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TESTIMONY OF

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AND

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TO THE

U.S HOUSE OF REPRESENTATIVES

ARMED SERVICES COMMITTEE

DEPARTMENT OF ENERGY DEFENSE NUCLEAR FACILITIES PANEL

CONCERNING

THE SPECIAL ISOTOPE SEPARATION (SIS) PLANT

March 20, 1989

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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 a committee which reviewed DOE's Advanced Isotope Separation Program, including the Atomic Vapor Laser Isotope Separation (AVLIS) process, which is the underlying technology for the Special Isotope Separation (SIS) plant. I am also an 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," published by the Ballinger Publishing Company. Therefore, I am knowledgeable about DOE programs for providing plutonium to meet perceived nuclear weapons needs.

I am accompanied this afternoon by Dan Reicher, a senior project attorney with NRDC. Prior to joining NRDC, Mr. Reicher was an assistant attorney general for environmental protection in the Commonwealth of Massachusetts, a law clerk to a federal district court judge, a staff member of the President's Commission on the Accident at Three Mile Island, and a legal assistant in the hazardous waste section of the U.S. Department

of Justice. Mr. Reicher is a graduate of Stanford Law School and Dartmouth College.

The Natural Resources Defense Council is a national non-profit environmental organization with over 100,000 members and contributors. 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. I am pleased to have this opportunity to present our views concerning the Special Isotope Separation facility.

Summary

NRDC has tracked the development of the $3 billion SIS program since the existence of the program was first publicly revealed about a decade ago. We have concluded that construction of an SIS facility, which would use lasers to refine a limited amount of plutonium for use in nuclear weapons, is unnecessary. We urge the Committee to halt the start of construction of the SIS plant, slated for May or June in Idaho, and to delete all funds for SIS construction in DOE's proposed Fiscal Year 1990 budget.

These actions by the Committee would reflect the serious doubts Congress and members of this Panel had about the SIS facility last year. During consideration of the Fiscal Year 1989 Defense Authorization bill, the House and Senate unanimously approved amendments, which delayed construction of the SIS plant

until March of this year, and directed DOE to prepare a series of reports on SIS technology. Twenty-one House members wrote their colleagues in 1988 endorsing an amendment that called for a one-year delay in SIS construction in light of serious concerns about the need for and technological-readiness of the SIS facility. (See attached letter.)

Since the last session, the General Accounting Office (GAO) has suggested that Congress re-evaluate the SIS project, and new information has raised even more doubts about the facility: [1]

o DOE has yet to demonstrate a need for plutonium from the SIS plant, particularly in light of the large plutonium surplus, continued decline in the size of the U.S. nuclear weapons stockpile, the ratification of the INF Treaty, and the bright prospects for a START agreement.

o The $3.1 billion price tag for the project is rising at a time when DOE's budget is being squeezed for funds for cleanup of serious environmental contamination at weapons plants across the country and for other materials production initiatives.

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[1] J. Dexter Peach, Assistant Comptroller General Resources, Community, and Economic Development Division, General Accounting Office, "GAO's View on DOE's Modernization Plan for the Weapons Complex" (GAO/T-RCED-89-5), January 25, 1989, at 6, 9.

o DOE has yet to demonstrate that the novel laser-based technology underlying the SIS plant will work at production scale.

o DOE has not yet completed its Preliminary Safety Analysis Review of the proposed SIS facility.

o DOE is currently unable to dispose of over 400 tons of plutonium-contaminated transuranic waste that would be generated annually from the SIS plant.

Despite these daunting problems, DOE plans to begin SIS construction in May or June, making SIS a concurrent development project. If construction starts as planned, SIS could very well be added to the long list of abandoned DOE projects -- a fate we simply cannot afford, particularly in light of the hundreds of waste cleanup projects at DOE facilities around the country that are in critical need of funding.

I. PLUTONIUM FROM THE SIS PLANT IS NOT NEEDED

Two essential ingredients in nuclear weapons are tritium, which decays rapidly and must be replenished in warheads, and plutonium, which essentially lasts forever and is fully recyclable. The SIS plant would not be capable of producing tritium, which is in short supply, but only weapon-grade plutonium, for which there is no identifiable need. Therefore,

any need for the SIS plant must be based on U.S. requirements for plutonium.

A. THE U.S. HAS A SURPLUS OF PLUTONIUM

The U.S. has a surplus of plutonium. In fact, former DOE Secretary Herrington told Congress in 1988 that the U.S. is "awash in plutonium" and that "we have more than we need."[2] This plutonium surplus explains the absence of alarm over the fact that the United States has not produced plutonium since June, 1988, when the L Reactor at the Savannah River Plant (SRP) in South Carolina was shut down. In contrast, there has been widespread concern over the halt to tritium production at SRP over the same period.

The current plutonium glut reflects a number of factors which must be understood in analyzing the need for development of SIS. First, as a report from Senator Mark Hatfield (R-OR), the ranking minority member on the Senate Appropriations Committee notes:

> Most plutonium for new weapons is obtained from retired weapons rather than from production at defense reactors. The most important source of plutonium is the current stockpile of weapons and the reserve inventory of plutonium which awaits use in future weapons ... Therefore, a nuclear weapons modernization and replacement program

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[2] John Herrington, Secretary of Energy, House Appropriations Subcommittee on Interior and Related Agencies, February 23, 1988.

can be met largely through retirement and dismantlement of old weapons.[3]

Moreover, in DOE's FY 1989 budget request DOE acknowledged that "most of the nuclear materials needed for new weapons systems are obtained from retired weapons."[4] Warheads in the existing U.S. arsenal contain a total of about 85 metric tons of weapon-grade plutonium. Typically, the U.S. retires about 1,600 warheads per year. On average each of these warheads contains about 3.6 kilograms (8 pounds) of plutonium. Each year, then, almost 6,000 kilograms or 6 metric tons of plutonium is made available for production of new warheads, an amount about equivalent to two-thirds to three-fourths the entire output of the SIS plant over its limited eight- to ten-year mission.[5] In the mid-1990's, for example, some 2,500 Poseidon missile warheads will be dismantled.[6]

Second, Senator Hatfield's report indicates that the DOE has built up a substantial reserve supply of plutonium in recent years. This is the result of the fact that since about 1980

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[3] "The Plutonium Cushion, Report on U.S. Defense Plutonium Needs and the Hanford N Reactor," Senator Mark O. Hatfield, October, 1987 at 5. ("Plutonium Cushion Report")

[4] Department of Energy, Department of Energy Fiscal Year 1989 Budget Request, Volume 1, February, 1988.

[5] DOE has not specific plans to use the SIS facility for the last two years of its operational life. See Department of Energy, Draft Environmental Impact Statement for the Proposed Special Isotope Separation Project, at v.

[6] Albright & Taylor, A Case Against Producing Nuclear Material, Bulletin of the Atomic Scientists, January, 1988 at 48.

plutonium production has been tied to erroneous and inflated projections of future warhead production. These projections are made in the Nuclear Weapons Stockpile Memorandum (NWSM), a classified document developed annually by DOE and the Department of Defense. The NWSM is a "blueprint" for warhead production and retirements and is the basis for DOE's plutonium production requirements. In reality, however, the NWSM in recent years has overestimated the number of warheads that will actually be produced. Because plutonium production is linked to these overestimates, DOE has built up a surplus of plutonium over the past six years. Senator Hatfield explained:

> The problem with using the NWSM as a blueprint or strict schedule for nuclear weapons requirements is that it never comes close to reality....Over the last six years, it has always overstated the number of warheads to be produced -- sometimes by a factor of two. The five year projection of warheads contained in the 1984 budget request and the 1983 NWSM was over estimated on average by 35% as compared to the actual warheads which were built or are now projected.[7]
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> Overstated projections in the Nuclear Weapons Stockpile Memorandum resulted in lower demand [for plutonium] than anticipated. Increased supply and reduced demand have created a plutonium cushion.[8]

Similarly, DOE and Congressional documents show that while in 1983 DOE was projecting a 13 percent increase in the number of warheads in the arsenal by 1987/1988, in reality there has been a

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[7] "Plutonium Cushion Report" at 5.

[8] Id. (emphasis added).

six percent drop. Meanwhile, between 1980 and 1985 DOE doubled plutonium production relative to the output during the previous five years.[9] In fact, during the Reagan years, while the number of warheads in the stockpile has dropped by some six percent -- freeing up an estimated four to five metric tons of plutonium -- some 10 metric tons of additional weapon-grade plutonium were added to the inventory from new production.

Third, over these years DOE has manufactured a huge inventory of weapon-grade plutonium in scrap. Some of this plutonium is recovered for further warhead production. The scrap inventory is apparently so large that, according to DOE existing scrap recovery facilities are "barely able to keep current with the residues [scrap] being generated. There is little or no capacity left to attack the residue backlog."[10]

B. **ARMS CONTROL WILL CREATE A PLUTONIUM FLOOD**

If the U.S. is currently "awash in plutonium" then the retirement of warheads under impending arms control agreements would create a plutonium flood. As explained above, DOE uses the plutonium from retired warheads to make new ones. Plutonium in warheads being retired under the INF Treaty is equivalent to about two years output of the SIS plant. And if President Bush

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[9] See, Nuclear Weapons Databook, Vol. 2 at 63, 67.

[10] Energy and Water Development Appropriations for 1988: Hearings before the Subcommittee on Energy and Water Development, House Committee on Appropriations, 100th Cong., 1st Sess. 1009-1010 (1987).

reaches a START agreement with the Soviets, the U.S. would retire about 4,000 warheads containing over one and a half times the SIS total lifetime plutonium output. In Appendix I, we calculate that taken together START and INF produce about two times as much plutonium as SIS. As DOE Assistant Secretary for Defense Programs Troy Wade admitted last year, "Should there be a START agreement and perhaps follow-on agreements where substantial weapons are returned, clearly it [SIS] would be worth revisiting."[11]

C. SIS IS NOT NEEDED FOR EMERGENCY PLUTONIUM PRODUCTION

DOE has finally acknowledged that plutonium is not in short supply, and therefore no longer attempts to justify construction of the SIS facility based on a current need for plutonium. Instead, DOE has resorted to promotion of the facility as an "insurance policy,"[12] a frequent rallying cry of proponents of projects in search of a mission. Under this view SIS would be developed in the unlikely event future plutonium supplies become inadequate, in particular due to increased plutonium requirements or problems with existing plutonium production and processing technology. This justification reflects the simple concern that

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[11] U.S. House of Representatives, House Appropriations Committee, Subcommittee on Energy and Water Development, Part 6, March 21, 1988, p. 1117.

[12] Statement of Secretary Herrington at Hearing before the Energy and Water Development Subcommittee of the House Armed Services Committee, March 10, 1988.

future unknown events may affect U.S. plutonium requirements and production capacity. In such a situation, the U.S. would need an alternative plutonium supply, according to DOE.

However, DOE fails to acknowledge that the current U.S. plutonium insurance policy is more than adequate. In fact, SIS provides no benefits that do not already exist through other more readily available and cheaper alternatives. Together these alternatives provide levels of plutonium insurance that make SIS a waste of money.

The seven elements of the U.S. plutonium insurance policy include:

* Reserve Plutonium Supply: In recent years DOE has built up a large reserve of readily available weapon-grade plutonium -- estimated at more than five tons -- as warhead production has not kept pace with plutonium output.

* Plutonium Scrap: More efficient processing of scrap plutonium in the future will add more plutonium to the stockpile than SIS. DOE proposes to spend at least $370 million over the next several years to enhance scrap recovery.

* N Reactor Restart: The Hanford N Reactor is currently in standby status. DOE acknowledges "the option of restarting N Reactor if future material requirements warrant such an

action."[13] DOE has spent over $100 million in upgrading the facility and expects to spend $70 million in FY90 to maintain it in cold standby status.[14] According to DOE, the reactor could be restarted in about two years. Moreover, its plutonium output--about 600-700 kg/year during its remaining five to eight year life--would be comparable to the proposed SIS plant.

* Accelerated Warhead Retirements: Senator Hatfield stated in his recent "Plutonium Cushion" Report that a substantial amount of additional plutonium could be made available for weapon production if the Department of Defense accelerated the retirement of obsolete warheads as Congress has urged it to do. "[B]y returning to earlier levels of retirements, we can significantly increase the amount of plutonium available for new weapons production and thereby become less dependent upon production from our reactors."[15] By retiring only 300 warheads out of an inventory of some 23,400, the U.S. would recover the equivalent of a year's worth of plutonium produced by SIS.[16]

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[13] "Pre-hearing Questions and Answers Relating to the March 3, 1988 Hearing Before the Subcommittee on Energy and Power Committee on Energy and Commerce," John S. Herrington, Secretary of Energy at question 10(d).

[14] Id. at 10(b).

[15] "The Plutonium Cushion, Report on U.S. Defense Plutonium Needs and the Hanford N Reactor," Senator Mark O. Hatfield, October, 1987 at 5.

[16] "The Plutonium Cushion, Report on U.S. Defense Plutonium Needs and the Hanford N Reactor," Senator Mark O. Hatfield, October, 1987 at 5.

* New Production Reactor: DOE is moving ahead with development of two new production reactors capable of producing tritium and weapon-grade plutonium.

* Production at SIS Demonstration Facility: DOE is already constructing what a former SIS project manager called a "plant scale size" SIS facility at Lawrence Livermore National Laboratory (LLNL).[17] The facility at LLNL would have the laser light capacity of a half-scale production plant.[18] We oppose operation of this prototype plant, but if it meets all environmental and safety standards, DOE could maintain it in cold standby and could even stockpile additional separator modules to provide a capability to expand its capacity rapidly. This would provide the additional emergency production capacity that is sought at the Idaho SIS plant and at substantial cost savings.

In fact, DOE initially planned to expand its SIS prototype plant, under a plan in which both the SIS prototype and production plants were to be built at the Hanford Reservation in Washington State. Ron Cochran, then Director of Nuclear Materials Production said, "The decision was made to locate the prototype facility at the Hanford site with the expectation that

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[17] DOE Proceeding No. 86 D 148, Public Scoping Hearing, Vol. 1 at 18.

[18] Special Isotope Separation Program Report to Congress by the Secretary of Energy, March 1989, at 8 ("DOE SIS Report").

should the technology prove usable, the facility would be expanded to a larger size."[19]

* Direct Use of Fuel-Grade Plutonium in Warheads: Fuel-grade plutonium -- which is the material that would be processed at SIS -- could be used directly in nuclear warheads without further refinement. For more than a decade strategic warheads have been designed to insure that they will not be rendered ineffective by the neutron flux of ABM warheads, or other warheads aimed at the same target (e.g., where two warheads of a MIRVed missile are aimed at the same target). Fuel-grade plutonium could be substituted for weapon-grade plutonium in modern strategic warheads with this design requirement without additional weapons testing.[20]

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[19] Aiken Standard, June 18, 1984, p. 1.

[20] Such warheads are designed so that their fission primary is not susceptible to pre-initiation of the nuclear chain reaction. The most straight forward way to do this -- and presumably US strategic warheads are designed in this fashion -- is to design the primary such that the chain reaction is initiated at the moment the fissile material becomes critical, and achieve the desired primary yield through deuterium-tritium boosting. The higher spontaneous fission rate of fuel-grade plutonium would not effect such a design. The only design difference would be due to the small adjustment in the ratio of plutonium to uranium in the primary due to the small increase in the critical mass of fuel grade plutonium over weapon-grade.

II. THE $3.1 BILLION PRICE TAG FOR SIS IS RISING

DOE's cost estimate for the SIS project has increased by about 250 percent since the project's inception, from about $355 million in 1981 to over $1.2 billion today, not including an additional $1.9 billion in operating costs over 30 years. This brings the total cost of SIS to over $3 billion. (See attached Graph.) And the General Accounting Office, which has suggested that Congress re-evaluate the SIS project, recently warned that "huge cost overruns" may be on the horizon.[21]

DOE has also expressed concern about SIS costs and associated schedules for construction and research and development. In fact the current SIS Project Manager had "major concerns" about the "overall project" as recently as June, 1988.[22]

Increases in the price tag of the SIS project are typical of DOE cost estimates for past construction projects, which have risen by an average of nearly 500 percent over initial estimates, according to a 1988 House Appropriations subcommittee report. The House report concluded that DOE estimates for major construction projects "must be challenged in light of the

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[21] J. Dexter Peach, Assistant Comptroller General Resources, Community, and Economic Development Division, General Accounting Office, "GAO's Views on DOE's Modernization Plan for the Weapons Complex" (GAO/T-RCED-89-5), January 25, 1989, pp. 6, 9.

[22] Project Manager's Progress Report, Special Isotope Separation Project, April to June, 1988.

Department's past competence in estimating the cost of and managing the construction of major projects."[23]

III. SIS TECHNOLOGY HAS NOT BEEN DEMONSTRATED AT PRODUCTION SCALE

The design of the SIS facility is only 30 percent complete, and SIS technology has yet to be demonstrated on a production scale.[24] SIS research and development has fallen behind schedule such that DOE will not complete the critical experiments needed to determine whether the integrated SIS technology will work at production scale any earlier than spring 1990. Last July and again this year DOE asked Congress to transfer millions of dollars earmarked for SIS construction to SIS research and development, a further indication that the development of SIS technology is not proceeding as planned and that the costs of SIS development will likely continue to escalate.

IV. SIS IS A CONCURRENT DEVELOPMENT PROJECT

Despite the fact that the adequacy of the SIS technology has not been established, DOE plans to begin SIS construction in Idaho in May or June. DOE's own inspectors have raised concerns

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[23] U.S. House of Representatives, Committee on Appropriations Subcommittee on Energy and Water Development, Report 100-618, May 11, 1988, p. 55.

[24] DOE SIS Report at 6, 9. Department of Energy, U.S. Department of Energy Fiscal Year 1990 Congressional Budget Request, Construction Project Data Sheets (DOE/MA-0356), January 1989, p. 310.

about DOE's plans to initiate SIS construction activities before SIS technology is tested. The SIS Project's Fiscal Year 1989 Validation report, prepared by DOE's Office of Assessment and Validation, states:

> Secretarial correspondence to the Congress indicates that successful results [of the SIS prototype tests] must be obtained from 'integrated process demonstrations of the technology prior to the start of physical construction.' It is not clear what the performance requirements are which constitutes acceptable test results. As normally understood on schedule 44's submitted to the Congress, equipment procurements, site preparation, excavation, etc., constitute start of physical construction. Site work, utility construction and procurements [for SIS] are scheduled for as early as 30 months before completion of integrated verification tests. The proposed schedule in the correspondence shows site preparation 10 months before the report on key process demonstrations."[25]

This situation is even worse now, with site preparation scheduled to take place as long as a year or more before performance verification tests on the SIS prototype plant are complete. Moreover, completion of the SIS prototype "may slip [an additional] 4 months," according to the latest SIS Project Manager's Progress Report.[26]

This concurrent development strategy seems designed to set the SIS construction project in gear before Congress has let off

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[25] Department of Energy, Fiscal Year 1989 Validation Report, Special Isotope Separation Project, p. 3 (emphasis added).

[26] Project Manager's Progress Report, Special Isotope Separation Project, October to December, 1988.

the clutch -- a policy which has proved disastrous many times in the past. DOE has spent billions of dollars in the last two decades on failed military and civilian projects. In some cases--notably the Plutonium Processing Building 371 at Rocky Flats in Colorado, the Gas Centrifuge Uranium Enrichment Plant in Ohio, and the Clinch River Breeder Reactor in Tennessee -- DOE proceeded with costly construction before the underlying technology for the proposed plants was fully demonstrated or the need for the facility clearly established.[27] DOE's record has led the GAO to conclude: "The shortcomings we've seen raise questions about the technical capabilities of the Department of Energy.[28]

V. THE SAFETY OF SIS TECHNOLOGY HAS NOT BEEN PROVEN

Plutonium vaporized in the SIS plant would burn spontaneously if exposed to air. DOE has yet to demonstrate that this and other hazards of operating the novel SIS technology can be controlled. Of particular concern is DOE's failure to complete the Preliminary Safety Analysis Review for SIS. Due to delays encountered in SIS design and the safety review process, the critical Preliminary Safety Analysis Review for SIS is not scheduled for release until early 1990 -- about two years behind

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[27] Keith Schneider, "U.S. Spent Billions on Atom Projects that Have Failed," New York Times, December 12, 1988, at 1.

[28] Id.

schedule and nearly a year after DOE plans to begin constructing the facility. [29]

Initially, DOE planned to complete the PSAR before the start of construction. As the June, 1988, SIS "Project Manager's Progress Report" states: "The PSAR must be approved prior to start of site preparation in March, 1989."[30] Moreover, the same report in September states: "Approval of the PSAR is needed by February in order to meet the March 1, 1989, site preparation milestone."[31] But apparently because of delays in completing the PSAR, DOE has decided to move ahead with construction before completing the document.[32]

VI. DOE CURRENTLY CANNOT DISPOSE OF SIS WASTE

In September, DOE announced that plans to open a geologic repository in New Mexico for radioactive waste have been postponed indefinitely due to safety and legal problems. As a result, DOE may not be able to dispose of SIS plutonium waste, raising the possibility that Idaho will become the permanent

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[29] Department of Energy, SIS Project Charter Schedule, October 27, 1986; Compare with Project Manager's Progress Report, Special Isotope Separation Project, October to December, 1988.

[30] Department of Energy, Project Manager's Progress Report, Special Isotope Separation Project, April - June, 1988.

[31] Project Manager's Progress Report, Special Isotope Separation Project, July to September, 1988 (emphasis added).

[32] Project Manager's Progress Report, Special Isotope Separation Project, October to December, 1988.

resting place. Existing plutonium wastes in Idaho have leaked from storage facilities and are migrating toward the Snake River aquifer, a vital underground water source for the northwest U.S. In the face of DOE's waste problems, Idaho Governor Cecil Andrus told the Senate Governmental Operations Committee, "If, as a nation, we cannot find a safe, environmentally acceptable means of storing the waste we produce, we had better stop producing it."[33]

VII. CONGRESS' RESPONSE

In light of the serious problems with the SIS project, Congress should delete all SIS construction funds in the DOE's proposed budget for Fiscal Year 1990 and halt the start of construction of SIS, scheduled for May or June. Congress should also support legislative efforts to bring the U.S. and the Soviets to the table to negotiate a bilateral, verifiable halt to the production of plutonium and highly enriched uranium ("fissile materials") for nuclear weapons.

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[33] Cecil D. Andrus, "Prepared Remarks before the Senate Governmental Operations Committee," January 26, 1989.

A. CONGRESS SHOULD DELETE SIS CONSTRUCTION FUNDS IN DOE'S PROPOSED FISCAL YEAR 1990 BUDGET.

The immediate issue that this panel must resolve as it reviews DOE's Fiscal Year 1990 budget proposal is whether the U.S. should commit to construction of the SIS plant this year. The answer is clearly no. By deleting SIS construction funds from DOE's proposed Fiscal Year 1990 budget, Congress would not put U.S. deterrent force at risk and would save taxpayers $115 million in FY90. If the facility is never built and operated, Congress would save about $2.5 billion or more over the next 30 years, including $146.5 million in construction funds in the Fiscal Year 1991 budget, and $169 million in construction funds in the Fiscal Year 1992 budget.

These savings could be transferred to DOE cleanup projects, which are in serious need of more funding. DOE's bill to clean up waste at facilities across the country could well be in excess of $100 billion -- more than the amount spent to put a man on the moon in the Apollo Space Program.[34] A recent DOE report on the modernization of the weapons complex indicates that over the next

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[34] General Accounting Office, "Dealing with Problems in the Nuclear Defense Complex Expected to Cost Over $100 Billion," GAO/RCED-88-197BR, July 1988, at 6. See also Department of Energy, "Environment, Safety and Health Report for the Department of Energy Defense Complex," July 1, 1988, at 35; Department of Energy, "Environment, Safety, and Health Needs of the U.S. Department of Energy, Volume 1: Assessment of Needs" (DOE/EH-0079), December 1988; Natural Resources Defense Council, "One Hundred Billion and Counting: A Primer on the Cost of Cleaning Up the Department of Energy's Nuclear Weapons Production Facilities," March 1988.

20 years DOE plans to spend less than half of what is necessary to cleanup radioactive and toxic waste at DOE facilities.[35]

A delay in constructing the SIS plant would not put the U.S. deterrent force at risk, even if a START agreement is not reached. Assuming the output of the SIS plant is about one ton annually, a one-year deferral in plant operation would delay the availability of a quantity of plutonium equivalent to about one percent of the total plutonium stockpile or fewer than 300 warheads. The plutonium in warheads retired under the INF Treaty alone is equivalent to about two years output from the SIS facility. Even former DOE Undersecretary Joseph Salgado admitted that a two-year moratorium on plutonium production "would not have a negative impact" on national defense.[36]

B. CONGRESS SHOULD HALT THE START OF CONSTRUCTION OF THE SIS PLANT, SCHEDULED FOR MAY OR JUNE.

To begin construction of SIS this June is premature under any circumstances. First, it simply does not make sense to begin construction of a plant until the viability of the underlying technology has been demonstrated. DOE will not know if SIS technology will work at production scale until spring 1990, at the earliest. In the past, DOE has wasted billions of dollars on concurrent development projects like SIS.

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[35] Department of Energy, "United States Department of Energy Nuclear Weapons Complex Modernization Report: Report to Congress by the President," December, 1988.

[36] Washington Post, February 28, 1988 at A4.

Second, DOE's own inspectors have raised concerns about DOE's plans to initiate SIS construction activities before integrated SIS technology is tested. Third, DOE initially planned to complete its Preliminary Safety Analysis Review (PSAR) for SIS before proceeding with construction in Idaho. Now, with the date for the release of the PSAR having slipped about two years, DOE has decided to push ahead with construction without completing this essential preliminary safety document.

C. CONGRESS SHOULD SUPPORT A BILATERAL, VERIFIABLE FISSILE MATERIAL CUTOFF.

The U.S has an historic opportunity to negotiate a bilateral, verifiable halt to the production of plutonium and highly enriched uranium for nuclear weapons. Currently, the U.S. is producing neither material. The U.S. has not produced plutonium since June, 1988, when the L Reactor at the Savannah River Plant was shut down. Likewise, highly enriched uranium has not been produced since 1964 when the U.S. unilaterally halted its production.

In fact, the U.S. has such a large stockpile of plutonium that many experts, including former CIA Director William Colby, former Chief of the SALT I Delegation, Gerard Smith, and former Director of the Arms Control and Disarmament Agency, Paul Warnke, have called on Congress and the President to declare a unilateral two-year moratorium on plutonium production and challenge the Soviet Union to negotiate a permanent, bilateral halt to the

production of plutonium -- and highly enriched uranium -- for nuclear weapons. (See attached letter.)

In the 1960's, the U.S. proposed a bilateral cutoff of the production of plutonium and highly enriched uranium for nuclear weapons to the Soviet Union, but the Soviets rejected the offer. In 1982, the Soviets announced their support of a bilateral cutoff. Foreign Minister Andrei Gromyko stated that the "cessation of production of fissionable materials for manufacturing nuclear weapons" could be made one of the initial stages of a nuclear disarmament program. [37]

The U.S. has indicated that a fissile material cutoff would be verifiable. In 1969, the U.S. proposed that such a cutoff could be verified by safeguards on declared nuclear facilities supplemented by surveillance satellites and other national intelligence means.[38] And DOE Assistant Secretary Troy Wade recently told a Senate Subcommittee that such an agreement would be difficult but "not impossible" to verify.[39]

The U.S. now has an historic opportunity to negotiate with the Soviets to halt permanently the production of these

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[37] Frank von Hippel, David Albright and Barbara G. Levi, "Stopping the Production of Materials for Weapons," Scientific American, September, 1985, p. 40. See also David Albright and Christopher Paine, "A Case Against Producing Nuclear Material," Bulletin of the Atomic Scientists, January/February 1988, p. 46.

[38] Id.

[39] Troy Wade, Assistant Secretary for Defense Programs, Testimony before the Senate Armed Services Committee, Subcommittee on Procurement and Nuclear Strategy, February, 1988.

materials. Congress should support legislative efforts to bring the U.S. and the Soviets to the negotiating table for this purpose.

CONCLUSION

DOE has acknowledged that the U.S. has a surplus of plutonium for nuclear weapons, but argues that the SIS plant should be built anyway for emergency plutonium production. But we have shown that DOE has numerous sources of plutonium available to provide plutonium in an emergency. Moreover, we have shown that arms control agreements could result in the dismantlement of thousands of nuclear weapons, and the plutonium from those weapons would drastically increase the current plutonium surplus. DOE admits that such arms control agreements could call the need for SIS into question, but argues that it is premature to assume that such agreements will be reached and thus SIS construction should start this spring.

But DOE has not demonstrated that SIS technology is viable or that the plant, which is only 30 percent designed, would be safe. A key report on the operation of the SIS prototype facility is not due out until Spring, 1990, and currently the facility is not even operating. The Preliminary Safety Analysis Review, which DOE had planned to complete before starting construction of the facility, is also unfinished and is not scheduled for release until early 1990--nearly two years behind schedule. Thus, by moving forward with construction at the site

this Spring, DOE is initiating a concurrent development strategy.

Since SIS technology is not yet ready for deployment, alternative sources of plutonium are available, and arms control agreements could nullify any conceivable need for the plant -- even in DOE's own calculations -- there is absolutely no justification for pushing forward with any construction planned for May or June or for approving any funds for SIS construction in the Fiscal Year 1990 budget.

Appendix I: Effect of INF and START on the NEED for SIS

The current U.S. stockpile of weapon-grade plutonium is about 100 metric tons (MT).[1] About 85 percent of this material is in weapons and the remainder available for weapons. The number of warheads in the U.S. stockpile at the end of 1986 was 23,400.[2] We believe the number today is closer to 22,500. Thus, warheads in the current stockpile contains about 3.6 to 3.8 kilograms (kg) of plutonium on average.[3] On average newer warheads, with high yield-to-weight and yield-to-volume can be expected to contain somewhat more plutonium than older warheads. Assuming the INF Treaty is ratified by the Senate this year, some 520 W50, W84, and W85 warheads will be withdrawn from the active inventory over the 3 year period FY 1989-91. Thus, it is reasonable to assume that 1.8 to 2.0 metric tons (MT) of weapon-grade plutonium will be available from this source, or some 600 kilograms per year in FY 1989, 90, and 91.

Assuming the START treaty is signed in 1989 and ratified in the following year, we can anticipate a net reduction of some 4000 warheads to occur over the six year period FY 1991-96. Thus, it is reasonable to assume that an additional 14 to 15 MT

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[1] A metric ton equals 1000 kilograms.

[2] HASC No. 100-12, FY 1988/89 DOE, p. 48.

[3] 85,000 kilograms/23,400 weapons = ~ 3.6 kilograms.

of plutonium will be made available, or 2.4 MT per year during FY 1991-96.

As shown in the summary Table 1, INF and START produce over two as much plutonium as SIS and twice as fast. Thus, if a START Treaty is negotiated the SIS Project looks even more wasteful than it is currently. A more sensible approach is to ask whether existing contingencies permit a postponement of the commitment to the SIS project for at least one year. The answer is clearly yes.

Table 1

Plutonium Available from INF and START
Compared to Plutonium from SIS[1]

	Weapon-Grade Plutonium (Metric Tons)				
FY	INF	START	SIS	Cumulative (INF+START)	SIS
1989	0.6	-	-	0.6	
1990	0.6	-	-	1.2	
1991	0.6	2.4	-	4.2	
1992		2.4	-	6.6	
1993		2.4	-	9.0	
1994		2.4	-	11.4	
1995		2.4	0.25	13.8	.25
1996		2.4	0.75	16.2	1.0
1997			1.0	16.2	2.0
1998			1.0	16.2	3.0
1999			1.0	16.2	4.0
2000			1.0	16.2	5.0
2001			1.0	16.2	6.0
2002			1.0	16.2	7.0
2003			1.0	16.2	8.0
TOTAL	1.8	14.4	8.0	16.2	8.0

[1] Assumes blending stops when SIS becomes operational in 1995.

Congress of the United States
House of Representatives
Washington, DC 20515

April 28, 1988

Dear Colleague:

We urge you to join us in supporting Rep. Albert Bustamante's amendment to the Defense Authorization Bill which would defer funding in Fiscal Year 1989 for the proposed $3 billion Special Isotope Separation (SIS) plutonium project at the Department of Energy's Idaho National Engineering Laboratory (INEL).

There is no justification for committing to development of the SIS project this year. Department of Energy (DOE) officials have indicated that the plutonium stockpile is adequate to meet demand. In fact, Secretary of Energy John Herrington testified recently that the U.S. is "awash" in plutonium and INEL Manager Don Ofte admitted: "The SIS is not designed to meet a well-defined need."

Arms control agreements would add further to the current surplus because plutonium recovered from retired warheads is used to make new ones. Independent physicists estimate that about one-third as much plutonium will be made available from weapons dismantled under the INF treaty as will be produced at the proposed SIS plant and approximately two and one-half times as much would be freed up if we reach a START agreement.

As you know, the defense budget is very tight this year. There are more critical priorities than construction of SIS in DOE's budget request including basic research, cleanup of the Department's weapons facilities, and verification technology. Commitment of funds to construction of SIS at this time does not represent a responsible expenditure of taxpayer's dollars.

In light of the severe budget restrictions we are faced with, it simply does not make sense to commit to development of a $3 billion plutonium project in FY 89. We strongly urge you to support Rep. Bustamante's amendment. If you need additional information, please call Jose Rosenfeld in Rep. Bustamante's office at 225-6719 or 225-4511.

Sincerely,

Albert G. Bustamante
Member of Congress

John H. Sprat, Jr.
Member of Congress

Mike Synar
Member of Congress

Morris K. Udall
Member of Congress

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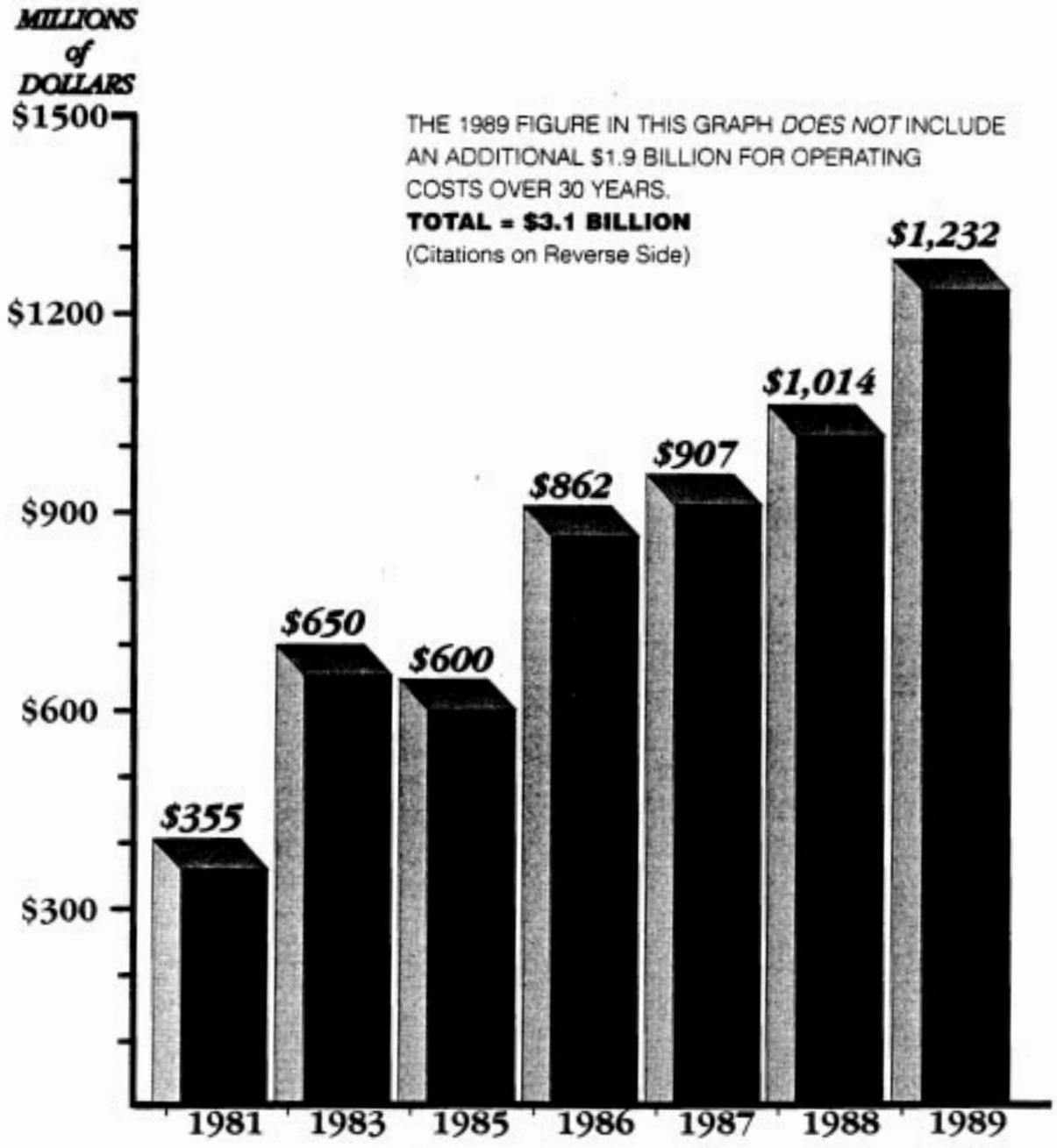
The SIS Plutonium Plant: $3.1 Billion and Rising...



Total Project Cost of Research, Development and Construction of the Department of Energy's proposed Special Isotope Separation (SIS) Plutonium Plant (1981-1989)
(SIS Plant Design is only 30% complete)

CITATIONS FOR SIS TOTAL PROJECT COST FIGURES ON GRAPH

1981 — U.S. House of Representatives, House Armed Services Committees Subcommittee on Procurement and Military Nuclear Systems (HASC 97-2), March 1,1981, pp. 149,161. Also see "DOE Asked to Halt Use of Laser Separation Technology to Enrich Plutonium for Weapons", *Energy Daily*, July 24, 1981, p. 4.

1983 — U.S. Senate, Senate Appropriations Committee, Subcommittee on Energy and Water Development (S. 98-126-pt. 2), March 17, 1983, p. 1196.

1985 — U.S. House of Representatives, House Armed Services Committee, Subcommittee on Procurement and Military Nuclear Systems (HASC 99-131), February, 1985, p. 117.

1986 — Department of Energy, "Report to Congress on the SIS Management Plan", October 24, 1986, p. 2.

1987 — Department of Energy, *Department of Energy Fiscal Year 1988 Budget Request, Construction Project Data Sheets*, January, 1987, p. 621.

1988 — Department of Energy, *Department of Energy Fiscal Year 1989 Budget Request, Construction Project Data Sheets* (DOE/MA-0274), February 1988, p. 325.

1989 — Department of Energy, *Department of Energy Fiscal Year 1990 Budget Request, Construction Project Data Sheets* (DOE/MA-0356), January, 1989, p. 312.

SIS Design 30 Percent Complete — Department of Energy, *Department of Energy Fiscal Year 1990 Budget Request, Construction Project Data Sheets* (DOE/MA-0356), January, 1989, p. 310.

NOTE: As indicated on the graph, DOE's cost estimate for the SIS project has increased by more than 250 percent since the project's inception. And the General Accounting Office , which has urged Congress to re-evaluate the SIS project, recently warned that "huge cost overruns" may be on the horizon. (J. Dexter Peach, Assistant Comptroller General Resources, Community, and Economic Development Division, General Accounting Office, "GAO' s Views on DOE's Modernization Plan for the Weapons Complex" (GAO/T-RCED-89-5), January 25, 1989, pp. 6, 9.)
This is consistent with DOE cost estimates for past construction projects, which have risen by an average of nearly 500 percent over initial estimates, according to a House Appropriations Subcommittee Report. (U.S. House of Representatives, Committee on Appropriations, Subcommittee on Energy and Water Development, Report 100-618, May 11, 1988, p. 55.)

PLUTONIUM CHALLENGE

A Challenge To Halt the Production of Plutonium for Nuclear Weapons

NOVEMBER 5, 1987

Environmental Action

Environmental Policy Institute

Energy Research Foundation

Federation of American Scientists

Friends of the Earth

Greenpeace

Natural Resources Defense Council

Physicians for Social Responsibility

Union of Concerned Scientists

THE PLUTONIUM CHALLENGE: AN OPEN LETTER TO THE PRESIDENT AND THE CONGRESS OF THE UNITED STATES

We want to alert you to a historic opportunity and to urge you to take a bold initiative for world security with substantial economic and environmental benefits for our nation.

THE UNITED STATES SHOULD DECLARE AN IMMEDIATE TWO-YEAR MORATORIUM ON THE FURTHER PRODUCTION OF PLUTONIUM FOR NUCLEAR WEAPONS AND CHALLENGE THE SOVIET UNION TO NEGOTIATE A BILATERAL, VERIFIABLE CUTOFF OF THE PRODUCTION OF PLUTONIUM -- AS WELL AS HIGHLY-ENRICHED URANIUM -- FOR NUCLEAR WEAPONS.

We are at a major turning point in the four-decade-long history of the production of nuclear warheads in our nation. Since 1945, the United States has manufactured some 60,000 warheads, of which some 25,000 are now in our arsenal. We have produced some 200,000 lbs. of plutonium and, prior to 1964, some one million lbs. of highly enriched uranium (HEU) - the key ingredients in all nuclear explosives, also known as "fissile materials". Our nuclear weapons material production reactors at the Hanford Reservation in Washington and the Savannah River Plant in South Carolina are now all over 20 years old and dangerously outmoded. The Chernobyl disaster in April 1986 focussed public attention upon the safety of these facilities. Today these reactors are limping along, producing only some 1000 lbs. of plutonium each year. Their continued operations are under very serious question.

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Washington, DC 20002

The Department of Energy (DOE) is formulating plans to spend tens of billions of dollars on new production reactors and a laser plutonium processing facility which would be in operation well into the 21st century. At the same time, however, the DOE is reluctant to take on an equally expensive task of cleaning up and disposing of the vast amounts of radioactive and chemical wastes it has already produced over the last four decades.

These DOE plans to increase production of plutonium run counter to the vision articulated by President Reagan and General Secretary Gorbachev at the Reykjavik Summit of a world of much reduced nuclear weapons arsenals. Both nations already have more than enough plutonium and HEU to maintain their combined current stockpiles of over 50,000 nuclear warheads - stockpiles sufficient to destroy one another's societies many times over and to threaten human well-being everywhere on our planet.

The United States risks nothing and has much to gain from our proposal of a two-year plutonium pause. We have not produced any HEU for nuclear weapons since 1964 and, by halting plutonium production for two years, we would be forgoing the equivalent of only some 1% of our current plutonium stockpile. In any event, almost all of the plutonium for new warheads is being obtained through retirement of old warheads and recycling.

Such a pause would provide a chance for our nation to stop and consider carefully the need for a new multibillion dollar investment in our nuclear weapons materials production complex. This review also would include an assessment of the future needs for: (1) tritium, which is used to increase the yields of nuclear warheads and unlike plutonium decays rapidly enough so that it must be replenished; and (2) HEU for non-weapons purposes, such as submarine fuel. We also should examine alternative ways of meeting those needs and, consistent with the goal of reduced nuclear arsenals, should initiate a pilot program to demonstrate the feasibility of the verifiable removal and disposal of fissile materials from dismantled warheads.

A unilateral production cutoff would create worldwide public pressure upon the Soviets to negotiate a verifiable halt to all production of plutonium and HEU for nuclear weapons. Such a cutoff would be an important cap on the arms race. It would provide a basis for other agreements to reduce nuclear armaments.

Under a production cutoff agreement, the United States and the Soviet Union would in effect make the same commitment not to produce fissile materials for nuclear explosives as have some 130 non-nuclear-weapons countries that have joined the Nuclear Non-Proliferation Treaty. This would give new legitimacy to American and Soviet leadership in international efforts to stop the spread of nuclear weapons. Moreover, the United States would be in a far stronger position to appeal to other nations, including the Soviet Union, to reconsider plans to introduce vast quantities of plutonium into their civilian nuclear power programs.

There are good reasons to believe that the Soviets would be responsive to an American initiative. In recent years, the Soviets have indicated an interest in a cutoff. They too have aging production reactors and heightened awareness of their hazards in the wake of Chernobyl. The Soviets also have demonstrated a new openness towards the presence of American and international inspectors to monitor nuclear weapons activities.

The shutdown of production reactors could be easily verified on an interim basis by satellites which are able to detect the heat associated with an operating reactor. The United States and the Soviet Union have already opened some of their civilian nuclear reactors to international safeguards, which are already in place in over 50 nations. Verification arrangements could be developed to monitor any continued production of tritium for weapons and HEU for non-weapons purposes.

If we make major new commitments to plutonium production facilities, the nuclear arms race will be that

much more difficult to stop. As a nation, we must just say NO to more plutonium and put forward to the Soviet Union this challenge in the interest of both our countries and indeed of the entire world.

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