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TESTIMONY OF

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TO THE

DEPARTMENT OF ENERGY

CONCERNING

THE SCOPE OF THE

ENVIRONMENTAL IMPACT STATEMENT

ON THE

SPECIAL ISOTOPE SEPARATION FACILITY

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My name is Thomas B. Cochran. I am a Senior Staff Scientist with the Natural Resources Defense Council (NRDC). I hold a Ph.D in Physics from Vanderbilt University, and was a member of the Department of Energy's (DOE) Energy Research Advisory Board (ERAB) from 1978-1982; DOE's Nuclear Proliferation Advisory Panel (1977-79); and the Nuclear Regulatory Commission's Advisory Panel for the Decontamination of the Three Mile Island Unit 2 (1980-1986). While on the ERAB I was a member of the Advanced Isotope Separation Study Group (1982) which reviewed the DOE Advanced Isotope Separation Program including the Laser Isotope Separation (AVLIS) Process. Consequently, I have some knowledge of the Special Isotope Separation (SIS) technology. I am also editor and co-author of the Nuclear Weapons Databook, Volume II, "U.S. Nuclear Warhead Production," and Volume III, "U.S. Nuclear Warhead Facility Profiles," which will be released by Ballinger Publishing Co. in April. Therefore, I am quite familiar with the DOE programs for providing plutonium to meet perceived nuclear weapons needs. Accompanying me this evening is Dan W. Reicher, an NRDC attorney. Mr. Reicher holds a J.D. from Stanford University Law School and was a staff member of the President's Commission on the Accident at Three Mile Island.

The Natural Resources Defense Council is a national non-profit environmental organization with almost 70,000 members. NRDC has been working for the past 15 years to ensure the safety of DOE's nuclear weapons production facilities, prevent the proliferation of nuclear weapons, and halt the use of weapon-

usable plutonium in civilian commerce. We are pleased to have this opportunity to present our views to the DOE concerning the scope of the Environmental Impact Statement on the Special Isotope Separation facility.

DOE currently advances two reasons for full-scale deployment of SIS. The primary reason is to produce weapon-grade plutonium from DOE's current inventory of fuel-grade plutonium, most of which is at DOE's Hanford Nuclear Reservation. A secondary reason is to separate plutonium isotopes -240 and -241 from existing weapon-grade plutonium to reduce radiation exposure of personnel who handle the weapons. Neither of these uses for SIS justifies its almost $1 billion price tag, the risks the facility poses to human health and the environment, and the damage SIS would do to efforts to prevent the spread of nuclear weapons to nations currently without them.

DOE's use of SIS to convert fuel-grade plutonium to weapon-grade plutonium is not cost effective and therefore cannot be justified. As shown in Tables 1 and 2, by the time the facility comes on line in 1995 or later, DOE will have at most about 6 MT of fuel grade plutonium available for SIS enrichment. This constitutes only a two-year supply of feed material were the SIS facility to operate at full capacity (approximately 3 MT/yr). This could be stretched to four years if the plant operated at a reduced capacity during start-up. This can be seen by the following analysis.

DOE's fuel-grade plutonium inventory was 16 metric tons (MT) in 1983. Of this, some 4 MT was obtained from the United Kingdom

under a barter agreement. The British government was given assurances that this 4 MT would not be used for weapons. Each year since 1983 on average about 0.5 MT of the remaining 12 MT of this material is available for blending with supergrade plutonium (3% Pu-240) from the Savannah River Plant, South Carolina to produce weapon-grade plutonium. (See Table 1). This is based on the assumption that the Savannah River Plant C-Reactor remains permanently shutdown. So each year the stockpile of fuel-grade plutonium available to feed the SIS declines significantly leaving about 6 MT in 1995.

If DOE were simply to continue its blending process rather than develop SIS to produce weapon-grade plutonium, we estimate that the fuel-grade plutonium stockpile at Hanford would be exhausted by about 2006. (See Table 1.) The time of depletion would be moved forward to about 2002 if the C-Reactor were restarted by 1990. If the SIS plant comes on line in 1995 and operates at 25% capacity in the first year, 50% in the second and 75% in the third, the 6 MT inventory will be exhausted in 1998. (See Table 2). Consequently, at most, the SIS plant will accelerate the availability of the fuel-grade stocks for weapons by 4 to 8 years. This is based on the assumption that development of the SIS plant does not continue to slip. This is an extraordinarily optimistic assumption considering development has already been delayed at least five years.

In sum, the question which must be addressed in the EIS is not whether DOE will be able to produce additional weapon-grade plutonium from existing stockpiles of fuel-grade plutonium, but

Table 1

INVENTORY OF DOE FUEL GRADE PLUTONIUM FOR BLENDING

| FY | SRP Reactors Producing Supergrade Pu[a] | Annual Supergrade Pu Produced[b] (Kg) | Annual Supergrade Pu Separated[c] (Kg) | Annual Fuel Grade Pu Required[d] (Kg) | Available Fuel-Grade Pu Inventory[e] (Kg) |
|---|---|---|---|---|---|
| 1981 | 0.6 | 250 | | | |
| 1982 | 1.0 | 540 | 400 | 200 | |
| 1983 | 2.0 | 1,070 | 800 | 400 | 12,000 |
| 1984 | 2.0 | 1,100 | 1,085 | 540 | 11,460 |
| 1985 | 2.0 | 1,010 | 1,055 | 530 | 10,930 |
| 1986 | 2.8 | 1,425 | 1,220 | 610 | 10,320 |
| 1987 | 2.1 | 1,075 | 1,250 | 625 | 9,695 |
| 1988 | 2.0 | 1,030 | 1,050 | 525 | 9,170 |
| 1989 | 2.0 | 1,000 | 1,015 | 510 | 8,660 |
| 1990 | 1.7 | 860 | 930 | 465 | 8,195 |
| 1991 | 1.1 | 550 | 1,410 | 705 | 7,490 |
| 1992 | 1.3 | 650 | 600 | 300 | 7,190 |
| 1993 | 1.6 | 820 | 735 | 370 | 6,820 |
| 1994 | 1.5 | 770 | 795 | 400 | 6,420 |
| 1995 | 1.7 | 725 | 750 | 375 | 6,045 |
| 1996 | 1.6 | 820 | 770 | 385 | 5,660 |
| 1997 | 2.2 | 1,125 | 970 | 485 | 5,175 |
| 1998 | 2.3 | 1,170 | 1,150 | 575 | 4,600 |
| 1999 | 2.2 | 1,125 | 1,150 | 575 | 4,025 |
| 2000 | 2.2 | 1,125 | 1,125 | 575 | 3,450 |
| 2001 | 2.2 | 1,125 | 1,125 | 575 | 2,875 |
| 2002 | 2.2 | 1,125 | 1,125 | 575 | 2,300 |
| 2003 | 2.2 | 1,125 | 1,125 | 575 | 1,725 |
| 2004 | 2.2 | 1,125 | 1,125 | 575 | 1,150 |
| 2005 | 2.2 | 1,125 | 1,125 | 575 | 575 |
| 2006 | 2.2 | 1,125 | 1,125 | 575 | 0 |

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[a] Assumes C-Reactor permanently shutdown in FY 1986. P-, K-, and L-Reactors available for tritium and supergrade plutonium (3% Pu-240) production. For FY 1986-99 the number of reactors dedicated to tritium production is given in J. S. Allender and L. M. Macafee, "Economic Analysis of the Fuel Production Facility," OPST -84, -420, pp. 5, 24 and based on the projected tritium requirements given in the 1984 Nuclear Weapons Stockpile Memorandum.

[b] See Nuclear Weapons Databook, Volume II, U.S. Nuclear Warhead Production, Ballinger Publ. Co., 1987 (in press), p. 63.

[c] Assumes 6 month cooling period.

[d] Assumes blending 2 parts supergrade Pu (3% Pu-240) and 1 part fuel-grade Pu (12% Pu-240).

[e] Assumes 31 March 1983 inventory of 16.13 MT, of which some 4 MT is of British origin and unavailable for weapons. See Nuclear Weapons Databook, Volume II, p. 77.

Table 2

INVENTORY OF DOE FUEL-GRADE PLUTONIUM FOR SIS

| FY | Annual Fuel Grade Pu Required[a] (Kg) | Available Fuel-Grade Pu Inventory[b] (Kg) |
|---|---|---|
| 1995 | 750 | 5,670 |
| 1996 | 1,500 | 4,170 |
| 1997 | 2,250 | 1,920 |
| 1998 | 3,000 | 0 |

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a Assumes plant capacity of 3 MT. Start-up capacity of 0.25, 0.5, 0.75, full in years 1 through 4 respectively.

b Inventory in FY 1994 from Table 1.

whether the slightly higher rate at which the existing stockpile of fuel-grade plutonium is processed is justifiable in view of: (1) the higher cost of SIS compared to blending; and (2) the grave health, environmental and proliferation risks posed by SIS. To place this in perspective, the 6 MT fuel grade inventory in 1995 will represent about 5 percent of the some 120 MT plutonium inventory in the U.S. weapons stockpile. DOE can increase this inventory incrementally at a rate of 1.4%/yr. using SIS or 0.5%/yr. by blending. There is no conceivable national security argument that can be made in 1987 for favoring the higher rate.

We believe that in view of these factors SIS cannot be justified. We find support for this conclusion in a 1985 report by President Reagan's Office of Management and Budget which seriously questioned the need for SIS saying:

> The SIS process has the highest cost (in total dollars and in dollars per gram of additional plutonium) of the various methods of increasing productivity. The SIS process also requires the most lead time and is the most technologically uncertain.1/

As we noted earlier, DOE's secondary reason for development of SIS is to remove certain isotopes from existing supplies of weapon-grade plutonium to reduce radiation exposure incurred by workers who handle nuclear weapons. DOE claims that without SIS, military personnel will be unnecessarily exposed to radiation. However, DOE fails to consider whether a reduction in the dose can be justified under the As Low As Reasonably Achievable

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1/ Nuclear Weapons Databook Vol. II, at 97, note 233.

(ALARA) principle and, assuming it can, the fact that reduced exposure can be achieved at a much lower cost through shielding.

Our analysis and that of the Office of Management and Budget lead, then, to the conclusion that SIS is not justifiable on the bases currently offered by DOE. Aside from these bases and pressures brought by a large cadre of scientists and engineers who have built their careers around SIS, why is DOE spending almost $1 billion to develop SIS? A careful reading of testimony DOE has given to Congress on SIS reveals that DOE's real reason for full-scale deployment of SIS is to be able to provide rapidly a large-scale plutonium production capability -- a so-called "surge capacity" -- which could be called upon in the event of a rapid buildup in Soviet nuclear weapons. Since there will be little in the way of DOE fuel-grade plutonium to satisfy this surge capacity, DOE clearly has its eyes on the only other large source of plutonium for the weapons program, namely spent fuel from commercial nuclear reactors. As early as 1981, then-Secretary of Energy Edwards endorsed the use of commercial spent nuclear fuel as a source of plutonium for the weapons program in a speech before the DOE Energy Research Advisory Board. The Secretary stated that such a move would provide the plutonium needed for both the weapons program and the breeder reactor program. He also claimed that it would solve the nuclear industry's waste disposal problem.

SIS, then appears to be part of a larger plan to provide surge capacity using commercial spent fuel. Critical to this

plan is the PUREX processing plant at Hanford which can extract plutonium from spent fuel for later enrichment in the SIS. DOE renovated and reactivated PUREX in 1983 and is currently making an extensive additional modification which will allow spent fuel rods from the Fast Flux Test Facility, and therefore from commercial power reactors as well, to be cut into small segments for processing. Conveniently, DOE will also become the owner of all the commercial spent fuel in the United States in 1998, pursuant to a series of contracts it has entered into with nuclear utilities. DOE is also developing plans to build a Monitored Retrievable Storage (MRS) facility to store spent fuel.

So by 1998, when we estimate DOE will begin to exhaust its supply of fuel-grade plutonium to feed the SIS facility, the DOE will hold title to virtually all the commercial spent fuel in the U.S., and will have in place all the technology it needs to mine plutonium from commercial nuclear power plants for the bomb program.

All that will stand in DOE's way is the Hart-Simpson-Mitchell amendment to the Atomic Energy Act which was enacted by Congress in 1982 and prohibits the use of spent commercial fuel for the production of nuclear weapons. But, as of the late 1990's, with the technology in place to reprocess commercial spent fuel, and a likely reduction in plutonium production capacity as a result of the inevitable closure of the Hanford N-Reactor and delayed development of a New Production Reactor, Congress may feel irresistible pressure to repeal the Hart-Simpson-Mitchell amendment. As one of DOE's own physicists has

commented:

> [r]egardless of the law, there will be a strong incentive to use the spent fuel rods from power plants to obtain plutonium for weapons. The Reagan administration has proposed a great increase in [the] number of nuclear warheads. This will require a large amount of plutonium. This is a scarce material. If a cheaper source of it is found, I'm quite sure they will make every effort to get at it. Seattle Post-Intelligencer, Aug. 28, 1983 at A1, A10.

So what's wrong with the use of SIS to mine commercial spent fuel for plutonium? In a word, everything. If implemented it would end almost four decades of careful separation of military and civilian nuclear programs. By essentially turning our commercial nuclear power plants into bomb factories, the U.S. would encourage other nations to use their civilian nuclear programs for military purposes. Using SIS to dismantle the wall between the peaceful and the military use of the atom would be an international tragedy of great proportions.

A decision to direct American civilian nuclear fuel to weapons use would also raise serious questions as to whether we will ever be able to put a lid on the nuclear arms race. The current U.S. inventory of weapon-grade plutonium now in or available for use in nuclear weapons is about 100 MT. By mining the plutonium in spent commercial nuclear fuel, DOE would be able to increase rapidly the plutonium inventory in the U.S. weapons stockpile by over 50 percent.

Because plutonium can be used for the manufacture of nuclear weapons, it is a prime target for diversion by people from both within and without an SIS facility. It is, therefore, imperative

that we minimize the number of facilities and people who handle plutonium. Thus, SIS should not be built unless it is absolutely necessary and, as we have demonstrated, SIS is not necessary to further DOE's publicly stated objectives.

Additionally, DOE simply does not have a track record which demonstrates its capability to safeguard SIS plutonium production adequately, that is: to strictly control the plutonium production process; to account for all quantities of plutonium at each stage in the process; and to ensure the physical security of the site. Just five months ago the plutonium reprocessing plant at Hanford was shutdown for, among other things, serious violations of rules designed to prevent theft of plutonium by terrorists. The facility for assembling complete nuclear devices at the Los Alamos National Laboratory was permanently closed a few years ago because of DOE's inability to provide adequate safeguards. And recently the security forces at the Savannah River Plant were shown to be inadequate to repel even a mock terrorist raid on the facility. These and numerous other lapses demonstrate that DOE has serious and continuing problems in safeguarding plutonium. The question, then, is whether we should be adding an unnecessary and economically unjustifiable facility to this troubled system.

The EIS must also consider carefully the highly toxic nature of plutonium. In recent statements DOE has attempted to minimize the health and environmental risks posed by plutonium. However, DOE's own documents recognize that plutonium's long-lived radioactivity and its radiotoxicity combine to make it an

exceedingly "potent cancer producer."[2] DOE-funded experiments with beagle dogs demonstrate that inhalation of less than one microcurie of Pu-239 oxide result in an incidence of lung cancer approaching 100%.[3] In an SIS production facility able to vaporize 2 to 3 tons of Pu a year (several hundred billion microcuries), there is the potential for severe health effects.[4]

DOE stresses that through "proper actions" the health and environmental risks of plutonium can be minimized. However, DOE's operation of its facilities does not leave us with much faith that the Department is capable of assuring that these proper actions are taken. It would take the rest of the evening to begin to describe the patent disregard DOE has shown for human health and the environment at its facilities around the nation. Much of this history of abuse and neglect stems from the unregulated status of the DOE facilities. Unlike commercial nuclear plants which are licensed and overseen by the Nuclear Regulatory Commission, DOE runs its own show. Thus the same agency which produces plutonium and disposes of some of the most toxic materials known to man also oversees the safety of its facilities. As Congressman Wyden of Oregon put it, this is akin to letting Dracula guard the blood bank. We believe that if DOE is permitted to go forward with development of SIS, the facility

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2/ Rocky Flats FEIS, DOE/EIS-0064, Vol. 2, G-3-1.

3/ J. F. Parks, "Inhaled Plutonium Oxide in Dogs," Pacific Northwest Laboratory Annual Report for 1985 to the DOE Office of Energy Research, Part 1, Biomedical Sciences, February 1986, pp. 3-17.

4/ There are 16 micrograms of Pu-239 per microcurie.

must be subject to full licensing and oversight by the Nuclear Regulatory Commission.

In summary, the SIS facility is uneconomical, unnecessary and poses serious health and proliferation risks. It should not be built. If it is built, it should be licensed and overseen by the Nuclear Regulatory Commission.