

# NUCLEAR MONITOR

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#608

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## NUCLEAR RELAPSE IN CENTRAL EUROPE: SLOVAKIA

**While many look to France, Finland and the U.S. for the first signs of a possible nuclear resurgence, few are aware of the push forward the nuclear industry is trying to make in Central Europe.**

(608.5597) **WISE Czech Republic** - At present, discussions are going on about new reactors in the Czech Republic, Slovakia, Romania, Bulgaria and Slovenia/Croatia. Lifetime extensions for existing reactors is already beyond debate in all the above mentioned countries including Hungary.

In the coming months, we plan to establish an overview of developments in each of these countries and investigate what roles the nuclear industry, national governments and Europe play. One interesting question is whether the German nuclear phase-out is driving nuclear energy producers eastward. On this occasion, we shed some light on developments in Slovakia.

### Nuclear power in Slovakia

The state owned A1 reactor near the village of Jaslovske Bohunice was closed down in 1977 after a series of accidents and is to be decommissioned. Block V1's two older VVER 440/230 type reactors are currently operating under an agreement with the EU that they will be closed down in

2006 and 2008 respectively. The two reactors in the V2 block (both of the newer VVER 440/213 type) are regularly upgraded since three years ago. Near the village of Mochovce, Slovakia has two functioning VVER 440/213 reactors with an upgraded Siemens operating system, that went on-line after heavy resistance in 1998 and 1999.

All operating reactors are owned by the state-owned, but soon to be privatized, electricity generation company Slovenske Elektrarne (SE). At present, the Slovak Industry Minister Rusko states clearly that the successful bidder will have to buy SE in its entirety, including its nuclear capacity. Two contenders, the Russia's state-owned RAO-UES and state-owned Czech company CEZ, have expressed clear interest in the entire package.

Rusko subsequently offered other possible contenders the opportunity of upgrading their bids to include also the nuclear part of SE and contenders now also include Germany's E.On and the UK's International Power, although CEZ remains the front runner. This is

partly based on the fact that CEZ knows the structure of SE very well (SE and CEZ were formerly one company), and has experience with all types of reactors in Slovakia. It is however possible that CEZ will decide to share part of SE operations with one of the other contenders, most likely RAO-UES.

Another condition Minister Rusko attached to the sale is the completion the blocks 3 and 4 at Mochovce, where building activity was stopped several years ago although the blocks are roughly 50% complete. As far as the IAEA is concerned, both VVER 440/213 reactors blocks still count as "under construction", but after political pressure, mainly from neighboring Austria, the prospect of the completion of these two blocks seemed extremely weak.

Unfortunately, the tide now appears to be reversing. CEZ and RAO-UES have already reacted positively to Rusko's demand but so far the other contenders have made no official comments. An estimated 70 Billion-Slovak Crown (around Euro 1,7 billion or US\$ 2.1 billion) would be required for the completion of these two blocks.

Gradual upgrading of Bohunice V2 started some three years ago and both blocks are, for the time being, scheduled to operate until 2024 and 2025. Observers in the country expect a further lifetime extension of 10 years, however.

According to former Greenpeace

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campaigner Lubica Trubiniova, Slovakia currently produces around 13% overcapacity, which is exported to neighboring countries with the exception of Austria with which no interconnection exists. It seems to be clear that two more blocks in Mochovce would increase Slovakia's overcapacity and therefore its position on the export market.

### Discussions on V1

The closure of Bohunice V1 is still heavily debated. Party leader Robert Fico, the populist leader of the SMER ("Direction") party, who currently leads opinion polls, has stated clearly that he intends to keep V1 open and also backs the completion of construction work on Mochovce 3 and 4. The current government is seeking to avoid confrontations with Brussels and has thus committed to the closure dates of 2006 and 2008 after receiving the parliamentary backing a few weeks ago. A referendum for early elections failed to achieve sufficient support when held on 3 April. This means that the current government will probably serve its term until 2006, making it very difficult for Fico and his SMER party to prevent the closure of V1.

Juraj Zamkovsky of Friends of the Earth in Slovakia however does note that the populist politician could still make a last minute attempt to keep V1 open if SMER are successful at the next elections. The first block at V1 is due for closure in the autumn of 2006 and the elections would also be held in

autumn 2006 so it is technically feasible that Fico could reverse the decision to close V1 as his first act in government. Friends of the Earth and the public advocacy group CEPA are attempting to undermine the lobby to keep V1 open by working on alternative development scenarios for the region of Bohunice, which would also see all V1 personnel being offered good alternative employment.

### Mochovce 3 and 4 in the nuclear debate

Economy Minister Pavol Rusko is not alone in pushing for Mochovce 3 and 4. His ANO ("Yes") party is likely to lose influence in possible upcoming early elections, but Fico's SMER and most political parties also support the idea although the reasoning is unclear. In part, nationalism plays a part, as does the argument on climate change. It is clear, however, that in the current capacity development, both blocks will add to Slovakia's overcapacity. Export possibilities currently mentioned focus mainly on former Yugoslavia.

It is clear that these two new blocks cannot be built without considering the European market situation. It is also clear that because much of the construction is already standing, it is unlikely that reactor types other than the VVER 440/213 will come under consideration. This partly explains the interest of RAO-UES and CEZ, who both have experience in building and running such reactors.

What must still be clarified is whether these two blocks will also be fitted with Siemens operating systems or with another. It is not known whether the European Union will accept such outdated designs, although decisions in the area of design tend to remain a matter for the nation concerned.

For CEZ, the completion of Mochovce 3 and 4 would be an interesting option to bolster the fortunes of Czech engineering contractor Skoda Holding a.s, in which CEZ is majority shareholder. It would also keep its own technical expertise updated for the moment it starts to invest in new nuclear power in the Czech Republic, a

move currently foreseen for the late 2010s. For RAO-UES, finishing Mochovce 3 and 4 is likewise interesting, as it could keep a foot in the door for future nuclear power plant orders in this part of Europe.

The position of E.ON will also be of great interest. E.ON is actively cooperating with the nuclear phase-out in Germany, but has issued several warnings that this policy might lead to a shortfall in Germany's capacity by the mid-2010s. Owning nuclear overcapacity in Central Europe might be the cheaper option for filling that gap without having to face critical questions in Germany.

### No anti-nuclear resistance

Presently the anti-nuclear movement in Slovakia is at an all-time low. Greenpeace stopped, at least temporarily, its energy campaign in the country last year and other environmental groups with interest in energy issues like Energia 2000, Za Matku Zem (For Mother Earth) or Friends of the Earth focus on the introduction of renewables and efficiency. None of the active national organizations has capacity on the nuclear issue. This might of course change should plans for further construction at Mochovce 3 and 4 become more concrete but until that time the nuclear lobby does not face much resistance.

It is clear, that the Slovak nuclear debate at the moment is mainly based on internal political arguments. Lifetime extension for Bohunice V2 and finishing of Mochovce 3 and 4 are very strong options in that debate. Early elections are expected to favor the nuclear lobby.

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**The next issue** (609) will be mailed out 7 May 2004.

Apologies to fans of 25 years ago, it will be back in our next issue.

# ASSESSMENT OF CHERNOBYL HEALTH CONSEQUENCES RESISTED

**The secretary-general of the United Nations, Kofi Annan, has repeatedly placed particular emphasis on the fact that millions of people continue to be directly affected by the consequences of the Chernobyl accident, that the acute suffering including health disorders continues, and that this disaster is a matter of global concern.**

(608,5598) E. Lengfelder, H. Rabes, H. Scherb & Ch. Frenzel - Among the New Independent States (NIS) countries, Belarus is mostly affected by the extent of radionuclide deposition, thyroid cancer incidence and many other effects. Internationally, there is an intense and controversial discussion about which health effects in the population, and to what extent, are truly caused by radiation exposure and which are attributed to radiation, but are scientifically unsound. There are serious issues to consider when answering these questions, and scientists and the quality of their work become a very important factor, also in achieving political goals.

For the huge number of patients suffering, for example from hypothyroidism or thyroid cancer, it is insignificant whether their disease can be scientifically attributed to radiation. Furthermore, it is also insignificant for the health system of the country, from which they expect to receive appropriate treatment.

The Chernobyl accident was the largest and most severe disaster in the history of civil nuclear technology. One that can and will happen again in one of the more than 400 nuclear power stations world wide, most being located in areas with a population density several fold greater than in the case of Chernobyl. The questions and answers concerning the particular health consequences of the accident and the possibility and effectiveness of countermeasures, are of extreme political and economical importance.

## Learning from the past

If we do not know the past, we will not be able to understand the present or make proper decisions for the future. This definitely applies to the many announcements and reports on the

health consequences after the Chernobyl accident that were released, in particular, by western governments, international bodies and the nuclear industry during the past 17 years.

In the weeks following the accident, the authorities in Moscow released several orders to keep information on the issue of Chernobyl secret. Later, in July 1987, the order was given that the acute and chronic diseases of liquidators (emergency workers) exposed to less than 50 rem, must not be attributed to the effects of ionizing radiation.

In 1990, the International Atomic Energy Agency (IAEA) organized the International Chernobyl Project (ICP), with the participation of the European Commission, the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), and many countries world wide, to investigate and assess the radiological situation in the three affected Soviet Republics. 200 scientists from the West and 500 from former USSR were sent by their governments to participate.

The IAEA team lead by US Professor F. Mettler concluded in 1991 that there were no health disorders that could be directly attributed to radiation exposure. IAEA favored psychological stress and anxiety as the cause of health disorders observed and this view was disseminated worldwide by the scientists involved.

However, in reality the number of thyroid cancer cases in children in Belarus was already 30 times higher than the average 10 years before Chernobyl, although the absolute number of cases was low. The IAEA and other international organizations failed to take into account the findings and reports of Belarusian and

Ukrainian scientists on the marked increase in thyroid cancers.

Several years ago, the BBC investigated and broadcast a TV documentary that revealed that as far back as 1990, Professor Mettler, as the scientific representative of the USA, had analyzed the pathological slides of thyroid cancers of 20 Ukrainian children, confirming malignancy in all cases, which in this age group could not be due to background incidence. Mettler and his colleagues suppressed this fact from their reports. As a result, international organizations and the UN did not start proper assistance programs for the people affected and valuable time was lost.

Independent scientists from NIS and Western countries continued to report on the increase in thyroid cancer, while scientists working for IAEA, UNSCEAR and American and European governments denied it. The WHO sent British thyroid pathologist D. Williams, radiation biologist K. Baverstock and other experts to the Chernobyl region and they confirmed findings of increased thyroid cancers and a probable link to radioiodine exposure from Chernobyl.

The BBC reported that resistance to the idea was strongest in America. The US government had special reason to be wary because the Department of Energy had deliberately released a cloud of iodine-131, in the 1950s, to test how well they could track a plume. This added to existing contamination from weapons tests and large releases of radioiodine from the Hanford nuclear facility over many years.

Williams confirmed evidence that large areas of the USA had a low-level exposure to radioactive iodine. Naturally, the US government was very

concerned and preferred to avoid being forced to admit that they may have caused thyroid cancers and may have to pay compensation.

According to Williams and other experts in this field, there is a strong wish and hope that radioiodine would not be shown to be the cause of thyroid cancer. Vested interests in the West have distorted the issue of thyroid cancer. Fear of crippling compensation claims, the entrenched views of scientists and industry concerns over bad PR had all obscured investigation by Williams. According to USA laws, the compensation claims of American citizens, who developed thyroid cancer after these releases, could add up to many billions of dollars, which the government wishes to avoid paying.

#### **International research projects on thyroid in Belarus**

Two international research programs on the health effects of Chernobyl are of special interest. The 'International Cooperation for post Chernobyl NIS Thyroid Tissue, Nucleic Acid and Data Banks' was formed by the USA, the European Commission on behalf of the European Atomic Energy Community, Japan and WHO with Belarus, Russia and Ukraine invited to form a collaborative research resource. The goals of the study include guidelines on the avoidance of competition among scientific groups, the study of the pathology and molecular biology of thyroid cancer including the role of isotopes of iodine and of other factors influencing cancer incidence including exposure to other carcinogens, genetic factors etc.

All resulting data is being collected in the U.K. The decisions regarding which research group will receive cancer material and is accepted to participate in the project, will be made by a managing committee, where the Western participating countries and organizations are in the majority.

Also of great interest are the 'BelAm Project' in Belarus and 'UkrAm Project' in Ukraine. The project began in Belarus in 1996 following the first

compensation claims in the US and involves the monitoring of around 12 000 people for 30 years in order to determine how many thyroid disorders, including cancer cases, would appear. International media has been critical, arguing that the project would be restricted to investigation of Belarusians but following the detection of any cancer cases, treatment and aftercare would be left to the patients and Belarusian health system, which is unable to provide all patients with appropriate treatment.

The articles also highlight the fact that in the USA and Europe scientific investigations on the state of people's health are only allowed if proper medical treatment is also guaranteed, so why this should not apply to the people of Belarus? In Gomel Oblast, southeast of Belarus, around 400 000 people who were children or adolescents at the time of the accident, are known to be at high risk of developing thyroid cancer. These people should all have regular check-ups, as opposed to restricting those rights to a minimum number in order to satisfy the interests of the USA.

**The reported numbers of thyroid cancer cases in Belarus after Chernobyl range from 1200 up to about 10 000.**

In 2000, a report by the UNSCEAR committee contained an evaluation of the consequences of the 1986 Chernobyl accident. It concludes that 'there is no evidence of a major public health impact attributable to radiation exposure fourteen years after the accident', apart from a high level of (treatable, non-fatal) thyroid cancers in children. With this exception, the report states 'there is no scientific evidence of increases in overall cancer incidence or mortality or in non-malignant disorders that could be related to radiation exposure.'

UNSCEAR's statement again ignores a large number of scientific publications

on a several fold increase in thyroid cancers in adults, a large increase in non-malignant thyroid disorders and other diseases. It should be noted that this UN committee does not consist of independently chosen or elected scientists, but of those sent as representatives of the governments of the 21 nations, who have a strong interest in the use of nuclear technology. Professor Mettler is still member of UNSCEAR and is still representing the interests of the US government.

#### **NGO activities in Belarus**

In 1991, the Otto Hug Strahleninstitut MHM, a German non-governmental medical-scientific non-profit organization, began several long-term treatment and research projects on cancer and other thyroid diseases in Belarus. Numerous experts in radiation medicine, biology, physics and statistics from several universities and research centers are integrated within the Institute. The cooperation with Belarus is based on long-term contracts with the Health Ministry and includes several university institutions in the West. The laboratories and medical institutions in Belarus received equipment and are now continuously supplied by the German Institute to facilitate medical treatment and research.

Since 1993, the 'Thyroid Center Gomel' project has diagnosed and treated more than 90 000 patients from Oblast for thyroid diseases including cancer, processing over 220 000 blood analyses for thyroid parameters. The laboratory regularly participates in international quality assurance programs. The 'Histopathological Laboratory' of the National Thyroid Center of Belarus started in 1995 and collaborates with the German Institute, which provides equipment and regularly supplies consumables. More than 7800 thyroid malignancies have been diagnosed, involving the preparation of over 40 000 pathological slides according to internationally accepted standards.

Since 1993, a fruitful international scientific cooperation on pathology and the molecular genetics of thyroid

cancer resulted in considerable progress in the understanding of the molecular biology of this disease and in the establishment of a tumor tissue bank. The extension of this cooperation to provide a molecular biology laboratory by the Institute is in progress. In 1997, the 'Radioiodine Therapy' project started in Gomel, and has since provided more than 2100 diagnostic and therapeutic radioiodine treatment courses to cancer patients through the donation of equipment and regular delivery of radioiodine. Since 1991, Belarus has received over 13 million Euro (US\$ 15.8 million) in medical, social and scientific support from the Otto Hug Strahleninstitut.

The German Association of Chernobyl Help (DVTH) is an umbrella organization, which integrates over 80 NGOs working in the fields of social rehabilitation, medical care and other areas in order to mitigate the situation in regions affected by Chernobyl. All these organizations and their sponsors wish to discover the real consequences of Chernobyl, rather than playing down or dramatizing its consequences of distorting information gathered. To date, the DVTH members have given support and measures valued at around 75 million Euro (US\$ 91.5 million) to the population in the countries affected by Chernobyl (mainly in Belarus).

#### **Look at the collective thyroid dose**

The reported numbers of thyroid cancer cases in Belarus after Chernobyl range from 1200 up to about 10 000. The figures are influenced by the risk assessment models used, the assignment of patients to different categories of reconstructed organ doses, the belief of some scientists that a lower radioiodine dose is ineffective in inducing cancer etc.

Recently, the authors of this paper completed a study on the annual age- and gender-specific incidence of thyroid cancers in the Czech Republic from 1976 until 1999. The study is probably the largest of its kind as it accounts for 247 million person-years.

From 1978 until 1999, there was an age-

dependant annual increase in the thyroid cancer incidence proportion of 2,1% per annum. From 1988 onwards, the study revealed an additional significant increase in the thyroid cancer incidence of 2,3% per year.

Although the contamination levels due to the Chernobyl releases, including radioiodine, in the Czech Republic were low compared to the situation in Belarus, Russia and Ukraine, resulting in low individual thyroid organ doses, it led to a relevant collective thyroid dose in the Czech population. Since improved medical surveillance and reporting following the Chernobyl accident are unlikely to account for the increase in thyroid cancer incidence, the radioiodine from Chernobyl appears to be the real causation of this disease.

This would mean that for the assessment of radioiodine associated thyroid cancers in the Chernobyl regions, one should look carefully at collective dose effects and at the group low in individual organ dose but very high in number, instead of taking parts of this group as an unexposed reference.

Regarding Kofi Annan's statement that Chernobyl is a matter of global concern, research projects by international organizations on the health consequences for the citizens of NIS countries after the Chernobyl catastrophe should be obliged to guarantee therapy and aftercare to a substantial part of the population at risk.

This approach would achieve the following objectives:

- \* Benefits for Western countries and organizations carrying out research projects would be balanced with treatment for the people affected in the NIS.
- \* The level of the health and treatment system in the affected areas would increase.
- \* The extent and the costs of health protection after a catastrophe in a nuclear power plant can be felt in the West and efforts to play down the consequences reduced.

[This paper is originally titled "Assessment of Chernobyl Health Consequences meets with resistance; Factors Influencing the Assessment of Chernobyl Health Consequences and the Contribution of International Non-governmental Organizations to Research and Treatment of Thyroid Pathologies in Belarus". Its authors are from the following institutions: E. Lengfelder & Ch. Frenzel - Institute of Radiation Biology, University of Munich, Germany Otto Hug Strahleninstitut MHM & Munich German Association for Chernobyl Help (DVTH), Munich-Ottobrunn; H. Rabes - Institute of Pathology, University of Munich, Germany; H. Scherb - GSF-Federal Research Center for Environment and Health, Munich]

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# HANAU EXPORT AND POSSIBLE MILITARY USES IN CHINA

**The German government is considering an export license for the mothballed Hanau MOX plant. The “Hanau-2” MOX fuel fabrication plant was 90% complete when halted in 1995. Between 1995-2000 there were attempts to sell the plant’s equipment to Russia as part of a program for the reuse of nuclear weapons plutonium but plans were cancelled due to a lack of funders . Since December 2003, discussions have been ongoing on whether to export the plant to China. Wolfgang Liebert and Michael Sailer provide us with the background of the proliferation risks of exporting a MOX facility to China.**

(608.5599) Wolfgang Liebert & Michael Sailer - The plant in Hanau, Germany, is designed so that ceramic uranium-plutonium mixed oxide (MOX) fuel elements can be produced in several chemical and mechanical process steps; these include pulverizing, compressing, sintering and grinding, as well as filling the fuel tablets into fuel rods. In principle, the plant in Hanau is capable of producing uranium fuel elements or MOX fuel elements with a plutonium content of around 5% for use in typical power reactors, or MOX fuel elements with a plutonium content of 40% or more for use in breeder reactors.

The technical design of such a plant is especially complex and expensive, because it is necessary to overcome an array of safety-related problems (the problem of criticality, the risks to employees from radiation and the risks posed by respirable radioactive dusts). As a consequence, processing operations in the plant are performed either under remote control or using “gloveboxes”. In addition, there are elaborate shields against neutron radiation.

The Hanau fuel element plant was unable to go into operation in Germany because of fundamental misgivings, unresolved licensing issues under atomic energy law and the lack of economic competitiveness of MOX fuel rods in comparison with conventional uranium fuels.

After relinquishment on the part of Siemens, the builder and operator, exportation of the plant to Russia was discussed from 1995 to 2000 (see also *WISE News Communiqué* 534.5201: “Fischer allows export of German

MOX plant to Russia”). This idea came to nothing because of a lack of money and it was said that the plant would be scrapped (see *WISE News Communiqué* 553.5311: “Hanau MOX plant to be scrapped, not exported”). Consideration is now being given to exporting the plant to China, which in turn, throws up some serious questions.

## Potential military use

The Hanau plant is of modular construction and could therefore – at least in part – also be used directly for military purposes. A nuclear weapon requires the production of plutonium metal (around 4-8 kilograms) in the form of hollow ball segments. Plant components for the cleaning of plutonium, for its chemical conversion into metallic form and for its dimensionally accurate mechanical processing could be used for this purpose. In principle, all the parts of the Hanau plant are suitable for the processing of weapons-grade plutonium. The Hanau plant’s remote control equipment and its gloveboxes would facilitate the handling of weapons-grade plutonium. Indirect military use could also take place through the copying of essential subtechnologies of military relevance, which could then be used for warhead production.

An indirect form of military use might consist in the production of fuel for plutonium-producing reactors for the weapons programme. This could involve the production of uranium or MOX fuels for special production reactors or for power reactors, or of MOX fuels for a fast breeder reactor.

## Nuclear weapons arsenal

As is well known, China is one of the five established nuclear powers with a

permanent seat on the UN Security Council. The first nuclear weapons test using highly enriched uranium (HEU) took place as early as 1964. The first thermonuclear device, whose explosive force was of the order of magnitude of megatonnes, was detonated in 1967. It took until late 1968 to test the first plutonium weapon. In 1971 China succeeded in testing a fusion-boosted plutonium bomb. The first test of an intercontinental ballistic missile took place in August 1981 with the “Dong Feng 5”.

Reliable information on China’s nuclear weapons is limited because there are no detailed or comprehensive Chinese statements on which to rely. China’s present arsenal of nuclear weapons is likely to include some 400 warheads. Its nuclear weapons systems consist of a variety of ballistic missiles of different ranges, bomber planes based on Russian technology and a nuclear-equipped submarine of limited usability.

Of particular significance are around 20 intercontinental ballistic missiles of type Dong Feng 5 with a range of 13,000 km. China’s fleet of bombers is considered to be obsolete, likewise the majority of its rocket systems. However, like all the other nuclear powers, China is modernizing its arsenal.

China is pushing ahead vigorously with its Dong Feng 31 programme, with a range of 8,000 km and work is under way to give it an intercontinental range. Multiple independently targetable re-entry vehicle (MIRV) warheads are also being developed for it and work on MIRV systems has been under way probably since the US missile defence programmes of the

1980s were launched. In 2000, knowledge was gained of a MIRV test involving, in particular, the release of decoy warheads suitable for defeating or penetrating missile defence systems. China is thought to have a MIRV capability, although its realization is apparently yet to be accomplished.

### **Fissile material production**

China's production of fissile materials for nuclear weapons can only be estimated with great uncertainty on the basis of presumed production capacities. It is assumed that, between 1964 and 1987 or 1989, a quantity of between 15 and 25 tonnes of HEU was produced and that plutonium production began later. The latest estimate of Chinese plutonium production by the independent US researchers Wright and Gronlund from 2003 states that, by 1991, around two to five tonnes of plutonium had been separated.

In the mid-1990s, China announced that it had stopped its production of fissile materials for nuclear weapons in 1991. However, China has for a number of years refused to work with the other nuclear powers to negotiate a treaty that would regulate, in internationally binding form, the cessation of such production. If one assumes that a few hundred warheads each contain 4-8 kilograms of plutonium, then China could have reserves of plutonium amounting to just a few hundred kilograms or up to around three tonnes.

### **Impending nuclear rearmament**

US strategic planning has for some years been undergoing profound change. Accordingly, the main objectives include the ongoing maintenance and modernization of the nuclear weapons arsenal, its integration into the USA's offensive capabilities, the build-up of ballistic missile defences, the development of bunker-busting nuclear weapons intended for actual use, as well as preemptive warfare – in particular against the ABC weapons potentials of other countries.

Regardless of whether a US ballistic missile defence system can ever work, China considers its limited nuclear deterrent potential to be under threat

and possibly at risk of being knocked out in the medium term by a preemptive US attack.

According to the logic of nuclear strategists, the Chinese leadership must aim for the quantitative and qualitative upgrading of its arsenal in order to reduce its vulnerability to a US attack on its bunkered intercontinental ballistic missiles in combination with the possibly limited implementation of US ballistic missile defences.

A suitable means of maintaining a Chinese "deterrent potential" would be to deploy a far greater number of modernized intercontinental ballistic missiles, and also to equip them with multiple warheads (possibly using decoys), which would have to be newly produced. In the case of a larger-scale rearmament programme, which must be expected, China would be dependent on resuming its production of plutonium.

### **Breeder project and dual use**

With Russian assistance, an experimental breeder has been under construction since 2000 and could be completed by 2005. It will then require MOX fuel of an average fissile material enrichment of around 50% and will thus be dependent upon a MOX fuel element facility like the Hanau plant.

The purpose of breeders is to produce additional plutonium from natural uranium, positioned in the so-called breeding blanket around the reactor core, using the therein-produced fast neutrons. This plutonium is of the highest weapons-grade quality. Consequently, the use of breeders would be particularly attractive for a nuclear rearmament programme.

In China there is no serious separation between the civil and military parts of the nuclear program. The China National Nuclear Corporation (CNNC) exemplifies this, a state-owned enterprise established in 1988 comprising some 200 enterprises and institutions with almost 300,000 employees. Its purpose is to satisfy both military and civil requirements in the nuclear field.

This is a classic dual-use enterprise with the widest possible responsibility.

### **Will safeguards work?**

The question is whether military use of the Hanau plant or parts of it could be rendered impossible by safeguards activities carried out by the International Atomic Energy Agency (IAEA). The IAEA monitoring system in non-nuclear weapons states presently provides for the complete accounting of all flows of fissile materials between a country's various installations in the form of the recording of incoming and outgoing materials.

As a nuclear weapons state, China enjoys a privileged status and thus is under no obligation to allow such complete monitoring of all its nuclear installations. Consequently, there can be no accounting for the flows of fissile materials, making it near impossible to prevent indirect use of the Hanau plant to produce plutonium for a nuclear weapons programme. For this to succeed, a safeguards-based monitoring regime would have to include all transfers from the plant to all potential plutonium-producing reactors (including the experimental breeder) and their spent fuel elements, and would also have to include all transfers to further installations (notably reprocessing plants). IAEA monitoring of the Hanau plant itself would be completely inadequate and essentially futile.

### **Need for new types of inspections**

Accounting for flows of fissile materials would do little to prevent direct military use of parts of the Hanau plant. An effective inspection regime for the plant, once re-erected in China, would have to include regulations on what specific starting, intermediate and end products (permitted materials) could be handled in the plant and what technical options could be used for an appropriate inspection regime (inspection methods, locations and intervals). Such an inspection regime does not presently exist and would have to be specially developed.

Equally, it would be necessary to implement safeguard inspections in the event that parts of the Hanau plant are re-erected in the civil-military nuclear industry elsewhere in China or in the event that copies of sensitive parts of the plant are made for use in the weapons programme. Once again, the conventional IAEA accounting system proves inadequate.

An effective inspection regime would first have to record all parts of the plant in detail, oversee their re-erection in China, establish a reporting regime for any subsequent changes and define an inspection regime for all essential components covering the entire lifecycle of the components. Such a nuclear inspection regime is so far without parallel and would have to be specially developed.

### **Risks of the plutonium economy**

The erection of the Hanau fuel plant in China would represent a clear step towards an extensive plutonium economy that China is reportedly planning. To date, however, there is still no sign of a major commercial reprocessing plant capable of separating sufficient quantities of plutonium from radioactive wastes for such a nuclear programme. The capacity of the Hanau plant, which could process five tonnes of plutonium per year, is at any rate massively oversized.

The separation and processing of plutonium, the transport of plutonium and its handling at many different sites with the aim of its use in a reactor creates diverse possibilities for plutonium to be diverted for weapons-related purposes. These aspects were already considered in the case of the abortive export of the Hanau plant to Russia. In the case of China, however, there is not even the intention to use the plant to make plutonium from disarmed warheads more inaccessible.

### **Where would the export of the plant lead?**

High technology from the West obviously arouses fundamental desires in China. This gives cause for concern, because the structure of the Chinese

nuclear complex is such that imported technology can be expected to be put not just to civil use, but may also resurface in a military context.

The possibility cannot be ruled out that parts of the Hanau plant will be used directly for the production of warheads as part of the nuclear weapons programme. This can serve the ongoing modernization of the Chinese nuclear weapons arsenal, since the high technical and safety standards of relevant components (or copies of them) must appear attractive.

Equally, it must be expected that the plant will be used indirectly for military purposes to produce fuel for plutonium-producing reactors. Military use of the Chinese breeder programme would be especially attractive for the weapons programme.

It would be naive to assume that China will not react to the USA's new nuclear-strategic plans. Intensified Chinese nuclear rearmament would presumably require additional plutonium production, as well as expanded and/or modernized capacities for warhead production. The Hanau plant could thus become one important element within a Chinese rearmament programme.

Consequently, exporting the Hanau plant to China harbours a high risk of its being used directly or indirectly for military purposes, even if an inspection regime (IAEA safeguards) is established. Furthermore, China, a nuclear power, would have to declare itself willing to allow additional monitoring of flows of fissile materials in all potentially downstream installations. These include all possible plutonium-producing reactors, including breeder and reprocessing plants, as well as further installations.

Such willingness, however, is most unlikely because China, as a privileged nuclear power, will not consent to any forms of monitoring of its civil-military nuclear programme which are not also established in the other nuclear power countries. In order to

rule out the possibility of direct military use of parts of the plant, it would be necessary to develop and then establish a completely new inspection regime. This would have to focus on the real end products of the plant, on all sensitive components, their whereabouts, as well as their possible use in other locations.

If, in response to US policy, there is quantitative and qualitative nuclear rearmament on the part of China, with the export of the Hanau plant from Germany making its contribution to this process, this would be a fiasco for German non-proliferation and disarmament policy. Chinese nuclear rearmament can serve neither German nor global interests. Consideration should also be given in this regard to the further destabilization of East and Southeast Asia.

As a final point, the provisions of the German Foreign Trade and Payments Act stipulate that the possibility of military use of exported goods must be ruled out. In our opinion, such a possibility definitely cannot be ruled out.

[Please note that this is an abridged version of an article originally entitled "Export of the Hanau Fuel Element Plant and its possible Military Uses in China". Contact the authors for the full version.]

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# ***A SINGLE STAR HIGHLIGHTS NUCLEAR TRANSPORT DANGERS***

**“I pledge allegiance to the flag of the United States of America, and to the Republic for which it stands, one nation under God, indivisible...” – except when it comes to radioactive waste, which can rip asunder not only molecules in our cells and DNA, but also the bonds that unite communities and nations. This is an overarching theme in environmental attorney Stan Barnett’s first novel, *A Single Star* (Corinthian Books, Mount Pleasant, South Carolina, 2003).**

(608.5600) NIRS - This fast-paced, action-packed political thriller revolves around a train shipment of weapons-grade plutonium and highly radioactive nuclear fuel bound for the U.S. Dept. of Energy’s (DOE) Savannah River Site (SRS) that the White House forces on an unwilling state. When terrorists take advantage of the explosive situation, the consequences far surpass DOE’s “maximum reasonably foreseeable accident.” (But then, as Einstein said, “the splitting of the atom has changed everything, save our mode of thinking, and thus we drift toward unparalleled catastrophe.”)

The story incorporates interesting inter-plays with actual history. The Governor of South Carolina did threaten to use state troopers to block DOE plutonium shipments to SRS at the border in 2001. The portrayal of U.S. government arrogance does reflect its actual treatment of Nevada vis-à-vis Yucca Mountain, and federal secrecy mirrors its actual modus operandi for shipping radioactive waste.

Much of the novel involves courtroom drama – just like the grassroots effort in Michigan in 1999, which succeeded in winning a temporary injunction against a DOE shipment of weapons-grade plutonium from Los Alamos to Canada for testing as fuel in reactors.

Some of the intrigues that seem far-fetched are, unfortunately, manifested in real life: spying upon UN offices before the US/UK invasion of Iraq; intimidation and personal vendettas at the highest levels of the White House (such as the outing of a covert CIA operative as an act of revenge on her husband for daring to reveal that the Bush Administration’s claim that Iraq

sought uranium for nuclear weapons from Niger was baseless).

Once the courts bowed to DOE pressure in January 2000, the shipment from Michigan to Canada involved an unidentified military escort and sharpshooters on rooftops – most likely US Marines on Canadian soil. DOE and Canadian authorities then undertook a reckless helicopter airlift of a transport container certified only for truck shipment, in order to fly over an awaiting Native American protest blockading the highway across an Ontario reservation. As they say, truth is stranger than fiction.

Barnett presciently wrote this book long before the terrorist train bombings in Madrid. One of the novel’s cast of villains muses “...if security for the train was as poor as that for most shipments of fuel rods in America, taking the plutonium would not be too difficult...” A protagonist, reflecting on the plight of US atomic veterans, and parents downwind of nuclear weapons testing (trusting the US Atomic Energy Commission’s assurances that fallout was harmless) giving their children radioactive milk in the 1950’s, concludes “...what is clear to me is that the more secrecy shrouds the handling of nuclear material, the more chance there is of our own accidents...” such as Chelyabinsk and Chernobyl.

Struggling against DOE’s obfuscation regarding the dangers of weapons-grade plutonium and high-level radioactive waste transportation, the protagonist observes “...The department simply told everyone that an accident couldn’t happen. They avoided the subject of what an accident would mean *if* it happened.”

In reality, this is how the US nuclear establishment in government and industry try to downplay the potential risks of severe accidents and terrorist attacks upon many thousands of atomic trucks, trains, and barges targeted to pass through 45 states and the District of Columbia en-route to Yucca.

In this all-too-real world of nuclear dangers, last year the US Nuclear Regulatory Commission ruled that terrorist attacks upon nuclear facilities are “too speculative” to be considered during licensing proceedings, and DOE assures the public that volcanic eruptions at the Yucca dump are highly unlikely (while they stubbornly refuse to address the catastrophic consequences that would result *if* such disasters do occur).

While most of the novel is accurate on technical details, there are some corrections to be made. Alpha radiation cannot penetrate HazMat suits (although gamma radiation and neutrons certainly can, and if inhaled or ingested, alpha particles can do major damage). Iodine tablets, while protective of the human thyroid gland against radioactive iodine gases released during a nuclear reactor accident, would be of no avail against plutonium and fission product releases from a high-level radioactive waste fire (the radioactive iodine gas, with its eight day half-life, having long since dissipated). And non-fissile Uranium-238 cannot be used for nuclear weaponry, although fissile U-235 most certainly can.

*A Single Star* calls to mind a story from the real-life struggle against the Yucca dump scheme. Over a decade ago at a public meeting, DOE’s

arrogance towards the State of Nevada and environmental opponents of the Yucca dump was palpable. A humorous note was passed from an environmental advocate to a State of Nevada representative. It read, "Nevada should secede!" That very sentiment has found expression in the nuke dump-targeted Free Republic of Wendland (Gorleben, Germany) for over 25 years now.

**North Korea had three nuclear bombs.** *The New York Times* has reported that A Q Khan, the disgraced father of Pakistan's nuclear weapons programs, has revealed to investigators that he saw three nuclear bombs in North Korea five years ago. Pakistan's government is said to have released details of Khan's visit to an underground weapons facility one hour from Pyongyang 3-4 weeks ago as a warning to states within its missile range. The leaking of such sensitive information in Washington appears linked to US Vice-President Dick Cheney's visit to Beijing where he hopes to persuade China to take a tougher stance on North Korea. The Bush administration had previously been frustrated by Beijing's reluctance to apply more pressure on its former ally. Cheney has presented the Chinese with its 'new evidence' but has insisted that the US is still committed to six-party talks but would soon be seeking "real results". (See also *WISE/NIRS Nuclear Monitor* 602.5572 "North Korea welcomes US delegation")

There are suggestions that Washington may also be seeking to influence the 15 April parliamentary elections in South Korea that are expected to decide the fate of President Roh Moo-hyun, who is mistrusted by the US for his soft line on Pyongyang. Khan's report will be difficult to verify given that Pakistani authorities have refused to allow questioning by the international community. It is also unclear if Khan, who is not a trained nuclear scientist, has the expertise to recognize an actual nuclear weapon as opposed to a mock-up.

***The New York Times*, 13 & 14 April 2004; *The Guardian*, 14 April 2004**

In 1990, residents on Anmyeon Island successfully protested a nuclear waste dump targeted at them by blocking the only bridge to the mainland, occupying the county building and police station, and announcing themselves a self-ruling republic free from the South Korean government (see *WISE/NIRS Nuclear Monitor* 583.5492: "Nuclear waste dump site

## IN BRIEF

**NIRS & Public Citizen petition NRC.** NIRS and Public Citizen have jointly petitioned the U.S. Nuclear Regulatory Commission (NRC) to participate in the forthcoming licensing procedure for the proposed uranium enrichment plant in New Mexico. The groups are representing their members living near the site of the proposed facility who are concerned with the inconsistencies, misrepresentations and unlawful aspects of the application, including the lack of a strategy to dispose of hazardous and radioactive wastes. NIRS and Public Citizen also cited problems with the application in its treatment of water resources, national security and nuclear proliferation, the need for the facility and the cost of decommissioning the plant once it ceases operating. This is the third attempt by Louisiana Energy Services (LES) at securing a site for its nuclear plant – earlier attempts were withdrawn following intense public opposition.

**Joint NIRS, Public Citizen & Southwest Research Information Center News Release, 6 April 2004**

**French PM pro new nukes.** Prime Minister Jean-Pierre Raffarin confirmed his support for the construction of new nuclear power plants on 5 April. He told parliament that France should build the experimental 1600 MWe European Pressurized Water Reactor (EPR), claiming it was 'our responsibility to ensure the future of the nuclear option' and that he would request a parliamentary debate on the issue 'within the coming weeks'.

**WNA News Briefing, 7-13 April 2004**

issues in South Korea"). Barnett's gripping novel also raises the provocative issue of secession. But then again, who is doing the real provoking?

**Source and Contact:** Kevin Kamps at NIRS

**Russian researcher sentenced.** A weapons specialist for the prestigious USA-Canada Institute has been sentenced to 15 years imprisonment for espionage in a closed trial in Moscow. Igor Sutyagin was convicted of supplying an UK firm, allegedly used as a front for the CIA, with information on submarines and missile warning systems. Sutyagin's defense argued that the researcher's work had been based on publicly available sources and that he had had no indication that the company was as intelligence cover. Human rights activists in Russia and around the world have condemned the verdict and there are reports suggesting irregularities during the trial and political motivation for the trial and conviction. The trial judge is said to have given the jury incorrect instruction by asking them to determine whether Sutyagin had passed on information, which he did not deny, rather than whether he had passed on state secrets.

**AP, 5 April 2004; BBC News 7 April 2004**

**Fund for sick nuclear worker not paying out.** Four years after the US Congress passed a law to aid sick nuclear plant workers, the compensation fund has only managed to process the claim of one worker who was sent a check for US\$ 15,000 despite the government earmarking US\$74 million for the program. The Energy Department, responsible for the program, claimed during a hearing before the Senate Energy Committee that it would require more time and money to do a better job. Approximately 22,000 eligible workers

filed for assistance yet only 372 have received feedback on their applications. Robert Card, the department's undersecretary said the agency needed another US\$ 33 million, in addition to the US\$ 26 million already spent on the program this year to speed up the programs pace. Card and his assistant Beverly Cook have since resigned from their posts. Some lawmakers have recommended moving the program to the Labor Department, which already runs a program for compensating workers affected by radiation exposure.

**Seattle Post-Intelligencer, 30 March & 2 April 2004**

**UK government advisers consider waste disposal options.** Last year the Blair government appointed a committee on radioactive waste management to re-examine all possibilities to find an acceptable

solution to the nuclear waste problem. The 14 options considered range from firing nuclear waste into the sun, placing it in Antarctic ice sheets so it sinks by its own heat to the bedrock, putting it under the Earth's crust so it is sucked to the molten core and burying under the seabed. The government estimates that its stockpile of high-level nuclear waste will soon reach 500,000 tons. The committee of Homer Simpson wannabes is apparently still considering all 14 options and has requested an extension of its deadline from end 2005 to mid 2006. We look forward to reading its final report.

**The Guardian, 14 April 2004**

**Nuclear industry looks to Asia for survival.** 18 of the 31 nuclear power units currently under construction worldwide are located in Asia making the continent a haven for predatory

European, North American and Russian suppliers. Following accidents at Three Mile Island and Chernobyl, the number of new nuclear projects under development in the West was drastically reduced leaving the industry in peril. Now, the vultures are circling around Asia seeking new ground on an energy-poor continent. China is expected to build four 1,000 MW plants at a cost of US\$ 6 billion as part of its drive to quadruple its nuclear capacity by 2020. The export of such sensitive technologies is prohibited in most nuclear supply countries but given the lack of business elsewhere, governments are re-evaluating their policies in order to secure lucrative contracts for their supplies. Even the U.S. is expected to ease its controls on China at this year and Germany is already considering selling China its Hanau plant.

**AP, 10 April 2004; Reuters, 13 April 2004**

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## THE NUCLEAR MONITOR

The Nuclear Information & Resource Service was founded in 1978 and is based in Washington, DC. The World Information Service on Energy was set up the same year and is housed in Amsterdam, Netherlands. NIRS and WISE Amsterdam joined forces in 2000, creating a worldwide network of information and resource centers for citizens and environmental organizations concerned about nuclear power, radioactive waste, radiation, and sustainable energy.

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).

### Receiving the Nuclear Monitor

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### Ed Asner on nuclear power

Ed Asner's speech at the April 15 kick-off dinner for the Fund for a Nuclear-Free World is now available for downloading at [www.nirs.org](http://www.nirs.org). Titled, An Angry Man Speaks About Nuclear Power, the speech covers a lot of ground on current nuclear issues. We think you'll like it.

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