

# NUCLEAR MONITOR

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## LARGE NUMBERS OF UNDETECTED CRACKS IN THE WORLD'S PWRs

Documents of the Davis-Besse incident reveal a strong possibility that there are large numbers of undetected cracks in the world's pressurized water reactors, particularly in the US. This suspicion has been confirmed by the discovery of an additional crack at Davis-Besse itself.

**(568.5402) NIRS/WISE Amsterdam** – The cracks are nothing new: they were first discovered in Bugey-3, France in 1991 (1). Soon afterwards, similar cracks were found in 10 other reactors in France, 5 in Germany and at least one in Switzerland. As time went by, cracks were discovered elsewhere, including Japan (2) and Spain (3). In 2001, similar cracks were found in the US, first in Oconee-3 (4) and subsequently in a total of 13 reactors (5).

The cracks in question are located in reactor vessel head penetrations: the tubes where control rods and other equipment (such as thermocouples) enter the top of the reactor vessel. These are often made of an alloy – Alloy 600 – which is susceptible to "stress corrosion cracking": in other

words, cracks form because the alloy is under stress and in contact with hot, corrosive primary coolant under high pressure.

The phenomenon is so widespread that Nuclear Regulatory Commission (NRC) has a special section on its web site devoted to Alloy-600 cracking (6).

Cracks can occur in various parts of these reactor vessel head penetrations. They can occur in the tubes themselves ("nozzles"), the control rod drive mechanism casing, or at welded joints (7).

The cracks grow until they go right through the metal, at which point primary coolant starts to leak out of the crack. The primary coolant consists of a solution of boric acid in

water, the boric acid being used to control the rate of nuclear fission in the reactor. When a leak occurs, the water turns into steam, leaving behind crystals of boric acid. Up until recently, these crystals were seen as a useful indicator that a leak has occurred rather than a major problem in itself.

However, this changed after a large hole was found in the lid of the reactor pressure vessel (RPV) at the Davis-Besse Nuclear Power Station near Toledo, Ohio (8).

At Davis-Besse, so much reactor water had leaked from the cracks that piles of boric acid crystals, weighing as much as 900 pounds (400kg), had built up on the reactor vessel head itself. The boric acid primary coolant water released through cracks then flashed to steam before cooling and dripping down onto the 605 degree Fahrenheit (317 degree Celsius) vessel head. Upon contact with the hot vessel head the water content again flashed to steam leaving the growing accumulation of boric acid crystals. With a melting point of 340 degrees Fahrenheit (171 degrees Celsius), some of the crystals became molten and the concentrated acid aggressively ate a hole through more than 6 inches (15 cm) of carbon steel making up the vessel head, leaving only the corrosion-resistant stainless steel liner intact. This liner bulged under the high pressure in the

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reactor, which it was not designed to resist.

All PWR operators around the world must be concerned that there are no more incidents like the hole at Davis-Besse. Now, however, there is a new question: are reactors being checked for cracks thoroughly enough, or are many cracks going undetected?

#### 4 out of 5 cracks undetected?

The evidence that the cracking problem may be far more widespread began with a curious statement buried in FirstEnergy's Root Cause Analysis Report for the Davis-Besse incident. The statement (9) indicated that more than 5 times as many cracks had been found in French reactors as in the rest of the world.

Curious as to why this may be, WISE Amsterdam forwarded the statement to French contacts, asking if they had any idea why the problem seemed to be much worse in France. They in turn contacted the French nuclear safety authority, who said that they thought this was because French reactors were inspected more thoroughly, using eddy current testing (10).

If the French authorities are correct, this means that for every crack detected in reactors outside France there could be another 4 which remain undetected because of deficiencies in the testing methods used.

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These extra cracks remain undetected because they are very small. As such, they are generally less dangerous than the larger cracks already found. However, as the reactor vessel heads age, the small cracks grow into larger cracks, which can eventually cause leaks.

#### New crack discovered at Davis-Besse as new corrosion problem looms

On 7 May 2002, FirstEnergy engineers met with staff at NRC Headquarters in Rockville, Maryland to review the Davis-Besse Root Cause Analysis of the RPV Head Degradation. As reported by the Ohio-based Cleveland Plain Dealer, "NRC officials were startled yesterday when FirstEnergy revealed that for the first time that there was one more crack in one of the control rod sleeves than previously been reported, prompting them to question the integrity of the entire FirstEnergy report"(11).

In fact, FirstEnergy had just been informed by Framatome a few days earlier that Nozzle #2 had an additional vertical crack that was originally missed in the interpretation of an Ultrasonic Testing (UT) exam. FE said they would be issuing a corrective action document and going back to review the UT data to see if additional cracks were also missed. In addition, Electric Power Research Institute identified a significant uncertainty factor for sizing crack length in these components. FE officials acknowledged that industry does not have good models to test the accuracy of crack measurements for vessel head nozzle penetration cracking as has come with significantly more experience in the pressurized water reactor steam generator tube cracking. In both cases, crack growth rate remains largely an unknown.

As company officials and regulators scramble to analyze and bound the many uncertainties associated with the cracking phenomenon and the very aggressive boron corrosion, still more questions were raised at an 11

April 2002 meeting with NRC's Advisory Committee on Reactor Safeguards (ACRS). John Grobe, NRC director of Region III Division of Reactor Safety told the committee that liquid boric acid had been found pooled in the corrosion cavity of the reactor head (12).

According to Grobe, UT examinations have also revealed what is described as "debonding": an extremely narrow gap between the thin stainless steel inner liner and the thicker outer layer of carbon steel that make up the reactor vessel. The gap extends beyond the known damage around the #3 vessel head control rod drive mechanism penetration (identified as a 5" wide by 7" long by 6 3/4" deep cavity.) Grobe told the ACRS that the "debonding" extends into the vicinity of vessel head penetration #11. After conversations with NRC staff, NIRS suspects this "debonding" to be more extensive corrosion undercutting of the ferritic iron resulting from capillary action of the molten boric acid. FirstEnergy's Root Cause Analysis dated 15 April 2002 does not address this yet-to-be-explained deterioration of the vessel integrity.

In the meantime, FirstEnergy has enlarged its original 13" plug repair concept to a 17" diameter repair that will now cut into the vessel and remove the adjacent area to include Nozzle 11 along with Nozzle 3 while plugging Nozzle 2. Under the utility's unprecedented repair option, which is not covered by any code or standard under the American Society of Mechanical Engineers, a forged plate of Inconel 690 would then be welded in to plug the cut hole. The three affected control rod drive mechanisms would be relocated to spare penetrations in the vessel head.

Alternately, First Energy revealed on 10 May that the company had signed a letter of intent with the owners of the unfinished Midland nuclear power station in Michigan for purchase of their unused Babcock and Wilcox reactor pressure vessel head as a possible replacement

option. To accomplish the replacement, a hole must be cut in both containment buildings to remove the replacement component before installing it at Davis-Besse. The replacement option still requires regulatory approval and a safety evaluation on possibly challenging modifications necessary to adapt the replacement component to the reactor. In December, 2001 FirstEnergy additionally ordered fabrication of a new reactor vessel head from a Japanese company which will take an estimated 2 years to complete.

By a letter dated 29 April, NRC convened a NRC special Oversight Panel under Inspection Manual Chapter (IMC) 0350, "Oversight of Operating Reactor Facilities in a Shutdown Condition with Performance Problems" for Davis-Besse to evaluate restart issues and schedules for the stricken reactor. On 24 April, NIRS along with the Union of Concerned Scientists and thirteen other regional environmental and consumer groups petitioned NRC to order a Verification by Independent Party (VIP) of FirstEnergy's Root Cause Analysis for apparent problem identification and resolution issues, possible damage to additional components in containment from aerosolized boric acid, competency of FirstEnergy actions in response to other NRC generic communications

and possible deferment of other plant modifications and corrective action programs.

#### **And it's not just cracks**

At Davis-Besse, it was not just the cracks which caused the leakage: the flanges of the control rod drive mechanism also caused leakage, which collected on the vessel head and masked the nozzle leakage. Other U.S. plants use canopy seals instead of flange seals, but these too have been reported to leak (13).

In France, the vessel head at Tricastin-4 was replaced in 1996, but two years later, boric acid from a leaking canopy seal caused superficial corrosion of the new vessel head (14). So even replacing the vessel head will not eliminate the problem entirely.

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- (1) *WISE News Communiqué 385.3770*: "Alarm over faulty design in European PWRs".
- (2) *WISE News Communiqué 461.4583*: "Japan: Radioactive water leak in Sendai-1"
- (3) *WISE News Communiqué 408.4043*: "New cracks found at Zorita NPP"
- (4) *WISE News Communiqué 553.5309*: "US: NRC ignores widespread safety flaw for decade".
- (5) *WISE News Communiqué 560*: "In Brief".

(6) [www.nrc.gov/reactors/operating/ops-experience/alloy600.html](http://www.nrc.gov/reactors/operating/ops-experience/alloy600.html)

(7) [www.nrc.gov/reactors/operating/ops-experience/alloy600/overview.html](http://www.nrc.gov/reactors/operating/ops-experience/alloy600/overview.html)

(8) *WISE/NIRS Nuclear Monitor 565.5385*: "Millimeters from disaster".

(9) "As of February 2000, about 6.5% of all EdF nozzles inspected had been found to contain cracks and about 1.25% of inspected nozzles in other plants worldwide had been found to contain cracks greater than the minimum measurable depth of about 2mm (0.08 inches)".

*Root Cause Analysis Report*. FirstEnergy Nuclear Operating Company, 18 April 2002, 3.0 Data Analysis p.9.

(10) Matthieu Schuler, e-mail to Bella Belbéoch., 29 April 2002

(11) John Funk, "NRC wants reactor top replaced," *The Cleveland Plain Dealer*, 8 May 2002.

(12) Daniel Horner, "Davis-Besse Proposes RPV Head Repair Concept As New Problems Emerge", *Inside NRC*, 22 April 2002.

(13) E-mail from Dave Lochbaum, Union of Concerned Scientists, 14 May 2002

(14) *Rapport d'activité 1998*, Autorité de Sûreté Nucléaire.

**Contact:** WISE Amsterdam; Paul Gunter at NIRS

## **HOUSE SAYS YES TO YUCCA**

On Wednesday 8 May the U.S. House of Representatives showed that it's still the best Congress money can buy, by voting for Yucca Mountain.

**(568.5403) NIRS** - By a vote of 306 in favor to 117 opposed (12 members did not vote), the House passed Joint Resolution 87. This overrides the State of Nevada's 8 April veto of President Bush's 15 February approval of the Dept. of Energy recommendation to move ahead and apply for a license to open a national repository for high-level radioactive waste at Yucca Mountain, Nevada.

The Nuclear Energy Institute had at least 14 lobbyists standing at the foot of the stairs leading up to the House chambers, "working" the Representatives as they walked up to cast their vote. Pro-Yucca House leaders had boasted that they would garner 350 votes. Speaker of the House, Dennis Hastert (from the most nuclear state in the US, Illinois, with 14 reactors; Hastert's home area hosts the world headquarters of

Exelon, the largest nuclear utility in the U.S.), rushed the vote to the floor, giving the House all of one month to consider a vote that will have consequences stretching out hundreds of thousands of years.

Thanks to everyone who helped generate calls, letters, faxes, emails – your hard work paid off, denying NEI the bigger victory they wanted. All in all, 117 votes against Yucca is

respectable, and sets a good tone for the looming Senate vote on Yucca, expected sometime between mid June and mid July.

**U.S. readers:** please help generate calls, letters, faxes, and emails to your Senators, and get your friends and family to as well. Contacting your Senator's office once per week at this critical point is not too much. Setting up meetings with your Senators when they are home for the Memorial Day recess would also be very valuable at this critical time.

Invite to join the meeting local environmental, public interest, and other groups that oppose Yucca. Introducing local resolutions at your city or county council expressing opposition to nuclear waste shipments through or near your community would be very valuable right now too.

In fact, nuclear utilities across the

U.S. are introducing pro-Yucca resolutions in several states. In Monroe, Michigan – home to Detroit Edison's Fermi Two nuclear reactor – the county council tried to secretly pass a pro-Yucca resolution, a violation of the Open Meetings Act. When caught in the act, the council voted 4 to 4, delaying action. But the utility then twisted arms at the county council, and a short time few days later, the council then voted to approve the pro-Yucca resolution.

In Holland, Michigan, the local council passed a pro-Yucca resolution without anyone in Don't Waste Michigan even knowing that it was being considered.

A local Native American woman rushed over to the council chambers to voice opposition to the proposal to dump high-level nuclear waste on Western Shoshone Indian lands, but was not allowed to speak – the resolution she had just learned about

had already been passed.

On a more hopeful note, the band Midnight Oil has taken on fighting Yucca with a passion. An anti-Yucca, anti-Mobile Chernobyl banner hangs behind the band during all shows. Lead singer Peter Garrett addresses Yucca from stage, directing the audience to the NIRS tables in the lobby, where they sign post cards and petitions to Senators.

Also, four new mock nuclear waste casks are currently under construction, with hopes of having a six-cask caravan kicking off 6 June at various points around the country.

If you have any questions or ideas, or if you're interested to plug into the mock cask event nearest you, please contact Kevin Kamps at +1 202 328 0002.

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

## U.S. NUCLEAR WASTE: UTAHNS SAY "ENOUGH IS ENOUGH"

There is a direct relationship between the vitality and capacity of a community's civic environment and the health of its natural environment. A dysfunctional civic environment not only fails to defend itself against the abuse of its natural environment, it invites that abuse. Such is the case in Tooele County specifically, and Utah generally, where our deserts have become the rug under which the nation's toxic wastes are swept.

**(568.5404) Families Against Incinerator Risk** - Utah's West Desert has become one of the largest environmental sacrifice zones in the country. Besides having the largest toxic air polluter in the country (MagCorp), Utah's West Desert is burdened with the largest emitter of toxins to the environment (Kennecott), half the nation's stockpile of chemical weapons and two chemical weapons incinerators, a hazardous waste incinerator, a massive radioactive waste landfill, a hazardous waste landfill, a proving ground for biological and chemical warfare agents (much of it contaminated with unexploded ordinance and anthrax spores), a

bombing range the size of Rhode Island, and an Army depot with a large underground plume of carcinogenic water.

Currently, there are two active nuclear waste proposals by Private Fuel Storage (PFS) and Envirocare that would make Utah the nation's dumping ground for nuclear waste. PFS wants to park 40,000 metric tons of spent nuclear fuel rods above ground on the Skull Valley Goshute Reservation 45 miles southwest of Salt Lake City. Additionally, Envirocare is seeking legislative and gubernatorial approval to dump dismantled nuclear reactors in their radioactive waste landfill 60 miles

west of Salt Lake City.

Everywhere you look, it seems like those in a position to decide if Envirocare should be allowed to dump nuclear waste in Utah have accepted money from the company. It first came to light with the declaration by Larry Anderson that he had accepted over \$600,000 in cash, gold coins and real estate from Envirocare owner Khosrow Semnani while he was the Director of the Utah Division of Radiation Control (DRC). Anderson was charged with extortion, while Semnani was investigated for bribery. Semnani pled guilty to the most lenient sentence allowed under Federal

guidelines and agreed to pay a \$100,000 fine. Anderson is now serving a 2 1/2 year jail term.

During the Larry Anderson trial, it was revealed that former Utah Governor Norm Bangerter accepted a \$65,000 "personal loan", State Senator Stephen Rees accepted \$108,000, and a member of the DRC Board accepted a personal loan of \$15,000. They're not alone. Governor Mike Leavitt and his campaign funds have accepted over \$85,000 from Envirocare in campaign contributions, and many of the Utah legislators have accepted money as well. The former chairman of the Utah DRC Board was hired by Envirocare to head their operations in Texas, and the former Director of the Utah Department of Environmental Quality is now the President for Envirocare.

Having seen that Envirocare had gone to great lengths to grease the skids for legislative and gubernatorial approval, a new group, Utahns for Radioactive Waste Control, was formed to launch a ballot initiative that would prevent Envirocare from accepting higher-levels of radioactive waste. Specifically, it would prevent "Class B & C" waste from being disposed of in Utah. Almost 70,000 petition signatures are needed by June 3, 2002 in order to qualify for the November election.

**The Radioactive Waste Restrictions Act** - What it will do

1. Prevent higher-levels of radioactive waste from being disposed of in Utah.
2. Reform Regulatory Oversight of Radioactive Waste Disposal.
3. Use taxes from radioactive wastes currently disposed of in Utah to support the Education, Environment, and Ethics Fund, and a homeless endowment fund.

So why are 84% of Utah residents opposed to Envirocare's attempt to accept higher-levels of radioactive

waste? According to the Nuclear Regulatory Commission, **unshielded exposure to "Class C" radioactive waste can "cause a lethal radiation dose, based on a 20-minute exposure at a 3 foot distance."**(1)

- **None of the waste would come from Utah.**(2)
- **Over 80% would come from nuclear reactors.**(3)
- **Less than .01% is medical waste.**(4)

Envirocare claims that the increase in taxes will force them out of business. However, Envirocare accepts over 97% of the 'low-level' commercial radioactive waste disposed of in the United States. Only 2 other sites currently accept these types of wastes: Washington and South Carolina. By 2008, S. Carolina will only accept wastes from a few locations on the East Coast. Washington only accepts waste from a few states in the northwest. More than 40 states will be looking for a place to dump their waste, and will have no other option other than to send their waste to Envirocare.

Each of the six previous commercial radioactive waste disposal sites has leaked radiation into the environment. Four of these sites are now closed. Some are now undergoing multi-million dollar clean-up projects.

Prior to 2001, Envirocare did not have to pay taxes to the State of Utah. Only a regulatory fee of \$2.50 per ton was applied to radioactive waste. Taxes assessed by the State would go towards textbooks, reduced class sizes, scholarships, & helping the homeless.

To the extent that we allow Utah's West Desert to become the enabler for a toxic economy, we encourage a collective behavior that is self-destructive. Burying yesterday's hazardous waste so that even more lethal waste can be produced only postpones the day of reckoning. Utahns are saying enough is enough, and are encouraging people to support any attempt to keep nuclear

waste from being transported through our front yards to be dumped in our back yards.

**References:**

- (1) U.S. General Accounting Office, Report RCED-98-40R, Radioactive Waste: Answers to Questions Related to the Proposed Ward Valley Low Level Radioactive Waste Disposal Facility, May 22, 1998.
- (2) Envirocare statement. Salt Lake City Mayoral Debate, March 15, 2001. [www.slcgov.com/mayor/envirocare%20forum.htm](http://www.slcgov.com/mayor/envirocare%20forum.htm)
- (3) *ibid.*
- (4) Marvin Resnikoff, PhD, Living Without Landfills, A Special Report of the Radioactive Waste Campaign; Published by Radioactive Waste Campaign, New Your, NY 1987. Dr. Resnikoff is the expert the State of Utah hired in their case against the Skull Valley nuclear waste storage site.

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# UK NEGLECTS ITS “SERIOUS AND URGENT” NUCLEAR WASTE PROBLEM

The Royal Society (the UK’s national academy of science) has published a highly critical response to the UK government’s consultation document on nuclear waste, accusing the government of prioritizing PR activities over tackling the real problems of nuclear waste.

**(568,5405) WISE Amsterdam** – The Royal Society was responding to the consultation document “Managing Radioactive Waste Safely” (see *WISE News Communiqué 554,5317*, “UK: New public consultation on radwaste policy”) from the Department for Environment, Food and Rural Affairs (DEFRA).

The Royal Society’s response was described by the BBC as “a damning indictment of successive governments and the nuclear industry”. It describes the problem of disposal of existing waste as “serious and urgent”, and says that it must be solved “regardless of whether a new generation of nuclear power stations produces fresh volumes of waste”. However, the DEFRA consultation document appears to assume that the main problem is “public presentation and acceptance” rather than the very real technical problems of dealing with radioactive waste.

## **Badly-managed waste**

The UK currently has more than 10,000 tonnes of radioactive waste, and the amount will increase 25-fold once existing nuclear facilities are decommissioned. Despite this huge increase to come, management of existing waste is a shambles. Around 90% of existing high level waste (HLW) and intermediate level waste (ILW) remain in “unconditioned form” – in other words, not yet packaged in a form suitable for long-term storage.

The Magnox waste is a particular problem because it is chemically reactive. It contains metallic uranium, which can spontaneously catch fire if exposed to air, and metallic magnesium, which burns

intensely with a blinding white light. The industry says reprocessing is the only way to make Magnox fuel safe, but the Royal Society points out that this in turn generates “highly radioactive and very hazardous liquids, which are energetic and mobile and have a very high natural tendency to disperse”. These liquids are stored in tanks at Sellafield, which must be continuously cooled to prevent a serious nuclear accident from occurring.

Vitrification “inevitably produces some liquid effluent which has hitherto been discharged to sea”. These discharges are the subject of protests from many countries, including Norway and Ireland.

Also the vitrification is so far behind schedule because of a variety of incidents, including fires (see *WISE News Communiqué 541*, “In Brief”) that reprocessing has at times been delayed (see *WISE News Communiqué 543,5242*, “Sellafield: Waste tanks incident”).

Use of plutonium or reprocessed uranium in “second cycle fuels” such as MOX would create “still more complicated wastes”, and there are “concerns amongst UK scientists” about the disposal of irradiated MOX fuel.

With low-level waste (LLW) and ILW there is also the problem that much of it contains organic matter such as resins, paper or cloth. These eventually generate methane and carbon dioxide, and reactions involving metals will generate hydrogen. All these gases could contain traces of radionuclides and so be radioactive.

Because of these problems, the Royal Society concludes that changes in waste management are essential “regardless of whether a new generation of nuclear power stations generates fresh volumes of waste”. The current nuclear waste management regime in the UK “falls short of that which could be achieved through the use of currently available technologies”.

To improve this, they propose “BATNEEC” (best available technology not entailing excessive cost). Unfortunately, failing to give a definition of “excessive cost” makes this phrase rather meaningless.

## **Lack of research**

The Royal Society calls for new research, particularly into conditioning nuclear waste into “forms that are passively safe and robustly stored”. It is pointed out that there are many different types of nuclear waste, and each type requires a suitable conditioning process. “Unfortunately”, the report continues, “the relevant scientific and technological research base has been seriously diminished”.

The report proposes more international collaborations, commenting that “an independent report at EU level might be appropriate”.

## **Risks – not just terrorism**

After 11 September, “an urgent safety review should take into account the possibility of extreme terrorist intervention”. However, terrorists are not the only risk: “The present hazard is real and the risk only maintained at acceptably low levels by very active management systems.

These are costly and inevitably bring some risk of worker exposure”.

### **Spin-doctors fail**

The government spin-doctors seem to think it is just a case of “managing the debate” rather than finding real solutions. In this, they follow the industry, which according to the report, “seems to have regarded treatment of waste as of secondary importance, and to have focused its efforts on countering what it saw as hostile public opinion and on economic concerns”.

However, the Royal Society points out that the nuclear waste issue has been a public relations failure. In particular, the UK nuclear waste agency Nirex “is closely associated with the failed policies of the past.” Instead, they support the House of Lords’ proposals for a Nuclear Waste

Management Commission (see *WISE News Communique* 508.5004, “UK advice: Underground repository for LLW; excess PU should be classified as waste”).

They also foresee that new problems could arise from the splitting off of BNFL’s nuclear liabilities into a new Liabilities Management Authority (see *WISE News Communique* 559.5347, “ Full steam ahead for UK’s nuclear industry ‘Titanic’ ”, which also appeared in last December’s NIRS Nuclear Monitor). The precise role of this new authority is unclear, but there will be “new regulatory interfaces” as responsibility for cleanup of nuclear sites is shifted to the new authority, which “can cause delays and increase costs”.

The report finishes with a final warning that the reprocessing

industry must not be allowed to dictate nuclear waste policy: “It is essential too ensure that waste disposal decisions and options are not driven exclusively by pre-commitments to upstream production stages, for example the commitment to reprocessing”.

**Sources:** www.royalsoc.ac.uk; BBC, 3 May 2002; DEFRA consultation document (at [www.defra.gov.uk/environment/consult/radwaste/pdf/radwaste.pdf](http://www.defra.gov.uk/environment/consult/radwaste/pdf/radwaste.pdf))

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## **HANAU, THE PARTICLES MYSTERY AND ILLEGAL DUMPING IN SWEDEN**

The mystery of radioactive particles in the Elbmarsch in northern Germany has broadened with the discovery of additional particles near the former German MOX plant Hanau. Meanwhile, the Swedish authorities fail to prosecute Westinghouse for illegal dumping of plutonium-containing waste from Hanau on a municipal dumpsite in Sweden.

(568.5406) **WISE Amsterdam** – The particle story was featured on the German TV program “Report Mainz” on 6 May and was the lead story in the *Tageszeitung* on 7 May. Spherical radioactive particles have been found in soil samples from the surroundings of the Hanau nuclear fuel plants, according to the TV program. The particles with a diameter of approximately 1 mm were found at a depth of 15 cm.

What the particles are, and how they came to be there, is still a matter of controversy. The roots of this controversy go right back to the discovery of a leukemia cluster in the 1980s in a different part of Germany.

Germany’s – and possibly Western Europe’s – most significant cluster of

leukemia cases near nuclear installations is probably in the Elbmarsch (see *WISE News Communique* 389.3788, “Leukaemia around Krümmel”).

This is an area around the banks of the river Elbe in northern Germany, and is home to the nuclear power station Krümmel and the research center GKSS, which had two old research reactors.

Independent radiation measurements carried out after the discovery of the leukemia cluster put into question the accuracy of radiation monitoring (see *WISE News Communique* 435.4300, “False radiation measuring in Germany?”)

In December 1997, the Leukemia

Commission of Schleswig-Holstein concluded that the cause of this was probably radioactive releases from Krümmel (see *WISE News Communique* 487.4835, “German leukemia commission: Krümmel NPP cause of high leukemia rate”). However, this raised the question of why a nuclear power station with just one reactor should give rise to so many leukemia cases.

The controversy continued after the discovery of strange spherical radioactive particles in the area. The German section of International Physicians for the Prevention of Nuclear War (IPPNW) arranged for these particles to be analyzed by a group called ARGE PhAM (working group on physical analysis and measurement techniques).

This group, whose leader Heinz Werner Gabriel describes himself as a "supporter of nuclear energy", says that the Elbmarsch particles contain plutonium, enriched uranium, curium, and americium. They claim that the particles are an experimental type of nuclear fuel known as "PAC fuel", and that they were released after an accident on 12 September 1986 at GKSS.

After these claims were made, staff of the Federal Radiation Protection Authority, the ecology department of the State of Lower Saxony and the Jülich nuclear research center all tried to find more particles, but without success. Some months ago, the state attorney for Schleswig-Holstein ordered seizure of the soil samples taken by ARGE PhAM in order to investigate them "very officially". (Note: in the Elbmarsch, one bank of the river Elbe is in Schleswig-Holstein and the other is in Lower Saxony).

#### **Particles at Hanau**

The mystery then broadened after the discovery of particles near the Nukem nuclear fuel production plant at Hanau, 500 km (300 miles) to the south. Although the TV program "Report Mainz" reported that these particles also contained plutonium and uranium, it turned out that they had not yet been analyzed - they merely "looked" similar to those from Geesthacht under the electron microscope.

Others have suggested that the whole affair is merely a media hoax, and the particles could be earthworm casts (!) or industrial slag. Industrial slag commonly contains naturally occurring radioactive materials such as uranium, radium, thorium and potassium.

#### **Illegal dumping in Sweden**

While speculation on the particles in Germany continues, Swedish authorities are refusing to prosecute Westinghouse for illegal dumping of plutonium-containing waste from Hanau, which ended up on a municipal dumpsite in Sweden.

40 metric tons of material have been delivered from Siemens to Ranstad Mineral AB. At Ranstad Mineral AB's uranium-processing plant (a former uranium mill), residual uranium was recovered from the Hanau material. After the extraction of the uranium, the material was dumped on the nearby municipal Risängen dump site which is located in the community of Skövde.

According to a Swedish parliament resolution, the import of radioactive waste into the country is prohibited in principle, but the Hanau material escapes this because it is classified as "useful residues."

In April 2000 it was found that the plutonium concentrations in samples from dumped waste originating from treated Hanau material exceeded the

admissible limit of 100 Bq/kg tenfold. The Swedish Radiation Protection Institute (SSI) then prohibited further dumping of this material. In December 2000 however, Westinghouse Atom AB, the licensee for the dumping, illegally continued dumping of at least five further batches of the material.

SSI then investigated whether Westinghouse Atom AB might have penal responsibility for breaching the Radiation Protection Law. According to the law, a minor breach does not imply penal responsibility. And, SSI considered the breach "minor", claiming that no hazards to humans or the environment had occurred.

#### **Irradiation: sooner or later?**

The particle controversy and the Sweden dumping incident illustrate the hollowness of the nuclear industry's claim to keep radioactive material isolated from the environment. Sooner or later, some of it always seems to escape. Whether unintentionally, as in the alleged incidents in Germany, or intentionally – and even illegally – as in the Sweden dumping incident, the industry just seems to keep spreading its waste around.

**Sources:** *tageszeitung*, 7 May 2002; WISE Uranium web site; *Main Echo*, 10 May 2002; *Frankfurter Rundschau*, 16 May 2002

**Contact:** WISE Uranium

## **TAIWAN: NO NUKES, NO WASTE!**

Expressing their wrath at the government's failure to remove nuclear waste from the island, the Tao tribe of Orchid Island launched an island wide protest on 1 May 2002 to demand that Taiwan's government set up a solid schedule and promise to remove nuclear waste from the island.

(568.5407) **Green Party Taiwan** - The temporary repository of radioactive waste in Orchid Island was opened in 1982, and has already stored 97,672 barrels of low-level radioactive waste, which accounts to 57% of total production (see *WISE News Communiqué* 387-8, "Orchid Island: Taiwan's Nuclear Dumpsite").

Taiwan's anti-nuclear organizations

have launched campaigns to support the Orchid Island residents. On 3 May 2002, in front of the Legislative Yuan, representatives of environmental NGOs denounce the failure of the relocation project as disrespecting environmental justice. The living standard of Orchid Island residents is much lower than that in Taiwan, and for them nuclear power is unnecessary and unwanted.

However, Orchid island residents have to bear the risk of nuclear waste produced from the main island of Taiwan.

Anti-nuclear organizations demand that Taiwan's government remove the nuclear waste from Orchid Island. The relocation project must not be postponed because of the difficulty of finding a final storage

site. It is proposed by anti-nuclear organizations that the government should relocate the nuclear waste to a military area or a nuclear prohibited site.

After the immediate response of the government to the aborigines' protest on 1 May, residents nearby the first, second and third nuclear power plants launched protests as well. Those residents are concerned that their health may have been threatened by the nearby high level radioactive waste storage and nuclear fuel. The fisheries living nearby the second nuclear power plant have even demanded that Taiwan Power Company pay them 26 billion NT dollars (US\$730 million) in compensation.

Anti-nuclear organizations consider that the problem of nuclear waste is due to the mistaken nuclear energy

policy of the government. Since the Progressive Democratic Party (DPP) became the ruling party, attempts had been made to correct the mistaken nuclear energy policy when the Executive Yuan announced a halt to the construction of the fourth nuclear power plant on 27 October 2000 (see *WISE News Communique* 538.5217, "Taiwan: Lungmen cancellation announced, political row continues"). However, the boycott of the opposing parties in the Legislative Yuan resulted in a resolution reinstating the project, forcing the government to resume construction of the Fourth Nuclear Power Plant on February 14, 2001 (see *WISE News Communique* 543.5245, "Taiwan: Two sides to the nuclear coin").

Any foreign negotiation with North Korea, Russia, China or even the Solomon Islands in seeking the final

storage site for nuclear waste would never provide a solution, if the opposing parties continually insist on the mistaken nuclear energy policy. Withdrawing the nuclear energy policy is the only way to resolve the problem. Therefore, anti-nuclear organizations call on the government and opposition parties to address the welfare of the people by halting the fourth nuclear power plant as soon as possible. It is also essential to decommission the three already built nuclear power plants, letting all the people enjoy a nuclear-free Taiwan and live without any risk of nuclear waste.

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## WEAKENING OF NUCLEAR TRANSPORT REGULATIONS

The United States Department of Transportation (DOT), in conjunction with the US Nuclear Regulatory Commission (NRC), is proposing to adopt United Nations International Atomic Energy Agency (IAEA) nuclear transport regulations. These may make nuclear transport more dangerous and may even help pave the way for radioactively contaminated materials to be "recycled" into everyday items.

(568.5408) NIRS – The IAEA regulations (TS-R-1) (1) allow radioactive materials under certain circumstances to be transported as if they are not radioactive, in addition to other provisions. Other nations and the European road and rail organizations are also being pressured under the guise of "harmonization" to accept these requirements.

Deregulation of radioactive materials has been repeatedly defeated by massive popular opposition when proposed by other US agencies (Environmental Protection Agency, Nuclear Regulatory Commission, Department of Energy). If approved, this rule would serve as a technical precedent for deregulating radioactive wastes and materials in the US and around the world.

Some main concerns are:

- (a) the process by which nuclear advocates, including federal regulators, use the United Nations/IAEA procedures to overcome clear national mandates against radioactive waste deregulation;
- (b) the deliberate dispersal of radioactive materials into raw materials, products, the marketplace and our surroundings;
- (c) the overall reduction in protections in the TS-R-1 transport regulations in many of its provisions; and
- (d) the fact that US DOT rules generally preempt state and local authority, undermining more protective laws and regulations.

### **Anti-democratic process**

IAEA transport requirements are continuously developed behind

closed doors with no opportunity for public input. The TSR-1 regulations took a routine path through the United Nations (UN) committees of nuclear advocates, avoiding the light of public scrutiny, to become regulations for UN transport organizations, the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO). These, and most, UN organizations have cooperative agreements with the IAEA that facilitate getting the nuclear industry's desired policies into international requirements or statements.

Although US government officials participated in the IAEA, UN, ICAO and IMO meetings, they did not effectively represent or inform the concerned public. There are

indications that they expressed some concerns with IAEA on its secretive, exclusive habits, but the only visible result so far is a reduction (from \$80 to \$17) in the price the public must (still) pay to get a copy of the IAEA documents proposed to become our governing regulations. Access to information in these rulemakings is very challenging and the content of the transport regulations is complex, making it more difficult for the public to play an active role.

### **Facilitating radioactive "recycling"**

Among the many complicated and protection-reducing transport schemes proposed in TSR-1, is the attempt to legalize the exemption of varying amounts of every radionuclide from nuclear transport regulations. This will also remove one of the obstacles to the dispersal of radioactively contaminated substances into daily commerce, raw materials, personal items, vehicles, buildings, children's toys and furniture, soil, concrete, medical devices and more.

A new chart (2) is being proposed that would set exempt concentration and quantity levels for releasing nuclear shipments from transport regulations. The right side columns in the new chart list Exempt Concentrations. These are the very same concentrations that the nuclear establishment is trying to get adopted in every country to allow radioactive waste release and recycling. US DOT and the rest of the world all currently have a uniform exempt concentration for any radioactive materials (70 becquerels per gram).

NIRS does not support any level of exemption, but this 70 becquerels per gram is the existing world value

### **Radioactive flood threat in Central**

**Asia.** On 12 May, a huge landslide nearly 400,000 cubic meters in size has blocked the course of a local river, posing a threat of flooding a radioactive dumping site near the town of Maylisu in the south of Kyrgyzstan. The dumpsite is one of many

that previous secret international rulemakings brought us. Now, supposedly based on "science", the nuclear establishment wants to change these numbers – and well over half of them (222 of the 382 listed) go up, thereby increasing the exempt concentrations for the majority of radionuclides. NIRS questions and challenges the "science" being used to justify TS-R-1 exemptions. We even more adamantly oppose any *increases* in those levels and have suggested that only reduced levels be adopted if changes are made.

The proposed chart lists exempt amounts or quantities of radioactive materials in entire shipments (consignments). Large amounts of some radioactive elements can be transported as if not radioactive. There are no comparable exemptions in the existing regulations. The amounts listed appear to have the potential to give unsuspecting members of the public doses near or exceeding allowable worker inhalation doses in the US.

### **Additional Concerns**

US DOT and NRC share authority over nuclear waste transport in the US and are intending to incorporate the IAEA's 1996 radioactive transport regulations plus a few additional provisions. The justification is we need to harmonize our standards internationally, but they were already in harmony. The new regulations (TS-R-1) are being adopted to relax protections and let more radioactive waste out into commerce unregulated. At a time when we could be facing dramatic increases in the amount of nuclear material on roads, rails, ships, planes and barges in the US and internationally, the trend should be

toward tightening up and increasing protections.

The NRC and DOT proposals also appear to weaken requirements for Type B containers (which are used for irradiated fuel transport), uranium hexafluoride packaging, plutonium transport requirements, surface contamination levels on Type B containers, design changes for dual purpose casks and "grandfathering" of old cask designs. For those who follow transport regulations, the "A1" and "A2" values which determine the need for and type of transport containers required, are being changed. One result is supposedly a determination that the double containers now required in the US for plutonium shipments are not necessary and a proposal to do away with that requirement.

The deadline for comment to US NRC and US DOT is July 29, 2002 and public hearings will be held in Chicago on 4 June and in Rockville, MD on 24 June.

### **References:**

- (1) 67 FR 83:21328-388 April 30, 2002, DOT RSPA Notice of Proposed Rulemaking Docket No. RSPA -99-6283 (HM 230) Hazardous Materials Regulations; Compatibility with IAEA, and
- 67 FR 83:21390-484 April 30, 2002, NRC Proposed Rule: Compatibility with IAEA Transportation Safety Standards (TS-R-1) & other transport amendments, and IAEA "Regulations for the Safe Transport of Radioactive Material," 1996 Edition, ST-1, now TS-R-1.
- (2) proposed 49 CFR 173.436 in the DOT regs or IAEA TSR-1 Section IV Table I columns 3 and 4.

**Source and contact:** D. D'Arrigo at NIRS (+1 202 328 0002 ext. 16, dianed@nirs.org)

## **IN BRIEF**

tailings dumps from Soviet uranium mines abandoned in the 1960s. Local civil defence teams are making all possible efforts in order to stop floodwaters reaching the dump, since a worst case scenario involves radioactive water "tearing through Central Asia all

the way to the Aral Sea" according to Anarkul Aitaliev, from the government's department of environmental monitoring.

By sheer coincidence, a working group of the Interparliamentary Assembly of the

Eurasian Economic Community arrived in Bishkek on 13 May 2002 on a fact-finding mission to Kyrgyzstan's tailings dumps.

**WISE Uranium web site**

**Radioactive killer mushrooms.** At another of Kyrgyzstan's tailings dumps, one local resident has died and another five are in intensive care after eating mushrooms. Residents had been picking mushrooms in the restricted zone of the Kara Balta uranium tailings dump, the largest in the country.

**WISE Uranium web site**

**Argentina: demonstration against waste import.** Around 3,000 protesters gathered in Buenos Aires on 12 May to protest against plans to import nuclear waste from Australia. The plans form part of the agreement for Argentinean company INVAP to build a replacement research reactor at Lucas Heights in Sydney (see *WISE/NIRS Nuclear Monitor* 566, "In Brief").

**news.com.au, 13 May 2002**

**Actions in Germany.** A week of anti-nuclear actions in Germany has included protests against a nuclear industry conference in Stuttgart (14-16 May) and actions against Castor transports. On 16 May, nuclear waste transports from Ohu, Krümmel, Mühlheim-Kärlich, Brokdorf and Neckarwestheim took place, and one of the transports was stopped for a time at Nuremberg. The transports are continuing towards La Hague (France) and Sellafield (UK) as this *WISE/NIRS Nuclear Monitor* goes to press.

**www.indymedia.de, 16 May 2002**

**Russia: anti nuclear action camp.**

Russian anti nuclear groups will organize protest actions, including an anti-nuclear walk and an action camp, starting 29 June and ending 6 July. The actions will take place near Krasnoyarsk, a Siberian city where Russia plans to store 20,000 tons of imported spent nuclear fuel. The organizers are Ecodefense (WISE Russia), the Krasnoyarsk branch of the Socio-Ecological Union, the Anti-nuclear campaign of the Socio-Ecological Union

and Greenpeace Russia.

**Contact: WISE Russia at [ecodefense@online.ru](mailto:ecodefense@online.ru).**

**NPP's documents end up in bookstore's trash.**

Documents on the U.S. North Perry nuclear power station have been found by a television station in a trash bin of a nearby bookstore. The documents had been dumped there by an employee of GE Power Systems, a company that was responsible for the refueling at the plant. The GE Power Systems company had recently been replaced by Framatome ANP. GE cleared out their office at the plant and the employee made arrangements to dispose of the documents at the bookstore. The U.S. Nuclear Regulatory Commission said that none of the documents revealed safeguarded information. But it also recognized that such kind of documents would be withheld from public disclosure if it were in NRC's possession.

**The News-Herald, 9 May 2002**

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WISE/NIRS NUCLEAR MONITOR

The Nuclear Information & Resource Service was founded in 1978 and is based in Washington, US. The World Information Service on Energy was set up in the same year and houses 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 issues.

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