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U.K.: CHAPELCROSS PERMANENTLY CLOSED

On 29 June, it was decided that the four Chapelcross reactors in Scotland are to be permanently closed down making Chapelcross is the seventh station with Magnox reactors to be shutdown in the U.K. The closure comes six years earlier than the planned closure date of 2010 first announced in 1999.

(612-613.5617) WISE Amsterdam – Chapelcross consists of four 50 MW gas-cooled Magnox reactors, the oldest reactor design in the U.K., and was opened in 1959. The reactors, which had been out of service since February, were to be reopened later this year but operator BNFL now says that electricity production there can no longer be commercially justified.

BNFL is now responsible for the preparation of reactors for decommissioning, final dismantling and hand-over to the Nuclear Decommissioning Authority (NDA).

When the fuel is removed, a special building known as a "safestore" is built around the reactor as a kind of sarcophagus. The sarcophagus is built after 30-35 years and serves as a radioactive waste storage for contaminated materials. Final dismantling of the sarcophagus occurs after another 100 years. During that period, the levels of radioactivity will have decreased, but dismantling still has to be conducted with precautions.

The NDA is a new authority in the U.K. and will take over the ownership and responsibility for most of BNFL and the UK Atomic Energy Authority's (UKAEA) sites. In fact, the NDA will be responsible for the decommissioning and clean up of contaminated facilities.

The creation of the NDA has been criticized by NGOs as being a permanent source of financial aid to the nuclear industry since it will be made responsible for cleaning up the mess produced by companies like BNFL. The NDA is expected to consume around GBP 1 billion (US$ 1.95 billion) per year for the next ten years, and more thereafter (see *WISE/NIRS Nuclear Monitor* 601.5568: "UK Parliament considers industry restructuring").

A major accident took place in July 2001 in reactor no. 3, when 24 spent fuel elements in a fuel basket broke free of a lifting mechanism, falling 80 feet down into a refueling shaft (see *WISE News Communique* 552.5297: "U.K.: Chapelcross shut down after fuel rod accident").

Later it was discovered that the graphite reactor core suffered shrinkage and distortion due to intense radiation. This led to problems with refueling and the use of control rods because of damaged guiding channels in the core. The accident and graphite problems led to an adjustment of the planned closure dates, from 2010 to 2008 and then to March 2005.

The Chapelcross reactors were also built and used for plutonium and tritium production for use in nuclear bombs. Only in 1998, was it announced that the reprocessing of spent fuel would be placed under Euratom and

IN THIS ISSUE:

IAEA inspections, marking the end of weapons plutonium production.

Chapelcross is not the only Magnox station closed earlier than expected in the last years. In May 2000, BNFL announced the permanent closure of the two Hinkley Point A reactors. At that time the reactors had been out of service for a year due to safety problems. Checks through old documentation proved that parts of the reactor vessels had not been tested properly when the station was first built. The Nuclear Installations Inspectorate (NII) had required studies and remote inspections in areas of the reactor that were almost inaccessible. BNFL decided not to spend tens of millions of pounds for an inspection program and shut down the station after 35 years of operation (see *WISE News Communique* 531.5179: "Hinkley Point-A is shut down permanently").

With the closure, in March 2003, of reactor no. 1 at the Calder Hall station, an end had come to the oldest Magnox station of the U.K. Although it was the oldest, in 2000, there was still the assumption that Calder Hall would operate until 2006 but by late 2001, all four reactors were closed when Calder Hall experienced the same graphite shrinkage and distortion problems as Chapelcross had. Reactor no. 1 was later restarted, but reactors 2 to 4 were never put back into operation because BNFL considered the costs for measures to prevent graphite shrinkage too high.

With the seventh Magnox station closed, only four stations remain in operation. Earlier closures were Berkeley (1989), Hunterston A (1990), Trawsfynydd (1993), Bradwell (2002), Hinkley point A (1999/2000) and Calder Hall (2001/2003). Dungeness A and Sizewell A are scheduled to be closed in 2006. The last two stations will be closed in 2013 (Oldbury) and 2016/2021 (Wylfa).

Reprocessing

The future of the other operating Magnox station is connected to the operation of Sellafield's B205 reprocessing plant, the most polluting plant at the site. This plant is the only facility capable of reprocessing Magnox metallic uranium fuel. Metallic uranium fuel is highly susceptible to corrosion and BNFL claims that it cannot be stored for long periods and must be reprocessed. BNFL has also regularly stated that B205 will close in 2012.

However, Oldbury and Wylfa are not expected to close before 2012, which means that fuel produced could no longer be reprocessed at the B205 plant. BNFL had been developing Magrox ceramic oxide fuel (like conventional light water reactors) but stopped in January 2001, claiming to have abandoned it as "solely a business decision based on sound commercial judgements". A five-year test run of 24 magrox fuel assemblies began in 2000 at Calder reactor 1, with another planned at Wylfa but it is not known whether that trial ever started. One of the problems with magrox fuel was that BNFL would have had to build a new fuel production line at its Springfield plant at an estimated cost of GBP 100 million (US$ 195 million).

BNFL has always said that the life span of both Oldbury and Wylfa would depend on whether or not magrox fuel was used but since magrox was scrapped, no reassessment of closure dates for those stations has been made.

One important consideration for the magnox closure programme is that it is now very much dependent on the performance of the B205 plant. When BNFL first announced the 2012 closure date for B205 in May 2000, it had calculated that a total of around 12,000 tonnes of magnox fuel would be reprocessed. So 12,000 tonnes in 12 years or 1,000 tonnes reprocessed annually! An ambitious target considering that in recent years the old plant was reprocessing around 400 tonnes per year. Unsurprising BNFL appears to have fallen well behind the goal of '1,000 tonnes per year'.

If BNFL really does intend to close B205 in 2012, then it must know that there is not enough time left to reprocess all the magnox fuel. This can mean one of two things; that the closure dates for some stations will be hastened to reduce the amount of magnox fuel requiring reprocessing; or that B205 is kept operational past 2012.

The latter would be highly unpopular for several reasons; one being that BNFL would be going back on its word; and another being that the high sea discharge levels from B205 would continue to the annoyance of the OSPAR treaty (see also *WISE/NIRS Nuclear Monitor* 589.5523: "OSPAR 2003: Sellafield discharges far away from "close to zero" target").

Sources: CORE press releases, 9 August 2002; 28 March 2003; 29 June 2004; CORE email, 12 July 2004; Scottish Campaign for Nuclear Disarmament, 2001

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Oops! In issue 611, we gave the incorrect reference to an earlier WISE News Communiqué article relating to an in brief story on Prof. Youri Bandajevsky. The correct article reference is 551.5289.

Apologies for the late delivery of issue 612, which was postponed due to illness amongst our editorial team and is now combined with this issue.

The next issue (614) will be mailed out 30 July 2004.

25 YEARS AGO

What happened 25 years ago? We go back to news from our 1979 WISE Bulletin, *comparing anti-nuclear news then and now.*

Then

In *WISE Bulletin* 6 we reported on plans for a Urenco enrichment plant in Gronau, Germany: "Urenco plans to build a third enrichment plant in Gronau […] The Gronau Citizens Committee against Uranium Enrichment is organizing a protest campaign. The committee points out that uranium enrichment is a vital link in the nuclear fuel cycle and has been neglected by the international movement against nuclear power. The committee is asking all concerned citizens in Gronau and throughout the world to register their protest against the Urenco plant". (*WISE Bulletin* 6, October 1979)

Now

The first enrichment unit opened in August 1985 at the Gronau plant, located close to the Dutch border. It reached a capacity of 1,000 tons SWU (Separative Work Units) until the late 1990s and will increase to 1,800 tons by the end of 2004, enough to provide fuel for 18-35 NPPs. In 1998, Urenco applied for an expansion license under the Federal Atomic Law to increase its capacity to 4,500 tons, which is the maximum capacity as designed in 1979. (www.urenco.de)

The request for expansion made in 1998 was opposed by many environmental and anti-nuclear groups and individuals. They objected to the capacity increase because it would have given indirect permission to further increases in nuclear energy worldwide. No assessment had been made at the time about the worldwide effects of uranium mining and transport risks. Urenco, apparently, was also not required to include measures to protect the plant against accidental or targeted air attacks. (Letter NRW State Office for Nature Protection, 30 April 2002)

A total of 6,700 objections were sent to the state ministry of Energy in 2003. (WISE Uranium, www.antenna.nl/wise/uranium)

The 1998 expansion request also included plans for storage buildings for depleted uranium. The annual feed of 2,730 tons of natural uranium results in just 300 tons of enriched uranium for NPPs compared to the huge amount of 2,430 tons of depleted uranium. Part of this depleted uranium is usually sent to Russia for re-enrichment, but will in the future also be stored as uraniumoxides in special storage buildings. On 22 June, a train carrying 19 wagons of depleted uranium left Gronau and was blockaded several times on its journey to the Dutch harbor of Rotterdam. (www.urenco.de; www.aku-gronau.de)

Protests are regularly held at the gates of Gronau by the Working Group Environment Gronau (AKU Gronau) and every first Sunday of the month, a "Sunday's walking tour" is held. (www.aku-gronau.de)

AUSTRALIAN GOVERNMENT N-DUMP PLAN FALTERS

The Federal Court of Australia has reversed the federal government's compulsory seizure of land in South Australia for a national nuclear waste dump. In the wake of the court decision, it is less likely than ever that the dump will be built - but events in the coming months will be crucial to the outcome of the battle.

(612-613.5618) Friends of the Earth Australia - Last year, the federal government seized land near Woomera in SA for the proposed dump, using the urgency provision of the Land Acquisition Act 1989 (See *WISE/NIRS Nuclear Monitor* 587.5515: "Australia: planned waste dump faces opposition"). The urgency provision was invoked to thwart the SA Government's attempt to have the dumpsite listed as a public park, thereby making it immune from compulsory acquisition.

On June 24, the Full Bench of the Federal Court overturned the land seizure in a unanimous judgement. SA Premier Mike Rann will visit members of the Kupa Piti Kungka Tjuta - senior Aboriginal women's council - in Coober Pedy in late July to celebrate the legal victory.

The Kungka's invitation reads: "The government tried to steal it. Quick way. They tried to beat us. They gotta listen Anangu [Aboriginal] way. We were shocked, they wanted to do it quick way and put the dump down, but they slipped up this time. When you come to Coober pedy please come to Aged Care and sit down with us on the manta [ground]. We can have a celebration, cuppa tea, photos. Talk and sing."

The federal government has flagged an appeal to the High Court, which would have to be lodged within 28 days of the June 24 Federal Court ruling. It is unlikely the High Court would overturn the Federal Court ruling given it was unanimous and the land grab was rejected on several grounds.

The Government could amend the Land Acquisition Act, but that would certainly be blocked in the Senate by the Labor Party and minor parties.

Another option for the federal government is to go through a 'normal' compulsory land acquisition process, as opposed to using the urgency provision. This would be protracted and contentious, but it appears to be the best option left open to the federal government.

Compulsory land acquisition could however be thwarted if the SA Parliament legislates to make the dump site a public park. Last year, an attempt to push through a public park Bill was blocked in the Upper House by the Liberal Party and Family First parliamentarian Andrew Evans. Evans was strongly attacked for reversing his pre-election pledge to oppose the nuclear dump, and he will be under great pressure to support a renewed attempt to pass the public parks Bill.

Another hurdle for the federal Coalition Government is the licensing process being conducted by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). Federal Science Minister Peter McGauran and his Department of Education, Science and Training (DEST) have been subject to repeated 'friendly fire' during the licensing process.

Two nuclear scientists have argued against the granting of licenses to build and operate the dump, basing their objections on their first-hand experience of DEST's mishandling of the latest cleanup of the Maralinga nuclear weapons test site.

Peter Johnston, Professor of Nuclear Physics at the Royal Melbourne Institute of Technology (RMIT) in Melbourne, argued in a submission to ARPANSA that DEST "lacks the technical competence to manage the [dump] project". More bluntly, nuclear engineer Alan Parkinson wrote in his submission: "It has to be noted that the same group responsible for the debacle of the Maralinga project have responsibility for the radioactive waste repository."

Even the strongly pro-nuclear International Atomic Energy Agency has recommended that DEST secure more in-house expertise (a polite way of saying that DEST lacks the requisite expertise), and the head of ARPANSA, Dr. John Loy, has publicly endorsed that view.

It was expected that ARPANSA would grant licenses to build and operate the dump in April. However, the licensing process is unlikely to be resolved until next year - if indeed it is not super-seded by events such as a change of government.

Regardless of the federal government's response to its present dilemmas, the proposed nuclear waste dump is certain to be a significant issue in the federal election to be held later this year.

Adding to his problems, Peter McGauran has been caught out misleading parliament. McGauran was asked the following question in parliament: "Did departmental officers develop a list of 'experts' that were used to make public comments in support of the proposed nuclear waste dump ..." His response in parliament on October 27 was: "No."

McGauran does not dispute that departmental officers developed a list of 'experts' - in fact the list has been released under Freedom of Information (FoI) legislation. He disputes whether the 'experts' were used to make public comments, telling The Advertiser on June 17: "I was asked specifically were technical experts used to make public comments and the answer is no."

However, the FoI documents show that McGauran's department paid PR firm Michels Warren to provide media training to some of the 'experts' and to organise media interviews with them. Moreover, transcripts and summaries of media interviews with a number of the enlisted 'experts' are included in the FoI documents.

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PACIFIC SOLUTION?

Prime Minister John Howard has proposed sending Australia's low-level nuclear waste to an offshore island after being forced to abandon plans for a radioactive waste dump near Woomera in South Australia. Responsibility for waste storage was handed back to the states.

According to shadow industry minister, Senator Kim Carr, the idea of storing nuke waste on a pacific atoll or in a country like Nauru is dangerously ridiculous and ought to be condemned. Export of Australian waste to Pacific Forum countries is prohibited under an international treaty.

Channel News Asia & Australian Broadcasting Corporation, 14 July 2004

CONGRATULATIONS SOUTH AUSTRALIA!

Prime Minister Howard has been forced to abandon efforts to site a national waste dump near Woomera in South Australia after years of maintaining a hard-line stance. Howard is now expected to scrap plans for a national dump altogether. Australia's federal government will now begin an urgent search for a single site to store low-level and intermediate level nuclear waste produced by federal agencies. State governments will now be expected to seek their own solutions for storing waste.

***No Nukes News*, July 2004, No. 2**

THE STATE OF THE WORLD

The last three months have seen a flurry of meetings and negotiations on the international nuclear non-proliferation and disarmament regime. Now July has arrived, somewhere the sun shines as the international political scene winds down for summer. The diplomats and NGO's existing within this obscure area of international diplomacy are like the regime itself, left dazed and confused as to where to go next.

(612-613.5619) Greenpeace International - As far back as May 2000, a keynote speech by George W. Bush on the issue of disarmament and non-proliferation should have warned the world of the cancer taking root that would leave the regime in disarray.

By February 2004, the Bush administration made it known that it did not support a global ban on nuclear testing; did not support key measures agreed by the international community on a road map to achieve global nuclear disarmament under the framework of the nuclear non-proliferation treaty (NPT); had put in place plans to develop new low-yield "bunker-busting" nuclear bombs; started gearing up for a possible resumption of nuclear testing as early as 2007 and made it clear that US nuclear doctrine now reserved the right to use nuclear weapons first – even in a conventional conflict and/or before any act of aggression had actually occurred.

These few examples serve to illustrate that the Bush administration, in just over four years, has left a regime that is battered, bruised and on life support. A kind act would be to pull the plug and let it die but this does not appear to be part of the master plan. It would appear that instead, the US is intent on getting someone else to do the dirty work.

Let us not single out the Bush administration alone, all other nations possessing nuclear weapons – Britain, France, Russia, China, India, Pakistan and Israel – are just as complicit in this act either through their silence or by the fact that they continue to possess nuclear weapons outside of any multilateral regime.

Also in February, in yet another keynote speech Bush launched a new set of initiatives to **CONTROL** access to civil nuclear technology and materials (See also *WISE/NIRS Nuclear Monitor* 604.5581 "Bush war on proliferation").

The proposals advocated moving further away from the possibility of the global abolition of nuclear weapons, towards a world where the indefinite possession of nuclear weapons, materials and technology is the divine right of the chosen few selected by the would-be deity, Bush.

An expansion of the illegal US led and driven Proliferation Security Initiative (PSI), the plan would only allow countries who had signed and were implementing 'full-scope' IAEA safeguards, access to nuclear materials and technology. It would not allow any other countries to build and operate reprocessing and/or uranium enrichment plants and would amend IAEA operating processes to exclude countries like Iran but include Israel.

And like religious fanatics, the Bush administration disciples have been sent across the world to beat the international community into submission and sell this New World order.

Another addiction of the Bush administration has been the nuclear programme of Iran. There are legitimate concerns regarding Tehran's intentions but has the emphasis placed on this been justified? Like a dog gnawing a bone, the Bush administration has singled out the Iranian nuclear programme as the devil incarnate while simultaneously applauding itself for forcing Libya to unilaterally dismantle its nuclear programmes. Somehow, the fact that Libya should be scolded for having had a clandestine nuclear bomb programme at all has been ignored.

For Bush's disciples, the first opportunity to push the new mantra was at the third and final Preparatory Committee meeting of members of the NPT working up to the five-yearly review of the Treaty's operations in 2005. There was much work to be done at the two-week gathering in the basement of UN HQ in New York but instead the meeting ended in complete disarray. Supposed to produce recommendations and finalise arrangements – such as rules of procedure, the agenda and documentation to be prepared for the 2005 review meeting – it ended in such confusion that differing opinions persist as to what, if anything, was actually agreed.

In every debate on every issue from nuclear disarmament to peaceful uses of nuclear energy, the US repeatedly accused Iran of having a clandestine nuclear bomb programme, lambasted to a lesser extent North Korean actions and applauded Libya for its confessions.

Others sought to engage in serious discussions about the P5's failure to fulfil their legal obligations under the NPT and disarm, the attempts to restrict the right of countries to have access to nuclear materials and technology under the treaty and Israel's possession of nuclear weapons and the failure of members to work seriously towards establishing a Middle East Nuclear Weapons Free Zone.

The sole international treaty that enshrines the promise that the US, Britain, France, Russia and China will get rid of their nuclear arsenals, signed by all except India, Israel and Pakistan with uncertainty about whether North Korea is in or out, has been left in turmoil. There is no agreed agenda, no agreement on participants or required documentation. In fact, the only agreement reached appears to be on the date and location.

The G8 summit in Georgia was the next big gathering for the Bush administration. There it became clear that the Bush administration's approach to nuclear non-proliferation and disarmament issues was the cause of some uneasiness. Rather than building on previous G8 initiatives, they failed to agree at all and instead of issuing a concise statement on next steps, the G8 Proliferation Action Plan instead reaffirmed past initiatives and proposals.

At the EU/US summit in Ireland that followed, the outcome was much different. The EU endorsed almost all Bush administration's proposals on proliferation control.

Tension between the US and its European allies spilled out into the public at the NATO Heads of State and Government summit at the end of June. US attempts to push NATO into helping Iraq reopened old wounds, with Germany and France being the most strident in opposition. Although a compromise was reached that will see NATO assisting with training, France and Germany have made it quite clear that they will only participate if the training occurs outside of Iraq. Other splits appeared when Putin snubbed the summit by refusing to attend the NATO/Russia Council and when Chirac more or less told Bush to mind his own business when Bush expressed hope that Turkey's accession to the EU would occur soon.

Once again the 26 member countries of NATO could not agree on language for the final communiqué that would show support for a world free of nuclear weapons whilst acknowledging that there was still a need for NATO to retain its nuclear capability.

Festooned with caveats and provisos, the language of the Istanbul summit communiqué on nuclear non-proliferation and disarmament issues was deliberately ambiguous to reach agreement on the text. For example, it welcomed the US led PSI with the caveat - only those "which are consistent with national legal authorities and relevant international law and frameworks, including United Nations Security Council Resolutions". (1)

It would appear that there is a level of concern so high that even the likes of IAEA head, Dr ElBaradei are speaking out more stridently in public on the need for nuclear disarmament. In an address to an international proliferation conference attended by most leading diplomats and NGOs in the field, he warned that:

"…it is time to abandon the unworkable notion that it is morally reprehensible for some countries to pursue nuclear weapons, but morally acceptable for others to rely on them. Our aim must be clear: a security structure that is based on our shared humanity and not on the ability of some to destroy us all."(2)

And he told the international community it had two options before it, either to "wait for the unthinkable to happen; or… take notice of the writing on the wall and begin to act today." (3) Quite the man of contradictions.

The international nuclear non-proliferation and disarmament regime is stuck in a deep rut that can only be escaped when nations choose to act rather than remain silent. In the world's capital cities and within NGOs, much thought should be given to finding ways forward over the summer. Only with an NGO and diplomatic community galvanised to force changes of attitudes among the possessors of nuclear weapons will we see real moves towards global abolition.

The other option is quite stark, and not one to contemplate, an even faster slide towards a new nuclear arms race and the increased possibility that nuclear weapons will be used one day for the third and, perhaps, final time.

References:

(1) Istanbul Summit Communiqué press release, 28 June 2004, available at www.nato.int/docu/pr/2004/p04-096e.htm
(2) "Nuclear Non-Proliferation: Global Security In A Rapidly Changing World", Keynote Address by Mohamed ElBaradei, Head of the International Atomic Energy Agency at the Carnegie International Non-Proliferation Conference, Washington, DC, 21 June 2004
(3) As (2)

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IRAN EFFORTS

Iran will resume the construction of equipment essential for a nuclear weapons program, despite its agreement with three major European powers. The decision does not violate international treaties but does break an agreement signed with France, Britain and Germany, in which Iran promised to suspend nuclear efforts in exchange for assistance with advanced nuclear technology (see *WISE/NIRS Nuclear Monitor* 602.5573 "Proliferation: focus on enrichment issues"). European officials and arms-control specialists called Iran's move a major setback and a reflection of the difficulties faced by those attempting to verify Iran's nuclear ambitions. Iran's leader Ayatollah Ali Khamenei has assured European countries that Iran is not seeking to develop nuclear weapons, but reiterated the country would not abandon its attempts with nuclear technology.

***The Washington Post*, 25 June 2004**

FINNISH NUCLEAR MADNESS

In 2001, Finland's parliament was the first in the world to politically grant approval to plans for the burial of high-level nuclear waste within the bedrock of Olkiluoto and now it is also showing new nuclear the green light. How did the disease of nuclear madness develop in Finland and is it contagious?

(612-613.5620) Harri Lammi & Kaisa Kosonen - The common understanding has been that deregulation would herald the final chapter of the nuclear horror stories and fairytales and yet Finnish operator Teollisuuden Voima (TVO) is currently forging ahead with plans for a new plant, showing no fear for economical profitability.

If completed, Olkiluoto3 (or FIN-5) would be the largest reactor ever built (1600 MW) and the first European Pressurised water Reactor (EPR), in addition to being the first plant to be constructed in a deregulated market place.

The 'Finnish case' is now used as a showcase around the world to encourage governments and companies to reverse existing views on nuclear.

Following decades of semi-official nuclear campaigning by the industry, the fifth reactor finally got the go-ahead after receiving political approval from the Finnish parliament in May 2002 (See *WISE/NIRS Nuclear Monitor* 569.5409 "Finland: Parliament approves new reactor, greens resign").

The argument can be made that Finland shares, with some developing countries, similar motives for interest in nuclear power. Finland was a late bloomer, industrialising much later than some of its European neighbours. The energy-intensive paper and metal industries that formed the backbone of Finland's economy in the aftermath of World War II have maintained a very powerful grip on society.

Old promises of nuclear power being a cheap and abundant source of energy that does not endanger human life still have good resonance in many Finnish ears. During the anti-nuclear battle of 2000 to 2002, nuclear power was explicitly presented as the main ingredient enabling the continuation of the industrial policy of the previous 60 years, which had lately been threatened by the need to drastically reduce greenhouse gas emissions. Nuclear would save the Finnish success story – this time from the threat of restrictive climate policies.

Persistent of nuclear lobby

According to independent opinion polls carried out regularly since the early 1980s, public opposition towards nuclear has always been greater than support for it – even after the parliamentary decision in 2002. From 2000 to 2002, the anti-nuclear movement had facilitated some of the largest environmental demonstrations in Finnish history and mobilised many prominent intellectuals to publicly petition against the project.

However, the atmosphere has now changed somewhat. The last consequential debates on nuclear took place in early 1990s and ended with parliament voting against granting a permit, by a margin of barely 10 votes, in 1993. Comparing the parliamentary discussions of 1993 and 2002, it is noticeable that by 2002 the pro-nuclear voices had increased and critical opinions seemingly diminished.

Moreover, the willingness and overall resolve to sacrifice financial profit for the sake of the environment had weakened. Instead of going forward, the Finnish nuclear discussion appears to have got stuck in reverse.

When TVO filed its application for the fifth reactor in 2000, it became clear early on that the nuclear lobby had prepared the ground for political discussion well. Big trade unions were quick to come out in favour of new nuclear in Finland, despite the fact that the boards had not consulted their members before making such announcements.

Another factor that had clearly changed from the early 1990s was domestic media opinion. When polled in 2002, 70% of chief editors at Finnish newspapers revealed themselves in favour of nuclear power. That figure did not even include the biggest, and near monopolistic, newspaper in Finland, *Helsingin Sanomat*, which had openly campaigned in favour of the nuclear reactor, but still sought to portray itself as neutral until the last moment.

The consequence of partisan views has been biased reporting about nuclear power in addition to prejudiced discussions taking place in major newspapers and on national television. The work of the Finnish anti-nuclear movement has become increasingly difficult as the voices of opposition have become marginalised.

Many close-call accidents and failures of the nuclear industry have been allowed to pass unreported and the discussions on the risks of the nuclear fuel chain are suppressed. It is difficult to get letters or articles that could encourage critical debate printed in newspapers, but this is not a problem experienced by those pandering pro-nuclear views, such articles are regularly published without question.

Nuclear waste problem "solved"

Probably the most essential part of the preparation carried out by the nuclear lobby involved the policy decision regarding the final storage of spent nuclear fuel. Members of Parliament (MPs) were assured that the waste decision would only be 'in principal', in the sense that it would merely grant a permit to carry out further location-specific research at Olkiluoto. It would not mean that approval had been given to the final disposal project as such, neither would it prove that a plan was ready for implementation.

Consequently, MPs opposing new nuclear agreed to vote in favour of the waste policy decision to avoid being

accused of obstruction and of unwillingness to seek a resolution the problem. Only three MPs managed to identify this as a bad strategy and voted against the policy, and against the wishes of their political parties.

However, as the decision on the final waste disposal was made and the lobbying for the fifth reactor went into full swing, the issue was soon turned on it head. From that point on, the nuclear lobby had magically turned the research permit into a 'solution'. According to them, the nuclear waste problem is now solved but of course, in reality this is far from the truth.

Bargain!

It is claimed that Olkiluoto-3 will produce electricity at less than 25 EUR / MW (1) and therefore the scheme used as an example of nuclear power's alleged competitiveness. However, it is clear to anyone paying attention that the 'Finnish case' proves nothing and cannot be used as a showcase.

The simple fact is that Teollisuuden Voima got the plant for a special price. The scheme to build EPR is of such strategic importance to the entire nuclear industry that the manufacturers have nothing to lose by practically giving it away – for them, there is much to gain. Most companies that participated in the bidding process also offered new NPP designs and it was crucial for one of them to secure the deal to get one plant up and running commercially.

The intense competition between manufacturers saw the price of the entire project reduced to 3 billion Euro (US$ 3.7 billion) but it still exceeded the maximum cost assumed during the political debate by some 500 million Euro (US$ 618 million). Framatome ANP are now also planning to build a similar EPR plant in France but the price has already been estimated at 25% higher that the costs to Finnish TVO (2).

Another simple fact is that TVO and Framatome ANP made a fixed price contract, which means that if the total cost does exceed 3 billion Euro, which is very likely considering that a new design and ambitious timeline are involved, Framatome and Siemens will be responsible for meeting the excess costs. There are already signs indicating that the total costs will be exceeded by a significant amount (3). The fixed price, which means that there is no financial risk for TVO if the project fails, has allowed the operator to arrange a very cheap loan, with an interest rate of just 2,6 %.

It has been claimed that the deal is fully commercial and that no government subsidies are concerned. However, there are already strong indications that French export credits (COFACE) are to be involved in the deal.

> STUK may be forced to grant approval to the plant because the issue has become so highly politicised.

There are several reasons that make the financing for the so-called FIN-5 a special deal and therefore no general conclusions can be made regarding the competitiveness of nuclear power on the basis of this particular project.

What now?

TVO is still required to apply for a construction permit and eventually for an operating permit from the Finnish government however both are considered purely formal procedures now. The construction of the plant itself is scheduled to start in the summer of 2005 and according to TVO's highly ambitious time-line, the plant should be up and running in 2009.

Whether there will be a new reactor in Finland is now dependent on four factors:

1) Approval from the Finnish Radiation and Nuclear Safety Authority (STUK)

The STUK evaluation will form the basis of the government's decision regarding the approval of a building permit. STUK's task is to review whether the EPR fulfils Finnish nuclear safety criteria – despite the fact that no such proof exists because that the EPR has never been built before. However, it seems that STUK may be forced to grant approval to the plant regardless because the issue has become so highly politicised.

It was recently revealed that the pressure vessel for TVO's plant has been already ordered (4). One must assume that such financial risks would not be assumed were it not taken for granted that the plant will receive the necessary approval.

2) The likelihood of technical and financial problems

Taking into account the various technical problems Framatome had with EPR's predecessor N4 (the commercial use of the plants was delayed by 3-6 years), problems with the prototype of EPR should be expected.

3) Tremendous national and international opposition

Finnish NGOs have identified the fight against FIN-5 as crucial although many recognise that stopping the EPR scheme at this phase would be extremely difficult. There are unfortunately already strong indications that another application will be made very soon, and not only in Finland. International co-operation between NGOs will be of paramount importance and work on co-ordinating efforts must be intensified.

4) A significant accident

The accidents at Three Mile Island and Chernobyl had a dramatic affect on nuclear programmes globally and it is widely believed that another accident now would very likely end the story of nuclear worldwide.

In October 2003, Hajimu Maeda the chairman of the World Association for Nuclear Operators (WANO) warned colleagues at WANO's Biennial General Meeting that "a terrible disease" threatens nuclear operating organisations from within. It begins, he said, with "loss of motivation to learn from others...overconfidence...(and) negligence in cultivating a safety culture due to severe pressure to reduce costs

following the deregulation of the power market." Those troubles, if ignored, "are like a terrible disease that originates within the organisation" and can, if not detected, lead to "a major accident" that will "destroy the whole organisation". (5)

As indicated by Mr. Maeda, the end of the nuclear industry may come quicker than expected. One can only hope that we do not have to experience another major accident to be reminded of the continuing and permanent dangers of nuclear power.

Nuclear solution to climate problem?
Prior to the nuclear decision, politicians, industry, labour unions etc. were in agreement that climate change is the biggest threat faced by the earth and that Finland should position itself in the frontline of the prevention battle. There was also broad agreement to phase-out coal (or at least condensing power plants) and on fostering proactive efforts on energy efficiency and renewables.

After the nuclear decision, the reasoning changed. In 2003-2004, the lobby for heavy industry and large energy producers organised a loud campaign against emission trading – in other words, against implementing the Kyoto protocol – with the backing of the labour unions. Some industry representatives also voiced direct opposition, effectively withdrawing earlier support for the Kyoto protocol.

The coal phase-out has now practically been driven off the agenda and the country is not expected to meet its targets for energy savings and efficiency. Last year Finland's greenhouse gas emissions exceeded the Kyoto target by 17 % and electricity consumption grew at the rate of 6 % in the summer. Finland is not even expected to meet its modest target for wind (500 MW by 2010) and is also running behind on the target for bioenergy.

The decision to build new nuclear in Finland will pit the country against those actively battling climate change and push Finnish energy and climate policies further down the unsustainable path.

One thing is certain, Finland has not found solutions to the problems of nuclear power despite the rhetoric. The nuclear industry has achieved some success using its historically favoured tactics – silencing dissent on the problems of nuclear power and outright lying about the risks.

The suppression of debate has been effective in a relatively small country like Finland – most people working in energy research, for energy companies and at the relevant ministries are intimately acquainted, further increasing the dilemma of nuclear regulator.

Despite the setbacks, the Finnish anti-nuclear movement is not ready to capitulate. After a little rest it is ready to bite back – hopefully with a little help from foreign friends.

Sources:
(1) *Kauppalehti*, 22 January 2004
(2) Platts Nuclear News Flashes, 25 May 2004
(3) *Tekniikka & Talous*, 19 May 2004 (Technology & Economy): Teraksen hinta uhkaa ydinvoimalan rakentajaa (The Price of Steel Threatens the Constructor of the Nuclear Power Plant)
(4) *Nucleonics Week*, 13 May 2004
(5) WANO 2003 BGM press release, 14 October 2003

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ITALY: LEADING PHYSICISTS REFUTE LOVELOCK

In an article about the "greenhouse effect" published in the English newspaper, *The Independent*, on 25 May, and reprinted in Italian *L'Unita*, James Lovelock, points out the catastrophes that will follow the progressive increase of the planet's temperature. Yet after describing the breaking up of ice sheets, rises in water levels to well above those of today and deadly heat, he goes on to recommend an immediate and widespread recourse to nuclear energy; supposedly safe and instantly available, unlike alternative energy sources, the dreams of visionaries.

(612-613.5621) Gianni Mattioli and Massimo Scalia - Lovelock concludes by trotting out that over-used mantra about how one must listen to scientists and not to irrational fears fueled by environmentalists…

Editors at *L'Unita* expressed surprise at Lovelock's position. Is Lovelock no longer a guru of environmentalism? The scenarios outlined by Lovelock recall several correlations put forward by the Intergovernmental Panel on Climate Change (IPCC) using linear time dependence which projects those catastrophic events happening in a medium to long term period. Unfortunately, the actual situation appears to be far worse. Without indulging in certain recent cinematic temptations, one can calmly affirm that we already find ourselves in an era of profound climatic changes, which we can only begin to reduce once the Kyoto protocol is enacted. Does that then make us greater catastrophists than Lovelock?

About fifteen years ago, when faced with these same topics now addressed

OVER THE TOP

The IAEA has said that nuclear power cannot grow fast enough over the next decades to slow climate change – even under the most favorable circumstances. This contradicts a recent surge in support for nuclear as the answer to global warming, as claimed by James Lovelock, amongst others. The IAEA considered two scenarios. In the first scenario no new NPPs would be built, apart from those already planned. Nuclear power's share of world electricity – and thus its relative contribution to fighting global warming – would drop from the current 16% to 12% by 2030. In the second scenario, nuclear energy grows by 70% over the next 25 years. But in this scenario, worldwide greenhouse gas emissions would also increase because the traditional methods of generating electricity from fossil fuels would also have grown. The IAEA told *The Independent*: "Saying that nuclear power can solve global warming by itself is way over the top".
***The Independent*, 28 June 2004**

again so dramatically in *The Independent*, we had already adhered to scientific disciplines different from those of Lovelock. These were more closely tied to the complex geophysical evolution of climatic variations: the theory of dynamic systems and their stability.

The rise in temperature linked to the rise – rapid and enormous – in the concentration of greenhouse gases in the atmosphere caused by the massive use of fossil fuels could, according to the stability theory, change the balance in the dynamics of large atmospheric masses, leading to climate disturbance and an increase in extreme meteorological events.

These predictions do not occur using linear time dependence, which instead postpones catastrophic events for another fifty years. It is precisely the ongoing disruption of this balance and recurring cycles that are responsible for an instability that produces extreme events, which rather than happening in 50 years time, have been ongoing for several years now.

Now, in order to confront these types of scenarios, Lovelock once again proposes the traditional nuclear prescription (but why did he not think of this 15 years ago when the first reports began streaming out of the IPCC?).

So why refute Lovelock's theory? For its disparaging obstinacy or lack of coherence? No, much more simply because it is not the solution, with all due respect to its supporters who are trumpeting it from the columns of the Italy's *Giornale* newspaper, riding the wave of the "penitent" guru.

The operating reserves of fissile uranium U235, the "fuel" of nuclear reactors, are estimated as reduced to just a few decades-worth, even at the most modest level of present consumption. And if we needed to find double that? Precisely to overcome this problem, the French had proposed "breeder" or "fast" reactors that, at least in theory, increased the estimated availability of U235 by several decades. However, the "Superphoenix", the only "fast" reactor ever activated across the Alps, is already a part of industrial archaeology.

But nuclear is available immediately urges Lovelock. Available? Immediately? One should reflect on the fact that today, 50 years after its "birth," nuclear constitutes just 7% of global energy needs and that no new reactor has been ordered in the United States since 1978.

In any case, Generation IV, the nine-country consortium led by the U.S., does not anticipate an industrial prototype before 2030, which will also have to overcome the challenge of nuclear power's social unacceptability.

So are renewable energy sources visionary dreams or a burgeoning reality? Let us refer to the data. Small solar panels for thermic use, "wind farms" for electric use and energy from biomass are already competing with oil. The "concentrated" solar system promoted by [Carlo] Rubbia, winner of the 1984 Nobel Prize in Physics, is also on its way. Prey to typically British isolationism, our guru ignored the fact that it is Germany, not Denmark, that has set about supplying 10% of its electrical needs from wind power, having already installed 14,000 MW of wind generators; and that renewable resources provide work to about 150,000 people in that country.

To change the energy model means confronting the enormous resistance of the "oil empires," but this does not make the nuclear path an easier or more certain one.

Article originally published in Italian and translated for the *WISE/NIRS Nuclear Monitor* by Linda Gunter.

Source and contact: Gianni Mattioli and Massimo Scalia are physicists at l'Università "la Sapienza" of Rome and leaders of Movimento Ecologista (www.yoyoba.it).

FURTHER READING

Researchers Jan Willem Storm van Leeuwen and Philip Bartlett Smith published studies in the recent years on the energy efficiency and carbon emissions of nuclear power. Extensive research work and calculations were carried out on this issue and an analysis of the life cycle of NPPs was also done. A nuclear reactor not only produces energy in the form of electricity, it also needs energy for the construction and dismantling of a plant, mining, enriching and converting uranium and storing nuclear waste. All these invested energies result in the emission of carbon dioxide gases, as they are mostly fueled by fossil fuels (e.g. uranium mining). With uranium resources decreasing (over the next decades) to 0.01% rich ores, the emissions of a nuclear reactor even equal those of a gas-fired power plant.

The reports and calculations can be found at www.oprit.rug.nl/deenen.

SOUTH AFRICA: MINISTER SAYS NUCLEAR UNAVOIDABLE

In a budget speech on 22 June, the South African Minister of Mineral and Energy, Phumzile Mlambo-Ngcuka, stated that "nuclear energy is unavoidable", citing the need for new supply to meet South Africa's growing energy needs in the future.

(612-613.5622) WISE Amsterdam - This statement implies tacit approval for the proposed Pebble Bed Modular Reactor (PBMR), currently being developed by Eskom. COSATU, the largest congress of South African trade unions has taken a firm stand against the PBMR, while the local government of Cape Town also expressed strong opposition to the PBMR by appealing against the Environmental approval given by the national Environmental Department earlier this year. Religious groups such as the influential Catholics Bishops conference have also come out against PBMR.

In response to Mlambo-Ngcuka's comments, Earthlife Africa Cape Town stated that the minister had been misguided and that energy efficiency measures would be the most cost effective way to ensure energy supply in the near future, with a shift to renewable energy sources in the long term. Campaigner Sibusiso Mimi said, "Nuclear energy is not an option for South Africa; the minister has surely overlooked many environmental and human safety issues which entail great amount of costs."

According to figures from the Department of Mineral and Energy (DME), energy efficiency measures could save 15 to 30% of the current energy usage and allow the avoidance or delay of energy infrastructure projects and reduce environmental emissions (DME 1998).

Who misinformed the Minister?

The SA cabinet has engaged an advisory panel to provide it with advice with regard to nuclear issues. One of the members of this panel is Mr. Ruel Khoza, the current chairperson of Eskom. According to Mr. Khoza, his role is to "look after the national interest, given that Eskom is a national utility".

Mr. Khoza is a man with varying interests. He is a major player in the 'black empowerment' arena and a director of Co-ordinated Network Investments (CNI) and AKA Capital.

The history of the PBMR is also of importance here. Up until 1992, Armscor commissioned research into a small nuclear reactor. This research was carried out through a company called IST. After 1993, IST sought buyers for its technology and eventually, after intensive lobbying, Eskom took over the PBMR development.

In 1998, a year after Khoza stepped in as chair of Eskom, CNI bought 29% of IST. The fact that Khoza now had a large stake in a company that stood to benefit directly from the PBMR project did not seem to raise any eyebrows. In 1999, this investment was secured when the cabinet were favourable impressed.

In 2002, Khoza increased his stake in IST, through AKA capital. The Directors of AKA capital are Khoza and his old business partners from CNI, Sam Nematswerani and Gary Morolo. In the 2002 agreement, voting rights to CNI's 29% was signed over to AKA Capital, and AKA Capital are granted a further option to buy 11 million shares of IST at 90 Rand cents (10-15 US$ cents) per share. AKA Capital also agreed to provide strategic management services to IST, further strengthening Khoza's relationship with the group.

In the current contract, this option can only be exercised on a third of the shares. But if exercise by late 2003, AKA Capital will make an instant profit of R1.2 million (US$ 198,000).

This is in no small part due to the fact that in August 2003, Eskom awarded a R260 million (US$ 42.9 million) contract to IST Nuclear (the entire IST group had a turnover of only R300 million in the previous year) for PBMR design causing the share price to increase by 50% overnight. With the development of the demo model PBMR unit alone being estimated at R10 billion (US$ 1.6 billion), IST stands to make much more money, and in turn, line its shareholders' (including Khoza) pockets if the project goes ahead.

So Mr. Khoza is an influential person. He binds Eskom to IST, and the go-ahead of the PBMR project will provide him with huge personal earnings. He is also a lobbying link into government.

Whether the PBMR is an eventual success or a white elephant is irrelevant to those who will have personally enriched themselves. But for the South African public, there is little hope that anyone will listen to their pleas to stop the nuclear madness. Instead, as electricity consumers, they will be forced to bear the huge costs and as citizens will suffer the unwanted legacy of nuclear wastes.

References: www.quaystone.co.za; www.m1.mny.co.za; www.namebase.org; Earthlife Africa press release, 22 June 2004 and email 11 July 2004

Contact: WISE Amsterdam

COURT ACTION

Earthlife Africa is proceeding with court action to force Eskom to reveal its board minutes. This is after some months of protracted attempts to gain access to these records through the normal that might be contained in the board minutes.

Earthlife Africa, by email, 11 July 2004

RUSSIAN SPENT FUEL IMPORTS STALLED

On 15 June, Ecodefense/WISE Russia published the report "*Russian Import of Spent Nuclear Fuel in 2001-2003*". It has been three years since Russia adopted, on 17 July 2001, a law that would allow the import of foreign spent nuclear fuel (see *WISE/NIRS Nuclear Monitor* 552.5300: "Russia open for nuclear waste import"). The law would facilitate Russia being turned into the world's nuclear waste dump, but no significant contracts have been signed in the subsequent period.

(612-613.5623) WISE Amsterdam - The law was adopted despite immense public opposition and with opinion polls at the time showing that 93% of the Russian population opposed the plans for waste import. Instead, the Russian government fiercely promoted the plans and anticipated earning as much as US$ 20 billion from the storage of about 20,000 tons of foreign spent fuel.

The Ministry of Atomic Power (Minatom) in 2001, often claimed that contracts would be signed (for example with Great Britain, Japan and other Asian countries), but those claims later appeared to be untrue and were disproved by the relevant authorities in those countries.

It would appear that many Western countries are, at least for the moment, reluctant to send their spent nuclear fuel to Russia. Finland had already announced in 1996 that it would cancel spent fuel transports to Russia because of the poor state of the "Mayak" reprocessing plant in Chelyabinsk.

Germany rejected the idea for environmental reasons and the U.S. took a similar stance that also included political reasons. Contrary to Minatom statements, the Japanese government denied receiving any offers from Russia and further Minatom claims about planned contracts for the import of British research fuel were denied by the responsible British operators.

In 2000, Taiwan and Switzerland were often mentioned as countries negotiating the export of some 4,000 tons of spent fuel, however, Taiwan announced its rejection of such a deal. The position of Switzerland remains unclear.

The export of spent fuel to Russia has been common practice for many Central and East European countries operating Russian designed reactors. Since 2001, the Ukraine has sent six or seven trains carrying spent fuel to Russia, but intends to halt such exports in 2005 and has built a fuel storage plant at Zaporozhe NPP in southern Ukraine.

Between 1998 and 2003, Bulgaria sent four trainloads of fuel to Russia and plans to continue. Hungary is still negotiating the possibility of sending fuel from its Paks NPP to Russia. In September 2003, it was announced that Russia and Slovenia were planning to sign a contract for fresh fuel delivery and the return of spent fuel to Russia, including fuel historically accumulated at the Krsko reactor.

The destinations for the imported spent fuel are the Mayak complex and the Krasnoyarsk-26 reprocessing plant although both complexes lack sufficient storage capacity to import large amounts of spent fuel. Mayak has capacity for 2,500 tons and is currently 80% full while Krasnoyarsk-26 has filled around 55% of its 6,000-ton capacity. There are just 3,200 tons of storage capacity remaining, which is far less than the 20,000 tons foreseen by Minatom.

Reprocessing could reduce the amount of fuel in the storage pools, but the reprocessing capacity at Mayak is low (400 tons yearly) and Krasnoyarsk-26 lacks an operating reprocessing plant (it would take 20 years to build such a plant).

In early 2003, the Mayak's license was recalled due to violations but was quickly reinstated following governmental pressure. The economic situation at Mayak is difficult as it accepts spent fuel at dumping prices of US$ 300 (Ukraine) to US$ 620 per kilogram (Bulgaria), compared to US$1,500 per kilogram for French and British reprocessing plants.

Even the director of Mayak confirmed that its reprocessing services do not earn enough to cover expenses and that the complex is 50% subsidized by the state. A similar state subsidy share is assumed for Krasnoyarsk-26

In an attempt to convince parliamentarians, Minatom insisted in 2001 that the imports would bring to the state budget about US$ 20 billion within 10 years. With this expectation, the first two years should have reaped profits of nearly US$ 4 billion but according to Ecodefense, the true profits from fuel imports between 2001 and 2003 were some US$ 100 million, 40 times lower than expected.

In its report, Ecodefense concludes that no significant changes have occurred in the three years since the waste import law was adopted.

Countries that have exported spent fuel to Russia in that period were existing clients; no new business had been generated.

IAEA SUPPORT

When Russian president Vladimir Putin and IAEA director Dr. ElBaradei met on 29 June, both publicly stated that Russia's plans for the storage of foreign spent fuel were acceptable. The IAEA chief also spoke at an international conference on nuclear energy and welcomed the idea of multinational storage sites, where a number of countries would store waste in one host country. He also said he was "encouraged that the Russian Federation is considering one such collective disposal initiative". **www.iaea.org, 30 June 2004**

Moreover, the biggest client (Ukraine) is expected to stop sending its fuel to Russia.

The two Russian storage sites are economically ineffective and 50% subsidized by the state and current storage capacity is insufficient for large international contracts, given that fuel from Russian NPPs is also to be stored at Krasnoyarsk-26 and Mayak.

The full report can be found at www.antiatom.ru/download/040615report.pdf.

Source and contact: WISE Russia

CONFERENCE ON LOW LEVEL RADIATION AND HEALTH

At the opening lecture of the 20th Low Level Radiation and Health Conference held in Edinburgh on 3 June, Dr Keith Baverstock issued a plea for a precautionary approach to the effects of depleted uranium (DU) on health. "The hazard is not so speculative that it should be ignored," he told the audience.

(612-613.5624) Laka Foundation - Last February he told Scottish newspaper, the *Sunday Herald*, that the World Health Organisation (WHO) had 'suppressed' a scientific study into depleted uranium cancer fears in Iraq. He and his colleagues warn in a report, currently being updated for publication, that military use of DU weapons poses a long-term health risk.

Dr Baverstock is currently based at the Department of Environmental Sciences at the Kuopio University in Finland and from 1991 to 2003, worked as the head of the Radiation Protection Division of the WHO (EURO).

Baverstock's lecture, entitled "Science, politics and ethics in the low dose debate", focussed on two case studies into the health of the UK test veterans and the use of DU weapons.

He describes the epidemiological study of British test veterans carried out by the National Radiological Protection Board (NRPB) in the 1980s, and calls attention to serious flaws in the methodology. The NRPB initially accepted primary data in the form of the names of servicemen attending the tests and rather sparse dosimetric data from the Ministry of Defence (MoD), apparently without independent verification.

It was recognised from the outset that there was incomplete discovery. After the first analysis in 1988, more veterans were identified in order to prevent a shortfall in the veteran test group compared to a similar cohort of servicemen who were not exposed to nuclear tests in Australia or the Pacific. However, the additional veterans have not been included in the main analysis.

Baverstock declares: "If the loss of the 15% of records was associated in any way with the health outcomes being studied, then the fact that there is not comparable loss in the controls immediately introduces bias."

According to the NRPB survey, participation in nuclear testing had not damaged the health of the veterans and thus, the MoD is able to conclude that there is no case for compensation. Baverstock, however, concludes that the NRPB survey was deficient and that the data was not scientifically exploited to its full extent. In addition, a lack of political will has made resolving the issue and impact on health of test veterans difficult.

On internal contamination (DU oxide dust particles), Baverstock notes that the International Committee on Radiation Protection (ICRP) regards these dust particles as a chemical rather than a radiological hazard, the exception being insoluble particles retained in the lungs.

Soluble particles are considered to be a chemical hazard and the resulting kidney damage is regarded as the principal toxic effect. Insoluble particles are considered to be a radiological hazard, with lung damage as the principal hazard.

Baverstock is of the opinion that this model is overly simplistic. He declares that a by-product of burning DU metal is a mixture of two oxides, one insoluble and the other sparingly soluble. The sparingly soluble oxide, when inhaled, remains in the lungs. The slowly dissolving uranium binds to DNA and proteins in lung tissue and slowly gets transferred from tissue to blood to other tissues, particularly bone, before finally being excreted to the kidneys.

Baverstock says recent results have indicated that while the uranium is in transit to the kidneys, or rather retained over long periods in the deep lung, it may give rise to genotoxicity, mediated not by radiation alone but by its chemical properties in combination with its radioactivity.

NEW REPORT

Dan Fahey recently finished a new report on depleted uranium, called *The Emergence and Decline of the Debate over Depleted Uranium Munitions*, 1991-2004 (June 2004). The 28-page report contains estimates for the list of countries possessing and manufacturing DU munitions, as well as a tabulation of known or suspected uses of DU in armed conflicts. Fahey also assesses the rise and fall of international anti-DU campaigning work. He examined four issues that influenced the course of the issue: scientific uncertainty, government misconduct, forms of mass communication, and the credibility of activists. The report can be downloaded from the WISE Uranium website: www.antenna.nl/wise/uranium/pdf/duemdec.pdf.

In addition, there is also the possibility of damage created by the bystander effect, where cells not directly irradiated but are situated close to cells that are, exhibit the effects radiation. Baverstock regrets that neither the ICRP, the IAEA nor the WHO took these potential effects into consideration when assessing the risks from inhaling DU dust particles. "When the WHO were advised of these three potential mechanisms, it ignored the information in the preparation of a Monograph on the health effects of DU published in 2001 and subsequently suppressed the publication of a paper postulating these three mechanisms."

Baverstock thinks that the most serious violation is that of the WHO, whose mandate to protect public health has surely been compromised. "In an ideal world the WHO would have alerted the IAEA and ICRP to the potential hazard of DU oxide dusts in Iraq," he says. "Until there is clear evidence that DU oxide dusts are harmless, battle zones where it has been used should be cleaned up."

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ORIGINAL 9-11 PLOT INCLUDED STRIKES AGAINST NPPS

Al Qeada's plans for attacking the United States on 11 September 2001 were much more extensive than the attacks on the World Trade Center and the Pentagon, the 9-11 Commission reported recently.

(612-613.5625) Greenpeace USA - According to a staff statement from the 9-11 Commission, the original idea for the attacks originated with Khalid Sheikh Mohammed and included the hijacking of at least ten airliners. In addition to the targets actually struck, "these hijacked planes were to be crashed into CIA and FBI headquarters, unidentified nuclear power plants, and the tallest buildings in California and Washington State."

The 9-11 Commission staff statement corroborates earlier information concerning Al Qeada's desire to strike nuclear facilities. According to FBI testimony in the trial of Ramzi Youseff, nephew of Khalid Sheikh Mohammed and mastermind of the 1993 World Trade Center Bombing, Al Qaeda operatives had bragged about targeting nuclear power plants while in custody.

In an interview with Al-Jazeera after the New York attacks, Khalid Sheikh Mohammed acknowledged that two unnamed nuclear power stations were the original targets. However Al-Qaeda feared that such an attack "might get out of hand". In the Al –Jazeera interview Mohammed stated that, "It was decided to abandon nuclear targets for the moment," Mohammed continued "I mean for the moment."

Despite information to the contrary, Bush administration officials have repeatedly attempted to downplay the prospect of terrorists targeting nuclear facilities. Homeland Security Chief Tom Ridge has commented, "Is it possible? Anything is possible. Is it probable, given the circumstances that we know? No, it's not probable. It is possible. We have to deal with the possibility. But the notion that flying an airplane into a nuclear site would result in this massive nuclear disaster—I think it's pretty farfetched."

Although the head of Homeland Security may think the notion "farfetched," the U.S. government obviously considered Bin Laden a threat to nuclear facilities and the radioactive materials they contain prior to the attacks of September 2001. In January of 2000, one or more members of the U.S. Nuclear Regulatory Commission (NRC) were briefed for forty-five minutes on "Material in Report re: Usama Bin-Ladin."

Greenpeace, which unearthed this information in Freedom of Information Act requests, has asked the NRC whether the briefing included the fact that terrorists were targeting nuclear facilities. Despite the Bin Ladin briefing and an abysmal track record where nearly half of all nuclear plants failed their security drills, the Commission voted to eliminate the government's program for testing nuclear power plant security. Instead, the Commission voted to turn security into a voluntary industry initiative basically allowing the nuclear industry to regulate nuclear security itself.

However, following the attacks of 9-11, the Commission was forced to scrap the industry program to test security and issued new regulations governing how the nuclear industry must address the threat to reactors.

The NRC's letter responding to Greenpeace states that "much of the information requested is classified national security information and can not be released." However, the Commissioner claims that the briefing did not include information concerning the security of nuclear plants.

After the revelations from the 9-11 Commission, the public is left to wonder why not and whether those in charge of nuclear power plant security were ever informed that terrorists wanted to turn nuclear power plants into weapons of mass destruction.

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QUESTIONS REMAIN AT EUROPEAN WASTE NETWORK

The European COWAM network (Community Waste Management) conference held in Berlin from 7-9 July was mostly attended by nuclear industry workers with just a few participants representing anti-nuclear NGOs. The central question was how to involve "stakeholders" in the siting of nuclear waste facilities and COWAM's main objective, to develop recommendations for the decision-making process.

(612-613.5626) Herman Damveld - Participants of the COWAM network include waste management authorities, representatives of municipalities, and also a number of NGOs. Its work covered the period of 2000-2003 and a final report was published in November 2003. COWAM will now continue as COWAM-2 under the European 6th Framework Program (1).

About 150 people from some 13 countries attended the plenary sessions and working groups at the conference, most working directly or indirectly for the nuclear industry or for universities, sometimes working on projects sponsored by the industry.

Urgent problem

One of the basic assumptions in our world is that "the polluter pays" and that waste producers are held responsible for finding solutions to problems they create. One participant noted that this principle has already been violated since nuclear energy has existed for 50 years and more than one generation has passed without a solution for nuclear waste being found. The nuclear industry, in turn, uses the "polluter pays" principle to speed up efforts to realize waste repositories.

The haste of the nuclear industry has been visible in the way it had tried to realize waste repositories; allocate facility sites and push through approval (also known as "decide-announce-defend"), resulting in fierce resistance from opponents. The nuclear industry has apparently recognized the weakness of this strategy and is now seeking new siting models. The COWAM network is a forum for the discussion of alternative approaches.

Financial controversies

COWAM receives subsidies from the European Commission and these are used to reimburse half the participants travel and accommodation costs. For small anti-nuclear groups participating in the network, this is proving to be an obstacle as the other 50% of expenses must be found elsewhere.

Lorraine Mann of the Scottish Association against Nuclear waste Dumping (SAND) expressed concerns that people from small activist groups were effectively excluded from participating because of the costs involved, whereas industry people could attend because they are able to claim expenses. Olov Holmstrand, representative of local groups in Sweden also subscribed to this view.

COWAM organizers replied by stating that they had done, and will do, their best to create financial conditions to cover all participant expenses and that some anti-nuclear participants were already being fully reimbursed for all travel and accommodation costs. However, the financial obstacle for smaller groups wishing to participate in networks such as COWAM still remain.

The European Commission apparently makes a great song and dance about public involvement in waste siting, but still spends billions on nuclear fusion and nuclear fission while having relatively small amounts of money available to facilitate worthy and balanced discussions.

A German participant commented that the mayor of Gorleben, in Germany, was not able to attend the conference because he had to avoid criticizing the planned repository. Gorleben is the location of a salt dome where the nuclear industry plans to store nuclear waste. The city receives funds for the project and any criticism could end the flow of cash. Although the COWAM conference was held in Germany, many local municipality representatives were absent.

Ethical issues

Despite the critical comments, the conference resulted in many important and interesting questions being debated in an open atmosphere. One working group discussed ethics (2) and asked participants to imagine that nuclear energy was phased out and in the event, who would be responsible for the nuclear waste and how this responsibility could be implemented.

Georg Arens of the German Federal Authority for Radiation Protection (BFS) stated that the interests of present and future generations must each be weighed on its own merits – that the expression of our interests should not outweigh our ethically responsible to future generations. The interests of the present generation should be implemented by involving the public in decision-making and through transparent communication by the government, according to Arens. Sounds credible but also a little too vague.

Fortunately, Sylvain Lavelle of the French Center for Ethics Technology & Society (Lille) examined the issue in more detail. Lavelle asked why we should be responsible for future generations and how long this responsibility should last; do we assume 3, 30 or 300 generations? Does this responsibility ever end? An important assumption made by Lavelle is that future generations will have the same possibilities as the present one.

Germany
Detlev Ipsen from the University of Kassel (Germany) was a member of the Arbeitskreis Endlagerung AkEnd (working group on final disposal) which, in 2002, proposed various approaches for finding a repository site for nuclear waste. Ipsen showed that 53% of the German population consider finding a solution for nuclear waste as being an urgent issue. At the same time, 80% of the population rejects the siting in their own region and the majority of respondents have no confidence in politicians. According to Ipsen, politicians prefer not to discuss the problem of waste because of a fear of losing votes.

Rolf Wernicke of the German environment ministry announced a follow-up of AkEnd's work. A law regulating siting procedures is to be adopted before the 2006 elections. A big conference for stakeholders will also be held in that year.

COWAM-2
COWAM-2 will hold the next conference in February 2005 at Gorleben and will publish studies on decision-making methods.

References:
(1) The final report from COWAM can be downloaded at www.cowam.com/documents/COWAM-FR2003.pdf. COWAM-2 can be found at www.cowam.org.
(2) A report called *Norms, Values and Nuclear Waste, June 2004* was published by Herman Damveld for the conference. It is available on request at the author: h.damveld@hetnet.nl

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KOODANKULAM AND INDIAN NUKEDOM

***Dinakaran*, a popular Tamil daily, reported on 17 June that the Indian nuclear authorities are planning to set up six more nuclear reactors at Koodankulam apart from the two currently under construction. According to Mr. S. K. Agrawal, the director of the Koodankulam nuclear power project, preliminary arrangements to set up the third and fourth reactors have begun.**

(612-613.5627) S. P. Udayakumar – It is now believed that the very first 1,000 MW nuclear reactor could go critical nine months ahead of the original target date of December 2007. The second one is to go critical 18 months ahead of the scheduled date in 2008.

Nuclear Power Corporation of India Ltd. (NPCIL) officials claim that a modern center with state-of-the-art facilities to train technical staff at various vital control units is being established. *The Hindu* newspaper quotes Mr. Agrawal in its June 18 issue saying: "Designed by Russians, the training centre will be a replica of the actual control room of a VVER reactor. It will prepare our technicians to face any challenge as we can simulate any kind of life-threatening situation with computers. By generating such unfavorable conditions without alerting the technicians, we can ascertain the reflexes of our personnel and through such methods of training, we will prepare our technocrats physically and mentally to ensure 100% safety in the reactor and its hinterland."

According to him, the reactor itself would control any abnormal operation as it has been designed with futuristic safety aspects.

Newly recruited technicians are being trained in Russia and the second batch of 18 technicians are currently undergoing a 13-month training there. Radiating confidence, Mr. Agrawal says: "Our boys are undergoing rigorous training in a centre in Russia, where the Chinese and Iranians are being trained. The Russians are very much pleased with the performance of our boys. The Russians will come over here in the first week of July to conduct an entry level test to select the next batch of trainees to be taken to Russia."

Chartered ships have been carrying equipment for the reactors and a ninth shipment is said to have recently arrived at the Tuticorin port with a range of condensers. The project director says that since major equipment is reaching the project site on time, erection of the reactor's major components would begin in October. The Main Reactor Pressure Vessel (MRPV) itself would reach Koodankulam by the end of this year.

In the meantime, the first pour of the concrete for the Prototype Fast Breeder Reactor (PFBR) construction at Kalpakkam, near Chennai, is to begin by mid-August, according to Baldev Raj, Director of the Indira Gandhi Centre for Atomic Research (IGCAR) at Kalpakkam.

Excavation work is complete and a sprawling mud-mat has been spread over the excavated area to level the ground on which the concrete foundation for the reactor will be erected. The Indian government has earmarked Rs. 4,500 crores (US$ 1.1 billion) for the project and its fuel cycle facilities. It will use mixed uranium-plutonium oxide as fuel and liquid sodium as coolant and would generate 500 MW power in 2010.

The first stage of the Indian nuclear power program is said to include construction of a series of Pressurized Heavy Water Reactors (PHWR). The second stage envisages the building of a series of breeder reactors to provide energy security to the country. Thorium-fuelled reactors will mark the third stage and an Advanced Heavy Water Reactor (AHWR) that will generate 300 MW is under development.

In this context, it is quite pertinent to note some of the recent accidents at Indian nuclear power plants. On April 17, 2004, three employees at the Waste Immobilization Plant (WIP) at Tarapur in Maharashtra received doses of radiation from a bottle containing

diluted highly radioactive waste that was "deliberately" placed on a chair that the three used at different times. On March 10, 2004, there was a "reactor power rise" in the first unit of the Kakrapara Atomic Power Station (KAPS) in Gujarat because "the operator failed in not tripping the reactor in time".

On January 21, 2003, six employees of the Kalpakkam Reprocessing Plant (KARP), about 50 km from Chennai, were exposed to radiation exceeding the AERB-prescribed annual dosage limit of 2 rem. A leak in a valve separating a high-level radioactive liquid waste tank and a low-level liquid waste tank led to the mixing of the two kinds of wastes and increased radioactivity in the area. There were no monitors to detect the radiation level in the enclosed area. The workers were not wearing the personal thermo luminescent dosimeters, which register the radiation doses received.

Mr. S.K. Jain, Chairman and Managing Director, Nuclear Power Corporation of India Limited (NPCIL), says there is "a structured, detailed training program" for the operators. Each and every person associated with the operation of the reactors in the country undergoes "rigorous training".

After successful completion of this, they are given licenses to operate the reactors for three to five years. After that, there is a system of re-licensing. He says: "[O]ur people are under instructions to take decisions, which should be in the most conservative direction with regard to safety. I don't have an answer why despite such a directive, such technical requirements, such training, the operator of the first unit behaved in that fashion. That is a mistake and we admit that."

References:

(1) "Nuclear Power Corporation plans state-of-the-art training centre," *The Hindu*, 18 June 2004.
(2) "Koodankulathil Melum 6 Anumin Unitkal" (6 More Nuclear Units at Koodankulam), *Dinakaran*, 17 June 2004.
(3) "Nuclear Power: Safety Concerns", *Frontline*, 2 July 2004.

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IN BRIEF

Congo: uranium mine collapses. Part of a uranium mine in the eastern Democratic Republic of Congo has collapsed, killing at least nine people. On 9 July, a roof at the mine collapsed while 30 miners worked underground. The Shinkolobwe mine supplied the uranium of the Hiroshima bomb in World War II. It was closed earlier this year but people still mine there for cobalt, used in mobile phones. Fears had arisen that people also tried to illegally recover uranium for sale to terror groups. BBC discovered some months ago that about 6,000 people were still working in the closed mine. The IAEA has expressed its concern about the illegal mining activities.
BBC, 12 July 2004

EBRD loan for K2/R4. The European Bank for Reconstruction and Development has approved a US$ 42 million loan for the Khmelnitski-2 and Rovno-4 project (K2/R4). The money is meant for safety upgrades after the reactors are start up in August and September. A further US$ 83 million in Euratom funds from the European Commission is expected soon. The now approved loan is much smaller than previously proposed. The original plan contained a US$ 1.7 billion loan from the EBRD and Euratom to complete the two reactors. But EBRD and Ukraine continued to disagree about the conditions for the loan and it was shelved in 2001. Early this year it became clear that a new proposal was under discussion (see *WISE/NIRS Nuclear Monitor*: "Ukrainian nuclear gravy train set to continue").
***WNA News Briefing* 7-13, July 2004;**

Japan: new MOX scandal. Officials in Japan are facing new allegations that the public was misled about cheaper alternatives to MOX. A study conducted in 1994 had shown that reprocessing was twice as expensive as the burial of spent fuel but it was never publicly released until reports surfaced in the Japanese press in early July. After recent safety violations, reactor malfunctions and accidents, the allegations of infor-mation being withheld mark the latest setback for Japan's nuclear program. Safety problems since Japan's worst accident in 1999 have undermined public trust in the nuclear power industry.
Associated Press, 4 July 2004

Leak at Swiss NPP. On 28 May, two incidents occurred at the Leibstadt reactor in Switzerland. The first incident when the reactor was restarted after a shut down period due to the repair of a leaking valve. During the restart, the reactivity and temperature of the cooling water rose too quickly due to a miscalculation by an operator. The second incident involved a valve close to the reactor vessel, which had not been closed after the repair works causing an amount of radioactive iodine-131 to be released into the environment. Both incidents were rated as level 1 on the International Nuclear Event Scale (INES).
***Swissinfo*, 29 June 2004; www-news.iaea.org, 29 June 2004.**

First step to increase tritium discharges at French NPPs. French authorities on 24 June issued a new license for radioactive and chemical discharges at the Electricité de France (EdF) NPP at Cattenom, close to Germany and Luxembourg. EdF applied for tritium discharges to be raised from 40 TBq/year per reactor to 50 TBq. In recent years, the threshold for liquid tritium discharges was lowered to 30 TBq/year per reactor upon the renewal of licenses. However, WISE-Paris now suggests that this could be the first step of a strategy to obtain licenses for increased of tritium discharges at all French plants.
***WISE-Paris*, 24 June 2004**

France to build EPR. The board of Electricité de France (EdF) has decided to build a demonstration unit of the European Pressurised water Reactor (EPR). Construction is expected to start in 2007, following public consultation, which is to include site selection, and licensing. EdF is to announce its site preference in August. The leading candidates are apparently Penly and Flamanville in Normandy and Tricastin in Rhone-Alps.
***Nucleonics Week*, 24 June 2004**

Brazil denies blocking U.N. Brazil's defence minister Jose Viegas has denied that Brazil was blocking U.N. inspections of its nuclear enrichment facilities and told reporters that Brazil accepts inspections. Viegas made his remarks in response to comments by the International Atomic Energy Agency (IAEA) chief Mohamed ElBaradei who had said that Brazil must allow access to the uranium enrichment plant or stand in violation of international treaties.
The Associated Press, 29 June 2004

Kalkar fuel to La Hague. 205 fresh fuel elements of the never-opened Kalkar breeder reactor and fuel elements of the Karlsruhe research breeder reactor in Germany will be transported to the French reprocessing plant La Hague. The plutonium containing elements were stored in a bunker at Hanau. La Hague will reprocess the plutonium from fuel into MOX elements for the German Gundremmingen reactor. Some environmental NGOs and local Green politicians reacted positively to the decision to remove the large amount of plutonium from the Hanau bunker, but urged measures to prevent a possible misuse for military purposes after reprocessing. Others opposed the plans because it involves reprocessing at La Hague. The ten shipments should be completed by July 2005 and the deal will cost 210 million Euro (US$ 267 million).
***Frankfurter Rundschau*, 16 June 2004**

Activists in Taiwan protest against new reactor. Anti-nuclear activists on 6 July protested outside Japan's Interchange Association in Taipei, accusing Japan of exporting 'deficient nuclear reactors' to Taiwan. A reactor pressure vessel arrived at a wharf in Gongliao, Taipei Country, in early July and was scheduled for hand-over to the Taiwan Power Co. to be then delivered to the fourth NPP under construction nearby. According to Chen Jiau-Hua of the Taiwan Environmental Protection Union (TEPU), the safety of the two reactors to be installed at the plant cannot be guaranteed. A similar reactor installed at a nuclear plant in Kashiwazaki, Japan had resulted in several nuclear accidents.
***Taipei Times*, 7 July 2004**

Kazakhstan sends first radioactive shipment. Kazakhstan has delivered its first batch of radioactive isotopes to the United States under a deal to prevent the spread of nuclear materials. The Nuclear Physics Institute sent about 100 millicuries of the isotope germanium-68 to the Los Alamos National Laboratory in New Mexico on 18 June. Under the deal, the Kazakh National Nuclear Center institute in Kazakhstan's commercial capital Almaty is expected to deliver another 200 millicuries in 2005 and 300 millicuries in 2006.
The Associated Press, 24 June 2004

Canada, to spend CAN$ 1 billion to restart nuclear. The Ontario government announced that it would invest nearly CAN$ 1 billion to restart a second reactor at the Pickering NPP east of Toronto. The project is expected to cost around CAN$ 900 million and would be completed within 15 months. Four reactors at the facility were shut down in 1997 for safety reasons, only one has been restarted.
Canadian Broadcasting Corporation, 7 July 2004

Philippines: plant costs US$ 155,00 a day but no electricity. Nearly 30 years after work began on the Bataan nuclear power plant, north of Manila; Filipino taxpayers are still paying US$ 155,000 a day (in interest) on a structure that has never produced one watt of power. The Bataan plant was a knee-jerk reaction, by former dictator Marcos, to the energy crisis of the early 1970s. In 1986, a team of international inspectors visited the site and declared it unsafe and inoperable after it was built near major earthquake fault lines and the Pinatubo volcano. The Aquino government later banned the use of nuclear power and enshrined it into the constitution.
Channel News Asia, 30 June 2004

Danish NGOs oppose permit for Barsebaeck. The Danish Forest and Nature Agency is participating in the transboundary consultation process as part of the Barsebaeck nuclear power plant's application for an environmental permit. Barsebäcksoffensiv (BBOFF), with seven Danish NGOs, has submitted a position paper recommending that Barsebaeck should not be given an environmental permit. Instead the Danish and the Swedish government should intensify efforts to shut down the plant as quickly as possible, said BBOFF.
Barsebäcksoffensiv & NOAH, Friends of the Earth Denmark, 30 June 2004

Fessenheim to restart. The Fessenheim plant's reactor no. 1 is to restart in coming weeks after being shut down in January 2003, due to a leak of resin particles in the primary circuit surrounding the reactor. Joseph Sanchez, director of Fessenheim (oldest plant in France) stated that preparations to re-launch the reactor's activity are being carried out, but that no date could be specified due to "commercial reasons". The primary circuit surrounding the nuclear reactor has undergone severe cleansing after being contaminated by the leaking resin particles.
AFP, 17 June 2004

Yucca budget reduced. The waste fee provisions of US$880 million requested by the DOE have been rejected and will not be included in the FY-05 bill. Instead, the DOE repository project was left with a

US$131 million allocation. The US$ 131 million allocation is roughly 14% of DOE's budget request for the waste program in FY-05, which assumed that US$ 749 million would involve reclassified fees.
***Nuclear Fuel*, 5 July 2004**

Israel insists on nuclear ambiguity. The International Atomic Energy Agency (IAEA) Director General, Mohamed ElBaradei, met with Israeli Prime Minister, Ariel Sharon, on 6 July, in an effort to urge Israel to join talks on creating a nuclear-free Middle East. Israel, who has not signed the nuclear non-proliferation treaty (NPT), insists in maintaining an ambiguous position. ElBaradei stated before his visit "I think everybody takes it as given that Israel has a nuclear capability, if not nuclear weapons. So, whether (…) they maintain their… ambiguity, it's for them to decide." He also added that talks on nuclear disarmament could, however, stimulate peace efforts by building confidence in the region. The Israeli Atomic Energy Commission recently posted a website acknowledging Dimona's existence for the first time. The site displays non-detailed pictures of the but makes no mention of the existence of nuclear weapons.
Arab News, *12 July 2004; BBC News, 6 July 2004*

Greenpeace launches Atlantic Nuclear Free Flotilla. The US Department of Energy (DOE) is to export "military-quality" plutonium from Charleston (in Eastern US) to Cherbourg on France's Normandy coast for reprocessing. The transport of 150 kg of plutonium will be carried out during the summer by two British armed cargo ships. On arrival at Cherbourg, the plutonium will be transformed into four MOX Lead Test Assemblies at the Cadarache plant in Southern France. These will then be shipped back to Charleston for testing at the Catwaba reactor in South Carolina. The National Regulation Commission's (NRC) approved of the license is being opposed by both Greenpeace and the local group Charleston Peace and announced the creation of a flotilla to protest the plutonium transport.
www.greenpeace.fr, 21 June 2004

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WISE/NIRS NUCLEAR MONITOR

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