

# NUCLEAR MONITOR

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## THAILAND: EIA REPORT ONGKARAK REACTOR REJECTED

**The plan to build a 10 MW research reactor at the Ongkarak nuclear research center in Thailand was obstructed again when the project's Environmental Impact Assessment report was rejected by Thai National Environment Board for incomplete data.**

(592.5538) AEPS - The National Environment Board of Thailand finally announced in August its rejection of the EIA report of a 10 MW research reactor proposed to be constructed in Ongkarak district, Nakorn Nayok province, Thailand.

According to Mr. Pathom Yamkate, deputy secretary-general of the Office of Atomic Energy for Peace (OAEP) which was the project's owner, the report was rejected because of its incomplete data. One of the missing data was current information about fault lines in Ongkarak district.

The report was also criticized for its lack of up-to-date data. "The EIA's information was so outdated that even constructions or landscapes that were changed for years or did not exist anymore, still appeared in the EIA's map", said a source in the National Environment Board.

The OAEP, however, denied the significance of the report and its rejection as to that it was not an obstacle for the project. According to Mr. Pathom, the project was not required by the present Environmental Act to conduct the EIA, but the OAEP decided to carry it out as an information base for its own use. "It was not compulsory by law, but we still did the report only because we are concerned about the project's safety".

The OAEP was ordered to submit the EIA report to the Environmental Board by the Nuclear Facility Safety Sub-committee (NFSS) which was the country's regulatory body responsible for the review of the project's Preliminary Safety Analysis Report (PSAR).

Following IAEA guidelines, PSAR was a key document OAEP was obliged to submit to NFSS in order to obtain the

project's construction permit. The NFSS had asked the Environmental Board to consider the EIA report, not because the EIA was required by law to be conducted, but because it was one of the major chapters in PSAR to be considered before PSAR could be approved.

Back in August 2002, the NFSS rejected the project's PSAR because the EIA chapter was missing (as did other safety documents). The OAEP had no other choice but to dust off the project's EIA which was first done in 1997 and was supposed to be finished within six months then but did not.

OAEP finally rushed to finish the report within a few months before submitting it to the National Environment Board in September 2002. With the board's complaint on the report's outdated data, clearly the OAEP probably have not done much in finishing the report which had been left unfinished since 1997 (1).

However, with the time constraint as the project's contract which was signed between OAEP and U.S. General Atomics in June 1997 has expired for two years now. OAEP had to get the construction permit soon, otherwise GA would demand compensation for the delay.

Therefore Mr. Pathom hoped that the construction permit could be granted

### IN THIS ISSUE:

Thailand: EIA report Ongkarak reactor rejected	1
German exclusion criteria on nukes toothless?	2
U.S. Indian Point: a weapon of mass destruction	4
Fusion reactor opponents secure ITER website	6
Russian K-159 submarine accident	7
In brief	10

to the project by the Commission of Atomic Energy for Peace, "and the OAEF would improve its EIA during the three year construction" (2).

**Notes:**

(1) For more background on the developments in 2002 see *WISE/NIRS Nuclear Monitor* 573.5439: "Thailand:

the final countdown for Ongkarak".  
(2) For more background on Thailand's nuclear program see *WISE News Communique* 473.4692: "Thailand's nuclear program: 1966-1997".

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# GERMAN EXCLUSION CRITERIA ON NUKES TOOTHLESS?

**Hermes, the German export credit insurance agency (ECA), has so-called "environmental guiding principles" taking into account ecological and social considerations. The new Red/Green government (Social-Democratic SPD and the Green Party) developed the new rules in April 2001 and since then they have an exclusion criteria on Nukes: "Export of nuclear technology designed for the building of new or conversion of existing nuclear power plants are excluded from support by the Federal Government". However, from the beginning critical voices have warned that the wording "nuclear technology" might leave enough loopholes to make the criteria not actually exclusive. A recent case sadly confirms and justifies these warnings.**

(592.5539) **Urgewald** - Finland has taken the political decision to build a new nuclear power plant, which would be the country's fifth reactor (see also *WISE/NIRS Nuclear Monitor* 587.5514: "Fight against Finnish new reactor to continue"). Teollisuuden Voima company (TVO), a power company owned by Finnish industrial enterprises (mainly paper industry) and electricity generating companies applied for and received permission from the government to build the station.

Guaranteeing the availability of cheap electric energy for the Finnish

industry was the main argument to justify the need for the new NPP. Right now, TVO is collecting bids, with the demand that the new nuclear unit should provide electricity in the range of 1000 to 1600 MW. Furthermore it should be located in one of the existing sites in order to benefit from the existing infrastructure.

The final bidders are the Russian Atomstroyexport (offering a 1000 MW PWR), the US General Electric (offering a 1400 MW BWR) and the French-German Framatome ANP offering a choice between the 1500 MW EPR European Pressure water Reactor or the Siemens designed 1000 MW boiling water reactor (SWR-1000).

In June, Siemens handed in to the German government a pre-request for a Hermes guarantee in order to get cheaper credits and offer a better price to the Finnish. As it obviously concerns a new power plant they should have, according to the Hermes guiding principles, gotten a negative response **straight away**.

But Siemens argued that they want the guarantee only for the turbines, which are no specific nuclear technology but could be used as well

in a gas power plant. This argument has been challenged by several engineers who agree that the power output of a nuclear unit is higher than the one of a gas unit, which makes nuclear turbines always bigger than gas turbines.

The German Ministry of Foreign Affairs, in the inter-ministerial Committee that decides on Hermes credits (the only one run by a Green Minister), seemed ready to swallow the Siemens argument but got strongly reminded of the Green bottom-line of non-support for Nukes by the environmental ministry (which is not part of the Committee).

Within the Committee there was a tough fight against the Minister of Economic Affairs and Chancellor Schröder whom are both strongly in favor of the guarantee for Siemens. Thus the inter-ministerial Committee missed the chance to clarify the exclusion criteria.

Instead, Siemens got a "letter of interest" as a compromise. This letter indicates that a Hermes guarantee might be provided if the company gets the contract to build the NPP. A second letter precises that this doesn't mean they will get the guarantee in any case but that they

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**The next issue** (593) will be mailed out 26 September 2003.

Due to circumstances this issue (592) has been delayed by one week. Our apologies!

## 25 YEARS AGO

*NIRS and WISE both celebrate their 25th anniversaries this year. This is the eleventh article in a series, "25 years ago", comparing anti-nuclear news "then" and "now", to mark our first quarter-century of anti-nuclear campaigning.*

### Then

In issue 2 of *WISE Bulletin* we wrote about uranium reserves in Greenland: "Recent discoveries of uranium in Greenland have whetted appetites in Brussels. Proven reserves at Kvanefjeld (east of Frederikshaab) are now 27,000 tons, estimated reserves 16,000 tons". (*WISE Bulletin*, July 1978)

### Now

Greenland, since 1721 governed by Denmark, got autonomy for domestic issues in 1979. Foreign issues, security, financial and justice are still governed from Denmark. (*NRC [NL]*, 10 December 2002)

The U.S. Army has a military base in Thule in the north of Greenland. Without consultation of Greenland's population, the government of Denmark agreed in 1952 to host the U.S. military base. On 21 January 1968, a B-52 bomber carrying thermonuclear weapons crashed near the base. The conventional high explosives in the four bombs exploded, scattering radioactive debris. The crash was reason to cancel the agreement on the storage of nuclear weapons at Thule. However, in 1995 it became clear that the government of Denmark had renewed the agreement, in disagreement with the population of Greenland. (*Fringe [NL]*, June 2001; *NRC [NL]*, 10 December 2002)

Several people who helped to clean up the crash site got radioactively contaminated. In 2000, former Danish workers of the military base said that they found evidence that one of the four bombs was at the sea bottom near Thule, at 250 meters depth. An old movie from 1968, taken from a submarine, would show a subject which could be one of the bombs. (*Arctica [NL]*, autumn 2000)

In 1997, the U.S. RAND "think tank" called the Thule military base a perfect location for the storage of radioactive waste, such as warheads from nuclear missiles and submarine reactors. The study was made on request of the U.S. Department of Energy. According to RAND, Greenland could host nuclear weapons materials and fuel from submarines from both the U.S. and Russia. RAND also looked at areas in Iceland, Scandinavia and Antarctica. (*Innu Informatiekrant [NL]*, winter 1997/1998)

The exploration activities at the Kvanefjeld are took place between 1955 and 1984. In south Greenland, exploration activities were conducted between 1979 and 1986 and resulted in 60,000 tons of "speculative resources". Despite the research on deposits, no mining has taken place. The ore at Kvanefjeld is rather poor and the uranium difficult to extract, the viability of exploiting depends on high uranium prices. It is not expected that with current uranium prices, Greenland will ever start uranium mining. (*Nuclear Europe*, January 1984; *Uranium 1995: resources, production and demand*, OECD/NEA, 1996; [www.antenna.nl/wise/uranium](http://www.antenna.nl/wise/uranium))

will have to come back to the committee and undergo an administration screening and review. In that way the decision for or against the guarantee has been postponed.

Another issue about the Siemens' request is strikingly interesting: as the Hermes credits are meant as an instrument to promote the export of German technology to and for "emerging and difficult markets" (the credits insures the exporting company against non-payment for the delivered goods; if this happens the company will get full compensation) economists and environmentalists are eagerly waiting for the arguments that proof

Finland to be a "emerging market with a high non-payment risk".

This leads to the question why Siemens is still trying to get a guarantee and why parts of the government think they should hand ou the cover. On this point Siemens argued with the US-competitor (General Electric) that might get a guarantee from its ECA, the U.S. Export-Import Bank.

They might argue as well with the high risk of a new technology (on both offered systems few experience exists) and with the high risk of a new NPP built in a liberalized energy market.

But it might be just as well the fact that it is Siemens requesting the guarantee, since the company appears powerful enough that it is beyond the rules that apply for other companies.

This brings up the question of subsidies, since the guarantee would help the delivering company to get better interest rates. Since the project sponsor has a bad rating, without the guarantee interest rates would be rather high.

Although it seems a clear case that the project does not fit into the Hermes criteria it is also true that the Siemens company itself is so powerful and influential in Germany

that it might not have to obey the rules that would apply for any other company.

According to Finnish newspapers no decision on the bidding process will be taken before the end of this year. If Siemens shows up again next year with a formal request for a guarantee, the government will have to prove how serious they are with their official policy to not support the further development, at home and

abroad, of nuclear technology.

The decision is even more important as it will influence the decision on the on-going debate on older applications for Hermes guarantees to exports nuclear technology or even complete stations to for instance Brazil, Bulgaria or Slovakia.

If the government gives away the exclusion criteria on Nukes by providing a guarantee for the new

Finnish NPP, Siemens will be very rapidly bringing up these old cases and ask for more financial guarantees via the Hermes credits.

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## U.S. INDIAN POINT: A WEAPON OF MASS DESTRUCTION

**Earlier this summer, Riverkeeper launched the third phase of an ongoing advertising campaign focused on the U.S. Indian Point NPP, situated just 22 miles (35 kilometers) from the Bronx and 35 miles (56 kilometers) north of midtown-Manhattan. Designed to inform New York City residents about the danger of having a nuclear plant so close to the City, the campaign made use of persuasive radio, television and newspaper ads equating Indian Point's reactors with "weapons of mass destruction."**

(592.5540) Riverkeeper - Judging by the sharp increase in the number of hits on our website - 4,000 more hits per day - the local and national press coverage the ads received and the buzz heard on the streets of New

York City, the ads succeeded in making Indian Point a household word for City residents.

Not surprisingly, the only ones not listening to the message were the bureaucrats at the Federal Emergency Management Agency (FEMA) who ruled in late July that the people living near Indian Point could be safely evacuated and sheltered in an emergency.

FEMA's blatant dismissal of the emergency plan's fatal flaws - identified in exhaustive detail by James Lee Witt, the country's leading emergency planning expert and corroborated by emergency workers, local residents and more than 310 elected officials - is breathtakingly contemptuous.

The good news is that the move, quickly endorsed by the Nuclear Regulatory Commission (NRC), was so outrageous that a number of elected officials - including Sen. Hillary Rodham Clinton (Democrats) and Republican Sue Kelly - immediately called for congressional hearings. The hearings, expected in the fall, should compel FEMA and the NRC to go back and take a new

look - this time with the assistance of an independent review panel.

We never expected due diligence from FEMA or the NRC. We've always understood that science and politics will ultimately bring about Indian Point's closure. FEMA's dereliction of duty can't change the fundamental facts underlying the monumental security, emergency preparedness and safety problems at Indian Point.

Given the Indian Point nuclear power plant's vicinity to the New York City metropolitan area, a catastrophic release of radiation could devastate the economy and endanger the lives of hundreds of thousands of people. A major release could contaminate an area equivalent to three-fourths the size of New York State.

Of the nation's 65 commercial nuclear reactor sites, Indian Point has the greatest density of people living and working within a 50-mile radius - approximately 20 million people living in 26 counties, including several in the Hudson Valley.

Noting the absurdity of Indian Point's vicinity to a major metropolitan area, Robert Ryan of the NRC, stated back

### ADVERT CAMPAIGN

The advertising campaign of Riverkeeper has been successful. A newspaper ad carried the message "What exactly do weapons of mass destruction look like?" above a picture of the Indian Point NPP. Ads were also used in bus shelters to reach many people on the streets. The message is clear: terrorists could use Indian Point as a target, turning it into a weapon of mass destruction.

Riverkeeper is further planning a postcard campaign. The postcards, which will be dropped off in bars and restaurants, have to be sent to decision makers at the Entergy company, the NRC and the Department for Homeland Security.

The advertising materials can be viewed at the website of Riverkeeper ([www.riverkeeper.org](http://www.riverkeeper.org)).  
**Nucleonics Week, 3 July 2003**

## IPSEC

Riverkeeper, author of this article, is member of a broad coalition of more than 60 civic, environmental, health and public policy organizations, which is called the Indian Point Safe Energy Coalition (IPSEC). It was formed shortly after the 11 September 2001 terrorist events in concern about the safety of Indian Point NPP.

Most recently, IPSEC brought a large delegation to Earth Day Lobby Day in Albany, NY; launched a massive post card campaign to Governor Pataki; distributed our award-winning documentary, *Nowhere to Run*, to libraries and elected officials; coordinated volunteers in New York City and the Hudson Valley to table at summer festivals; and, has become the voice of concerned citizens on radio, television, and in newspapers via our aggressive media campaign.

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in 1979: "I think it is insane to have a three-unit reactor on the Hudson River in Westchester County, 40 miles from Time Square, 20 miles from the Bronx... It's a nightmare from the point of view of emergency preparedness."

It's no secret that the nation's nuclear power plants are high on the terrorists' list of targets. This fact has been broadcast widely by President Bush in his 2002 State-of-the-Union address, cabinet officials in the Bush Administration, U.S. intelligence agencies, government associations, scientific research institutions, and the terrorists themselves.

With the New York City metropolitan area still in the terrorist crosshairs for future terrorist attacks, Indian Point presents a proximate, vulnerable target that poses a significant threat to public health and safety and the region's economy.

The effort to permanently close and decommission the nuclear power facility at Indian Point is based upon reports issued by federal agencies, academic institutions, policy think-tanks, health associations and media. Unfortunately, officials at Entergy and the U.S. NRC continue to deny the findings of these reports which address Indian Point's true vulnerability and the potential for catastrophic economic and health impacts. The public has a right to know this information, as well as the fact that Entergy and the NRC are not

taking the appropriate steps to bolster plant security and have turned their back on these reports:

--According to a September 2002 report from the National Governor's Association, "a terrorist attack on a nuclear facility should be viewed like a terrorist attack using a dirty bomb [**a weapon of mass destruction**], but possibly more catastrophic due to the volume of nuclear material available for dispersion." The NGA report goes on to state: "Like a dirty bomb-but on a much larger scale-an attack on a nuclear facility would have long-term economic and psychological consequences. Large sections of land surrounding the facility would need to be evacuated, secured, and decontaminated. Such areas may not be inhabitable for a generation or more. Chernobyl caused the closure and evacuation of much of the nearby area, as the contamination from the decaying radioactive sources was deemed too great a risk for humans."

--The National Research Council, in a July 2002 report, states that the threat risk to nuclear power plants is high with potential consequences "ranging from reactor shutdowns to core meltdowns with very large releases of radioactivity." The report goes on to say: "Nuclear power plants may present a tempting high-visibility target for terrorist attack, and the potential for a September 11-

type surprise attack in the near term ... appears to be high. Such attacks could potentially have severe consequences if the attack were large enough." Additionally, the National Research Council, the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering, cautions: "Complete denial of the means to attack [nuclear power plants] from the air or ground using U.S. assets such as aircraft is probably not feasible....Given the public fear of anything 'nuclear' or 'radioactive,' even a minor terrorist attack could have greatly magnified psychological and economic consequences."

--The American Thyroid Association recommends the pre-distribution of potassium iodide tablets to people within a 50-mile radius of a nuclear plant and as far away as 200 miles. If a radioactive plume from Indian Point were to only affect a small area, as the Entergy corporation claims, than why does the ATA clearly state on their website "No one can predict how far a radioactive iodine cloud might spread." Children, young adults, and pregnant women are most vulnerable to radioactive iodine exposure.

--A 1987 NRC study has concluded that a generic estimate of the release fraction of cesium isotopes during an irradiated ("spent") fuel pool fire — that is, the fraction of the pool's inventory of cesium isotopes that would reach the atmosphere — is 100 percent. The inventory of cesium-137 in a nuclear facility is a useful indicator of the potential, long-term consequences of a release of radioactive material from that facility. A spent fuel fire disaster at Unit 2, for instance, could release up to 42 million Curies of cesium-137 (based on November 1998 inventories). Additional amounts of cesium-137 would be present in any fuel assemblies that have been added to these pools since November 1998. For comparison, the Chernobyl

reactor accident of 1986 released about 2.4 million Curies of cesium-137 to the atmosphere.

-A 1997 Brookhaven National Lab Report prepared for the U.S. NRC, claims that a disaster involving a spent fuel pool fire could cause up to 143,000 cancer deaths, as much as US\$566 billion in economic damages, and could make an area up to 2,790 square miles around the plant uninhabitable.

The mainstream effort to close the Indian Point nuclear power plant continues to grow. To date, over 310 elected officials – including U.S. Representatives Nita Lowey, Sue Kelly, Maurice Hinchey, Eliot Engel and 7 other members of Congress – and 45 municipalities in NY, NJ, and CT are now calling for the shutdown of the Westchester-based plant. In early May, several major investment fund managers added their voice to the diverse group calling for the plant's shutdown.

The costs, risks, and consequences far outweigh the replaceable benefits provided by Indian Point. And with an unworkable and irreparable evacuation plan and chronic security and safety lapses, our government officials are left with no choice but to

Riverkeeper and the U.S. Union of Concerned Scientists petitioned the NRC to order the immediate shut down of Indian Point and vital repairs be made. Recent studies by the Los Alamos National Laboratory have concluded that the chances of a reactor meltdown increase by nearly a factor of 100 at Indian Point because the plant drainage pits (also known as containment sumps) are "almost certain" to be blocked with debris during an accident.

In an accident at a nuclear plant, water and steam rushing out from a broken pipe can blow insulation and coatings off of equipment. The water can carry this debris to the containment sump and clog the mesh screens that cover the sumps. When this happens, the emergency pumps cannot get the water from the sump needed for sustained cooling of the reactor core. It

### SAFETY PROBLEMS

becomes only a matter of time before the reactor core overheats and releases a radioactive cloud to threaten people downwind of the plant.

The NRC has known the problem at Indian Point since 1996 and classified it as a serious problem, but currently plans to fix it only by 2007. Los Alamos has studied the situation at 69 pressurized water reactors and found that for some, the risk of core damage was multiplied 100 times because of the debris problem. The Indian Point reactors were both in the worst five.

After reviewing the petition, the NRC will take one of three actions: order the immediate shut down of Indian Point; order repairs at the next refueling; or deny the petition. **New York Times, 7 September 2003; press release Riverkeeper/UCS, 8 September 2003**

close Indian Point, thereby protecting one of the nation's most vital economic, cultural, and ecological regions.

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## FUSION REACTOR OPPONENTS SECURE ITER WEB SITE

**According to Canadian Natural Resources Minister Herb Dhaliwal, a decision is imminent on the proposed CDN\$19 billion (US\$ 14 billion) ITER experimental fusion reactor. The Sierra Club of Canada has established a new web site using ITER's own name 'www.iter.ca', to increase public awareness of the issue. The website contains extensive information on the problems of the International Thermonuclear Experimental Reactor: costs, safety, waste, proposed site in Canada, etc.**

(592.5541) Sierra Club of Canada - Sierra Club of Canada policy advisor David Martin said, "We were surprised to find that 'www.iter.ca' was available as an internet domain, and was not secured by ITER Canada. We hope that Canadians will find the new site informative. The Sierra Club expects that its web site will soon have more traffic than ITER Canada's own site." ITER Canada is the nuclear

industry group promoting construction of ITER at the Darlington Nuclear Station in Clarington Ontario. Its web site is 'www.itercanada.com'.

Most Canadians are unaware that the ITER reactor has been the subject of intense nuclear industry lobbying. While the Ontario Province government of Ernie Eves plans

social service cuts of CDN\$1.5 billion, it has quietly committed about the same amount of tax dollars for the ITER fusion boondoggle. The Sierra Club web site provides information about the ITER project that has previously been discussed only behind closed doors. It includes a variety of background materials including the "Fusion Funnies" that provide an amusing and informative

evaluation of the environmental and economic costs of the ITER reactor.

The federal cabinet was expected to make a crucial decision last June on whether to provide billion-dollar subsidies for ITER. In a recent letter to Canadian environmental leaders, Dhaliwal said that a decision will be made "in the near future". A decision is expected possibly in September.

Minister Dhaliwal also said in the letter, "Canada entered into the [ITER] negotiations on the condition that the project be located in Canada and that the Government not be required to provide funding to the project or take any financial risk. Since then, France, Spain and Japan have tabled very attractive offers to host ITER, involving funding from these countries' governments."

ITER Canada originally promised there would be no financial cost for ITER, but returned to the Canadian and Ontario governments early this year seeking CDN\$2.3 billion in cash subsidies. The Ontario government of Premier Ernie Eves has already committed to providing half of the

CDN\$2.3 billion subsidy. According to Natural Resources Canada, cost overruns on the reactor are likely and the Canadian and Ontario governments will be liable for them.

In addition to ITER funding, the international ITER partners are demanding that the Canadian government restart its fusion research program, which was costing about CDN\$30 million per year when the government wisely decided to pull the plug in 1995. So the whole subsidy package could mount to CDN\$3 billion or more, with two-thirds coming from the federal government. This could equal or exceed the amount of money (CDN\$2 billion) promised to meet Canada's commitment to fight climate change under the Kyoto Protocol.

Even if the federal government decides against subsidizing the construction of ITER in Canada, ongoing Canadian participation to build ITER in Japan or Europe would likely require a contribution of 10% or more of the total cost — up to CDN\$2 billion (1 billion from both the federal and Ontario governments).

The Canadian environmental community is opposing subsidies for construction of the ITER fusion reactor in Canada, as well as restart of the federal fusion program, and any ongoing participation in the ITER project.

ITER Canada has misled the public by hiding the fact that the ITER reactor will not generate any electricity. A practical fusion generating station will take at least 50 years to build, and may prove too complicated and too expensive to succeed at all.

Other proposed sites for the ITER reactor are: Rokkasho in Japan, Cadarache in France and Vandellos in Spain. All sites which already host a nuclear facility.

More background on ITER in *WISE/NIRS Nuclear Monitor* 584.5500: "U.S. and China join fusion project".

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## **RUSSIAN K-159 SUBMARINE ACCIDENT**

**A Russian "November" class attack submarine, the K-159, sank in bad weather on 30 August in the Barents Sea five kilometers northwest of the Arctic Island of Kildin. The nuclear powered submarine was being towed from the Gremikha naval base to the Polyarny shipyard, where it was headed for dismantling. Nine crew members were killed, only one survived the accident.**

(592.5542) **WISE Amsterdam** - The K-159 was towed by a tugboat, floating on four air-filled pontoons for a 350-kilometer journey. The pontoons however, came loose from the sub as the tugboat-submarine convoy was hit by stormy weather. This weather was forecasted, but despite this the convoy left for the trip. The K-159 is now at 240 meters below sea level.

Searching for a cause of the accident, on 3 September a source at the naval general staff stated that the captain of the K-159 called the towing vessel by radio, saying a leak had been found at the propeller joints at the rear of the sub, in compartment nine. That may have caused the accident.

The Norwegian based NGO Bellona commissioned its own independent investigation which has, so far, shown no abnormal extra radiation in the surroundings of the sunken sub. But it will take much more time to see whether there is a leak as a possible result of the accident. Bellona can only measure quite far away downstream as they cannot trespass into Russian waters.

On the long term the depth poses great dangers to the vessel's two reactor compartments as they will be under even more strain from the additional water pressure, said Alexander Nikitin, chairman of Bellona's St. Petersburg office.

The about 25 atmospheres bearing down on the already rusting and hulking vessel makes the situation even more dangerous, for the hazard that some reactor leak could occur, contaminating the fish-rich area of the Barents Sea, said Nikitin.

There is a further possibility that Gulf Stream currents, which run east through the Barents Sea, will carry that radioactivity further afield. But there is also a possibility that, given the Barents' complicated stream patterns, the radioactive materials will travel west.

Further dangers to the reactor compartments are posed by the

submarine's age. The K-159 was decommissioned in 1989, but it had been last refuelled in 1972, making the spent uranium fuel that is still in its reactors far more radioactive than if the vessel had gone down with a fresher fuel load.

After decommissioning, the control rods (which control the chain reaction in the reactor core) were welded in a lower position to prevent the reactor from restarting. But how solid these rods were set in place and what the possible consequences have been of the impact of the sub with the seafloor is yet unknown. Added to this all is the corrosion of the boat's hull as it has been awaiting decommissioning for more than a decade.

The K-159 has two reactors, each with a thermal capacity of 70 MW. The reactor cores of these reactors contain approximately 800 kilograms of spent fuel with the radioactivity of 750 curies per kilogram.

The Norwegian radiation protection Authority (NRPA) has started taking samples for their own research and judgement as soon as they were notified that the K-159 sank. Norwegian fishing vessels in the area were immediately ordered to get as close as possible to the spot and start taking measurements which have, as the *Nuclear Monitor* goes to press, not been officially published.

### **Lifting possibilities**

The Russian Navy has announced it will salvage the K-159 but the spokesperson said this is unlikely to happen before May next year. Given the depth at which the vessel is and the usually stormy conditions in the Barents Sea this will be complex and expensive operation. Bellona says that the Russian Navy should investigate all possibilities of lifting the vessel without causing further damage to both reactor cores.

According to environmental organizations towing is far too dangerous. A safer method is sending a ship, specially designed to unload fuel from subs. In Northwest

Russia, there is such a ship called the *Imandra*, which is operated by the Murmansk Shipping Company. This method is more expensive.

Another option, suggested by Bellona, is shipping submarines with the help of a floating dry dock, which is also safer but more expensive. Bellona warned the Russian Navy already in 2001 that towing submarines from Gremikha carried with it precisely the sort of risks that caused the 30 August catastrophe, and recommended to the Russian government that the submarines at this base be dismantled onsite.

...many more serious accidents and disasters have been hitting the Russian nuclear fleet, especially the submarines.

One of the many burning questions about the sinking that still remain unanswered is why a crew was aboard the K-159 at all. The fact that this crew would remain on board while the vessel was being towed for dismantling far away is a striking anomaly, according to former naval officers and submariners. Every safety rule was violated, said retired Admiral Eduard Baltin, who once commanded the K-159.

Russia's Minister of Defense has also ordered a temporary halt to the towing of decommissioned nuclear submarines.

### **Earlier Russian nuke sub accidents**

Besides the K-159-accident many more serious accidents and disasters have been hitting the Russian nuclear fleet, especially the submarines. Bellona has published a report on these accidents in July 1996 (\*). Following are some of the incidents documented in the 1996 report.

### **Sunken submarines**

K-8 - During exercise 'Okean', early 1970, the K-8 submarine was operating in the Atlantic southwest of the UK. On 8 April 1970 fire broke

out in two separate compartments of the sub. The vessel surfaced as the crew attempted to extinguish the fires. For two days the crew struggled to keep the vessel afloat. On 11 April the K-8 sank and went to the bottom in 4,680 meters of water. The Commanding Officer and 51 of his crew died in this accident.

K-219 - In October 1986, in the western Atlantic east of Bermuda, the K-219 got into trouble. Smoke and steam were seen issuing from one of the 16 missile tubes on the vessel. The sub was on a regular patrol off the North American coast when an explosion happened in one of the loaded missile tubes. The subsequent damage caused the missile compartment to leak and the submarine was forced to surface. Then fire broke out in the damaged missile tube. While the crew was trying to deal with that problem, an electrical short tripped off the emergency systems and one of the reactors shut down. The second reactor had also to be shut down and the vessel was left without power. On 6 October the K-219 sank, four crewmembers died. The cause of the explosion remains unknown.

K-278 - On 7 April 1989 the K-278 Komsomolets sub, one of the few named submarines in the Soviet Navy, was submerged at a depth of 160 meters in the Norwegian Sea some 180 kilometers south of Bear Island on passage back to her Northern Fleet base. In the morning fire broke out in one of the compartments. The vessel went to surface with the crew fully engaged in fighting the fire. The fire however spread. The power failures triggered the emergency systems which automatically shut down the reactor. Around five o'clock in the afternoon the K-278 sank at a depth of 1,685 meters, taking the 42 of the crew members with her to the bottom.

K-141 - Three years ago, on 12 August 2000, the Kursk (K-141), an Oscar-II class submarine sank in the Barents Sea, killing all 118 crew aboard. Eventually the vessel (at 108 meters

depth) was raised in autumn 2001 by a Dutch consortium after a year of complex preparations and at a cost of US\$65 million.

The K-27 submarine did not sink after an accident but was scuttled in the Kara Sea in 1981 when necessary repairs were deemed impossible and decommissioning considered to be too expensive.

### Reactor accidents

K-8 - The earliest documented nuclear incident involved the November Class K-8 on exercise in the Barents Sea on 13 October 1960. A leak in the steam generator occurred which led to a subsequent damage in pipes of the reactor coolant circuit. Large amounts of radioactive gas leaked from the reactor. A reactor meltdown was prevented by the crew. The reactor compartment apparently was not sealed off and the entire submarine was contaminated by the radioactive gas. Some crewmembers suffered potentially fatal doses of radiation.

K-19 - The Hotel-class missile submarine K-19, Russia's first nuclear power powered submarine, had a leaking pipe in the pressure regulating circuit of the primary cooling system of the reactor on 4 July 1961 in the North Atlantic. The coolant supply diminished and excess heat began to build up within the reactor core. The crew was exposed to substantial doses of radiation and eight of them died of acute radiation sickness.

K-11 – On 6 February 1965 the November Class submarine K-11 lay in dock at the naval yard Severodvinsk for refueling. Because of control rods in the wrong position radioactive steam escaped when the reactor lid had been opened. Six days later fire broke out. There are no data on radiation exposure to personnel.

K-27 - On 24 May 1968, a sudden and unexplained loss of reactor power occurred in the November Class submarine. The crew was unable to restore power levels and radioactive

gases began to leak into the reactor compartment. The level of radiation in the rest of the sub increased. The crew managed to shut down the reactor but there was major damage to the fuel rod assemblies. Nine members of the crew died from radiation sickness. The K-27 never returned to service. In February 2003 a scientific expedition discovered 237 containers holding solid radioactive waste and the burial site of the K-27 in the Kara Sea in northern Russia (see above at sunken submarines).

K-140 – On 27 August 1968 the Yankee Class submarine K-140 was at Severodvinsk for repairs. An uncontrolled increase in reactor power occurred (18 times normal levels) when control rods were raised automatically because of incorrect installation of electrical cables. Radiation levels aboard the vessel deteriorated.

K-329 - In 1970, while the Charlie Class K-329 lay in harbor at the shipbuilding yard Krasnoe Sormovo, there was an uncontrolled start up of the ship's reactor. This led to a fire and the release of radioactivity.

K-222 – On 30 September 1980, the K-222 was at Severodvinsk for a reactor check. Following a failure in automatic equipment, the control rods were raised and the reactor started up. As a result, the reactor core was damaged.

K-123 – On 8 August 1982, the Alfa Class K-123 suffered a loss of coolant accident because of a leak in a steam generator. Two tons of liquid cooling metal damaged the reactor. It took nine years to repair the submarine.

K-314 – On 10 August 1985, the Victor-I Class K-314 was at Chazhma Bay yard near Vladivostok. Due to mispositioned control rods the reactor became critical during refueling. The subsequent explosion spread a plume of radioactivity up to 6 kilometers. Ten people died in the accident.

K-431 – In December 1985, the Echo-

II Class K-431 reactor overheated outside Vladivostok.

K-192 (formerly K-131) - On 25 June 1989, the Echo-II class submarine K-192 suffered an accident involving one of the two reactors on board. The vessel was in the Norwegian Sea when a leak was discovered in the primary coolant circuit. The contaminated water from the leak was pumped out into the sea. The Soviet Northern Fleet service ship Amur came to assist the K-192. Amur took over the task of supplying coolant to the reactor and the reactor core temperature started to come down. The supply of coolant was shut off for repairs but afterwards not reconnected. The cold coolant caused the overheated fuel assemblies to crack, and water came into contact with the uranium fuel. The crew who worked on the repair received doses of radiation which could cause premature death.

Other accidents involving radiation Northern Fleet submarines also experienced other accidents in which radioactivity was released. In most cases the releases were caused by leaks in the primary circuit or steam generators. In these cases however, there was no damage to the reactor core (as above).

\*The report *The Russian Northern Fleet* (Report 2:1996) can be found at [www.bellona.org/en/international/russia/navy/northern\\_fleet/report\\_2-1996/index.html](http://www.bellona.org/en/international/russia/navy/northern_fleet/report_2-1996/index.html)

**Sources:** Bellona website ([www.bellona.org](http://www.bellona.org)), "Hazardous Duty - Nuclear Submarine Accidents" by Micheal Young, The Naval Officers Association of Canada ([www.naval.ca/article/young/nuclearsubmarineaccidents\\_bymichaelyoung.html](http://www.naval.ca/article/young/nuclearsubmarineaccidents_bymichaelyoung.html)), World Environment News, 19 November 2002

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# IN BRIEF

**LES abandons proposed Tennessee site.** The Louisiana Energy Services (LES) has officially abandoned its plans to build a uranium enrichment plant at Hartsville, Tennessee. The plans for the facility in Hartsville had raised major opposition. As a consequence, the Trousdale County adopted tough operating restrictions such as that depleted uranium couldn't be stored on site for more than 90 days (which is very short for an enrichment plant). Other issue which was decisive for LES were tax conditions in Tennessee. LES has now chosen Lea County in New Mexico but opposition is also expected there (see *WISE/NIRS Nuclear Monitor* 591.5534: "LES switching to New Mexico?").  
***Nucleonics Week*, 28 August 2003**

**South African Cape Town stands up against PBMR-project.** In a surprising move, the city of Cape Town decided to appeal the government's go-ahead for the controversial Pebble Bed Modular Reactor (PBMR) at Koeberg in Western Cape. In June the Department of Environmental Affairs issued a 'record of decision' (ROD) clearing the way on environmental grounds for Eskom's experimental PBMR-project (see *WISE/NIRS Nuclear Monitor* 590.5529: "South African government approves Environmental Impact Assessment PBMR").

The statutory 30-day appeal period against the decision closed at the end of July, but, at the request of the city, the environmental affairs minister, Valli Moosa, extended the deadline by another 30 days till 25 August. Following many concerns, raised by residents, the City of Cape Town decided to appeal. The City has consistently raised concerns regarding flaws and omissions from the Environment Impact Assessment (EIA) as well as its potential environmental impact.

The issues highlighted in the City's appeal include: full lifecycle financial and environmental costs of nuclear

waste storage at Koeberg; the costs to the City of current and future emergency planning and related infrastructure, potential plume dispersal and the impact on spatial planning, land use and housing; health risk assessment, ambient radiation monitoring and health monitoring in surrounding communities; that the decommissioning date and plan, as well as environmental rehabilitation plan, be prepared in consultation with the City. Before building the reactor, Eskom must still obtain other statutory approvals, including a nuclear license.

***Press Release City of Cape Town*, 25 August 2003; *Cape Argus*, 25 August 2003**

**Nuclear waste and ethics.** The Dutch Socialist Party (SP) has published a report called *Norms, Values and Nuclear Waste; An up-to-date ethical "No Thanks" to nuclear waste*. The report (in English) was written by Herman Damveld in collaboration with Steef van Duin. The 44 page report deals with ethical questions which are important in the debate on what to do with nuclear waste, such as ethics, values, future generations and retrievable waste storage. The report can be ordered from the author through email: h.damveld@hetnet.nl.

***Norms, Values and Nuclear Waste*, SP/H. Damveld, September 2003**

**THORP to close by 2010?** Stories in the media have suggested that the THORP reprocessing plant at Sellafield (UK) would close by 2010. Brian Watson, director of the Sellafield site, told the *Guardian* on 26 August that the company was changing from production into a waste disposal company. "There is 30 billion British Pounds (US\$48 billion) worth of clean up work here. We are switching from reprocessing to clean-up", said Watson. In several news sources, the interview was explained as an official statement that

Sellafield would stop reprocessing before 2010. BNFL denied such a turn in a press release but there are facts which show that reprocessing indeed might stop before 2010. First of all, existing reprocessing contracts should be completed by 2006, and there are doubts about the few surviving post-contracts. Secondly, no further contracts are being sought. And thirdly, a Nuclear Decommissioning Authority takes over Sellafield operations in 2005, so any closure decision would not be for BNFL.

***WANA News*, August 2003**

**Criminal complaint against Sweden's Barsebäck NPP.** On 19 August, the Swedish Nuclear Power Inspectorate (SKI) filed a criminal complaint against the Barsebäck Kraft AB company, saying the company might have broken the law by allowing Barsebäck-2 (600 MW BWR) to operate under abnormal conditions, with decreased safety margins. It is the first time ever that SKI has brought a criminal complaint against a reactor operator.

During the summer 2002 outage, "thermal mixers" in the feedwater system were changed. In the fall, operators noted that the feedwater flow was abnormal. A manual adjustment was made on 3 January but the problem worsened until the reactor was shut down on 15 January. It was then discovered that the mixers were broken and that pieces had come loose. The incident was rated at level 1 of the International Nuclear Event Scale (INES). According to SKI, the reactor should have been shut down on 3 January at the latest. That the reactor was operated for two more weeks had clearly violated the Act on Nuclear Activities and SKI's requirements.

SKI has now issued further requirements for the operation and the plant will be put under special supervision for at least a year. Between 1994 and 1997, the plant

was under such supervision because of a series of incidents.

Swedish and Danish NGOs have urged a soon closure of the Barsebäck reactor. On 1 September, the Barsebäckoffensiv (BBOFF), a network of Danish, Swedish and German activists/NGOs/political parties, issued a report on the safety of the reactor. The report deals with the consequences of a worst-case accident at Barsebäck. BBOFF concluded that Danish emergency authorities are not sufficiently prepared for a serious accident and are underestimating the consequences of a major disaster. A serious accident could result in radioactive releases comparable to those in the Chernobyl disaster in 1986 and exclusion zones up to 100 kilometers could be necessary (instead of the 30 kilometers in emergency plans). The report can be

found at [www.noah.dk/energi](http://www.noah.dk/energi).  
**Press release Barsebäck Kraft, 19 August 2003; Nucleonics Week, 21 August 2003; BBOFF press release and report, 1 September 2003**

**Paks-2 won't restart until mid-2004.**  
The Hungarian Paks-2 reactor will not restart before summer 2004. On 10 April, a serious accident happened in the fuel pool of the reactor when chemical cleaning of fuel elements resulted in overheating of fuel and a release of radioactivity. Several fuel elements got damaged in the event, which was classified as level 3 on the INES scale. Recently the IAEA published the results of an expert mission to the plant. The IAEA mission confirmed that the accident was caused by design deficiencies, insufficient oversight of the system and a lack of safety management. The IAEA report can be found at

[www.haea.hu/magyar/doc/IAEAExpertMission2003.pdf](http://www.haea.hu/magyar/doc/IAEAExpertMission2003.pdf).  
**Nucleonics Week, 4 September 2003**

**U.S. electricity crisis and nuclear power.** The Public Citizen Critical Mass Energy and Environment Project released a report on the electricity blackout of 14 August (see *WISE/NIRS Nuclear Monitor* 591.5532: "U.S. electricity crisis: unfortunate but entirely predictable"). According to CMEP, the blackout was a spectacular demonstration of the vulnerability of NPPs in a deregulated market. CMEP urges the U.S. Congress not to rely on nuclear power and further electricity deregulation. The report can be found at [www.citizen.org/documents/bigblackout.pdf](http://www.citizen.org/documents/bigblackout.pdf)  
**The Big Blackout and Amnesia in Congress, CMEP, September 2003**

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The *Nuclear Monitor* publishes international information in English 20 times a year. A Spanish translation of this newsletter is available on the WISE Amsterdam website ([www.antenna.nl/wise/esp](http://www.antenna.nl/wise/esp)). A Russian version is published by WISE Russia and a Ukrainian version is published by WISE Ukraine (available at [www.nirs.org](http://www.nirs.org)). The *Nuclear Monitor* can be obtained both on paper and in an email version (pdf format). Back issues are available through the WISE Amsterdam homepage: [www.antenna.nl/wise](http://www.antenna.nl/wise) and at [www.nirs.org](http://www.nirs.org).

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