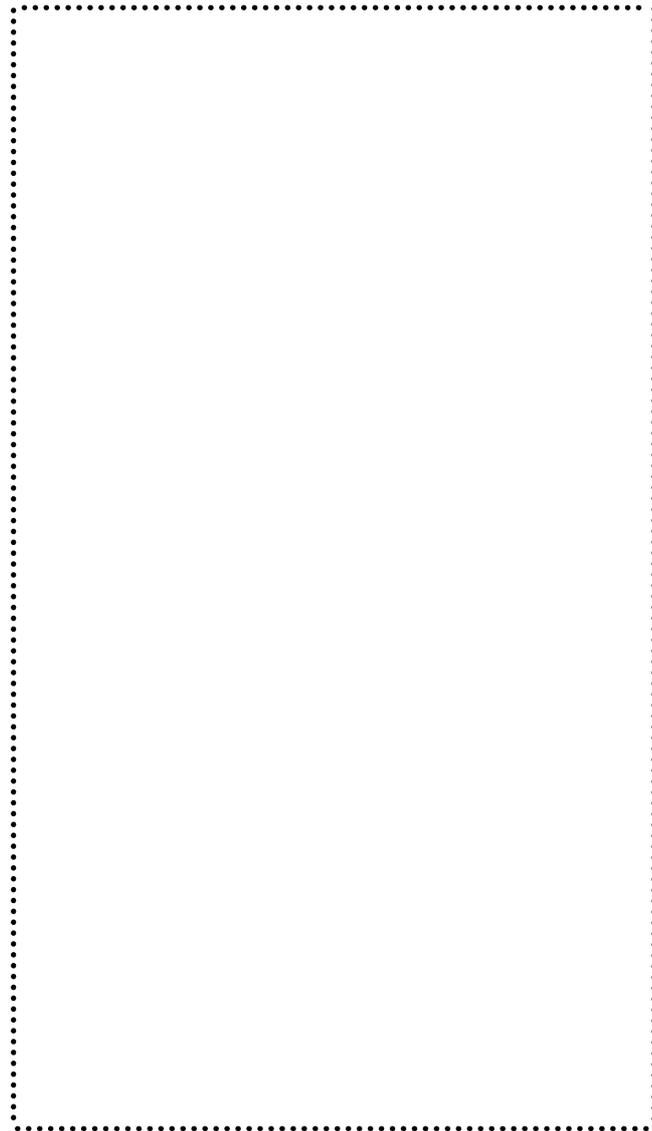
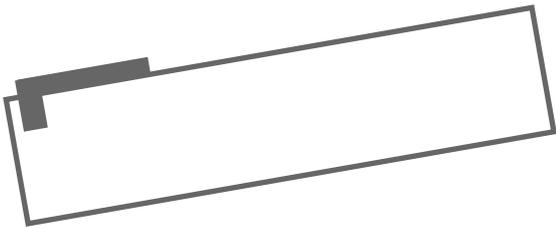


# Plutonium *Investigation*



**T**he United States is the biggest plutonium player in the global scene, even though it currently does not have a commercially-based reprocessing or plutonium use policy. The known US stockpile under federal management is well over 100 tonnes, and private utilities retain very significant stocks in unreprocessed irradiated fuel.

It was in the United States that plutonium was created experimentally for the first time, by Glenn Seaborg in 1941 (PI No. 12-13); and in 1945 the United States became the first country to manufacture and test plutonium-based fission weapons. The United States remains the only country to

CONTINUED ON PAGE 2

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## Questions over US-Russian Plutonium Deal

In early February 2000, in a surprise move, the Russian government reportedly has reversed its former policy of insisting on using plutonium recovered from military stocks as reactor fuel (see *Plutonium Investigation* No.12-13, March-April 1999). According to a White House briefing, an initiative was concluded as part of the President's FY 2001 Expanded Threat Reduction Initiative. The DOE says it launched a \$100 million collaborative program with Russia to reduce the proliferation challenges posed by Russian nuclear facilities and weapons-usable nuclear material, especially separated plutonium from the civilian nuclear power sector.

This new initiative is a key element in a broad U.S. effort in Russia to end the production of fissile materials and reduce existing stockpiles, an effort that includes the Plutonium Disposition Program, the HEU Purchase Agreement, the Plutonium Production Reactor Agreement, and the Core Conversion Agreement. The Administration justifies the development saying "all of these activities, as well as the hundreds of millions of dollars we are spending to improve fissile material security in Russia and other countries of the former Soviet Union, reflect our deep concerns over the risks of theft and diversion of nuclear materials in the unique circumstances of the post-Cold War environment".

A few days after the DOE announcement, the Atomic Energy Minister Yevgeny Adamov, according to the Washington Post, told visiting U.S. academics that "no negotiations" on such an agreement were being conducted, and that only preliminary talks had been held. Matthew Bunn, one of the key scientists involved in the plutonium disposition projects at Harvard University, said it appeared that the U.S. Department of Energy had been "too eager to claim an agreement before it existed".

For DOE Fact Sheet on the US-Russian deal see: <http://www.pu-investigation.org/news.html#long>

being reversed as a result of a series of disarmament initiatives with Russia.

In the 1970s the Atomic Energy Commission, a forerunner of DOE, produced desk studies on plutonium fuel use, the most prominent of which was the Generic Environmental Statement on Use of Mixed Oxide Fuel (MOX) in Light Water Reactors (GESMO) issued in 1976. The GESMO project was terminated in 1979 following the national policy decision not to use MOX plutonium fuels. A completed commercial scale reprocessing plant at Barnwell, South Carolina, was mothballed at the same time. The West Valley, New York, reprocessing plant, a commercial venture belonging to Nuclear Fuel Services, operated only from 1996-1972. It was shut down due to serious environmental and financial problems. A reprocessing plant at Morris, Illinois, never operated because of technical flaws.

The current so-called "plutonium disposition" strategy dates from early 1992, under the Bush administration, and an accord dubbed the "Safe and Secure Dismantlement" (SSD) initiative aimed initially solely at Russia's nuclear weapons arsenal and fissile materials stockpile. The initiative set off a series of options studies by government departments and agencies, exploring the technical, diplomatic, and potentially commercial implications of what began as a nonproliferation bilateral agreement.

Within barely a year of the 1992 accord, studies began to emerge. The US Nuclear Regulatory Commission (NRC) looked at the implications of licensing US commercial reactors if they were fueled with Russian origin ex-military plutonium. The Congressional Office of Technology Assessment (OTA) reported in September 1993 that both the use of plutonium in fuel and the immobilization of plutonium in waste are technically possible, but the jury remained out on the economics of the options. The OTA report, "Dismantling the Bomb and Managing the Nuclear Materials", was critical of the government's lack of a "clear mission", and warned that utilities themselves were cautioning against using surplus weapons plutonium as they feared it was likely to re-ignite public opposition to nuclear power.

Another set of studies, begun in August 1992 by DOE's Plutonium Disposition Task Force, was released in July 1993. A DOE Fission Working group and a Technical Review Committee backed

plutonium re-use as MOX suggesting that it was the "most practical and economic alternative evaluated". They did not, however, consider the vitrification or other disposal options, which reduced the usefulness of their views. Whereas a Congressional Research Service paper for lawmakers, "The Nuclear Weapons Complex Alternatives", issued in February 1992, had concluded that blending separated plutonium from former military uses with high-level waste and managing it as a waste form was a feasible option.

In a 27 September 1993 address to the United Nations General Assembly, focused on nonproliferation, President Clinton outlined the US plutonium position aimed at banning the additional production of plutonium (and high-enriched uranium [HEU]) and discouraging the excessive accumulation of plutonium in separated form. Until very recently, the United States has not efficient action to put this policy into effect; the stock of separated plutonium continues to accumulate. Nevertheless, shortly after the speech, on 7 December 1993, the then energy secretary, Hazel O'Leary, launched DOE's "Openness Initiative", involving the release of previously classified official data. This initiative led to the publication, in February 1996, of a wide-ranging report, "Plutonium: the First 50 Years, United States Plutonium Production, Acquisition and Utilization, from 1944 to 1994".

Then in January 1994, what has become the operating blueprint for disposition policy - "Management and Disposition of Excess Weapons Plutonium" - was released by the prestigious National Academy of Sciences (NAS) after eighteen months of research. The National Security Council had requested that the report be prepared.

The NAS Committee on International Security and Arms Control (CISAC) warned bleakly that the accumulation of plutonium represented "a clear and present danger". In its assessment of MOX recycle technical options, it asserted, however, that "the need to deal with excess weapons plutonium should not drive decisions concerning the future of nuclear power".

For the longer term, the committee urged that options for disposition of plutonium be designed to meet a "spent-fuel standard" - making this plutonium as difficult to acquire and to turn into weapons as the much larger and growing quantity of plutonium in irradiated fuel from civilian reactors

worldwide. The spent fuel standard should be met "as quickly as possible", while maintaining the strictest standards of accounting and security and ensuring protection for the environment, safety, and health. The US government adopted the spent fuel standard proposal, as a matter of importance, within a few months. The committee also coined the term "stored weapon standard", MOX made from military plutonium and the plutonium itself should be stored to the "stored weapons standard" all along the processing path.

In another conclusion the NAS said that vitrification raised "fewer security risks in handling than the MOX option, because the process of mixing plutonium with High Level Waste would be easier to safeguard than the more complex problem of fabricating MOX".

Researchers calculated that adopting either the MOX strategy or the vitrification option to convert plutonium to the spent fuel standard would cost between \$1 billion and \$5 billion for the 50 tonnes of "excess" weapons plutonium expected to become available in the United States by 2005, as a result of disarmament agreements. Commenting on the report's implications, NAS plutonium panel chairman, Wolfgang Panafsky said in a memorable phrase: "The world is condemned to having to baby-sit this material for at least another decade".

The full NAS study may be accessed via the NAS web site at [www.nas.edu](http://www.nas.edu).

NAS produced a related study in July 1995, on the specific MOX reactor related recycle options. The 1994 NAS report set in train another series of reports and initiatives on disposition policy. Already public/private consortia such as that based around the Washington Public Power Supply System (WPPSS) were developing projects. WPPSS's "Isiah Project" - backed by research laboratories including Battelle Pacific Northwest centered in a plan to experimentally fuel with MOX some incomplete or otherwise redundant reactors at the Hanford nuclear reservation.

Hazel O'Leary was less sanguine. She was quoted in the Denver Post, 29 March 1994: "Some people think that plutonium is a very valuable commodity which could enter the market place. I think that's balderdash". Shortly thereafter one prospective industrial consortium headed by ABB-Combustion Engineering said it would defer plans to finance, build, own and operate two multipurpose MOX-burning reactors at Savannah River until

### U.S. NGOs on Plutonium Disposition\*

"We are told that the MOX program is a non-proliferation measure. But under pressure from nuclear establishments in both countries (US and Russia), the goal of stabilization and immobilization of plutonium has been undermined by a program which threatens to push both of our countries into a plutonium economy. Money makes policy. The larger the investment into plutonium facilities under the auspices of a disposition program, the more likely it is that these facilities will continue to be used for other purposes once the disposition program is completed. Furthermore, it is apparent that international plutonium companies such as Cogema (France) and British Nuclear Fuels (UK), Ltd. are seeking to serve their own financial interests by pushing MOX."

*\* extract from a declaration of a coalition of over 200 NGOs, released 15 June 1999, at the opening of DOE-organized hearings on the supplement to the Surplus Plutonium Disposition EIS*

DOE had decided upon its long term disposition options.

By the summer of 1994, the formal process of consultation on the emergent disposition strategy was underway. On 21 June, using the traditional means, the DOE published in the Federal Register, the government's notice board, its Notice of Intent (NOI) to solicit comments from the public on the scope of a proposed Programmatic Environmental Impact Assessment (PEIS) on the storage and disposition of weapons usable fissile materials. It is characteristic of the long-drawn-out US system of public consultation - and publication of relevant documentation to an extent probably not matched anywhere else - that even the "pre-decisional" text of the NOI for the PEIS was issued for public comment.

By November 1994 a DOE plutonium issues panel had released yet another report, on "Environmental Safety and Health Vulnerabilities Associated with the Department's Plutonium Storage", which listed thirty-seven storage, direct

disposal, immobilization, and reactor acceleration options for disposition.

On 1 March 1995, President Clinton announced that 38.2 tonnes of weapon grade plutonium were to be declared surplus to US defense needs. The amount was significantly lower than the 50 tonnes suggested in earlier governmental statements. A debate over the new figure arose subsequently. (See the box on page 11)

In February 1996, shortly after DOE issued its path-breaking plutonium openness document revealing the government plutonium inventory of nearly 100 tonnes, the DOE issued the PEIS for its draft Stockpile Stewardship and Management strategy, which discussed the demands that would be made in the future on certain major DOE sites, including Los Alamos and Lawrence Livermore Laboratories and Pantex, Savannah River, and Oak Ridge's Y-12 plant. They would find it necessary to take a more aggressive role in future plutonium management as a result of the downsizing implications of DOE plans.

A draft PEIS on the "Storage and Disposition of Weapons-Usable Fissile Materials", covering Hanford, Idaho National Engineering Laboratory, Oak Ridge, Pantex, Savannah River and NTS was issued at the same time. In the Storage and Disposition document the options canvassed for plutonium disposition were immobilization in glass or ceramic form; deep borehole disposal in immobilized form; or introduce into reactors as MOX.

Both the nuclear weapons labs and the processing sites from this point onwards engaged in a serious competitive battle to secure political favor in support of their respective roles in future plutonium management, with jobs being a key driver. The PEIS estimated the job situation at the major DOE sites by 2005 as follows: Oak Ridge 18,000; Savannah River 16,500; Hanford 14,000; Idaho 7,000; NTS 3,800; Pantex 3,600.

By August 1996 DOE had issued another study, "A Technical Summary for Surplus Weapons-Usable Plutonium Disposition". One initial finding suggested it would take between twenty-five and thirty-one years and cost between \$1.78 billion and \$2.09 billion to consume the surplus weapons-origin plutonium as MOX in existing light water reactors. By contrast, vitrification undertaken in existing facilities would take nine to eighteen years and cost around \$1.81 bn. The

## The New Federal Agency NNSA – 'S' for 'Security' or for 'Secrecy'?

As of 1 March 2000 a new federal agency, the National Nuclear Security Administration, will assume management of DOE facilities still directly engaged in research and development on nuclear weapons. The agency will come into being as a result of accusations that lax DOE security allowed defense secrets to be stolen from Los Alamos National Laboratory (see section on nuclear sites later). Congress, in the National Defense Authorization Act for Fiscal Year 2000 required DOE to create the agency to separate weapons R&D from its non-defense research programs.

The new agency will be semi-autonomous, with the Energy Secretary having at least titular oversight. According to DOE's implementation plan, cleanup and environmental management at existing waste sites will continue to be carried out by DOE's Office of Management and Budget (OEM). However, "management of newly generated wastes at NNSA laboratories and facilities is the responsibility of the NNSA, but is not necessarily an NNSA function". NNSA may, the plan says, give management of the wastes to OEM, but the plan does not specify the arrangements for such an approach.

When it created the NNSA, Congress also created the position of under secretary to oversee DOE's energy, science, and environmental management programs. DOE says that this under secretary will have the authority to close a site if a health or safety issue necessitates closure.

Nevertheless, the reorganization of the DOE is open to serious criticism. Attorneys general from more than forty states signed a letter to Congress in September 1999, warning that the agency could override state control of environmental issues at the laboratories. Public-interest organizations fear that they will be cut off from their existing sources of information about laboratory activities. A danger of a different type is that DOE's civilian research programs will no longer be able to benefit from research on nuclear weapons. As of early February 2000, the under secretary for national security, who will lead the new agency, had not yet been named. Energy Secretary Bill Richardson is interim leader. Dr. David Michaels, DOE assistant secretary, will become under secretary for the energy, science, and environmental management programs.

lower-end estimate of ceramic immobilization was \$1.8 bn, carried out over nine to twenty-one years. Other possible options were judged to cost a lot more, electro-metallurgical transmutation, for instance, \$3.43 bn over thirteen to twenty-two years, if it worked. A powerful coalition of non-government groups including the Nuclear Control Institute, Greenpeace International and the Union of Concerned Scientists challenged the economic analysis of the MOX option as a serious underestimate.

On 1 October 1996 a draft "Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Disposition

Alternatives", prepared jointly by the DOE offices of Arms Control & Nonproliferation and of Fissile Materials Disposition, was issued. It conceded that using the MOX option "could be perceived as a change in the US fuel cycle policy of not encouraging separation and recycling of plutonium" and could encourage additional use. It added: "Use of MOX by the United States might in some cases provide modest political cover for would-be proliferent states to pursue and justify plutonium production capabilities".

Although the DOE study was careful to play down the proliferation risks, John Holum, then director of the Arms Control and Disarmament

Agency (ACDA), was unconvinced. He commented in a stinging memo of 1 November 1996 that if the United States adopted the MOX option “we would hear only one message for the next twenty years: that plutonium use for generating commercial power is now being blessed by the US (...) the overriding message we will convey is that civil plutonium use is acceptable”. He said that he “recommended strongly” that the Energy Secretary reject the hybrid (dual-track) option and select immobilization.

The two government bodies smoothed over differences on the proliferation impact of MOX, allowing DOE to select the twin-track MOX and immobilization strategy as the preferred alternative in its Final PEIS on Storage and Disposition. Nevertheless, DOE felt it necessary to comment in December 1997, when it released this version: “Although it may be possible to make a nuclear weapon from irradiated commercial reactor fuel, this can only be done with extreme difficulty by individuals with a great deal of experience in handling and processing nuclear materials. DOE believes that the disposition of weapons plutonium through the use of MOX fuel in reactors would meet the Spent Fuel Standard in creating a radiological barrier that makes the plutonium as difficult to retrieve and re-use in weapons as in spent commercial fuel.” DOE announced its Record of Decision (ROD) on the Final PEIS in January 1997. As anticipated, the ROD confirmed the dual-track.

**The PEIS on Storage and Disposition is a very detailed document. It sets out multiple options for dealing with the plutonium surplus:**

- For MOX, it envisages four main plutonium consumption routes: use in existing light-water reactors (LWRs), in refurbished currently partly built LWRs; in “evolutionary design” LWRs or in CANDU reactors in Canada; and it rejects twelve alternative reactor possibilities on technical or nonproliferation grounds.
- For immobilization with radionuclides, it accepts three main options as possibilities: vitrification in borosilicate glass, with each glass log containing about 84 kgs of plutonium; immobilization in ceramic disks, each containing about 4 kgs of plutonium, or electrometallurgical treatment. Three

other options are rejected, two on technical grounds; and underground detonation is rejected as not likely to get a license.

- Two direct disposal options are judged reasonable: immobilization or direct emplacement in deep boreholes. Eleven others are rejected on a variety of technical or environmental safety grounds.
- The other option is no disposition action and continued storage of the plutonium stocks.

To comply with the US policy generally discouraging the civilian use of plutonium the MOX fuel fabrication facility would have to meet the following conditions: its construction would take place at a secured DOE site; it would be owned by the government; it would be operated only for the disposition of surplus weapons plutonium; and it would be shut down at the completion of its disposition mission.

A coalition of fourteen opposition groups strongly condemned the DOE for opting for the MOX option. The DOE argued that using some US military origin plutonium in MOX fuel would encourage the Russians to do likewise. According to the energy secretary, of a hundred comments submitted on the twin track plan, about half opposed MOX and half opposed immobilization using vitrification.

One opponent of the FPEIS said in frustration: “Beyond the usual findings that it is rife with flagrant redundancies; is an incomprehensible maze of meaningless tables; is so inconsistent with other documents to qualify as a parallel universe of information; is devoid of the meaningful information numerous groups/people requested in writing last year; [it] has enough sharp, unanticipated twists of logic to qualify the writers (and maybe paid activists) for mental disability...”.

And so the positions were set for the plutonium debate, which continues to the present. A national networking coalition of over two hundred groups formed, under the banner of ‘NIX MOX’ (‘nix’ in German stands for ‘nothing’), with links to opponents of MOX in Europe and Russia. The coalition has organized regional protest meetings and annual protest days to focus popular and media attention on the implications of plutonium use. Typical of the opponents’ criticisms are those from the Safe Energy Communication Council (SECC), a coalition of environmental, consumer and public-interest groups, in Washington, DC,



## MOX - Recent Developments

The two-track option confirmed, DOE moved forward, putting the emphasis on MOX. In June 1998, then Energy Secretary Frederico Peña announced that he had selected the SRS as the new site for a MOX fabrication plant, costing \$500 million and offering around 500 new jobs. In December 1998 the new Energy Secretary Bill Richardson made known the choice of SRS as the planned location also of a plutonium Pit Disassembly and Conversion Plant (PDCP). The choice followed keen competition for the plant between SRS and the PANTEX facility located in Amarillo, Texas. The plant supposedly would create 400 permanent jobs after its completion in five to six years time.

On 23 March 1999, DOE announced a \$130 million contract for the first phase of MOX use in US commercial reactors. The contract followed an extended DOE consultation and review procedure that began in the spring of 1997 with the publication of the Procurement Acquisition Strategy to canvass MOX manufacturers and utilities interested in the MOX disposal option. DOE awarded the contract to an industry consortium composed of Duke Engineering & Services, Stone & Webster, and Cogema Inc., the US subsidiary of France's state-owned nuclear fuel company. Subcontractors for the team are Belgonucleaire, Framatome and Nuclear Fuel Services. Opponents point out that DOE made this contracting decision before it issued its Record of Decision in regard to its EIS (Environmental Impact Statement) on Surplus Plutonium Disposition.

DOE also chose six reactors in the Carolinas and Virginia to burn MOX. The plants are: **Catawba 1 and 2** (near York, South Carolina), owned by several municipal electric companies and Duke Power; **McGuire 1 and 2** (near Huntersville, North Carolina), owned by Duke alone; and **North Anna 1 and 2** (near Mineral, Virginia), owned by Virginia Power.

Duke's view of the implications of getting into the MOX business is clear from a comment that its senior vice president Tuckerman made to *The Tennessean* newspaper in October 1998, "If MOX fuel is successful in the United States it could ultimately lead to full-scale reprocessing of spent nuclear fuel...".

Commonwealth Edison had pulled out of a BNFL-led, competing consortium in September,

1998, following stakeholder objection to the company's prospective involvement in the MOX program. The BNFL consortium was composed of Bechtel, Babcock & Wilcox, and Westinghouse. The other consortium to submit a proposal to DOE by the September 1998 deadline was led by Siemens, and included Raytheon and Battelle. DOE refused this bid, because of perceived irregularities in the consortium's composition.

The announcement of the MOX burn program followed release of a study in January 1999 by the Nuclear Control Institute, which concluded that a severe accident at a reactor using 100% MOX could result in twice as many cancer deaths as a similar accident at a uranium-fueled plant. For reactors fueled by one-third MOX cores as is envisaged for the start of the program, the calculation suggests a 37% increase in cancers. The increases would be due to the greater number of actinides in MOX fuel, including plutonium, americium and curium.

Shortly after the contract announcement, DOE issued the Draft EIS for Savannah River Site's Spent Nuclear Fuel Management. It is a very important document on the future of reprocessing aimed at assisting the DOE, which owns SRS, to decide how to manage sixty-eight tonnes of irradiated fuel. Most of this material is already at SRS, and the remainder is scheduled to arrive there during the next thirty-five years. The two reprocessing plants at SRS, the F- and H-Canyons, are the last operational reprocessing plants in the country, since the plants at Hanford and Idaho have closed. (The Draft EIS is available on: <http://tis.eh.doe.gov/nepa/docs/docs.htm>)

In August 1999 DOE concluded a deal with Raytheon for a 2 1/2 -year, \$40 million contract to design the plutonium Pit Disassembly and Conversion Plant (PDCP). A July 1998 DOE study estimated that the facility would cost about \$920 million at SRS, compared to \$980 million at Pantex. The 1999 Appropriation request for pit disassembly into unclassified forms was \$155.4m, an increase of \$72.3m over the 1998 figure. The PDCP would have a capacity of 3.5 tonnes of plutonium a year.

The ARIES (Advanced Recovery & Integrated Extraction System) developed jointly by Los Alamos (LANL) and Lawrence Livermore labs will provide the technical base, according to DOE. ARIES uses hydrogen and / or oxygen to recover

### Weapons Plutonium Inventories by Nuclear Processing Plant

Rocky Flats	12.9 tonnes
Hanford	11.0 tonnes
INEEL Idaho	4.5 tonnes
Los Alamos	2.6 tonnes
Savannah River	2.1 tonnes
Pantex	21.3 tonnes

*Figures are open to question as different DOE sources indicate different quantities*

the plutonium from the pits. The pit falls apart in flakes, which are collected and transformed into plutonium oxide. A demonstration prototype pit disassembly plant, capable of processing up to 40 different types of pit, was started up at LANL in September 1998. LANL has been lobbying the Russians to use this technology.

A key political figure in pressing for United States-Russia cooperation on plutonium management has been Senator Pete Domenici, a powerful Republican from New Mexico who chairs the Senate Special Task Force for Plutonium Disposition.

The Record of Decision on surplus plutonium disposition was released 4 January 2000. The decision prepares the way for the immobilization of approximately 17 metric tonnes of plutonium and fabrication of up to 33 tonnes of MOX fuel. It makes official the plan by DOE to construct three plants at Savannah River, a plant to provide pit assembly and conversion, a plant to fabricate MOX fuel, and another to immobilize plutonium in ceramic pucks, which are themselves to be embedded in vitrified high-level waste. It also clears the way for the implementation of DOE's contract with the Duke, Cogema, Stone & Webster consortium, which could not take effect until the National Environmental Protection Act process was complete. The contract covers construction, operation, and even desactivation of the MOX plant and irradiation of the fabricated MOX in the chosen reactors.

According to a review of the project EIS by the

Nuclear Control Institute, the proposed MOX facility will be based on an existing MOX plant in France (the MELOX plant at Marcoule) but will be modified to meet US regulations. Under the proposed design, plutonium dioxide powder would be received from DOE's proposed Pit Disassembly and Conversion Plant and would be aqueously processed in acid (so-called "polished") to ensure that it meets the agreed-to fuel specification for MOX fuel. Following the "polishing" step, the plutonium in solution would then be converted back into plutonium dioxide. The plutonium dioxide would be mixed with uranium dioxide and formed into MOX fuel pellets.

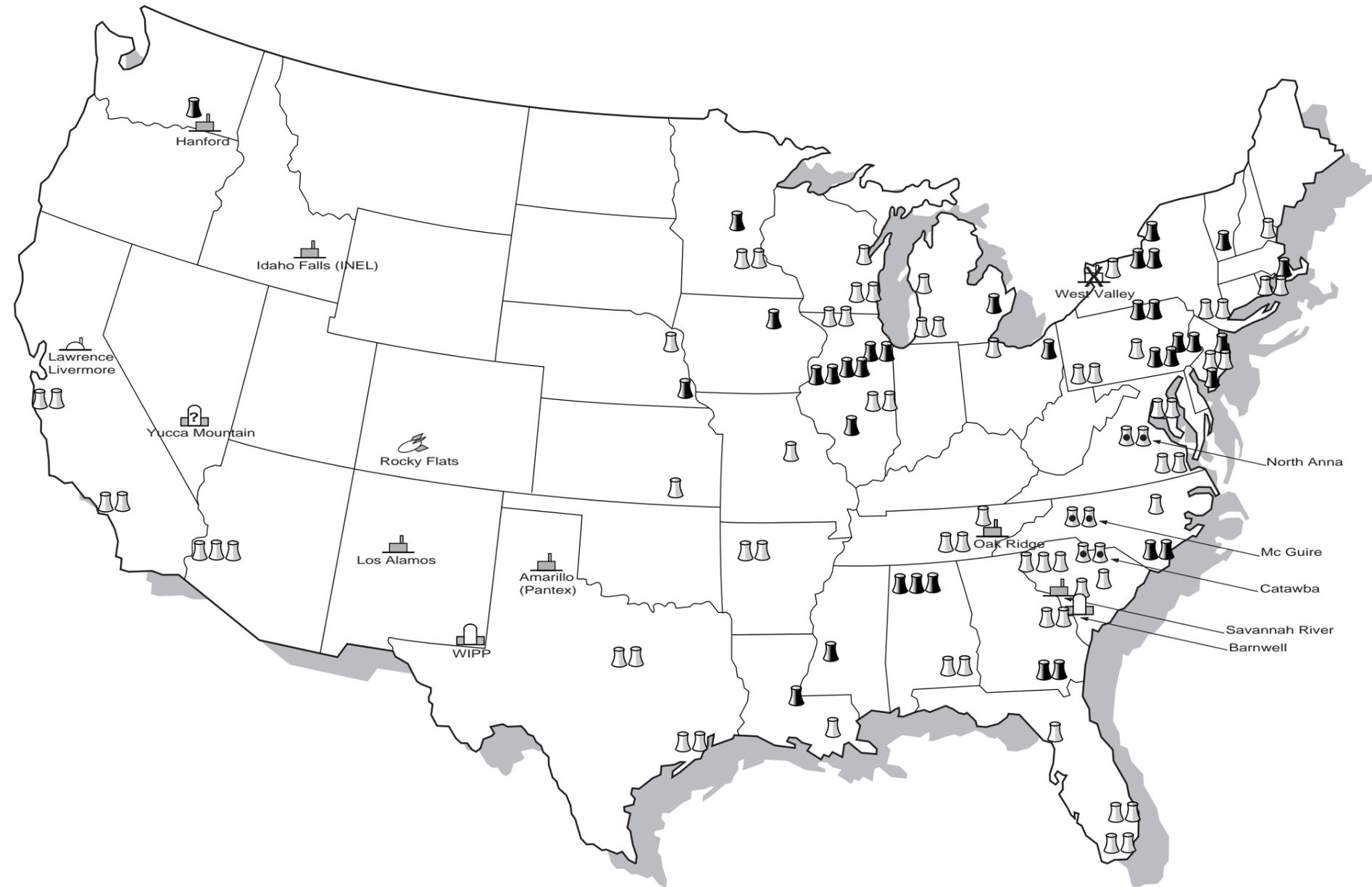
DOE will submit a budget to Congress for the MOX program in 2000 for the fiscal year 2001. If Congress budgets money for the estimated \$1 billion project, construction will begin in 2001 with completion scheduled for 2004. The facility then would start extracting plutonium and producing MOX fuel in 2005.

Immobilization plans are progressing more slowly. The Defense Waste Processing Facility (DWPF), the facility that is to vitrify the high-level waste into which the plutonium pucks will be placed has experienced technical difficulties, as a result of which DOE is only able to vitrify the sludge at the bottom of SRS's storage tanks. It cannot handle the liquid in the tanks. In January 1998, after an expenditure of \$450 million, DOE shut down the In-Tank Precipitation Facility that processed the liquid, because of inflammable benzene buildup inside the facility's tanks. DOE has not yet developed a new process for solidifying the liquid, which consists of salt and some radioactive materials, primarily cesium-137.

The proposed plutonium immobilization plant would cost from \$478 million to \$484 million to build and operate, and would employ about 250 people, according to DOE estimates. The facility was slated to receive \$21million in fiscal year 2000, which began on 1 October 1999. But by the time President Clinton signed the budget into law, the funding had been removed to the dismay of many advocates of immobilization. DOE is now using the problems at DWPF as the reason for dragging its feet on the plutonium immobilization plant; but critics claim that DOE's actual reason is disinterest in the immobilization option for plutonium disposal. A preliminary report on DWPF by the National Research Council faults DOE for not



# Plutonium IN THE UNITED STATES



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**104 OPERATING NUCLEAR POWER PLANTS**

- 69 Pressurized Water Reactors (PWR)
- 35 Boiling Water Reactors (BWR)

**NO CURRENT REPROCESSING PLANT**

**2 SITES OF PLUTONIUM HANDLING**

- Lawrence Livermore Laboratory
- Rocky Flats

**2 STORAGE SITES FOR LOW AND MEDIUM LEVEL RADIOACTIVE WASTE**

- WIPP: Waste Isolation Pilot Plant
- Barnwell (South Carolina)

**6 DOE INTERIM STORAGE SITES FOR LOW, MEDIUM AND HIGH LEVEL RADIOACTIVE WASTE**

- Savannah River
- Los Alamos
- Hanford
- Pantex
- Oak Ridge
- Idaho Falls

## Site Highlights

(weekly reports on the labs at:  
<http://www.dnfsb.gov/weekly.html>)

### Savannah River Site (SRS) Plutonium Processing Program

According to the Draft EIS for the Savannah River Site, DOE wants to reprocess a little over 19 tonnes of irradiated fuel and less than a ton of other material, including 16 bundles of targets that were originally intended for the production of plutonium-242 used in nuclear weapons testing and development. This is about 28% of the total mass of material discussed in the Draft EIS. Nearly all this nuclear material is already at SRS. The reprocessing is scheduled to have been completed by the end of 2001.

A second technique DOE proposes to use is called "melt and dilute" (m&d). The irradiated fuel or other types of nuclear material will be heated, diluted with depleted uranium (if the fuel contains HEU), and sealed in stainless steel containers. DOE hopes that this process will produce a stable waste form.

Melt and dilute is DOE's preferred alternative for about 28 tonnes of irradiated fuel (about 41% of the total mass). Very little of this irradiated fuel is at SRS now. Most of it is at research or test reactors, where some is still being used. When, or even whether, it will arrive at SRS is uncertain.

US-irradiated fuel will arrive at SRS up to 2035, while shipments of US-origin irradiated fuel from outside the United States should be complete by 2010. The m&d program was quietly suspended in June 1999 due to budgetary constraints, then reinstated shortly afterwards. The m&d plant would cost about \$1.9 billion to build and operate during its 30-year life span.

Other work planned for SRS is plutonium immobilization. Plutonium that is to be disposed of is to be baked into ceramic pucks at a yet-to-be-constructed plutonium immobilization plant. The pucks are then to be inserted into metal cages and the cages placed inside canisters of vitrified high-level waste. The vitrification of the high-level waste will take place at the Defense Waste Processing Facility (DWPF), which has been vitrifying SRS's waste since 1996, a formidable task, since SRS stores about 34 million gallons of such waste in forty-nine carbon-steel tanks.

Before treatment, plutonium would be stored at several SRS facilities. Much plutonium would be placed in one of the site's five inactive nuclear reactors - with "K" reactor prominent. Non-pit military plutonium would be stored at a proposed Actinide Packaging and Storage Facility, if this facility comes into being. Construction began on the installation in 1998, but, citing rising costs, DOE unofficially abandoned the project in 1999.

Some twenty-two tonnes of stainless steel and zirconium-clad fuel rods are also stored at SRS. Because they cannot be melted, those rods will be shipped to Idaho for long-term storage, DOE says. SRS already poses a huge cleanup challenge, with tritium contamination emerging as an increasingly large problem.

Seven SRS employees were contaminated with plutonium on their clothing and skin during an incident on 1 September 1999. Four of the seven inhaled the plutonium while involved in repackaging plutonium stored in the container when the incident occurred. Following a regional meeting of groups opposed to the SRS MOX project in October 1999, Bob Schaeffer, public education director of the Alliance for Nuclear Accountability commented: "A planned MOX fabrication facility at SRS is little more than a 'perpetual pork machine'".

SRS is operated by an integrated team led by Westinghouse Savannah River Company. The team also includes Bechtel Savannah River Inc., Babcock & Wilcox Savannah River Company, and British Nuclear Fuels, Limited Savannah River Corporation. The last is responsible for the solid waste program.

### Pantex and Pits

Pantex, near Amarillo Texas, is the DOE's interim storage site for plutonium weapons cores ("pits") from dismantled weapons. The plant presently stores more than 12,000 pits in old, unsealed containers (one per pit) and in 1960s era above ground bunkers. The Record of Decision for the Final Pantex Site Wide Environmental Impact Statement allowed for storing up to 20,000 pits on an *interim* basis. The final PEIS on Storage and Disposition designated Pantex as the *long-term* storage site.

Storage conditions at the plant are, nevertheless, far from satisfactory. The Defense Nuclear Facilities Safety Board (DNFSB) said in *Technical Report #18: The Safety of Storing Pits at Pantex*: "For most of the pits now in storage at Pantex, the outer metallic cladding is the only reliable containment". In the summer of 1998 Pantex was forced to move thirty pits from one bunker to another due to temperature concerns during a record heat wave.

DNFSB Recommendation 99-1, issued in August 1999, calls for four steps to improve the short-term safety of pits at Pantex. (The DNFSB recommendations can be found at <http://dr.tis.doe.gov/archive>)

A response by Energy Secretary Bill Richardson, published in the Federal Register of 29 October stated: "Actions include a systems analysis study to generate programmatic requirements for a pit shipping container, a review of pit surveillance data to characterize pit integrity in current environments, and increasing the pit repackaging rate to 200 pits per month".

Up to 4,000 "national asset" plutonium pits will remain indefinitely at Pantex scheduled to be stored in a single, upgraded structure, Building 12-116. The balance will be shipped to Savannah River—if possible.

After an investment of \$50 million and five years of development, less than 50 of the 10,000 pits at Pantex are in AT-400A containers, which were originally put forward as the answer to corrosion safety problems and suitable for both storage and shipping. The slow pace of the project led DOE to abandon it in favor of a cheaper container that is unsuitable for shipping. DOE thus created a potential choke point in plans to trans-ship the packaged pits for disassembly. As the DNFSB said in August 1999, "DOE's program plan for materials disposition is in peril regarding recycling excess pits into mixed oxide fuel, because there is no container suitable for shipping the pits from the Pantex Plant to the Savannah River Site, and no plans exist for development of such a container".

Plutonium transports loom large in the United States. In the past two years or so, approximately 1,200 nuclear weapon triggers (plutonium pits) were trucked to Pantex from the Rocky Flats Plant in Colorado. Another sixty pits were trucked to Pantex from the Savannah River Site in South Carolina. A DNFSB weekly report of December 1998 states that approximately 18,500 containers of plutonium bearing materials in a wide assortment of forms will be moved from California, Idaho, Washington, Texas, New Mexico, and Colorado to SRS in the next 10-15 years.

According to DOE's Draft Integrated Pit Storage Program Plan, AT-400 containers are to be replaced with the AL-R8 container requiring a "sealed insert" for all pits. DOE plans to repackage pits over a five-to six-year period (as DOE stated could be done with AT-400A) at a cost of \$7-9 million, with a production rate of 200 per month on two proposed lines. However, DOE has yet to come up with the necessary overpack for the AL-R8.

In May 1999, Don Moniak of the public interest organization Serious Texans Against Nuclear Dumping (STAND) accused Pantex management of bad faith. STAND released to the media internal documents from Pantex that revealed that while Pantex was publicly describing the nuclear non-proliferation benefits of processing plutonium for disposition, Pantex officials were secretly pursuing large-scale plutonium pit production operations. "The Plutonium Pit Disassembly and Conversion facility is the first step in disposition and ALSO the first step in pit production", Moniak points out. Pit production in the United States had centered on Rocky Flats Plant in Colorado, which halted production in 1989.

In April 1999 Philadelphia based company Day and Zimmerman, Inc. announced a merger agreement with the Mason and Hanger Corporation. The latter has been the primary contractor at Pantex since

1956, responsible for assembly, disassembly and storage of nuclear weapons components.

(See also: <http://www.pantex.com:90/topicpdf/docs/> and <http://www.ch.doe.gov/business/pit/pit.htm>)

## Hanford

The Hanford nuclear reservation covering some 560 square miles in Washington State was a key production center for military plutonium from its start-up in 1943. Many of its operations - including nine production reactors at peak - are now shutdown, and the clean up of over fifty years of plutonium production and processing is now the main task for the over 10,000-person workforce engaged at the site, judged to be the most radioactively contaminated in the United States. Hanford intends to glassify 54 million gallons of radioactive waste buried in 177 underground tanks, an endeavor that could take 30 years and cost \$40 billion to \$50 billion. In July 1998 the UK company BNFL led a consortium that won a \$6.9 billion DOE contract to treat and immobilize 20 to 25% of the waste over the next 20 years.

Under an earlier 1989 Tri-Party Agreement signed by the U.S. Environmental Protection Agency, DOE and Washington State, DOE agreed to pump the radioactive liquid waste from 149 aging, single-shell tanks into newer, double-shell tanks as an "interim stabilization" measure, a project has been plagued with repeated changes and time extensions.

But Hanford contractors have promoted new plutonium production and processing projects, particularly over the past year or so. One project being pushed is the re-opening of the Fast Flux Test Reactor (FFTF), which originally operated for 10 years to 1992. FFTF has since been maintained on standby, at a cost of hundreds of millions of dollars. In fiscal year 2000 the cost will be \$28 million. DOE calculates that it will cost about \$200 million to dismantle the FFTF or \$230 million to revive it by 2004.

Amongst the possible uses now promoted for FFTF are plutonium-238 production for NASA space batteries; the accelerator transmutation of waste; isotope experimentation and tritium production (for details visit: [www.ne.doe.gov](http://www.ne.doe.gov)). But the Government Accountability Project (GAP) charges that the civilian missions proposed for FFTF mask the true rationale which, according to a recently released internal memorandum, is production of "special isotopes in significant quantities for national security". (See: [www.whistleblower.org/www/fftfespr.htm](http://www.whistleblower.org/www/fftfespr.htm)). Another 'argument' to restart FFTF is the availability of 'cheap' Kalkar plutonium fuel. The German fast breeder reactor SNR-300 at Kalkar has never been put into operation - the site has been transformed into an adventure park - and the German government has not yet decided what to do with the core it has in store. The

U.S. idea to use it at Hanford would solve many problems in Germany...

Critics such as the Alliance for Nuclear Accountability (ANA) - comprising over thirty local, regional, and national organizations representing the concerns of communities living in the shadows of the US nuclear weapons complex sites - charge that investment in FFTF development will divert resources away from the major cleanup programs such as that for the old K-Basins, pools holding 2,300 tonnes of irradiated nuclear fuel. Cleanup of the K-Basins is expected to cost \$1.6 billion and to be completed by 2005.

The DOE has recently held public consultation on its PEIS for FFTF and other Hanford projects. Pacific Northwest National Lab (PNNL) and its contractor, Battelle were commissioned in the summer of 1999 to produce a preliminary scoping plan for FFTF which concluded there was a "compelling need and support for the restart of FFTF".(For more details visit: <http://www.ne.doe.gov/nerac/neracoverview1a.html>)

But proliferation concerns have been raised by ANA, the Nuclear Control Institute, and others over FFTF restart. DOE's Office of Nonproliferation and National Security looking at the use of plutonium fuel in the FFTF, in the context of international nuclear nonproliferation treaties.

FFTF formerly ran on a plutonium-based MOX fuel. DOE currently plans to use an on-site supply of leftover MOX fuel for six years, then to import the Kalkar fuel from Germany, and later to convert to HEU fuel. A final decision on whether to restart the FFTF is scheduled for December 2000.

One other main Hanford plant under examination is the never-used Fuels and Materials Examination Facility (FMEF), which is being considered for the role of specialist chemical reprocessor of plutonium-238. The New York Times reported in October 1999 that the Plutonium Finishing Plant at Hanford was shut down for long periods in 1996 and 1997 after 17 violations of rules meant to avoid criticalities. The violations took place as technicians tried "intermittently to stabilize liquid plutonium left over from weapons production". Transuranic plutonium-contaminated sludge wastes are destined for final disposal at the WIPP facility in New Mexico.

(See also Hanford Watch: [www.hanfordwatch.org](http://www.hanfordwatch.org) and Alliance for Nuclear Accountability (ANA): [www.ananuclear.org](http://www.ananuclear.org))

## Rocky Flats

Rocky Flats plutonium warhead production plant near Denver, Colorado, which halted further fabrication of warhead pits in November 1989, presently holds up to 25% of the surplus weapons plutonium destined for management at Pantex or Savannah River. Operated by Kaiser-Hill for the DOE, the plant

has a long history of plutonium mismanagement problems, including more than one ton of plutonium that, according to the Rocky Mountain Peace and Justice Center, cannot be accounted for. Details of three major plutonium accidents at the plant, a fire in 1957, leaks from waste stored outdoors between 1954 and 1966, and another fire in 1969 became known only decades later as part of a dose reconstruction study for Rocky Flats begun in 1989 and completed in 1999. An analysis of the longer term implications of these accidents was published in the summer of 1999 by the Washington, DC-based Institute for Science and International Security (ISIS).

(For details visit: [www.isis-online.org](http://www.isis-online.org))

Rocky Flats Environmental Technology Site, as it has been renamed, is now focused on the cleanup of radioactive and toxic contamination. According to DOE plans, cleanup operations are contingent on removal of the large quantity of plutonium remaining at Rocky Flats. A decision by the Defense Nuclear Facilities Safety Board in August 1999 means transuranic (TRU) plutonium contaminated wastes previously destined to be shipped to Savannah River will now go to WIPP. The decision states: "An estimated 30% of the cans (containing >10% Pu or >200 grams Pu, much of it in the form of plutonium oxide powder) will require material repackaging in a glovebox to get below WIPP limits prior to packaging in the pipe component. Kaiser-Hill is preparing a report to justify the reclassification of this material from high risk (due to presence of pyrophoric Pu and reactive metals) to low risk so it can be sent to WIPP without further stabilization".

In the middle of June 1999, after several delays, the first shipment of an estimated 2,000 55-gallon barrels of TRU wastes left under the gaze of protestors.

The shipping of some 315 kgs of plutonium fluoride residues (containing approximately 140 kgs of plutonium), from Rocky Flats has been at issue for some years, but especially since DOE plans were published for comment in November 1997. The shipment plans were announced in November 1998.

(For details visit: <http://www.em.doe.gov/pluteis/>)

The DOE says that for "plutonium metal or oxide that would result from processing technologies involving plutonium separation, disposition would be by immobilization in glass or ceramic material for disposal in a monitored geologic repository pursuant to the Nuclear Waste Policy Act (consistent with decisions to be made under the department's Surplus Plutonium Disposition EIS)". DOE plans to complete removal of surplus plutonium from Rocky Flats by 2003.

If all transportation permissions are received, the DOE hopes to complete clean-up of the site by 2006, as detailed in an agreement between DOE, EPA and the state of Colorado.

(See also: Rocky Mountain Peace and Justice Center: [www.rmpjc.org](http://www.rmpjc.org))

### **Lawrence Livermore National Laboratory (LLNL)**

LLNL is operated by the University of California for DOE and is located about fifty miles east of San Francisco. Lawrence Livermore Laboratory was set up to carry out R&D on all facets of nuclear weapons. It has long played a key role in the inertial confinement fusion program, and was in the news in 1999 for problems with the National Ignition Facility, now under construction at the site. The Laboratory is the lead site for work on plutonium immobilization. It will perform an increasing amount of other work with plutonium, according to briefing papers from the Federal Office of Management and Budget obtained by the non-profit Tri-Valley CAREs in mid-1999. The documents indicate that DOE will "move promptly", to the Laboratory, work on the W80 nuclear warhead developed at Los Alamos, a move that will increase the plutonium pit work at Livermore. Lawrence Livermore already has about 880 pounds of plutonium and is slated to receive more from Rocky Flats.

(See also: <http://www.llnl.gov/> and, for another point of view, [www.igc.org/tvc](http://www.igc.org/tvc))

### **INEEL—IDAHO**

The Idaho National Engineering and Environmental Laboratory has been pressing for involvement in the national plutonium program since 1994, when DOE mothballed its partially completed Integral Fast Reactor (IFR) - a new design that DOE had planned to test at the no-longer-operating EBR-II reactor. The Plutonium Focus Area - a partnership that includes the DOE Idaho Operations Office, Lockheed Martin Idaho Technologies Company, and Argonne National Laboratory - continues to analyze plutonium stabilization needs. Capsules comprising sealed containers of MOX fuel made from weapons-grade plutonium have been irradiated at INEEL in the Advanced Test Reactor (ATR). The fuel was designed at Oak Ridge National Laboratory and fabricated at Los Alamos National Laboratory. The Idaho research site, developed over an area of 890 square miles, is home to the world's largest concentration of experimental nuclear reactors, 52 units have operated at the complex since it opened in 1949. About a dozen INEEL reactors are still operable.

INEEL currently stores approximately 60 percent of DOE's inventory of transuranic waste. DOE sent much of this waste to Idaho from Rocky Flats where it was a byproduct of nuclear weapons production. DOE must ship 100,000 cubic feet - 15,000 drums of plutonium-contaminated waste - to WIPP by the end

of 2002. If INEEL fails to meet that plan, a 1995 court order could prevent it from receiving irradiated fuel from foreign reactors for storage. The first shipment of INEEL plutonium-contaminated waste reached the WIPP repository in April 1999. Record keeping anomalies discovered by a DOE audit in June 1999 temporarily interrupted the shipments of plutonium contaminated waste to WIPP. In total all 315,000 barrels of waste must be removed by from INEEL by 2019.

About one-third of the 2.3 million cubic feet of stored plutonium-contaminated waste at INEEL is not radioactive enough to qualify for disposal at WIPP. As a result, the DOE signed a \$1 billion contract with BNFL Inc. in 1998 to build a mixed-waste treatment plant at the Idaho site, to handle up to 185,000 cubic meters of plutonium-contaminated waste. The facility centers in an incinerator which is hotly contested and in early February 2000 was still going through the permitting process.

In April 1999 the DOE named INEEL, in cooperation with Argonne National Laboratory, as the US location of the US and Russian International Centers for Environmental Safety. The Centers will plan and manage cooperative environmental technology development and demonstration projects associated with managing irradiated nuclear fuel and the cleanup of nuclear sites.

INEEL has been storing irradiated fuel and core debris from Three Mile Island-2 since July 1986. In March 1999 INEEL moved the first shipment of irradiated fuel and core debris into dry storage, thus meeting the 1995 "Idaho Settlement Agreement".

At INEEL high-level waste from irradiated nuclear fuel processing is stored as a dry granular powder in bins, while sodium bearing liquid waste is stored as liquid in underground storage tanks.

(See also: [www.inel.gov](http://www.inel.gov))

### **Los Alamos**

Los Alamos National Laboratory (LANL) in New Mexico produced the first US plutonium bombs, which were tested at Alamogordo in July, 1945, and dropped on Nagasaki the next month. Since then the labs have played a key role in US plutonium policy, both in warhead design and development and more recently in experimental mixed oxide fuel (MOX) manufacture. In the past two years, DOE has allocated \$3.425 million for MOX fuel fabrication R&D work at LANL and another \$10.075 million for a LANL/Oak Ridge program to irradiate test pellets made at LANL in the ATR at Idaho. However, a March 1999 LANL report called into question the ability of the lab to successfully fabricate MOX test fuel using weapons-grade plutonium, because the morphology of weapons-grade plutonium differs significantly from that of reactor-grade plutonium

LANL has taken the lead for many years in pushing for development of accelerator-driven transmutation technology (ATW) for the long-term treatment of plutonium-bearing irradiated fuel. (Visit: [www.adtt.lanl.gov/](http://www.adtt.lanl.gov/)) A DOE report to Congress in early November 1999 on the ATW of nuclear waste found that a program to treat 87,000 tonnes of commercial irradiated fuel would cost about \$280 billion over its lifetime and would take 117 years.

(Visit: [www.rw.doe.gov](http://www.rw.doe.gov))

In September 1999 LANL announced that it had perfected a new in vitro technique to monitor radiological workers who may have been exposed to plutonium. The technique, which uses thermal ionization mass spectrometry, or TIMS, makes possible the detection of a lifetime dose of plutonium that is as low as 0.1 rem. The technique is thus forty times more sensitive than the measurement levels associated with existing alpha spectroscopy methods, LANL reports.

In 1999 the reputation and integrity of LANL, which is operated by the University of California under contract with DOE, were severely impaired by allegations of espionage and lax security.

(See also: [www.lanl.gov](http://www.lanl.gov))

## Yucca Mountain

The main federal policy for the long-term management of high level commercial irradiated nuclear fuel - containing most of the nation's commercial plutonium - dates from a 1982 law requiring the DOE to build a final repository and to take responsibility for the fuel by end of January 1998. DOE is considering only one location for this repository, a 230-square mile site at Yucca Mountain near the DOE nuclear warhead test site in Nevada. As DOE defaulted on the statutory deadline due to successive delays in the repository program, electricity utilities and state agencies threatened to sue DOE to force the government both to start taking over management of the 38,000 tonnes of irradiated fuel in temporary storage at over seventy reactor sites; and to stop requiring utilities to pay a total of \$600 million annually into the federal nuclear waste fund created to pay for the irradiated fuel program. Over \$15 billion has been paid into the fund. DOE offered a compensation package to utilities if they did not sue, but in October 1998 the US Federal Court of Claims found in favor of the first utility to take a case forward.

Even if all plans for Yucca repository development are now met, the DOE says that the repository can not be ready until 2010 at the earliest. DOE proposes to spend nearly \$37 billion from 1999 to 2116 (the estimated closure date for the repository) on the irradiated fuel program. \$6.5 billion have already been spent on high-level waste research. The repository plan includes using some 93 miles of tunnels

800 to 1,000 feet under the mountain to store the estimated 77,000 tonnes of fuel, including radioactive material from five DOE sites.

Despite many challenges by Nevada state authorities and others, a DOE 'Viability Assessment' of the Yucca site, released in December 1998, gave the go ahead for further geologic studies. It concluded there were no "showstoppers" that would disqualify the site. A final recommendation is due in 2001.

In August 1999, the DOE released a draft EIS for the proposed Yucca repository, which has been criticized for lack of attention to transportation risks.

(Visit: <http://www.state.nv.us/nucwaste/yucca/travel.htm>)

Public consultation in regard to the site continues in many different forums. In November 1998 over two hundred national and local groups collectively argued that the hydrogeology of the site makes it technically unsuitable. Some organizations such as IEER in Washington DC argue that Yucca Mountain should become a center for research on long-term solutions to storing the nation's nuclear waste. The President has insisted that he will veto any nuclear waste bill passed by Congress that attempts to force the shipment of irradiated fuel to Nevada before a final disposal site is ready.

A coalition of environment groups backs this position, claiming irradiated fuel shipments would create "Mobile Chernobyls". Critics charge that if the Yucca Mountain repository goes ahead, upwards of 50 million highway users will be exposed over 30 years to 100,000 truck shipments of high-level nuclear waste through 43 states, with the likelihood of hundreds of accidents. Many argue in favor of continued on-site at-reactor monitored storage of irradiated fuel.

Various alternatives to Yucca Mountain have been suggested. They include South Pacific islands for final disposal or federal nuclear reservations such as Oak Ridge for temporary monitored retrievable storage (MRS). A proposal by a private company to build a storage site for irradiated fuel on a Goshute Indian Reservation in Utah is going through the National Environmental Policy Act process.

In February 2000 the Senate by a 64-34 vote passed a bill supporting the Yucca site as the preferred option to which shipments of the stocks of spent fuel stores at commercial reactor sites should be made from 2007, if the repository gets the technical and legal go-aheads. At the time of writing it seemed that the Bill would not get endorsement in the House of representatives due to the opposition of the President.

(See also:

<http://www.ceip.org/programs/npp/yucca.htm>

[www.ymp.gov/](http://www.ymp.gov/)

[www.nwtrb.gov](http://www.nwtrb.gov)

<http://www.state.nv.us/nucwaste/>)

## WIPP

The Waste Isolation Pilot Plant (WIPP) located near Carlsbad, New Mexico, is the DOE's final repository for a complex mix of transuranic (TRU) wastes, mainly from the military and federal nuclear research and development programs. The area where the waste will be buried is situated 2,150 feet underground in a 3,000-foot-thick, 220-million-year-old bedded salt formation.

The waste site was selected in 1979. Years of technical and regulatory delays in completion of the repository followed. WIPP received its first consignment of waste, from Los Alamos, in late March 1991. The facility had cost \$2 billion to build. (Visit: <http://www.wipp.carlsbad.nm.us/wipp.htm>) Additional consignments of plutonium-contaminated TRU wastes arrived from INEEL Idaho and Rocky Flats in the summer of 1999. SRS shipments are not slated to start until late in the year 2000, but Hanford shipments are scheduled to begin earlier.

Shipments may contain these plutonium isotopes: Pu-238, Pu-239, Pu-240, Pu-241, and Am-241. By law, WIPP cannot be used to store irradiated reactor fuel. In total around 38,000 shipments of waste are destined for WIPP over a 30- to 35-year period. New Mexico State authorities have been reviewing transport safety issues concerning WIPP waste, especially the integrity of the TRUPACT-II containers, for over ten years.

The State of New Mexico favors WIPP, but is not always in agreement with DOE. The State and DOE have been in dispute in the courts over claimed state's rights to open up consignments of wastes for WIPP. DOE is challenging the right of New Mexico to set its own restrictive environmental standards for hazardous wastes imported into the state for disposal. DOE estimates that re-examining the barrels could cost an additional \$10s of millions.

In late October the New Mexico state authorities issued a Hazardous Waste Facility permit for WIPP that obligates DOE's private contractor, Westinghouse, to post a \$100 million bond to demonstrate its financial ability to close the site once it has been filled, something deemed unnecessary by DOE.

Regional environmental groups and in particular the Southwest Research and Information Center have worked for years to ensure that local people are involved in decision making in regard to WIPP and that the site meets health and safety standards. (See also: [www.sric.org](http://www.sric.org))

## Oak Ridge

Oak Ridge National Laboratory (ORNL) is one of three installations on DOE's Oak Ridge Reservation, near Knoxville, Tennessee. The others are K-25,

which enriched uranium, and Y-12, which helps to maintain and modernize the US nuclear arsenal.

ORNL first produced plutonium in the 1940s, and its experimental graphite reactor was the pilot plant for the Hanford production reactors. Indeed "the wartime role of the Laboratory was to find a way to produce and separate gram quantities of plutonium for use in the development of the bomb".

ORNL's activities are now diverse, but still include work in the area of plutonium. For example, according to the "R & D" section of an FY 99 Annual Operating Plan, dated October 1998, the "Oak Ridge National Laboratory will provide specific technical assessments in the reactor area for...irradiated fuel characterization... work scope planning for non-destructive assay (with computational support) of irradiated MOX fuel at the Ginna reactor".

MOX research was carried out at ORNL from 1960 to 1973, and some experimental MOX was made for the FFTF reactor at Hanford in the 1970s. Reprocessing development began in 1950, and continued for nearly fifty years to 1998.

ORNL is DOE's lead laboratory for the reactor-based (MOX) disposition option for management of surplus defense plutonium. R&D to "define, develop, and demonstrate technologies required for implementation of this option" is underway. (Visit [www.ornl.gov/](http://www.ornl.gov/)) ORNL is leading a team of US and Russian technical experts in the design and safety analysis of the hybrid and full MOX cores for Russian fast reactors. The US team also includes Argonne National Laboratory in support of ORNL. (Visit: <http://ornl.gov/etd/FMDP/plutonium.html>)

Further details of US-Russia joint fissile materials disposition projects are listed on the US Arms Control and Disarmament Agency web site. (Visit: [www.acda.gov/](http://www.acda.gov/))

Plutonium processing is not specifically mentioned in the science and technology section in ORNL's new (October 1999) mission and strategic plan, but development of ceramics, useful for immobilization, and actinide science do merit a mention. The ORNL annual budget is \$500 million, with nearly 9000 researchers working at the labs. As of February 2000, the Laboratory is managed by Lockheed Martin Energy Research Corp., but the University of Tennessee and Battelle Memorial Institute will take over from Lockheed around April 2000.

Other research into nonproliferation and safeguards covering plutonium is carried out by the DOE's Sandia Labs in New Mexico. In FY 1999 \$37 million was spent on general safeguards and security programs, including control and accountability of special nuclear materials, physical security systems, classified matter protection and control by Sandia for DOE ([www.ca.sandia.gov](http://www.ca.sandia.gov))



#### US Department of Energy (DOE)

US-DOE was created in 1976 to strategically manage all energy programs, including R&D, along with nuclear material production for the Defense Department.

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#### DOE's Office of Fissile Materials Disposition (MD)

This office is in charge of programs aimed at disposing of surplus weapons plutonium in either a MOX or immobilized form and works in parallel with Minatom in Russia on this "dual track" disposition approach.

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#### DOE's Office of Nonproliferation and National Security (NN)

The Office is in charge of DOE's program and initiatives aimed at curbing the spread of nuclear weapons technologies and material, with primary focus on securing of Russian fissile materials and development of joint research projects with closed Russian nuclear cities.

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#### DOE's Office of Civilian Radioactive Waste Management (RW)

This Department of Energy office is responsible for disposal of high-level radioactive waste, including development of facilities - such as Yucca Mountain - to store spent fuel from commercial nuclear reactors.

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#### Defense Nuclear Facilities Safety Board (DNFSB)

The Defense Nuclear Facilities Safety Board is responsible for independent, external oversight of all activities in DOE's nuclear weapons complex affecting nuclear health and safety and makes recommendations directly to the President, as well as to the Secretaries of Energy and Defense.

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#### Environmental Protection Agency (EPA)

The United States Environmental Protection Agency (EPA) implements the Federal laws in the field of environment. EPA was assigned some responsibility for setting environmental radiation protection standards from the Atomic Energy Commission, and absorbed the duties of the Federal Radiation Council.

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#### Nuclear Regulatory Commission (NRC)

On plutonium issues, the NRC is in charge of license amendments for the reactors chosen to use MOX and for licensing the MOX fabrication facility, both of which are unprecedented.

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#### Nuclear Energy Institute

NEI serves and supports the commercial nuclear energy industry by articulating their position on the national energy policy. The nuclear lobby federated.

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#### American Nuclear Society (ANS)

The American Nuclear Society is a not-for-profit, international, scientific and educational organization promoting the advancement of nuclear science and technology. The American nuclear industry lobby organisation.

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#### National Council on Radiation Protection and Measurements (NCRP)

The National Council on Radiation Protection and Measurements is a public service organization formulating and disseminating information, guidance and recommendations on radiation protection and measurements.

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#### National Nuclear Security Administration (NNSA)

This is a new body set to start operating from April 2000, implementing and co-ordinating the administration's various security enhancement programs

#### Lawrence Livermore National Laboratory (LLNL)

At LLNL, a key DOE research facility (operated by the University of California for DOE), development of plutonium immobilization technologies and laser technologies for weapons design purposes play a leading role.

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#### Pacific Northwest National Laboratory (PNNL)

PNNL, the research institution for DOE's Hanford site, is currently developing a restart plan for the Fast Flux Test Facility breeder reactor and was the lead laboratory for the now-halted program to convert Russian plutonium production reactors to a fuel which would not have been reprocessed.

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<http://www.pnl.gov>

#### The Oak Ridge National Laboratory (ORNL)

ORNL conducts a wide range of energy-related research and is administered by the Oak Ridge Operations Office, the DOE office which oversees the two gaseous diffusion plants and the Y-12 weapons production facility.

**COMMUNICATIONS AND PUBLIC AFFAIRS**  
P.O. BOX 2008, OAK RIDGE, TN 37831  
e-mail: [mclaughlinmz@ornl.gov](mailto:mclaughlinmz@ornl.gov)  
<http://www.ornl.gov>

#### Idaho National Engineering and Environmental Laboratory (INEEL)

INEEL is the home of about 30 DOE research reactors, including the now-cancelled Integral Fast Reactor program and the closed Experimental Breeder Reactors I & II, and houses the center for research into electrometallurgical treatment (pyroprocessing) of spent fuel and is the storage site for spent naval reactor fuel.

P.O. BOX 1625, IDAHO FALLS, ID 83415  
e-mail: [ehr@inel.gov](mailto:ehr@inel.gov)  
<http://www.inel.gov/>

#### Argonne National Laboratory (ANL)

Based both in Chicago and at INEEL, this research facility (operated by the University of Chicago for DOE), is in charge of the international program aimed at converting research reactors from HEU to LEU, administers contracts for the plutonium disposition program, and conducts research into pyroprocessing.

**9700 S. CASS AVENUE, ARGONNE, IL 60439**

**TEL: +1 630 252 2000**

**<http://www.anl.gov>**

#### Los Alamos National Laboratory (LANL)

LANL (operated by the University of California for DOE) is the lead facility into weapons research, is the site chosen for development of the "Lead Test Assemblies" for the MOX program, is the site designated for a new plutonium "pit" facility, and helps direct "subcritical" tests at the Nevada Test Site.

**TODD HANSON**

**MS C177 PA: PUBLIC AFFAIRS OFFICE**

**LOS ALAMOS, NEW MEXICO 87545**

**TEL: +1 505 665 2085 - FAX: +1 505 665 3910**

**e-mail: [tahanson@lanl.gov](mailto:tahanson@lanl.gov)**

**<http://www.lanl.gov>**

#### Sandia National Laboratory (SNL)

Sandia is engaged in technological testing and application in support of other DOE weapons facilities and is the center for research into nuclear materials storage and transport casks.

**P.O. BOX 969, 7011 EAST AVE, LIVERMORE, CA 94551-0969**

**TEL: +1 925 294 3000**

**<http://www.ca.sandia.gov>**

#### Duke Energy

Duke Energy is the owner of Duke Engineering & Services, member of the DCS Consortium (Duke Engineering & Services, Stone & Webster and Cogema Inc. or the "MOX Consortium") which won DOE's first plutonium disposition contract (see p. 9).

**526 SOUTH CHURCH STREET, CHARLOTTE, NORTH CAROLINA 28202**

**TEL: +1 704 594 6200**

**e-mail: [dck7365@duke-energy.com](mailto:dck7365@duke-energy.com)**

**<http://www.duke-energy.com>**

#### Savannah River Site (SRS)

SRS, where plutonium and tritium were formerly produced, operates two reprocessing facilities in order to "stabilize" a wide variety of DOE's inventory of spent fuel and stored liquids, is the sole site for handling and processing of tritium for the U.S. weapons program, and has been designated as the site for both plutonium immobilization and MOX production.

**MARY FLORA: MANAGER, (PUBLIC INVOLVEMENT)**

**BUILDING 703-A, ROOM 141, AIKEN, S.C. 29808**

**TEL: +1 803 725 2272 - FAX: +1 803 725 4023**

**e-mail: [mary.flora@srs.gov](mailto:mary.flora@srs.gov)**

**<http://www.srs.gov/>**

#### Waste Isolation Pilot Plant (WIPP)

WIPP is an underground nuclear waste facility built in a salt deposit and began receiving TRU waste from the various DOE sites in 1999.

**DENNIS HURTT, OFFICE OF PUBLIC AFFAIRS DOE, CARLSBAD AREA OFFICE, P.O. BOX 3090, CARLSBAD, NM 88221-3090**

**TEL: +1 505 234 7327 - FAX: +1 505 887 5419**

**e-mail: [hurtt@wipp.carlsbad.nm.us](mailto:hurtt@wipp.carlsbad.nm.us)**

**<http://www.wipp.carlsbad.nm.us/>**

#### Yucca Mountain

This facility, located adjacent to the nuclear test site, is the sole site chosen to be investigated by the DOE as an underground repository for commercial spent fuel and high-level waste from the U.S. weapons program.

**<http://www.ceip.org/programs/npp/yucca.htm>**

**<http://www.ymp.gov/>**

**<http://www.epa.gov/radiation/yucca/>**

#### Rocky Flats

Formerly, plutonium "pits", or cores, for all U.S. nuclear weapons were machined at this site but due to environmental concerns production activity ceased in the early 1990s and clean-up programs are proceeding.

**ROCKY FLATS SITE TECHNOLOGY COORDINATION GROUP (STCG)**

**GARY N. HUFFMAN, DOE-ROCKY FLATS FIELD OFFICE**

**TEL: +1 303 966 7490**

**e-mail: [stcg@rfets.gov](mailto:stcg@rfets.gov)**

**<http://www.rfets.gov/>**

#### Alliance for Nuclear Accountability (ANA)

ANA is a network of more than 30 local, regional and national peace and environmental groups (see <http://www.ananuclear.org/member.htm>) concerned by the U.S. nuclear weapons sites and radioactive waste dumps. Its web site provides information on current projects and issues, and links to groups and organizations all over the USA.

**BOB SCHAEFFER, PUBLIC EDUCATION CONSULTANT**

**ANA DC OFFICE: 1801 18TH ST., NW, SUITE 9-2,**

**WASHINGTON, DC 20009**

**TEL: +1 202 833 4668 - FAX: +1 202 234 9536**

**e-mail: [bobschaeffer@earthlink.net](mailto:bobschaeffer@earthlink.net)**

**<http://www.ananuclear.org/>**

#### Institute for Science and International Security

ISIS is a non-profit, non-partisan institution dedicated to informing the public about science and policy issues affecting international security. It organizes international conferences on trends in civil, separated plutonium stocks and methods to reduce the size of these stocks, most recently on March 14-15th 2000 in Washington, DC.

**DAVID ALBRIGHT, PRESIDENT**

**236 MASSACHUSETTS AVENUE, NE, SUITE 500,**

**WASHINGTON, DC 20002**

**TEL: +1 202 547 3633 - FAX: +1 202 547 3634**

**e-mail: [isis@isis-online.org](mailto:isis@isis-online.org)**

**<http://www.isis-online.org>**

#### National Academy of Sciences (NAS)

A working group of the NAS defined the scientific basis for the dual track decision on excess plutonium management.

**2101 CONSTITUTION AVENUE, NW, ROOM HA456,**

**WASHINGTON, DC 20418**

**TEL: +1 202 334 3066 - FAX: +1 202 334 3077**

**e-mail: [wwwfdbk@nas.edu](mailto:wwwfdbk@nas.edu)**

**<http://www4.nationalacademies.org/nas/nashome.nsf>**

#### Nuclear Control Institute

NCI has worked since 1981 on research and investigation to combat the international commerce in nuclear materials - in particular plutonium - and technologies. It has specialized in highlighting security and environmental risks of transporting nuclear materials, in the US and worldwide.

**PAUL LEVENTHAL, PRESIDENT**

**TOM CLEMENTS, EXECUTIVE DIRECTOR**

**1000 CONNECTICUT AVENUE NW, SUITE 804, WASHINGTON,**

**DC, 20036**

**TEL: +1 202 822 8444 - FAX: +1 202 452 0892**

**e-mail: [nci@mailback.com](mailto:nci@mailback.com)**

**<http://www.nci.org>**

#### Union of Concerned Scientists (USC)

USC is an independent nonprofit alliance of 50,000 concerned citizens and scientists across the United States providing research results on energy and environmental matters to government, the media and public.

**DAVID LOCHBAUM**

**2 BRATTLE SQUARE, CAMBRIDGE, MA 02238**

**TEL: +1 617 547 5552 - FAX: +1 617 864 9405**

**e-mail: [dlochbaum@ucsusa.org](mailto:dlochbaum@ucsusa.org)**

**<http://www.ucsusa.org>**

#### Institute for Energy and Environmental Research (IEER)

IEER provides activists, policy-makers, journalists, and the public with scientific and technical information on energy and environmental issues.

**ARJUN MAKIJANI, DIRECTOR**

**6935 LAUREL AVE., TAKOMA PARK, MARYLAND, 20912**

**TEL: +1 301 270 5500 - FAX: +1 301 270 3029**

**e-mail: [ieer@ieer.org](mailto:ieer@ieer.org)**

**<http://www.ieer.org/>**

#### Nuclear Information and Resource Service (NIRS)

NIRS is an information and networking center for citizens and environmental organizations concerned about nuclear power, radioactive waste, radiation, and sustainable energy issues. It was a co-initiator of the "Nix-MOX" campaign.

**1424 16TH STREET NW, #404, WASHINGTON, DC 20036**

**TEL: +1 202 328 0002 - FAX: +1 202 462 2183**

**e-mail: [nirnet@nirs.org](mailto:nirnet@nirs.org)**

**<http://www.nirs.org/>**

#### Natural Resources Defense Council (NRDC)

NRDC runs a program defined as "Alternatives to Spent Fuel Reprocessing for 'Waste Management' and the Future of the Civil

Nuclear Fuel Cycle. This project supports work on nuclear facility safety, fissile material security and accounting, adequacy of international safeguards, nuclear fuel-cycle policy, and alternative energy options in former East Bloc nations, Europe, and Asia".

#### **NRDC HEADQUARTERS**

40 West 20th St., New York, NY 10011,  
TEL: +1-212-727-2700,  
e-mail: [nrdcinfo@nrdc.org](mailto:nrdcinfo@nrdc.org)  
<http://www.nrdc.org/nrdcpro/fpprog.html>

#### **Serious Texans Against Nuclear Dumping (STAND)**

STAND has proven particularly efficient in the monitoring of plutonium issues at Pantex (see p. 15). Don Moniak is editor of STANDPoint, an electronic publication on Pantex issues.

#### **DON MONIAK**

7105 W. 34TH AVENUE, SUITE F, AMARILLO, TX 79109  
TEL: +1 806 358 2622 - FAX: +1 806 355 3837  
e-mail: [dm4stand@arn.net](mailto:dm4stand@arn.net)  
<http://www.teleport.com/~opw/stand.html>

#### **Snake River Alliance**

Snake River Alliance is an Idaho-based grassroots organization which focuses its work on nuclear issues, most especially monitoring activities at the Idaho National Engineering and Environmental Laboratory.

PO BOX 1731, BOISE, ID 83701

TEL: +1 208 344 9161 - FAX: +1 208 344 9305  
<http://www.snakeriveralliance.org>

#### **Hanford Watch**

Hanford Watch was founded in 1992 to educate the public on Hanford issues and work to increase public participation in the Hanford decision-making process.

#### **PAIGE KNIGHT**

e-mail: [paigeknt@juno.com](mailto:paigeknt@juno.com)  
<http://www.hanfordwatch.org>

#### **Oak Ridge Environmental Peace Alliance (OREPA)**

OREPA is multi-disciplinary advocacy and activist organization which monitors the Oak Ridge Nuclear Reservation.

PO BOX 5743, OAK RIDGE, TN 37831

TEL: +1 423 483 8202 - FAX: +1 423 483 9725  
e-mail: [orep@earthlink.net](mailto:orep@earthlink.net)  
<http://www.korrnet.org/fgs>

#### **Los Alamos Study Group**

Los Alamos Study Group is a non-profit, research-oriented, nuclear disarmament organization monitoring and analyzing activities at the Los Alamos National Laboratory.

212 EAST MARCY STREET, SANTA FE, NM 87501

TEL: +1 505 982 7747 - FAX: +1 505 982 8502  
e-mail: [gmello@lasg.org](mailto:gmello@lasg.org)  
<http://www.lasg.org>

#### **Western States Legal Foundation (WSLF)**

WSLF a non-profit, public interest organization which monitors and analyzes nuclear weapons programs at the Livermore, Los Alamos, and Sandia National Laboratories and the Nevada Test Site.

1440 BROADWAY, #500, OAKLAND, CA 94612

TEL: +1 510 839 5877 - FAX: +1 510 839 5397  
e-mail: [wslf@earthlink.net](mailto:wslf@earthlink.net)

#### **Tri-Valley Communities Against a Radioactive Environment (CARE)**

Tri-Valley CARES is a local watchdog group aiming to convert the Livermore Laboratories to viable centers for peaceful and environmentally responsible scientific research.

#### **SALLY LIGHT**

2582 OLD FIRST STREET, LIVERMORE, CA 94550

TEL: +1 925 443 7148 - FAX: +1 925 443 0177  
e-mail: [marylia@earthlink.net](mailto:marylia@earthlink.net)  
<http://www.igc.org/tvcl>

#### **South West Research Information Center (SRIC)**

SRIC is a non-profit organization providing information to the public on matters affecting environment, human health and communities. SRIC's Nuclear Waste Safety Program for many years prevented the opening of the Waste Isolation Pilote Plant (WIPP).

#### **DON HANCOCK, DIRECTOR**

105 STANFORD SE, PO BOX 4524, ALBUQUERQUE, NM 87106

TEL: +1 505 262 1862 - FAX: +1 505 262 1864  
e-mail: [srcdon@earthlink.net](mailto:srcdon@earthlink.net)  
<http://www.sric.org>

#### **Shundahai Network**

A Native American organization working on nuclear abolition issues, native lands, and against the transportation of radioactive waste and the proposed Yucca Mountain, Nevada high-level dumpsite (see p. 18).

5007 ELMHURST LANE, LAS VEGAS, NV 89108-1304

TEL: +1 702 647 3095 - FAX: +1 702 647 9385  
<http://www.shundahai.org>  
e-mail: [shundahai@shundahai.org](mailto:shundahai@shundahai.org)

#### **Safe Energy Communication Council - SECC**

SECC is an environmental coalition of national energy, environmental and public interest media groups also working to educate the public about the economic and environmental liabilities of nuclear power.

1717 MASSACHUSETTS AVE NW #805, WASHINGTON DC 20036

TEL: +1 202 483 8491 - FAX: +1 202 234 9194  
e-mail: [seccgen@aol.com](mailto:seccgen@aol.com)

#### **Nuclear Waste Citizens Coalition**

The Nuclear Waste Citizens Coalition unites 18 different groups working on various aspects of the nuclear waste problem.

C/O CITIZEN ALERT, P.O. BOX 17173, LAS VEGAS, NV 89114

TEL: +1 702 796 5662 - FAX: +1 202 796 4886

e-mail: [citizenalert@igc.org](mailto:citizenalert@igc.org)

<http://www.igc.org/citizenalert/nwcc/nwcc2.html>

#### **Citizen Alert**

Citizen Alert was founded in 1975 in response to the federal government's plan to dump high-level nuclear waste in Nevada.

#### **RICK NIELSEN**

P.O. BOX 17173, LAS VEGAS NV 89114

TEL: +1 702 796 5662 - FAX: +1 702 796 4886

e-mail: [citizenalert@igc.apc.org](mailto:citizenalert@igc.apc.org)

<http://www.igc.org/citizenalert/>

#### **Rocky Mountain Peace Center (RMPC)**

The RMPC is a grassroots organization which works on nuclear weapons and waste issues with focus on the Rocky Flats Department of Energy site which produced plutonium triggers for nuclear weapons (see p. 16).

#### **TOM MARSHALL**

P.O. BOX 1156, BOULDER CO 80306

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e-mail: [tmarshall@igc.apc.org](mailto:tmarshall@igc.apc.org)

#### **Nuclear Energy Information Service (NEIS)**

NEIS is a non-profit, citizen organization in Evanston, Illinois that educates the public about nuclear power and safe alternatives using research, public forums, debate and educational events.

#### **DAVE KRAFT**

P.O. BOX 1637, EVASTON IL 60204-1637

TEL: +1 847 869 7650 - Fax: +1 847 869 7658

#### **Nevada Nuclear Waste Task Force (NNWTF)**

NNWTF is a non-profit organization focusing strictly on Yucca Mountain and high-level nuclear waste. For nearly 10 years it was the public involvement contractor for the State of Nevada.

#### **JUDY TREICHEL**

3926 BUSHNELL DR #71, LAS VEGAS, NV 89103

TEL: +1 702 248 1127 - FAX: +1 702 248 1128

e-mail: [QBBG02A@prodigy.com](mailto:QBBG02A@prodigy.com)

#### **Citizens Awareness Network (CAN)**

The Citizens Awareness Network (CAN) provides information to the local communities of western Massachusetts about issues of nuclear power and nuclear waste. CAN specifically focuses on the health and safety of both the public and workers in the nuclear industry.

#### **DEBBY KATZ**

P.O. BOX 83, SHELBURNE FALLS MA 01370

TEL: +1 413 339 4374 - FAX: +1 413 339 8768

e-mail: [can@sharpnet.com](mailto:can@sharpnet.com)

<http://equinox.shaysnet.com/~can/>

#### **Center for Energy and Environmental Studies - Princeton University**

Frank von Hippel served as Assistant Director for National Security in the White House's Office of Science and Technology Policy (OSTP) and is a Professor at Princeton's Woodrow Wilson School. He also directs the Federation of American Scientists' nuclear disarmament and non-proliferation program.

#### **FRANK VON HIPPEL**

H102 ENG. QUAD, PRINCETON UNIVERSITY, NJ 08544 PRINCETON

TEL: +1 609 258 4695 - FAX: +1 609 258 3661

e-mail: [fvhippel@princeton.edu](mailto:fvhippel@princeton.edu)

#### **Nuclear Age Peace Foundation**

The Nuclear Age Peace Foundation, an international education and advocacy organization focusing on issues of international Peace and Security, is the global contact for Abolition 2000 (<http://www.napf.org/abolition2000/index.html>) which is a global network comprised of more than 1,455 citizen action groups in 92 countries, all working to eliminate nuclear weapons globally.

PMB 121, 1187 COAST VILLAGE ROAD, SUITE 1, SANTA

BARBARA, CA 93108-2794

TEL: +1 805 965 3443; FAX: +1 805 568 0466

e-mail: [wagingpeace@napf.org](mailto:wagingpeace@napf.org)

<http://www.napf.org>

## FIGURES OF THE MONTH

### PLUTONIUM STOCKS IN THE UNITED STATES

Annual figures for civil unirradiated plutonium	As of 31st Dec. 1997 rounded for 1 tonne plutonium	As of 31st Dec. 1996
1.Unirradiated separated plutonium in product stores at reprocessing plants	0.00 t	0.00 t
2.Unirradiated separated plutonium in the course of manufacture or fabrication and plutonium in unirradiated products at fuel or other fabricating plants or elsewhere	< 0.05 t	< 0.05 t
3.Plutonium in unirradiated fuel or other fabricated products at reactor sites or elsewhere	4.60 t	4.60 t
4.Unirradiated separated plutonium held elsewhere**	40.40 t	40.40 t
<b>TOTAL*</b> (line not existing in the official document)	<b>45.00 t</b>	<b>45.00 t</b>

\* : rounded for 100 kg

\*\* : including separated plutonium used for research purposes

Estimated quantities of plutonium contained in spent civil reactor fuel	As of 31st Dec. 1997 rounded for 1 tonne plutonium	As of 31st Dec. 1996
1.Plutonium contained in spent fuel at civil reactor sites	287 t	270 t
2.Plutonium contained in spent fuel at reprocessing plants	0 t	0 t
3.Plutonium contained in spent fuel held elsewhere	15 t	13 t
<b>TOTAL</b> (this line does not exist in the official document)	<b>302 t</b>	<b>283 t</b>

(Source: Permanent Mission of the United States of America to the IAEA, 11 October 1999)

The 45 t of separated plutonium along with 7,5 t of the 15 t listed in plutonium contained in spent civil reactor fuel constitutes the 52,5 t that the United States has declared as excess to defense needs. These 7,5 t were originally generated or acquired for defense purposes but have not been separated from the spent fuel. According to the US government statement, there is no American separated plutonium in the U.S. or elsewhere than that which was produced or acquired in the past for defense-related purposes.

## THE WORDS OF THE MONTH

### "NO ONE CAN BUY THE CASE FOR SELLAFIELD ANY LONGER"

"The worst argument for keeping the nuclear-fuel reprocessing plant at Sellafield going is that it employs a lot of people. But it is hard to escape the conclusion that that is almost the only reason why BNFL still exists. The reprocessing industry was set up to produce the enriched plutonium originally needed for nuclear weapons, and it has managed to keep going as the supplier of fuel to new kinds of nuclear power stations that have so far failed to produce electricity at an economical price."

*The Independent, 12 February 2000*  
(UK Daily Paper which revealed the quality control falsification issue)

"If the managers of British Nuclear Fuels (BNFL) were secretly in the pay of green lobbyists working to shut down Britain's nuclear industry, they could scarcely have done a better job. (...)"

"The focus today on reprocessing dates back to Cold War days when uranium was expensive. Today it is cheap and there is a case to be examined for BNFL scrapping its reprocessing facilities, either charging clients to store waste instead or developing its other concerns."

*The Times, Editorial, 19 February 2000*

"If Japan and Germany pull out, BNFL's sales of MOX fuel - and a new plant it has constructed to make it - will be doomed. And the rationale of its mainbusiness, reprocessing used nuclear fuel, will disappear."

@The Independent on Sunday, 20 February 2000

"Pressure is mounting for top-level sackings at Sellafield today as the nuclear plant faces its worst crisis in 30 years. (...)"

BNFL's most recent Environment, Health & Safety (EH&S) report, "Responsible for safety and care for the environment", released last October, carries a verification statement by Lloyd's Register Quality Assurance Ltd (LRQA).

The statement says that "the sites (including Sellafield) visited by LRQA were well run with management and staff committed to EH&S management. Mechanisms for achieving improvements in EH&S performance at site level were consistent with corporate objectives".

One of the NII reports, on the Health & Safety Executive (HSE) team inspection of the control and supervision of operations at BNFL's Sellafield site, issued last Friday states as one of three main conclusions that "there is a lack of high quality safety management system across the site which is compounded by an overly complex management structure".

*Evening News & Star, 19 February 2000, under the headline "DAMNED"*

"BNFL said yesterday that workers at the mixed oxide plant had measured the batch of pellets as required and were sure they were safe and to specification, but the computer had crashed and the data had been lost. Rather than do the work again, they falsified the data, copying from a previous batch. The fuel was then made into rods, delivered to the German company and placed in the reactor."

*The Guardian, London, 23 February 2000*

**BNFL: PRIVATIZATION BYE, BYE...?**

The story is unusual, to say the least. The only other case, one can recall, is the falsification of welding x-rays in certain French nuclear power plants years ago. When the UK Nuclear Installations Inspectorate (NII) published its damning report on "MOX fuel data falsification at BNFL, Sellafield", on 18 February 2000, the story had been around for a few months, but few expected such a harsh and unusual judgment by the safety authorities: "In particular, the deficiencies found in the quality checking process will have to be rectified, the management of the plant improved and operators either replaced or retrained to bring the safety culture in the plant up to standard the Health and Safety Executive (HSE) requires for a nuclear installation". (Download a PDF version of the full report at: <http://www.pu-investigation.org/reports/000221HSEMOXFalsification.pdf>.)

In the meantime the incriminated plant remains shut down. The plant, that is the MOX Demonstration Facility (MDF) at Sellafield, close to the THORP reprocessing facility, also operated by BNFL. The NII chief inspector, Lawrence Williams, said at the press conference launching the reports, that he would withdraw the operating licence for THORP if safety upgrades in the high level liquid radioactive wastes storage tanks at Sellafield were not implemented within the tough timeframe the NII set out. And the large 120 t Sellafield MOX Plant (SMP) is still waiting for a license to operate. Hard to imagine that this will happen soon. Even more uncertain seems the planned 49% privatization of BNFL. Who wants to buy a sinking ship?

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- "La France Nucléaire 1997", Mary Byrd Davis, WISE-Paris, 256 pages; 120 FRF + 25 FRF for postage
- "Comprehensive Impact Assessment of the Use of MOX Fuel in Light Water Reactors", Jinzaburo Takagi, et al., CNIC, Tokyo, 335 pages; 400 FRF (NGOs 160 FRF) + 60 FRF postage + VAT for Europe (contact CNIC for US and Asia, fax: 81-3-53 30 95 30).

Payment to WISE-Paris by check in FRF or bank transfer.

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