastes were expected to have been satisfactorily completed. BNG's latest Sellafield Newsletter (February 28) has conceded that, as these equipment checks are not now expected to be completed until 'the middle of 2007' there will be no prospect of THORP commencing full operation until then.

The downstream equipment responsible for the further delay is Evaporator C in which the highly active liquors from reprocessing are processed prior to storage in the High Level Waste tanks. BNG's reasons for the belated investigation of the Evaporator remain obscure and conflicting. Its claim in the February 28, Sellafield Newsletter that 'we have had no problems with Evaporator C' will clearly raise questions as to why, with NII consent already gained, checks that would inevitably lead to further costly delays and frustration are either necessary at

all or are only being carried out at this very late stage of the plant's extended closure.

The re-opening of THORP, closed since the INES Level 3 spillage accident in April 2005, was originally projected by BNG to restart in December 2005 - a date subsequently advanced numerous times as a result of the complexity of the mopping-up work after the accident, the modifications to the damaged Cell where 83,000 liters of dissolved reactor fuel leaked undetected over an eight month period, and the securing of regulatory consent at every stage.

This latest delay will be of increasing concern to the NDA who, as owners of THORP, are already counting the costs of the loss of two years reprocessing revenue currently put conservatively at around £50M (73million Euro). It will also trigger fresh alarm bells with Overseas customers already angered by delays to their contracts (at least 5 years late) and at BNG's inept handling of THORP. The extra delay will also increase the pressure on the availability at Sellafield of sufficient pond storage space to accommodate the weekly import of spent AGR fuel from British Energy's (BE) power stations. With no reprocessing of BE or other fuel for

what is now likely to be 30 months, the normal '12 months spare pond capacity' reserved for AGR fuel, will already be at a premium and the unrestricted operation of those power stations increasingly compromised.

In the NDA's Lifetime Plan for Sellafield, THORP operations are due to finish in March 2011. With some 4000 tons of contracted fuel (Overseas and BE) still to be reprocessed by that date, THORP faces the impossible challenge of reprocessing at a rate of well over 1000 tons per year if the contracts are to be fulfilled. The plant has averaged around 550 tons per year since it commenced operations in 1994. The futility of the situation has lead many to call for THORP's immediate and permanent closure, including demands from the Norwegian and Irish Governments.

**Source:** Core Briefing 01/07, 1 March 2007

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## IN BRIEF

**American Centrifuge Plant, further delay and more expensive.** The new "costs target" for USEC's planned uranium enrichment plant is \$2.3 billion (1.7 billion Euro), the company said in a February 12 press release. The earlier estimate for the American Centrifuge Plant in Piketon, Ohio, was \$1.7 billion. USEC said the latest estimate is "subject to change" since "certain key variables are difficult to quantify with certainty at this stage of the project," but said it was "pursuing cost mitigation approaches." The press release cited "strong upward pressures" on the price of key materials and commodities. Also, USEC said, the original estimate was based largely on extrapolations from information on an earlier DOE centrifuge development project, and USEC had updated the design and changed some of the materials. The deployment schedule also has changed, with full production now scheduled for 2012 rather than 2011, USEC said. The USEC January 2004 press release (in which USEC announced the location) mentioned 2010 and \$1.5 billion. The delay, which comes from additional testing, should allow a capacity of 3.8 million separate work units, rather than 3.5 million SWU, the press release said.

**Nuclear News Fashes, 12 February 2007 / USEC Press release, 12 January 2004**

**Japan: more nuclear power plant data falsified.** Tokyo Electric Power Co. (TEPCO) has found that additional data at its nuclear power plants was falsified. On March 1, the company reported to the government's Nuclear and Industrial Safety Agency (NISA) nine cases in which data on nuclear power plants was falsified, including six newly uncovered cases. In one of the six newly uncovered cases, a diesel power generator that is part of the emergency reactor core cooling system of the No. 3 Reactor at Kashiwazaki-Kariwa Nuclear Power Plant in Niigata Prefecture broke down shortly after trial operations in July 1995, according to TEPCO officials. However, it deliberately omitted the trouble in its trial records and instead stated that the test ended without any problems. The thermal output at No. 5 and 6 reactors at Fukushima No. 1 Nuclear Power Plant in Fukushima Prefecture surpassed its rated output by 0.1 percent on five occasions between 1991 and 1998, but workers entered figures below the actual output in their logbooks, the officials said.

Later in March Tohoku Electric Power Company admitted to the NISA that in 1998 an automatic shutdown at Onogawa 1 was not reported either to company officials or NISA. Abnormal conditions triggered the automatic shutdown of the 500 MWe boiling water reactor while it was disconnected from the grid and in the process of being shut down for a planned circulation pump inspection. NISA is investigating the incident, which is an apparent breach of law, although the statute of limitations has now passed and no legal action would be taken.

The admissions comes as part of a purge of all power companies' safety records after it was found that safety-related events had been unreported at some non-nuclear facilities in late 2006. To be continued...?

**Mainichi Daily News, 1 March & World Nuclear news, 12 March 2007**

### **North Korea and US Reach Agreement**

After a standoff of almost five years, the United States and North Korea have reached an agreement on taking steps toward the dismantlement of North Korea's nuclear production facilities. On 13 February, chief US negotiator Christopher R. Hill and North Korean negotiator Kim Kye-gwan agreed that the US would supply energy aid to North Korea in exchange for shutting down the Yongbyon nuclear facility and allowing inspections by the International Atomic Energy Agency. The US will supply 50,000 tons of heavy fuel oil for the Yongbyon reactor. It will provide an additional 950,000 tons of fuel if North Korea declares and disables its nuclear facilities. The total cost of the fuel is estimated at \$320 million.

This agreement represents a breakthrough in negotiations between the two countries. Relations between the North Korean government and the Bush administration have always been poor. In 2002, the US accused Pyongyang of attempting to produce weapons grade plutonium. This accusation led to the collapse of the 1994 agreement between the Clinton Administration and Pyongyang in which the US traded energy for North Korean dismantlement commitments. This was followed by North Korea's withdrawal from the nuclear Non-Proliferation Treaty. In October 2006, North Korea conducted an underground nuclear weapon test, making an agreement on disarmament seem even less likely. Many are skeptical whether this deal will hold up. In a conversation between US Secretary of State Condoleezza Rice and Japanese Foreign Minister Taro Aso, Aso said "This is a first step. Whether it actually goes ahead remains to be seen. We do not know whether it will go ahead just because it has been signed." In 2005, a similar agreement was reached only to have Pyongyang back out after the US Treasury Department suspended certain North Korean bank accounts thought to be linked to money counterfeiting.

**The Sunflower, March 2007**

**UK: Government's Nuclear Plans declared unlawful by High Court.** On February 15, the Government's decision to back a new fleet of nuclear power stations was declared to be unlawful in the High Court. In the Royal Courts of Justice in London, Mr Justice Sullivan agreed with Greenpeace, who brought the case, that the energy review was not the 'fullest public consultation' the Government had committed itself to before making a decision to back new nuclear power stations. The commitment had been made in the earlier energy white paper in 2003. Mr Justice Sullivan said that the consultation exercise was "seriously flawed and that the process was manifestly inadequate and unfair" because insufficient information had been made available by the Government for consultees to make an "intelligent response".

The court had heard last week that the Government failed to present clear proposals and information on key issues surrounding a new generation of nuclear power plants, such as dealing with radioactive waste and financial costs. Greenpeace and other groups were also denied the opportunity to comment on relevant documents which the Government failed to disclose.

The Government will have to conduct a new, fuller review if they want to justify the future of nuclear power in the UK.

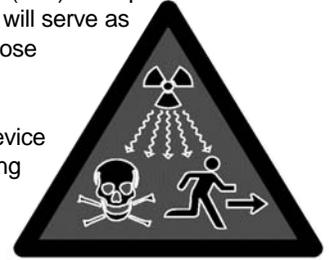
**Greenpeace UK, Press release 15 February 2007**

**New radiation symbol; industry calls it 'macabre'.** With radiating waves, a skull and crossbones and a running person, a new ionizing radiation warning symbol is being introduced to supplement the traditional international symbol for radiation, the three cornered trefoil.

The new symbol is being launched by the IAEA and the International Organization for Standardization (ISO) to help reduce needless deaths and serious injuries from accidental exposure to large radioactive sources. It will serve as a supplementary warning to the trefoil, which has no intuitive meaning and little recognition beyond those educated in its significance.

The symbol is intended for IAEA Category 1, 2 and 3 sources including food irradiators, teletherapy machines for cancer treatment, and industrial radiography units. The symbol is to be placed on the device housing the source as a warning not to dismantle the device or to get any closer, but the rules for using the symbol mean it will not be visible under normal use - only if someone attempts to dismantle or disassemble it. (One can hear the sigh of relief by the nuclear industry).

**IAEA Press release, 15 February & World-Nuclear-News, 19 February 2007**



**German minister says "no" to Biblis A extension from Mülheim-Kärlich.** Environment minister and chief nuclear regulator Sigmar Gabriel has rejected RWE's application to extend the lifetime of Biblis A by transferring kiloWatt-hours to it from the shut down Mülheim-Kärlich pressurized water reactor. A ruling has not yet been made on an alternative application to transfer kWh to Biblis A from Emsland, one of Germany's newer plants.

In 2000, the German utilities agreed with the government to limit the operation of their nuclear power plants to a lifetime 2623 TWh, equivalent to an average life of 32 years. The cap was introduced as part of government plans to phase out nuclear energy.

Without the extension, Biblis A would have to cease operating in 2008 - before the next federal election, when the phase out policy could be overturned. The agreement between the German government and the country's power supply companies included the permanent closure of Mülheim-Kärlich, which had only operated from 1986-1988. In exchange RWE was granted the option of transferring 107.25 TWh of electricity production to other nuclear plants, known as the Mülheim-Kärlich allowance.

In September 2006, RWE requested that 30 TWh be transferred to Biblis A from Mülheim-Kärlich. Had the government granted the extension, Biblis A would have enabled it to continue operating until the second half of 2011, in line with Biblis B, which should already be able to run until 2011 thanks to a transfer of 21.45 TWh under the Mülheim-Kärlich allowance, which did not require approval. Both plants are currently offline as they undergo repairs to their seismic supports.

German utilities are trying to extend the operating lives of their reactors at a time when many are starting to question the wisdom of the phase out policy.

**World Nuclear News, 6 March 2007**

**EI Baradei calls upgrading UK's Trident nuclear submarines hypocritical.** Britain cannot expect other countries to refrain from acquiring nuclear weapons if it upgrades the Trident deterrent, said Mohammed EI Baradei head of the IAEA on February 20.

"[Other countries] are told nuclear weapons are counter-productive because they do not protect your security," said EI Baradei in a lecture at the London School of Economics. "But when they look to the big boys, what do they see? They see increasing reliance on nuclear weapons for security, they see nuclear weapons being continually modernised." He also condemned the "unfairness" of a world in which nine countries seek to maintain their monopoly of nuclear weapons. Concluding that nuclear weapons should ultimately be abolished, EI Baradei added: "We need to treat nuclear weapons the way we treat slavery or genocide. There needs to be a taboo over possessing them." The nuclear non-proliferation treaty, which came into effect in 1970 and which Mr EI Baradei is legally obliged to enforce, bans all signatories from using atomic power for military purposes. On March 14, Tony Blair won the parliamentary support for plans, worth £20bn (\$38.7bn or €29.3bn) to renew the UK's nuclear submarine system, despite a large rebellion by Labour MPs.

**Telegraph.co.uk, 21 February 2007, BBC News 15 March 2007**

**India: One-day Hunger Strike in Koodankulam.** Some 7,000 men, women and children from 175 fishing and farming villages from Tirunelveli, Thoothukudi and Kanyakumari district fasted together on February 15. This event was also treated as the "public hearing" organized by the public themselves. Scores of people -fishermen, farmers, women, social activists, doctors, teachers, lawyers, scientists, priests and youth- expressed their opposition to the Koodankulam plants. They all demanded immediate closure of the ongoing projects (I and II) and the planned projects (III, IV, V and VI). The whole day people made passionate speeches and the audience gave undivided attention to all of them. People had been prevented by the police from coming to the strike, some of them harassed. Many vehicles were diverted and searched. Indian activist Medha Patkar spoke, and asked the people to shun the caste and religious divides and fight united against the atomic power and bomb projects. (more on the campaign in Nuclear Monitor 652)

**Email Koodankulam support group, 18 February 2007**

**New Ignalina 3 plans doubled in size - Poland joins, Czechs consider.** The three Baltic states, together with Poland, have agreed in principle to construct a nuclear power plant in Lithuania by 2015. Lithuanian President Valdas Adamkus said: "There is an agreement between Lithuania, Latvia, Estonia and Poland to secure energy independence by building more than one reactor."

Under the agreement, Lithuania would have 34% of the project and Latvia, Estonia and Poland would each have 22%. Lithuanian prime minister Gediminas Kirkilas said that a final deal to build the plant was expected to be signed by mid-2008, with a tender to supply the reactors due by early 2009. The proposed plant's capacity is now expected to be up to 3200 MWe, up from the initially planned 800-1600 MWe. Kirkilas also said that Lithuania was interested in attracting Sweden and the Czech Republic to the project. Vaclav Bartuska, Czech government commissioner for energy security, said that utility CEZ is expected to "probably" participate in the project. He said he is scheduled to meet participants in the project to discuss its economics, adding that "this is an economic project and it has to be judged on economic merits."

A public debate in Riga on January 26, indicated that there is strong opposition, and that rosy industry figure estimates for third generation plants (costs, construction time) have been far from the reality in Finland and Bulgaria.

**Reuters, 23 February 2007; Interfax, 26 February 2007; Nuclear Monitor 652, 8 February 2007**

**JNFL delays construction of MOX plant.** Japan Nuclear Fuel Ltd (JNFL) has revised the schedule for the start of construction and completion of the mixed-oxide (MOX) nuclear fuel fabrication plant at Rokkasho, Aomori Prefecture, by six months. The company has requested permission from the Ministry of Economy, Trade & Industry (METI) to delay the start of construction from April to October 2007, while completion of the facility will be pushed back from April to October 2012. The planned facility will manufacture both BWR and PWR fuel assemblies using powdered MOX fuel from the adjacent reprocessing plant. It will have a maximum capacity of 130 tons heavy metal (tHM) per annum. The cost of the facility has also risen from some ¥120 billion (\$1.0bn or €774mn) to ¥130 billion (\$1.1bn or €838mn).

**Atoms in Japan, 20 February 2007**

**Decision about Krsko 2 expected this year.** During a workshop organised by the energy NGO Focus in Ljubljana on 22 January, it became clear that this year a decision can be expected to build a second nuclear power station in Krsko, Slovenia. Slovenia is looking at a 3rd generation US designed reactor and expects to have to pay around 2000 €/ kWe for construction of a 1000 MW installation. During the workshop, a Russian design was explicitly excluded, as well as 2nd generation designs. The reactor would be built mainly with an eye on export to Italy and Austria, while on the long term preventing the need for expansion of renewable sources like wind. Wind energy currently in general faces a lot of opposition in Slovenia by nature protection organisations, often on the basis of outdated information. Slovenia has a large untapped potential for wind energy - comparable to that of Austria, as well as for energy from biomass, geothermal and solar energy. Small hydro offers possibilities of expansion as well.

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