REPORT

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PLUTONIUM ROUNDTABLE: RISKS AND SOLUTIONS

A PUBLIC EDUCATION PROJECT ON POLICY CHOICES FOR NUCLEAR WEAPONS DISPOSAL

October 5 - 7, 1995

TRI-CITIES
PANEL: Thursday, Oct. 5th, 6:30 PM
WORKSHOP: Friday, Oct. 6, 8:00 AM
Cavanaugh's, Kennewick
1101 N. Columbia Center Blvd.

SEATTLE
PANEL: Friday, Oct. 6th, 6:30 PM
WORKSHOP: Sat., Oct. 7, 8:00 AM
The Mountaineers
300 3rd Ave. West

SUPPORTING ORGANIZATIONS

WA Physicians for Social Responsibility
League of Women Voters of WA
WA Department of Ecology
Hanford Education Action League
U. S. Department of Energy
Institute for Energy and Environmental Research
Westinghouse Hanford Company
Sierra Club, Cascade Chapter
Oregon Department of Energy
Heart of America Northwest
U. of WA, School of Public Health & Community Medicine
Hanford Advisory Board

Washington Physicians for Social Responsibility and the League of Women Voters of Washington are committed to an on-going effort to increase public awareness and to encourage public involvement in this critically important policy question of the disposition of plutonium.

Financial support for the Roundtable is provided by the Bullitt Foundation and the League of Women Voters Education Fund.

PROJECT MANAGERS

Martin Fleck
Washington Physicians For Social Responsibility
4554 12th Ave NE
Seattle WA 98105
phone (206) 547 2630
FAX (206) 547

Betty Tabbutt
League of Women Voters of Washington
1063 S Capitol Waay, Rm 212
Olympia WA 98501
phone (360) 352 8220
FAX (360) 956 9287

PLANNING COMMITTEE

Tim Takaro, Chair
Walt Blair
Patricia Boiko
Lael Braymer
Doris Cellarius
Dirk Dunning
Paige Knight
Lance Lang
Dick Nelson
Todd Martin
Bill Mitchell
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Dan Silver
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Tom Tebb
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Alan Waltar
John Yerxa

SUMMARY RECOMMENDATIONS

Plutonium Roundtable Workshops

Compiled by Betty Tabbutt
League of Women Voters of Washington

On October 5th, 6th and 7th, the League of Women Voters of Washington and the Washington Physicians for Social Responsibility co-sponsored, along with 10 supporting organizations, the Plutonium Roundtable. The purpose of this forum was to open the public discussion of the policy choices for the transport, storage and disposal of the nuclear material which will be removed from our weapons arsenal. It is important for the public to understand the security concerns, the international treaty issues as well as the health and environmental risks which must be considered in the choices.

The panelists and respondents are listed on the agenda (next page).

The workshops focused on the following topics:

Implications for the Northwest
Proliferation and international cooperation
The spent fuel standard and beyond - relationship to commercial fuel and waste
Development of a farsighted political process - public involvement.

THE ISSUES RAISED AND DISCUSSED DURING THE WORKSHOPS RESULTED IN THE FOLLOWING SUMMARIZED RECOMMENDATIONS:

The public feels that there should be equity of the nuclear burden and that all nuclear material, weapons material as well as defense cleanup material should be on the table at the same time for a reasonable consideration of actions.

The public insists that cleanup must continue on schedule. Choosing an option for the disposition of weapons plutonium must not slow or interfere with the process of cleanup at DOE sites.

We should separate immediate actions, short-term actions and long-term actions. In so doing, we must avoid the cold war mentality of acting without consideration of consequences.

We should question the "clear & present danger" mentality if that leads us to the blind decisions and no accountability (such as the Cold War decision process). We should cautiously access the urgency so as to move forward with the appropriate speed. Building a realistic time-line should include considerations of:

separation of international decisions points from the choosing of options for the US,
present window of political opportunity,
threat of terrorism or problems of security assurance, and
activities of "rogue nations" or horizontal proliferation.

If we **keep a focus on both short-term and long-term decisions**, we should avoid closing off long-term options.

It is important to start in order to show the world US leadership and build trust.

Immediate action is recommended for the following:

1. DOE should design a comprehensive, integrated and complex-wide impact analysis and public discussion

for all US nuclear weapons and waste material transport, storage and disposal. (See Public Involvement Workshop suggestions.)

2. Congress must commit funding for cleanup to continue on schedule.

3. Commit funding and authority to the International Atomic Energy Agency (IAEA).

4. Under IAEA, involve laboratories in both US (DOE labs) and Russia to start development of safeguard programs.

5. US must declare military excess. Work through IAEA to have Russia (and other former Soviet Union states) do the same.

6. IAEA (or some other body independent of DOE) should assemble credible numbers on waste types, volumes/weights, locations.

7. Identify facilities which could be used for plutonium disposition and urge DOE to not dispose of them until final, long-term decisions are made.

Short-term actions may include:

1. Start arms reduction in very visible way; credible to third world (and other non-nuclear states).

2. Use as fuel in existing commercial reactors may be a short-term opportunity. However, the wisdom of giving yet another subsidy to the commercial nuclear industry was questioned.
Information needed: life-cycle costs
where would mixed oxide (MOX) fuel be made?
identify risks.

3. Combining plutonium with high level cleanup waste and vitrifying may be an option.
Information needed: how would that change the design/operation of a vitrification plant?
is pretreatment necessary?
costs
identify risks.

Long-term actions:

1. Assurance of disposal (capacity) for commercial waste and cleanup waste (with or without the inclusion of weapons material).

2. Long-term institutional controls to secure any and all materials which could be used for weapons. We need to go "beyond the spent fuel standard."

3. Build a global political climate in which no nations will feel the need to make or hold weapons plutonium.

PANEL AGENDA

6:30 PM Opening

Moderator: Elaine Hallmark, *Confluence NW*

Mike Lowry, Governor
Thomas Grumbly, Assistant Secretary for Environmental Management, USDOE
Nikolai Egorov, Deputy Minister, Russian Federation on Atomic Energy

7:15 Risks and Solutions Panel
Panelists:

Tom Cochran, *Natural Resources Defense Council*
John Honekamp, *Pacific Northwest Laboratories*
Arjun Makhijani, *Institute for Energy and Environmental Research*
Richard Wilson, *Harvard University*

8:30 Discussion and questions
Respondents:

Al Conklin, *Washington Department of Health*
David Conrad, *Nez Perce Tribe*
Bill Counsil, *Washington Public Power Supply System*
Mike Grainey, *Oregon Department of Energy*
Russell Jim, *Yakama Indian Nation*
Mike Lawrence, *Pajarito Scientific Corporation*
John Savage, *Oregon Department of Energy*
J.R. Wilkinson, *Confederated Tribes of the Umatilla Indian Reservation*

Questions from the audience

10:00 Adjourn

WORKSHOP AGENDA

8:00 AM Introduction of the Issues: Elaine Hallmark

8:30 Concurrent Sessions

The Panelists and the Respondents will participate as resource members of the concurrent sessions of the Workshop.

1) Implication for the Northwest
Facilitator: Lynne Stembridge, *Hanford Education Action League* (in Kennewick)
Cynthia Sarthou, *Heart of America, Northwest* (in Seattle)
Resource persons: Arjun Makhijani, Bill Counsil, Mike Grainey/John Savage

2) Proliferation and international cooperation
Facilitator: Dr. Tim Takaro, *WA Physicians for Social Responsibility*
Resource persons: John Honekamp, Nikolai Egorov, Mike Lawrence

3) The spent fuel standard and beyond - relationship to commercial fuel and waste
   Facilitator: Walt Blair, *Westinghouse Hanford Company*
   Resource persons: Richard Wilson, Al Conklin

4) Development of a farsighted political process - public involvement
   Facilitator: Merilyn Reeves, *League of Women Voters*
   Resource persons: Tom Cochran, David Conrad, J. R. Wilkinson

10:15 Break

10:30 Report from Individual Workshops
Summary of information needed, and values and concerns to be considered.

11:15 Next steps in a decision process

12:00 Adjourn

WORKSHOP SUMMARIES

IMPLICATIONS FOR THE NORTHWEST

Values:

1. OPEN public discussion, let the people decide.
2. Start moving forward & get it cleaned up! Beware of "paralysis of analysis."
3. Protect future generations. (May leave not only environmental legacy, but also an economic one.)
4. Must have public accountability.
5. Cleanup must continue, be preserved , enhanced.
6. Consider cultural perspectives.

Principles

1. Develop a NW consensus. Bring NW together, unified, meld global impact with local discussions.
2. Don't cut corners.
3. Don't create a bigger mess in dealing with this.
4. Protect worker health. Strive for maximum cleanup and safety standards.
5. Use investment at Hanford to solve national problems.
6. Oregon should have a say.

Concerns & Issues

1. Technical minds & solutions may not make the best decisions.
2. Decisions may be made on false sense of alarm.
3. Tensions - regional v. national perspective.
4. Don't make Washington the nuclear garbage dumpster.
   - Why move it somewhere else? problem is here at one of largest dumps (Hanford). Moving it prolongs the problem.
   - US could purchase plutonium from Russia, have the potential here at Hanford. Need to focus and decide.
5. How to get funding to clean it up, get it done.
6. Future Site Use Working Group v. using land outside the 200 Area - building facilities.
7. We need a national policy and direction.
8. Concern for transportation.
9. Apply NRC regulations to DOE.
10. Timing a concern. Grumbly says one year. Russia and US elections coming.

Information needed:

1. Public needs all the information, including life-cycle costs. Needs all facts and needs to know we will be using an option that is not perfect.
2. Need more information on comparison between MOX and vitrification options:
   - retrievability
   - handling time of plutonium (security risks)
   - environmental pitfalls.
3. Public needs independent information.

Suggestions/Next steps

1. Aggressively inform & involve the public
   - objectively discuss pros & cons of all options & risks
   - inform them on life-cycle costs
   - hear from them
   - coalesce all interested parties
   - coordinate education
   - define where we agree
   - develop a public education coalition - Hanford Advisory Board process?
   - Board educate constituencies.
2. Find a precedent. Show the world we can do it.
3. Consider a combination of options.

PROLIFERATION & INTERNATIONAL COOPERATION-

Principles:

1. Keep focus on problem as an international one.
2. Make sure plutonium can't be used by terrorists.
3. US needs to do something quickly to demonstrate intent and to reduce risk. Start by declaring military excess.
4. Must recognize rights of other countries to make decisions. US & Russia must lead way to international cooperation.
5. Address both vertical and horizontal proliferation.
6. Avoid the cold war mentality of "do now without consideration of consequences."

Problems:

1. There is not consensus within each country on future decisions.
2. How can we guarantee protection to states so they do not perceive the need for nuclear weapons? (horizontal proliferation).
3. Can we devise rules that are self-enforcing?
4. Even spent fuel could potentially be used to make a bomb.

Concerns

1. Concern about Russian shipments to/agreements with Iran.
2. There are other materials/devices available to terrorists. plutonium is not obvious first choice.
3. Don't create roadblocks to future decisions/developments.
4. How to deal with countries who don't play by rules.

Agreement:

1. IAEA most efficient organization for control of proliferation - IAEA capacity should be enhanced by international community.

Suggestions/Next Steps:

1. Short-term - US should commit resources to former Soviet Union to help control materials.
2. Disconnect short-term from long-term to avoid stifling action now.
3. Start arms reduction in very visible way; credible to third world (and other non-nuclear states.)
4. US Congress appropriation - political commitment.
5. IAEA involvement - funding, Russia-US agreements should be incorporated into IAEA safeguards/protocol.

SPENT FUEL STANDARD

Information : Pu not highly radioactive/dangerous.
Material becomes same as commercial nuclear fuel (highly radioactive) when used in nuclear power plant.
Hanford has 11-12 tons Pu at Plutonium Finishing Plant and in spent fuel. Quantity of Pu at K-Basin has never been separated as such (dry storage is being implemented).

Spent Fuel Standard Definition: Fuel irradiated enough to make it radioactive enough to discourage use or diversion. (NAS)

Goal: To make all non-strategic Pu as unattractive for diversion as spent fuel.

Principle: US needs to lead the way for rest of the world. We must have international cooperation, going beyond Russia to involve all nations.

Problems:
1. Russians wish to use Pu to make energy in Russia. We are concerned about security risks.
2. US commercial reactors still use nuclear material and produce waste. US must curtail this waste also. Still no permanent storage site for power plant waste.
3. Foreign reactor fuel comes to US for treatment.

THREE options:
1. MOX fuel - for Pu pits/rich forms
2. Pu/waste mix - for current high level waste
   - for dilute forms
   - for recycled scrap from MOX processing
3. Deep borehole - not desirable to public
   - slow transport of Pu in environment makes it feasible in theory, but long term environmental risks a future access makes use uncertain.

OPTION "beyond spent fuel"
- Management with proper institutional controls.

Issues:
1. Are there?
   -short term solution (WPPSS plant at Hanford could be used for trial)
   -long term solution (choose best option, deep burn or accelerator)

2. Is there a "clear & present danger"? What does this imply?

Agreement: Need to indicate to Fed government FMEF is a national resource & should not be disposed of until a decision on using it for MOX fuel has been made.

Further information needed:
-Knowing numbers for sure - how much/where? Independent info. (DOE does its own calculations as to where materials are)
-Where would MOX fuel be made?
- Is spent fuel safe from bomb-creators?
- is reprocessing a danger because spent fuel can still become weapons material again?

DEVELOPMENT OF A FARSIGHTED POLITICAL PROCESS - PUBLIC INVOLVEMENT

Suggestions for effective public involvement:

1. **balance:** Act quickly versus Involve affected people
   (reference to DOE fast track & experiences where DOE did force states to accept policies (e.g. SC)
   - Commit to consensus (teach people what means/how to do)
   - technical/scientific issues shouldn't overwhelm groups (Citing Unsafe at any Speed - book that is readable
   - safety, health not be compromised - start education now
   - How do people learn ? use non threatening approach, keep it simple, direct, listening

2. **clarify the problem.**- Frame specific questions to gather views, talk about tradeoffs- Evaluate critical genetic load of radiation on humans
   - which is the most clear/present danger we are dealing with.
   -ensure those who work with radiation are beyond reproductive age
   - pose issues in do-able terms, organize people around specific actions.
   - core issues defined - pros & cons given. Identify players (with PDC)
   - restore/develop process with integrity, ask full questions
   - "clear & present danger" not perceived now, not understood. US needs to act first?

3. **solutions should come from public** not to.
   - listen to advisory boards, regional, on all issues defining the problem, DOE, ratepayers.
   - more communications means listening to each other. Build trust. Descriptions of tortuous Hanford process to build trust, arrive at agreement that site (central plateau) should be "used wisely for waste"
   - good models started here - use.

Everyone here (at Plutonium Roundtable) will, we hope, work toward consensus, toward effective public involvement, because little time exists for public involvement.

4. **national dialogues needed** (dep'ts need to speak to each other).
   - WMPEIS - make comprehensive
   - Establish/coordinate multi-level commitment to public involvement
   - Governments at state/community levels need to talk with one another

5. **media could be used to educate**, radio also not all video. Make it enjoyable.
   - reasonable expectations.
   - respect public opinion.
   - video tapes available
   - expand on Oregon effort

6. **Investigate options** of getting rid of Pu in near term (too much emphasis on burial options)
   - Outreach in international community
   - Build on gains, cites involvement in thyroid study.
   - Integrate both technical and public involvement efforts,

Concerns & Issues:

1. non-proliferation issues important
2. management of technology important.
3. looking to our future, not just five years hence
4. women need to be better utilized on panels, etc.
5.. Public decisions not private process

public decisions need to be reflected so we know they have really listened.
What decisions need to be made? DOE bringing in what & why & where?
6. technical not long term visions expressed last night - ultimate solutions no more plutonium.
political process, where is the money? locking up?
7. Can democracy survive in our technical age?
How can public agree where experts cannot?
need to do something now before a disaster occurs.
Heart of issue is TRUST in politicians.

PARTICIPANTS

MODERATOR

Elaine Hallmark , attorney-facilitator, is a founding partner in CONFLUENCE NORTHWEST, a firm limited to providing mediation and conflict resolution services since 1988. She served as Chair of Oregon's Dispute Resolution Commission and was instrumental in developing Oregon's public policy dispute resolution program. She is the principal facilitator for the Hanford Advisory Board.

OPENING COMMENTS

Mike Lowry, Governor of the State of Washington elected in 1992, has previously served five terms in the US House of Representatives and as member and chair of the King County Council. He taught government at Seattle University's Institute for Public Service, sharing his experience in the legislative process. A priority as Governor has been for state agencies to reduce spending and streamline operations.

*Thomas Grumbly, A*ssistant Secretary for Environmental Management US Department of Energy, is responsible for directing all environmental management activities at the Department's nuclear weapons sites, including waste management operations, environmental restoration, environmental compliance, and related technology development and demonstration activities. Prior to assuming his appointment to the USDOE, Mr. Grumbly served as President and CEO of Clean Sites, Inc.

Nikolai Egorov is Deputy Minister of the Russian Federation on Atomic Energy.

Dennis Korolev, International Relations Committee of the Russian Federation Ministry of Atomic Energy, will serve as interpreter for Mr. Egorov.

PANELISTS

Thomas Cochran, Ph.D. is Senior Scientist with the Natural Resources Defense Council (NRDC) and Director of NRDC's Nuclear Program. He initiated NRDC's Nuclear Weapons Databook Project. He also initiated a series of joint nuclear weapons verification projects with the Soviet Academy of Sciences. He has served as a consultant to numerous government and non-government agencies on energy, nuclear nonproliferation and nuclear reactor matters. He has served as a member of various federal advisory boards.

John Honekamp, Ph.D. has 35 years experience covering a broad range of technical, management and independent oversight functions related to the development, design, construction, testing and operations of nuclear power plants. He has managed RD&T programs in both DOE and Naval nuclear programs, served on corporate safety review boards, established and managed independent design and construction quality verification programs in the commercial sector and managed the resolution of complex technical and regulatory issues. He is currently Pacific Northwest Laboratory's Deputy Manager, International Nuclear Safety Program.

Arjun Makhijani, Ph.D., is co-author with Annie Makhijani of Fissile Materials in a Glass, Darkly: Technical and Policy Aspects of the Disposition of Plutonium and Highly Enriched Uranium. He is the president of the Institute for Energy and Environmental Research (IEER) which "provides the public and policy makers with thoughtful, clear, and sound scientific and technical studies. IEER aims to democratize science and promote a safer, healthier environment." Dr. Makhijani holds his doctorate in engineering from the University of California at Berkeley. He has authored and co-authored numerous studies and books on nuclear-weapons-related issues.

Richard Wilson, Ph.D., a native of London, has taught at Harvard since 1960 and is now Mallinckrodt Professor of Physics. He was a founder and Director of the Energy and Environmental Policy Center at Harvard, and he was the first Director of the NE Regional Center for study of Global Environmental Change. He is a founding member of the Society of Risk Analysis, has served on its council, and on the editorial board of its journal Risk Analysis. He has most recently served on the Panel of the American Nuclear Society which has published its report entitled Protection and Management of Plutonium.

RESPONDENTS

Al Conklin, is Head of Air Emissions & Defense Waste Section, Division of Radiation Protection of the Washington Department of Health. He has 19 years of Hanford experience, first with Hanford contractors, then, for the past 9 years, regulating them in the state Department of Health. He has been closely involved with nuclear waste management issues, with Hanford's past release of radionuclides, and with the public on both issues. He currently regulates Hanford and other nuclear facilities for radioactive air emissions under state and federal Clean Air Acts.

David Conrad is the Nez Perce Department of Environmental Restoration and Waste Management Policy Analyst. He participates (either as substitute for Donna Powaukee or as part of the regular work assignments) in close to fifteen working group/committees associated with the Department of Energy environmental management issues. He joined the Nez Perce ERWM Department six months after its inception, after a year long internship in EM headquarters sponsored through the Council of Energy Resource Tribes. He has a B.S. in Political Science from Santa Clara University and a master of Science in Environmental Science and Policy from the University of Wisconsin - Green Bay. Mr. Conrad is a member of the Osage nation from Oklahoma.

William G. Counsil joined the Washington Public Supply System in 1993 and is Managing Director. He is responsible for the management of all Supply System activities including the operation of Plant 2 and the Packwood Lake Hydroelectric Project. He is also responsible for overseeing asset recovery and site restoration for terminated nuclear plants and Hanford Generating Project, and implementation of conservation programs such as the megawatt improvement program at Plant 2. His previous utility experience includes positions with Texas Utility Electric Company and Northeast Utilities.

Mike Grainey is Assistant Director of the Oregon Department of Energy. In that position he assists the Director in the operation of the Department, including energy conservation and renewable resource programs, siting and regulation of energy facilities, state energy planning efforts, and regulation and cleanup of nuclear materials. Mr. Grainey helps direct the state's effort on issues related to the cleanup of USDOE's Hanford Facility. He has represented the State of Oregon on the regional Hanford Advisory Board and numerous other Hanford related boards, including the National Association of Attorneys General Task Force on USDOE facilities. Mr. Grainey is an attorney and he has published numerous law review articles, professional papers and delivered lectures on energy and cleanup issues.

Russell Jim is Manager of the Environmental Restoration and Waste Management Program of the Yakama Indian Nation. He is Chairman of the National Indian Nuclear Waste Policy Committee for the National Congress of American Indians. He held governor appointments to the Nuclear Waste Advisory Council and the Washington Commission for the Humanities. Mr. Jim is a board member for the Center for World Indigenous Studies.

Mike Lawrence has over twenty five years experience in the management of U.S. Government nuclear programs. He was Manager of the Hanford Site for the U.S. Department of Energy from 1984 to 1990 and represented the United States to the International Atomic Energy Agency while serving as Counselor for

Nuclear Policy for the U.S. Department of State in Vienna, Austria from 1991 to 1995. He is President and CEO of Pajarito Scientific Corporation of Los Alamos, New Mexico which provides nuclear material assay equipment and services.

John Savage was named Director of the Oregon Department of Energy by Governor John Kitzhaber in August 1995. The Department is responsible for energy planning, operating the State's energy conservation and renewable resource programs, siting and regulation of energy facilities, emergency response planning, and regulation of the transport and disposal of nuclear materials. The Department is the state's lead agency on all issues related to Hanford.

J. R. Wilkinson has worked for the Confederated Tribes of the Umatilla Indian Reservation as Program Manager for the Department of Natural Resources' Special Sciences & Resources Program. Before working for the CTUIR, J.R. worked in Nevada for three years on Nevada issues including Yucca Mountain. J.R. is also the co-founder of Hanford Education Action League (HEAL).

OPENING SPEAKERS

MIKE LOWRY
Governor
Remarks transcribed from videotape

Thank you , Elaine, thank you very much for serving as moderator on this very important discussion.

Minister Egorov, we are honored that you are here with us in our state. Welcome. The friendship of the people of the federation of Russia with the people of Washington state is very important to us, and we are delighted that you are taking your time to be here with us.

Tom Grumbly, thank you, again, for spending time in Washington state. You have spent much time here. We appreciate your being here.

Certainly appreciate the time of all of the panel members who are here. Certainly appreciate the time of the citizens and public who have come for this very, very important discussion. I want to complement Physicians for Social Responsibility and the League of Women Voters for your leadership in bringing this before us. And also I want to thank and complement all the other organizations that have also participated for making this possible.

I think the most important requirement that is in the process of being met is that we do demand that this is a totally open process and that the public and all the other people be totally involved. And first and foremost, that is what this forum is doing, what the League and PSR are doing. That ,of course, was not the past history. That was a past history, frankly speaking, that involved people not many of whom are the people who are in this room. It is very important as we move forward that this open process that is representative of of public discussion and involvement continue.

I grew up in a small community where there were 14 in my graduating class. I tell the press on this side of the state that I was in the top 14 of my graduating class. That was in St. John Endicott. We actually were down-winders. My mother believes that my sister's early death by cancer was somewhat attributed to that. My mother thinks that. I do not know. But I do know that as the wind blew up Whitman County that there is no question that we, where I grew up, were part of those affected areas of the time behind us.

Now those were all times behind us. And what we are at here today is an exciting new world in which, with the end of the cold war, the friendship that is developing between Russia and the US and everyone is so important. And we are here to talk about the future.

I think there are things that we should acknowledge going in, and I would like to state as part of the position of the state of Washington:

First any solution to this challenge that is before us, this important world peace challenge that is before us, is that it must effectively prevent further production and spread of nuclear weapons. That must be part of the solution and it is the reason why we in the state of Washington , while we clearly have carried much more than our share of the burden, still are interested in participating, if it is done right, in the answer for world peace and preventing plutonium from getting into the hands that would be dangerous and making sure we are moving ahead with that number one objective of effectively preventing the further production and spread of nuclear weapons. So even though we have carried more that our share, we still are very interested in making sure that happens.

Secondly, we must have the principle that any action will protect the peoples' safety and security and the environment and must minimize risk to the workers and the public. That absolutely has to be a principle that is addressed, and that, of course, has not been the previous history when the world was in a much different, more emergency situation.

We must have a real commitment, and this I say especially to our friends from the Department of Energy, we must have a real commitment to cleaning up the legacy of plutonium production that we now have. That 10 metric tons that is here, the 80% of the spent military nuclear waste that is stored at Hanford, stored in the state of Washington, 80% of the spent nuclear waste stored in our state, there is good reason to fear it already seeping into the Columbia River, is already a situation of serious danger to our health and to our environment. And we must have a commitment of the federal government to meet its responsibility of effectively cleaning up that very, very serious health and environmental danger to the people of the Northwest as we move ahead on meeting the important responsibility of what we do with the plutonium in dismantling the warheads. That that has to be a given, and we cannot set aside that responsibility of cleaning up that tremendous dangerous situation we have right now in this state. We cannot set that aside while we progress on this other one or the state of Washington will adamantly, adamantly fight anything that does that. We have a responsibility to the health of the people of this state to do that.

And fourth, all states must be a part of this answer. We do have a disproportionate share of the responsibility that has been placed upon us. All states must be part of this.

And if these conditions are the objectives we can work toward, then we in the state of Washington will look forward to working with everyone in this room on accomplishing this vital objective of peace in the world.

I want to congratulate you. I want to say the state of Washington is here to work with everyone involved for accomplishing this objective.

THOMAS GRUMBLY
Assistant Secretary for Environmental Management
Department of Energy
Remarks transcribed from videotape

Thank you very much. I, too, would like to thank the organizers of this conference, beginning with the League of Women Voters and Physicians for Social Responsibility, but certainly not ending there. Without the good work of a lot of organizations including the Sierra Club, University of Washington and other organizations, this would not have been possible.

I would also like to bring greetings from the Secretary of Energy to the governor of your state, Governor Lowry and as well as Minister Egorov. We look forward to your visit to Washington after this, and we look forward to continuing cooperation between the US and the Russian Federation as we deal with this entire problem.

I think everybody who is involved with this problem understands that plutonium evokes the very strongest of views from people, which I'm sure you heard not only yesterday, but will also hear tonight. As most of us know, there are two basic dangers to this substance, the weapons side, non-proliferation side, of the things as well as the environmental problems that the Governor talked about. With respect to the environmental side, I will commit to the citizens of the state of Washington that as long as we have the kind of partnership with the state of Washington that we do now, that this government will meet its commitments to cleanup the problems that are at Hanford.

But I think everybody in this room also knows that this issue of what we are going to do with the enormous amounts of weapons grade material as well as the waste scraps that contain plutonium is a problem that really is a tremendous problem not only for ourselves but the rest of our society now as well as probably for our children and for our grandchildren.

I would like to talk just very briefly for people who are not as familiar as many here are about some of the complexities of this problem and what the Department of Energy is currently doing about it so you will have a sense of where your government is on this problem at the moment. I think we understand that the complexities of plutonium are immense. It exists in several different forms. We have many different categories, including things called the strategic stockpile which is the actual weapons grade material involved in potentially dealing with weapons itself, the strategic reserve. We have stuff that is totally surplus, we have transuranic waste, we have alpha-contaminated low level waste. So we are talking about a lot of different kinds of materials and a lot of different forms here.

The issues that are involved are numerous. They involve nuclear safety issues, radiation issues, criticality and direct radiation issues, the issues of non-proliferation, costs, and the value of plutonium as a fuel, its value as a nuclear explosive. And furthermore, in the post cold war era, the nuclear danger of excess weapons plutonium is in many ways more diffuse and harder to manage and more dangerous in many ways than were the nuclear tensions of the cold war itself.

As you know, this nation produced vast quantities of plutonium during the cold war. Since 1989, significant quantities of weapons-usable fissile material have become surplus for national defense needs in both the US and Russia, and further weapons dismantlement, as we are doing now, will only increase the stockpiles of materials we already have. And it really has been almost 10 years since a Republican Secretary of Energy, John Harrington, said way before the current environment that "the United States was awash in plutonium." So the efforts to do something meaningful about plutonium is something that is clearly a bipartisan effort that stretches back over several administrations and will continue into the future.

What our Department at the moment is doing is the following:

The President's non-proliferation and export control policy commits the United States to undertake a comprehensive approach to the growing accumulation of fissile materials. In October 1994, the Secretary of Energy and the Congress together created an Office of Fissile Materials Disposition inside the Department of Energy to focus on options for the storage of weapons usable fissile materials and for the disposition of materials that were declared surplus to national defense needs.

And in March 1995, the President declared 200 tons of fissile material to be surplus to the United States defense needs. The department is contributing to the reduction of nuclear danger by developing strategies right now and implementing action for both plutonium storage and disposition. Our efforts are focused on completing a number of analyses of the research necessary to enable informed decision-making on the long-term storage and disposition of these materials.

We have a whole lot of processes that are underway. They involve not only direct decision making but a whole lot of things that are done in concert with the National Environmental Policy Act so that it is clear that whatever decision we come out with will be a decision that not only deals with the weapons side of this but also deals effectively with the environmental side of what it is that we have to do.

What we have done already is in June of last year we prepared an environmental impact statement on the storage and disposition of this material. We've held 12 public meetings around the country between August and October of 94. We had over 1200 people attend these meetings around the country and literally thousands of comments and suggestions concerning the proposed scope of what it is that we are doing. Where we are in terms of the path forward is that we have used all the input we have received during all of these public meetings around the country, technical analyses by the national laboratories and industry to try to begin to narrow the options about what we are going to do in terms of long-term storage and disposition of this material.

We have something that in bureaucratic terms is called a program environmental impact statement that will evaluate the environmental impacts of alternatives for the long-term storage of this material, and not only this material but also highly enriched uranium. Fundamentally now we are down to three alternatives and I think we will hear a lot about this tonight.

First, continued storage in existing facilities. Essentially that is the status-quo, and that is something we have to do as a baseline.

Secondly, an upgrade of certain storage facilities around the country.

And three, consolidation of this material at one or more of the DOE sites that are around the country.

Under the upgrade alternative, existing interim facilities would be brought into compliance with the most current safety standards for nuclear material storage. And there are five facilities that are still being considered for this. First is the Idaho National Engineering Lab, the Oak Ridge National Laboratory in Tennessee, the Pantex Site in Texas, Hanford and the Savannah River Site in South Carolina.

Under the consolidation alternative, these same sites plus the Nevada Test Site would be considered for housing a new storage facility for current and future DOE weapons usable fissile material inventory.

One thing we can say for sure is that we are not going to continue to have plutonium at Rocky Flats near Denver, Colorado. We have really made the decision that Rocky Flats is not the kind of place where we want to continue to have this material in close proximity to nearly the 2 1/2 million citizens of the city of Denver.

This past March, the Department issued an implementation plan for long term storage of weapons usable fissile materials and disposition of plutonium, and in dealing with this we have identified several kinds of disposition alternatives in terms of what we are going to do in the future. Let me just briefly summarize

what those are and also what they are not.

We have made the decision that we are not going to bury this material in sub sea bed disposal.

And, it may seem funny, but there have been in the past some ideas in the past that perhaps we ought to utilize outer space. We have ruled that out.

The alternatives for plutonium disposition really fit into three categories right now, and you are going to hear a lot about this.

First is burning it in nuclear reactors using MOX fuel. Surplus plutonium would be fabricated into mixed oxide fuel to be used in existing modified or new nuclear reactor, which would consume a fraction of the plutonium and embed the rest in highly radioactive spent fuel similar to that produced by commercial power reactors.

The second would be to immobilize this material. Surplus plutonium would be vitrified or embedded in a ceramic or other material either alone or mixed with other radioactive high level waste to form glass or ceramic logs for ultimate disposal in a deep geologic repository. Base cases under consideration right now include borosilicate glass and vitrification facilities, new ceramic immobilization facilities and an electro-metallurgic treatment at an existing facility.

And the third is geologic disposal. Surplus plutonium in an acceptable form would be placed directly in suitable canisters and buried in boreholes drilled in the earth or a mined geologic repository.

I think the odds are that a mix of one or more of these options is probably going to be chosen but only after a great deal of analysis and a great deal more public input as we go down the line.

It is our objective, it is the objective of the US, it is the objective of this administration to try to make tentative decisions about both the location as well as the technologies to be used for dealing with this by the middle of the summer of 1996. This is a policy that this administration is not going to shirk from. It is going to step up to the plate and we are going to make progress against this very difficult problem.

Let me talk just briefly with the Russians and then sit down. In January of 94 Summit at Moscow Presidents Clinton and Yeltsin agreed to task their experts to study joint options for the disposition of plutonium, taking into account the issues of non-proliferation and environmental protection, safety, and technical and economic factors. Under the leadership of what is called the Interagency Working Group on Plutonium Disposition, an initial meeting was held in Moscow in May of 1994 to establish the framework of this effort. The DOE supported by the national laboratories have assumed the lead technical role in supporting this joint effort.

At the end of January of this year, specialists from the US and Russia met at the Los Alamos National Laboratory for a three day exchange of technical presentations on scientific research that has been conducted on possible plutonium disposition alternatives and on promising prospective investigations. The sides agreed that their joint activities include a series of technical visits to occur in the course of the group's work. The meeting and facility visit also served to help strengthen the growing spirit of trust that we hope will continue to grow between our nations.

In this vein we are organizing, as well, a plutonium stabilization and immobilization conference in December with members of the Russian Ministry of Atomic Energy and its laboratories. And with that conference we are trying to build a common understanding of the performance economics and schedules for deploying immobilization technologies. And our efforts, I think, will provide the President the basis and the flexibility to initiate the implementation of plutonium disposition efforts either multilaterally or bilaterally through negotiation or unilaterally.

In conclusion, in many ways I think we all know we are still feeling our way to resolving plutonium disposition. Even though the future is uncertain on this, the US has an indisputable record of being able to meet the technical and scientific challenges that it has before it. So I am absolutely confident that this nation can meet the technical challenges that it will have to meet in order to deal effectively with this.

I think that all of us who are interested in this understand that the greater challenge is resolving all these issues in a democracy with all the complexities of meaningful and important public participation. The point of our democracy is to try to evolve and to arrive at a reasonable decision together and, as the Governor said, utilizing as many open forums as we possibly can.

This government, indeed it is the objective of this Secretary of Energy and this President never to go back to the kind of closed door operations that characterized
the workings of this program prior to the end of the cold war. We have to continue to commit ourselves to making sure that the process of arriving at a decision is one in which everybody is consulted.

We are going to have to step up to the plate and make decisions. That is the essence of leadership. That is what you elect people to do. You don't elect us to, frankly, screw around and play games in Washington. You elect us to step up to the plate and make things happen. We are determined in this area, an area that is very difficult to make progress as we go forward into the future. We are obviously not going to be finished with this problem in a single step. It won't be completed in this administration, or even the second half of this administration. It wont be completed in this decade and maybe not in my lifetime to be able to totally deal with the problem. But we clearly have to begin.

We already have a huge number of bureaucratic efforts that are underway to try to bring this to conclusion, probably too many efforts for the average citizen to really understand. What we need now and what we commit to tonight is the need to tie this together in a meaningful way that allows citizens to participate in the process. And to further this goal I am committing with you today and to the Governor of this state to produce an integrated strategic plan for plutonium materials that will describe how all the various processes for plutonium waste as well as actual plutonium tie together.

Your governor has used quiet diplomacy to try to push for exactly this kind of planning process. He hasn't raised his voice; he hasn't demagogued this issue. He has been urging us to address this issue in the right way and, frankly, we should have seen the need for this a long time ago. But sometimes it takes someone from outside the beltway to tell you that they have a better vision than we do.

So we commit to you that we will try to bring all the things together in a comprehensive fashion so that the people, not only in this state, but the rest of the states in the United States can understand what we are going to do, why we are going to do it, and where it will end up.

Thank you very much.

NIKOLAI EGOROV
Deputy Minister
Russian Federation on Atomic Energy
Translation by Denis Korolev
Remarks transcribed from videotape

Thank you very much to your Governor and ladies and gentlemen. I am very pleased and very grateful for the opportunity to participate in the second meeting on the most important critical problem for both of our countries, which I do believe, sincerely, we are to address cooperatively.

In the ministry for Atomic Energy part of my responsibility is to outline the general policy of the country and the Ministry in all issues related to plutonium. I have spent 23 years at one of these enterprises of our country which was specifically designed for plutonium production and the last ten years with the Ministry for Atomic Energy.

Frankly, I do not think that for many of us present here today could have imagined the possibility for us to sit around a round table and discuss such a problem several years ago. Fortunately, today we are living in an all together different world and I do believe that people on both sides of the ocean are quite satisfied, so far, with the general direction of the development of cooperation The fifty years of competition between our two countries left us with a number of problems, a number of urgent problems, which we shall now address cooperatively.

Sometime ago we had 13 production reactors in our country, the reactors designed specifically for the production of plutonium. Right now we have only 3 operating reactors of that type in our country and the reason for us having these reactors still operating is not that we need more plutonium to be produced, but that those reactors are producing heat and electricity for communities living in the direct vicinity of those reactors. However, in accordance with the agreements signed between the US and the Russian Federation the plan is to shut down those three production reactors by the year of 2000 and, logically, by the same year we are going to shut down and decommission plutonium separation facilities. The fact is the reason for us to wait until the year 2000 is that immediate shut down of those production reactors would leave us with the necessity to immediately provide some alternative source of energy for those regions. Right now the plutonium which is still being generated by those reactors, if I say so, is arrested and is stored directly at the site of those reactors.

Throughout the 50 years of operation of all the production reactors in the country, we have generated a total amount of approximately 100 metric tons of weapons-grade plutonium. Thirty metric tons of plutonium,the so called energy grade or reactor grade, have been produced by means of radio-chemical separation, reprocessing spent fuel coming from commercial power plants. This is currently being stored at sites of reprocessing plants. And we estimate another 60 metric tons of plutonium to be in the spent fuel of nuclear power plants. So if we can compare those figures now with those figures presented by the esteemed representative of the Department of Energy of this country, we arrive at the conclusion that the stockpiles in both countries is more or less the same. Which proves the fact that both of our countries are currently facing the most urgent task of disposition and utilization of that plutonium, at the same time recognizing the necessity of meeting two standards: the standard of non-proliferation of nuclear weapons and nuclear technology as well as the standard of comprehensive protection of health of our populations as well as the protection of the environment, and also recognizing the fact that all this work is to be done in the most cost effective and efficient way.

We are also understanding now that it is almost next to impossible to resolve any of those problems and meet any of those standards without broad involvement of the public, both in the United States and in our country.

If I can now come back to identify the principal positions of the general problem of plutonium disposition which were adopted in the Russian Federation. I believe it was in short-term purposes in both of our

countries in sharing one and the same purpose that is necessary to ensure the safe and secure storage of this material for a certain period of time that would ensure lack of opportunity for any groups or any parties to divert the material. To meet that requirement, we have already studied the construction of safe and secure and ecologically safe storage facilities for fissile materials, plutonium included, as one of the enterprises of the Ministry of Health of Chelobnsk and that facility is being constructed on the basis of a design jointly developed by US and Russian scientists.

I would like to take this opportunity now to thank the scientists and technicians on both sides in the Unites States and our country for the great amount of efforts which was apparent to develop the design and start out the whole work as well as for the effort and work which is being implemented right now. I do believe that the implementation and finalization of that joint project for the storage facility for fissile materials will make a major contribution in the further development of our cooperation. And I would like to stress that this is cooperation in a most urgent and acute problem.

As for the longer term policy of our country in terms of plutonium disposition, we are basing our policy on the perception, which may sound strange to certain people, but nonetheless is the perception, that perception is that plutonium is the integral part of the national assets of the Russian Federation and that we should make maximum use of that asset. I would say that we, in both countries, have paid too high a price sometime ago to generate and create that material and that is why we must choose the most efficient way of disposition of this material. That is why the general position of the Russian Federation in terms of plutonium disposition is that we should use, in the longer-term, that material as a component of the mixed oxide fuel for commercial power plants. At the same time we are quite aware of the fact that some other parties may consider other possible option of plutonium disposition, like direct disposal of plutonium or disposal of plutonium in different forms like vitrified forms or any others.

That is why, summing up the policy of our country, there are several main principles. The first principle is that we are going to develop in the future the nuclear energy in our country, and we believe that in order to do that in the most efficient way, we should close up the fuel cycle. The Russian Federation does have at its disposal tested and well-developed technologies of spent fuel reprocessing and plutonium separation and fabrication of MOX fuel.

At the same time we are quite aware of the necessity of saving jobs for distinguished scientists and technicians who were previously involved in a lot of military-related activities. That is why we do think that we have sought the sound and comprehensive international cooperation directed at the establishment or identification of the most cost-effective and efficient way of the utilization of the potential of plutonium. I am not planning to assure you that we are already all the way into the implementation, but we still feel we have to start the first stage of this activity. So far we have accomplished already in our country, in our reactors, the first test of a pilot fuel assemblies of MOX fuels and the results we have received in those tests are believed promising.

And to conclude my presentation I would once again like to go through the main problems of the Russian national program for plutonium disposition. First thing is that in the short term we are to assure the safe and secure storage of that material. This storage is to be insured until the time when the material can be used in reactors. In the meantime, we are planning to develop on the basis of one of the enterprises of the Ministry of Atomic Energy the Nuclear Energy Center, which will represent a complex of the new reprocessing plant, the MOX fabrication plants and the storage of several units of fast-breeding reactors. We understand that all those activities will require a lot of time, significant financial support. That is why we do not believe that we will accomplish this work in the near future.

We are attributing now great importance to the development of international cooperation first of all with the United States of America to seek and find the most reliable ways of plutonium utilization. That is why it was extremely interesting for me to receive the invitation to participate at this forum since this is the easiest way of getting information on the attitude of the general public in the United States of America to plutonium disposition. We do believe that plutonium disposition problem is a complicated and complex

problem and we think that it will take quite a significant time on both sides and also integration of scientists of your country and our country to develop more or less reliable and cost-effective ways of its solution.

I am glad that I can witness the further development and sound development of this cooperation between our two countries. And I do believe that the results of this cooperation of our experts on that particular item will probably make it possible for both the United States and Russian Federation to adjust in a certain way its policy on plutonium disposition. In the meantime we are to take all the necessary steps in our countries in order to assure the safe and secure storage of this material and protection of the environmental as well as the public.

PANELISTS PRESENTATIONS

THOMAS B. COCHRAN
Natural Resources Defense Council

DISPOSITION OF FISSILE MATERIAL FROM WEAPONS
October 5 - 7, 1995

I. Introduction.

As we move into the twenty-first century, one of the highest priorities of every nation should be the construction of a truly universal comprehensive and non-discriminatory regime for safeguarding and permanently disposing of nuclear weapon-usable fissile material, thereby creating a genuine opportunity for the abolition of nuclear weapons. Important steps toward achieving this goal include:

(a) further deep reductions in the deployed arsenals of all nuclear-weapons states, declared and undeclared;

(b) declarations, data exchanges, and cooperative verification measures to confirm the progressive elimination of both operational and reserve nuclear weapon stockpiles, including the permanent disassembly of nuclear warheads and bombs, the destruction of non-fissile components, and the status of fissile material components withdrawn from weapons;

(c) secure storage of all plutonium and HEU components withdrawn from weapons under bilateral or five-power verification pending implementation of arrangements for conversion/dilution to reactor fuel or direct disposal as vitrified waste;

(d) application in the weapons states of IAEA or comparable multilateral safeguards to all fissile material inventories not stored in weapons-component form, and to all facilities with the capacity to use, produce, separate, enrich, or otherwise process fissile material;

(e) a global, verified cutoff in the production of fissile materials for weapons purposes;

(f) capping and drawing down the world inventories of weapons-usable fissile materials, including a moratorium on programs for the civil production and use of separated plutonium and highly-enriched uranium (HEU), with particular emphasis on programs in Russia, Japan, U.K, and France.

Our objective should not only be the abolition of nuclear weapons, but a complete ban on the civil production, stockpiling and use of weapons-usable fissile materials, with verified declarations and reductions of existing stocks. Additional plutonium should not be separated for use as a civil reactor fuel until such time as world energy market conditions justify the added security risk of using it for this purpose, and stronger international security arrangements are available to mitigate this risk.

Although the United States and Russia are engaged in negotiations on the full range of fissile material control issues, including an exchange of weapons stockpile and fissile material data, a plutonium production reactor cut-off, and the purchase of Russian weapon highly enriched uranium (HEU), some of these negotiations moving at a painfully slow pace and others are bogged down completely. On the U.S. side progress has been slowed by the enormity of the problem, the reluctance of the Department of Defense (DOD) to relinquish militarily useful fissile materials and open U.S. weapons facilities to bilateral safeguards, and by the slow pace at which the DOE is implementing the National Environmental Policy Act (NEAP) process for deciding how to dispose of the plutonium. On the Russian side there are the added problems of a lack of money and opposition by hard-liners to U.S.-Russian cooperative efforts.

II. Reductions in the U.S. and Russian Warhead Stockpiles.

In a separate report I have compiled the current U.S. inventories of nuclear weapons and weapon-usable fissile material. [1] As noted in this report the U.S. nuclear stockpile as of 1990 was about 21,500 warheads. Since then about 30 percent of the U.S. stockpile has been dismantled. The U.S. nuclear weapons stockpile is currently about 11,000 warheads. Another 4,400 U.S. warheads have been removed from the operational arsenal and are stored in depots and awaiting dismantlement. Since end-FY 1990 the U.S. has dismantled about 7,800 warheads, a rate of about 1,550 per year. Over the next five years the U.S. could dismantle an additional 8,000 warheads. The U.S. operational stockpile scheduled for 2003 will be about 5,000 warheads, with another 2,500 warheads kept in reserve for possible redeployment.

U.S. Department of Energy (DOE) inventory of plutonium is about 98 metric tons (t). Approximately 84 t is weapon-grade (WGPu) for weapons, and about 15 t is fuel-grade plutonium (FGPu) for civil R&D. Of the 84 t WGPu, some 64 t is in weapons or intact pits, and the remaining 19 t is in the form of solutions, scrap and waste materials at the Rocky Flats Plant and other DOE sites. The U.S. plans to retain a strategic reserve of about 23 t of WGPu in intact pits--roughly 7,800 pits--and has declared that 38 t of WGPu, including 19 t in roughly 6,300 pits, is in excess of weapons requirements and will no longer be available for weapons. The other half of the WGPu that has been declared to be excess is the 19 t of solutions, scrap and waste materials. Thus, only 19 t out of 64 t (30%) of the WGPu currently in weapons or intact pits has been declared surplus. Under current plans the remaining 45 t (70%) will be retained under START II as intact warheads or intact strategic reserve pits.

The Soviet stockpile is believed to have peaked at about 45,000 warheads in the mid-1980s,[2] and has probably been reduced to about 25,000 warheads today, with approximately one-half operational and the other half scheduled for dismantlement. Since the warhead retirement rate is probably not much greater than that in the U.S., the Russian arsenal will exceed the U.S. arsenal into the next century.

The future size of the Russian nuclear weapons stockpile, as well as the precise past and current size, is still cloaked in secrecy. No doubt Russia will match the U.S. in the arsenal it retains and create a hedge of its own. Therefore, we can anticipate that the Russians likely will retain at least 7,500 warheads after 2003.

Having declared its willingness to sell 500 t of HEU (≥90% U-235) from weapons to the United States, Russia has in effect declared as excess 3-4 times the amount of weapon-grade equivalent fissile material as the United States. But then Russia has produced considerably more fissile material for weapons than the United States.

III. Disposition of Plutonium.

A. U.S. Plutonium. the national Academy of Sciences adopted several NRDC recommendations related to the disposition of plutonium, including the commercial "spent fuel standard" as the criterion for adequate long-term disposition. The U.S. DOE is preparing an Environmental Impact Statement (EIS) on Fissile Material Disposition, covering excess plutonium, HEU and U-233 stocks. In its pre-decisional draft EIS, DOE has retained three categories of plutonium disposal options: 1) direct deep borehole disposal, 2) immobilization in glass, ceramic, or metal for subsequent geologic disposal, and 3) conversion to mixed-oxide (MOX) fuel for burning in reactors on a once through basis followed by permanent geologic disposal. The deep borehole options, including direct emplacement or with immobilization prior to disposal, are probably not serious contenders, but are carried because they were not ruled out by the national Academy of Sciences (*Management and Disposition of Excess Weapons,* NAS, 1994).

As noted in my inventory report, DOE's excess plutonium is found in a wide variety of forms, including solutions, oxide, residues, and metal. Much of it is not suitable for conversion into MOX fuel, or at least it would be costly to do so. The Department, therefore, will have to vitrify at least some of the excess

plutonium. The National Academy of Sciences recently proposed that the DOE pursue both the vitrification and the MOX options, at least for a while. I support this proposal, having suggested this approach last year.

I believe an attractive option for Hanford would be to hire a commercial firm to build and operate a vitrification plant at Hanford and for DOE to modify the Fuel and Material Examination Facility (FMEF) to mix plutonium with defense waste prior to delivery to the commercial firm for vitrification. last year a development team comprised of the Environmental Corporation of American, Raytheon Company, and SGN/Numatec, Inc. submitted a proposal to DOE whereby they would construct a copy of the vitrification plant at La Hague that was designed by SGN and is operated by Cogema. DOE rejected the proposal on the basis that it would not accept a sole source bid for this undertaking.

Regardless of whether the plutonium deposition option is vitrification, MOX, or both, the plutonium will ultimately be destined for a geologic repository. The nuclear industry in the United States is embarked on a reckless gutting of the licensing criteria for assessing the adequacy of the proposed U.S. repository at Yucca Mountain in Nevada.

B. Russian Plutonium. The situation on the Russian side with respect to disposal of excess plutonium looks bleak. As noted above, by our estimates Russia has about 180-200 t of plutonium, excluding that in spent fuel. About 150-170 t was produced for weapons and is now in weapons, dismantled pits, and in storage at various manufacturing plants, while about 30 t came from processing civil reactor fuel and is now mostly in storage at Chelyabinsk-65. Thus, Russia has about twice as much separated plutonium in weapons and storage as does the United States. Moreover, despite having a plutonium surplus under inadequate physical security and material control and accounting, Russia continues to separate two to three tonnes of plutonium per year at three sites. As former Secretary of Energy Herrington once remarked about the United States, Russia is simply "awash" in plutonium.

This past January the United States and Russia agreed to study the following options for disposing of Russian plutonium from dismantled weapons: burial in deep boreholes or geologic repositories, burning as MOX in LWRs, stabilization, immobilization, and accelerator transmutation. Minatom steadfastly maintains that it should close its civil fuel cycles and use its excess plutonium as start-up cores for a breeder reactor fuel cycle. While we would not necessarily oppose every MOX option for Russia, NRDC will oppose any U.S. or Western assistance to dispose of excess Russian plutonium in a manner that would assist significantly Minatom's efforts to close its civil fuel cycle. Given that Russia's excess plutonium is also found in a wide variety of forms, including forms that are unsuitable for conversion to MOX, Minatom would be well served by developing a direct disposal option even if it priority is for MOX.

IV. Disposition of Excess HEU.

A. Disposition of HEU from U.S. Weapons. In its pre-decisions draft EIS, DOE has retained as reasonable alternatives: A) direct sale of HEU, b) sale after blending to LEU (19% U-235 or 5% U-235), and c) discard as waste after blending to 19% U-235. Blending to LEU for subsequent sale as power reactor fuel is the obvious preferred option.

Of the 175 t of HEU already declared excess, 63.2 t has been committed to the United States Enrichment Corporation (USEC) to be converted into rector fuel. This includes 13.2 t (about 97.3% U-235) that was produced for naval reactor fuel, but did not meet Navy specs, and 50 t from thermonuclear weapons secondaries, of which 5 t 70%-enriched and the remaining 45 t is 37.5%-enriched. Blending some of this material has already begun.

B. Disposition of HEU from Russian Weapons. On February 18, 1993 the United States and the Russian Federation agreed to the sale of approximately 500 t of HEU (≥90% U-235) from dismantled Russian

weapons for use as civil power-reactor fuel in the United States, provided the two sides agree on price. The full 500 t of HEU could be converted into 15,260 t of LEU (4.4% U-235). An implementing contract was signed on January 14, 1994 by the USEC, serving as the Executive Agent for the United States. USEC agreed to purchase the LEU, blended from the HEU in Russia, over 20 years at a rate of up to 10 t of HEU-equivalent per year for the first five years and up to 30 t per year for the remaining 15 years. Until the United States and Russia consummate the data exchange we will not know the true significance of the U.S.-Russia HEU deal in terms of its impact on Russia's nuclear weapons stockpile and reserve. To date 6 t of the 500 t of HEU-equivalent will have been sold and several tonnes have already been shipped.[3] USEC has ordered 12 t of HEU-equivalent for 1996, but the parties have not yet agreed on the price and/or payment schedule.

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[1] Thomas B. Cochran, "U.S. Inventories of Nuclear Weapons and Weapons-Usable Fissile Material," NRDC, Revised 26 September 1995.

[2] Thomas B. Cochran, Robert S. Norris and Oleg A. Bukharin, *Making the Russian Bomb: From Stalin to Yeltsin,* (Boulder, CO: Westview Press, 1995, p.31.

[3] *The Washington Post,* June 25, 1995, p. A21.

JOHN R. HONEKAMP
Pacific Northwest Laboratories

CONTROL AND DISPOSITION OF EXCESS WEAPONS-GRADE NUCLEAR MATERIAL AN URGENT NATIONAL SECURITY PROBLEM

The critical nature of the problems associated with the control and disposition of excess weapons-grade nuclear material in the former Soviet Union was clearly articulated by former Defense Secretary Les Aspin and by the national Academy of Sciences.

> ***"The old nuclear danger we faced was thousands of warheads in the Soviet Union. The new nuclear danger we face is perhaps a handful of nuclear devices in the hands of rouge states or even terrorists" - Les Aspin - December 1993***

> ***"The existence of this surplus material [from dismantled nuclear weapons] constitutes a clear and present danger to national and international security" - National Academy of Sciences - 1994***

In the past most of the emphasis on nuclear nonproliferation has been on preventing the diversion or theft of nuclear materials form civilian power programs. In addition, Article VI of the NPT includes the commitment to pursue an early end to the nuclear arms race and complete nuclear disarmament under strict and effective international control. To date the efforts to prevent diversion or theft of nuclear materials from civilian power programs have been effective and we are now in the process of large nuclear arms reductions by the U.S. and Russia. In order to capitalize on this unique opportunity it is imperative that we move quickly to establish the necessary framework to control and dispose of the excess weapons-grade materials in the US and Russia without compromising our efforts to prevent diversion or theft of nuclear materials from civilian nuclear power programs.

The challenge we face is to effectively deal with two complex and controversial problems simultaneously. We cannot allow the lack of full agreement on the disposal of nuclear wastes and the recycle of spent fuel in the civilian nuclear power area to interfere with establishing an effective framework for the control and disposition of the large and growing stockpiles of weapons-usable materials from nuclear disarmament.

There are clearly relationships between these two issues. However, the magnitude and urgency of the threat to international security is much different. International controls are in place for the civilian nuclear fuel cycle that have been effective so far. While some argue that these controls must be strengthened and/or national policies changes, most of the nuclear materials in question are not an immediate proliferation concern. On the other hand the materials being removed from nuclear weapons are an immediate proliferation concern if they are not adequately controlled and disposed of.

In this context I would propose the following frame of reference for our discussions

1. The large and growing stockpiles of weapons usable nuclear materials from nuclear disarmament are a major concern to increased proliferation risk.

2. The highly enriched uranium removed from weapons can be readily dealt with through dilution with natural or depleted uranium and the programs in this area must proceed expeditiously.

3. There are no simple unilateral solutions for the weapons-grade Plutonium.

4. The key elements to any solution for Plutonium must include:
   - Reciprocity and symmetry on the part of the US
   - Transparency
   - Financial assistance to the FSU for secure storage and disposal of these materials.

5. It is important to proceed now to resolve this problem, not study it to death or unnecessarily burden it with the ongoing debates over the civilian nuclear fuel cycle.

ARJUN MAKHIJANI
Institute for Energy and Environmental Research

SUMMARY AND RECOMMENDATIONS
From Fissile Materials in a Glass, Darkly

Major Findings and Recommendations

Putting plutonium and highly enriched uranium (HEU) into forms not easily usable for making nuclear weapons is one of the most urgent security problems facing the world today. A great deal of the urgency derives from the severe economic decline that has occurred in the former Soviet Union since the late 1980s. Several political upheavals have accompanied that decline and the time-scale for these political changes has been on the order of a year or two. Further upheavals are possible and, if economic decline is not reversed soon, likely.

Despite the progress that has occurred between the United States and Russia on many nuclear-weapons-related issues, neither country has a coherent policy for disposition of nuclear materials. Russia is unlikely to act without U.S. leadership and reciprocity, especially given the rising nationalist sentiment that has accompanied economic decline in Russia in the last two or three years. There are already signs that such sentiments may take the form of Russian government policies favoring preserving large stores of weapons-usable fissile materials and nuclear weapons, rather than reducing them.[1] Thus, the U.S. must develop its disposition policy with an eye to its effects in Russia. Given the danger that a global black market in weapons-usable fissile materials originating in Russia may develop, it is imperative that the United States choose a disposition policy and persuade Russia to do the same.

Weapons-usable plutonium also arise from the reprocessing of civilian spent fuel and this must be included in overall disposition policy. The governments of five key countries — Russia, France, Japan, Britain and India — regard plutonium as a valuable long-term energy resource. They continue to operate reprocessing plants to separate plutonium from civilian spent fuel, but their capacity to use plutonium has lagged far behind the rate of its production. As a result, surpluses of civilian plutonium continue to mount, including in Russia. The United States is the only leading country that has wisely rejected the use of civilian plutonium because of its proliferation dangers and its high costs. It is therefore the only country that is in a position to exercise the leadership to persuade other countries to forgo civilian plutonium production, at least for the time being, and to put all separated plutonium into non-weapons-usable forms.

Low uranium prices and an abundant resource base mean that plutonium will not be an economically viable nuclear fuel for many decades (if ever) even for those who regard it as a valuable resource for the long-term. This could provide a basis for attempting to achieve an interim, but universal, halt to civilian and military reprocessing. U.S. disposition policy must be compatible with exercising the leadership to get to this goal. An interim halt to reprocessing would allow time for the energy and security issues associated with plutonium to be negotiated without continuing to separate plutonium in the meantime.

Most studies have advocated that the United States consider the option of turning plutonium into highly radioactive spent fuel by "burning" some of it nuclear reactors as plutonium-uranium mixed oxide (MOX) fuel. Despite some advantages of this approach, it would create an infrastructure for the long-term use of plutonium as a fuel in civilian power plants. This is highly undesirable from a non-proliferation standpoint, and has no economic advantages whatsoever.

Appropriate institutional arrangements for managing nuclear-weapons-usable materials for the long-term are needed. The DOE has made great progress on openness at the national level; it created a new office for disposition of nuclear materials in January 1994. It has also boldly taken the lead in rejecting the Advanced Liquid Metal Reactor, which would legitimize plutonium-based fuels, for plutonium disposition,

despite pork-barrel pressures to continue funding it. Yet, nuclear weapons spending continues to be very high. This is evidence that the hold of the nuclear weapons makers, which produced conflicts on interest regarding health and environmental issues in the past, continues to be strong, despite the end of the Cold War. It remains to be seen whether the gains of the past few years, and notable of the last two on openness at the national level, can be generalized throughout the weapons complex and sustained. Accomplishing that consolidation is essential to successful implementation of disposition policy.

Our principal recommendations for plutonium disposition are as follows:

- The United States should formally declare excess plutonium a security, economic, and environmental liability, and forswear its reuse in weapons.

- The U.S. should adopt vitrification of plutonium as the strategy for putting plutonium into a non-weapons-usable form. It should forgo all options that involve the use of any reprocessing or reactor technologies for plutonium disposition in order to help promote the objective of an interim, global halt to reprocessing and to discourage the use of plutonium as a fuel in other countries.

- In the next two years, the U.S. should build three or four pilot plants for the vitrification of plutonium so that any technological problems can be cleared up prior to large-scale implementation, and so that the choice of the best vitrification technology can be made on the basis of a technically sound Environmental Impact Statement on vitrification under the National Environmental Protection Act.

- The U.S. should take the initiative in the creation of an international financial guarantee for the re-extraction of plutonium from glass, should it become an economical fuel in the future. It should link this guarantee to achieving an interim, global halt to reprocessing and vitrifying all civilian and all excess military plutonium globally. Appropriate restraints, including public hearings, must be built into this guarantee so that plutonium is not re-extracted without a clear and unequivocal economic justification. On no account should plutonium be re-extracted for use in weapons.

- A reserve of low enriched uranium (LEU) reactor fuel, created by blending down HEU into LEU, should be created so that an alternative to plutonium will be available for decades.

It does not appear at this stage that there are any serious technical hurdles to the implementation of this policy, which is based on combining already commercial technologies. *If this policy is carried out from the beginning with due attention to environmental, health and safety concerns for workers and the communities near proposed facilities, it should be possible to put all separated civilian and all excess military plutonium into non-weapons-usable form in a decade or less once the political decision is made to do so.*

Other Findings and Recommendations — Plutonium

There is no satisfactory solution for plutonium disposition that addresses all important security and environmental concerns for all time frames. We must choose from a menu of options that are all partly unsatisfactory in some respects.

The U.S. should evaluate three options for plutonium vitrification:

- Vitrification of plutonium mixed with gamma-emitting fission products so that the resulting glass logs meet the spent fuel standard;
- Vitrification of plutonium mixed with depleted uranium, or some other similar alpha emitting element;
- Vitrification of plutonium with a non-radioactive element, such as europium, that would render the extracted mixture unusable for weapons without expensive and difficult processing.

Vitrification of plutonium alone could also be considered, but it does not appear to present a sufficient barrier to re-extraction by sub-national groups, and therefore is probably unacceptable from a non-proliferation standpoint.

The "spent fuel standard" for military plutonium disposition — that is, making plutonium as difficult to re-extract as it is from civilian power plant spent fuel — would be the most appropriate one for the short and medium term if the only concerns were technical ones of re-extraction difficulty and protection against diversion. Such a standard for disposition using vitrification is currently unacceptable to countries that are reprocessing civilian spent fuel because of the very high cost of re-extraction and because vitrification does not extract any energy from plutonium. The security criteria for evaluation of the choice of a disposition policy should include the potential of the policy to contribute to the goal of an interim, global halt to reprocessing and the speed at which all civilian plutonium and excess military plutonium can be put into non-weapons-usable forms.

• An option with lower re-extraction costs compared to the spent fuel standard but still high enough to pose great challenges to sub-national groups should be explored. Such an option may help to further the goal of achieving a universal, interim halt to reprocessing. If there were financial guarantees for plutonium re-extraction, should it become economical for civilian power production in countries that are now reprocessing civilian spent fuel, these countries may agree to vitrify their plutonium. Vitrification of plutonium with alpha-emitting heavy metals, such as depleted uranium (or other elements with low gamma-emitting properties belonging to a class of elements calls actinides), or with certain non-radioactive elements such as europium or gadolinium, are options that could meet this criterion if there are appropriately high levels of plutonium dilution. The glass so produced should be safeguarded at the same level as plutonium pits or nuclear warheads. (Pits are the metal spheres that form the nuclear triggers of warheads.) This option by itself will not meet the spent fuel standards, especially so far as resistance to diversion is concerned.

• One way of achieving the spent fuel standard and still having a disposition policy that is compatible with policies needed for an interim halt to reprocessing would be to vitrify plutonium with rare earths or actinides first and add a gamma-emitting fission product, such as cesium-137, to the canister (instead of adding fission products to the glass). This would provide the same high resistance to theft as spent fuel and also greatly reduce the amount of fission products for achieving it compared to the option of mixing fission products in the glass itself. As a result, worker exposures and other health and environmental risks may be lower compared to other spent fuel standard options. A feasibility study and laboratory experiments should be initiated to examine this option. *This option appears to be the most promising of all the options that we have examined for achieving the principal disposition goals to the maximum feasible extent.*

• The U. S. should address disposition of plutonium scrap and residues as part of its overall plutonium disposition plan. Because of proliferation concerns, it should rule out all options for processing of residues that, in practice, promote development of reprocessing technologies, such as pyroprocessing. The inclusion of residues in disposition policy will also be very important for non-proliferation and materials accounting in Russia. The U.S. should stop funding the development of pyroprocessing even as a plutonium disposition option. One pilot plant for plutonium vitrification should be devoted to the problem of processing scrap and residues. According to our preliminary evaluation the use of a new technology for direct vitrification of residues, developed by Oak Ridge National Laboratory, appears to be a promising choice for this plant.

• The use of the existing vitrification plants at Savannah River Site, South Carolina and West Valley, New York, present severe practical difficulties. A feasibility study to examine the use of the plant at Savannah River Site for plutonium vitrification at the time when the melter is scheduled to be replaced should be

initiated. The start-up of these two plants for high-level waste vitrification should not be delayed because of their potential use for plutonium vitrification.

• The security problems arising from plutonium cannot be fully resolved even in theory until there is a halt to nuclear power, since nuclear power plants generate plutonium. The U.S. Department of Energy should initiate a fresh evaluation, with full public participation, of the long-term security issues arising from the use and spread of nuclear power plants in light of the severe practical difficulties that have arisen in considering disposition of excess military plutonium.

Other Findings and Recommendation — HEU

• Unlike plutonium, HEU could, in principle, be blended down to provide an economical nuclear power reactor fuel substitute for uranium from mines, so long as there is a market for such fuel.

• The use of LEU made by blending down HEU as a substitute for mined uranium has a number of environmental advantages, such as preventing the accumulation of new radioactive mill tailings and saving energy used in uranium enrichment. These advantages can be realized only if blending is done in strict conformity with U.S. health and environmental laws. It should be noted that this conclusion assumes that a substantial fraction of existing nuclear power plants will continue to operate for at least the next decade-and-a-half or so. It does not address any environmental or economic issues associated with continuing to run particular nuclear power plants relative to implementing efficiency measures and/or building other types of power plants to replace nuclear capacity.

• The potential re-enrichment of LEU, especially using gas centrifuge technology, will continue to pose proliferation risks even after HEU is blended down.

• The potential advantages of using LEU derived from HEU are partly offset by the realities that U.S. blending down capacity is at present small and verification provisions in Russia to ensure that HEU is actually being blended down are not in place. As a result, storage of HEU in the United States and Russia will continue for a considerable time unless the pace of implementation is increased. Long storage periods increase security risks from potential black-market sales, notably of Russian HEU. Greater capacity for blending down HEU is needed in the near-term if the blending down option is pursued.

• The U.S. should adopt a policy of reciprocity vis-à-vis Russia as regards HEU disposition policy. This will lead to a more equitable and secure reduction of a larger portion of global HEU stocks than planned under the current U.S.-Russian agreement.

• Vitrification of HEU as an interim measure may reduce security risks arising from the potential for black market sales. However, it may also make the future use of LEU derived from vitrified HEU uneconomical relative to LEU from mined uranium. Prior to choosing an option, the DOE should include in its Programmatic Environmental Impact Statement on disposition of fissile materials a careful evaluation, with full public participation, of the security and environmental concerns of extended HEU storage compared to conversion of larger amounts of HEU to LEU and vitrification of much or most HEU.

1 Lydia Popova, Director, Nuclear Ecology Program, Socio-Ecological Union, Moscow, oral presentation to IEER National Symposium on Weapons-Usable Fissile Materials held in Washington D.C. on November 17 and 18, 1994. See also Associated Press wire story on Russian nuclear scientists' views, November 3, 1994.

RICHARD WILSON
Harvard University

Position Submitted From
PROTECTION AND MANAGEMENT OF PLUTONIUM
American Nuclear Society Special Panel Report
August 1995

Key Conclusions and Recommendations

The world must protect plutonium and mange the ability to produce it for the indefinite future. This is true regardless of whether or not we use plutonium as an energy resource. Our study examined the issues arising from the need to protect and manage plutonium arising both from the dismantlement of nuclear weapons and from civil nuclear power activities. It was not, however, an in-depth study of the future demand for nuclear energy, or of many of the issues that would arise from the large-scale use of breeder reactors.

Short-Term: Surplus Weapons Plutonium

1. We strongly support conversion of all plutonium now scheduled for release from U.S. and Russian weapons stocks to a form in which it is protected from theft or seizure by intense radioactivity (the "spent fuel standard"). Since this conversion will at best take a few years to complete, immediate emphasis must be placed on the assurance that all unconverted materials are protected as securely as when they were part of the active weapons stockpile. We urge that higher priority and attention be devoted to assuring that this standard is being met.

2. We recommend prompt implementation of the reactor irradiation option for disposition of surplus U.S. and Russian weapons plutonium, employing available reactors in the United States and Russia, or in third countries.

3. The time schedule for both initiation and completion of conversion should be shortened. Both dates are important, but emphasis should be placed on the earliest possible initiation.

4. To assure and demonstrate the irreversibility of the weapons-reduction process, all released plutonium in the United States and Russia should be placed under international safeguards as early in the disposition process as possible.

Longer-Term: Civil Plutonium

5. Improved efficiency of energy generation and use will continue to constrain energy growth in the industrialized countries, but energy demand, especially for electric power, is increasing steadily in the developing countries. We cannot expect and should not wish these countries to forgo the benefits of abundant energy that the industrial world has enjoyed for so long.

6. All sources of energy — fossil fuels, renewables, and nuclear — as well as improved efficiency, will have to be drawn on to meet the expected growth in demand in an environmentally acceptable manner. The use of nuclear energy will take place primarily in industrialized countries, making fossil fuel more accessible and affordable for use in the developing world.

7. Currently proven reserves of reasonable priced uranium are insufficient to support a long-term, major contribution of nuclear energy to meeting world energy demand. Additional reserves will undoubtedly be discovered, but there is no law of nature that assures that the rate of discovery will match increased demand at prices that will allow continued reliance on power reactors that utilize only about 1 percent of the available energy in uranium. Breeder reactors, which allow virtually complete use of the energy of uranium or thorium, can overcome this limitation, but we cannot predict with certainty when or whether the use of breeder reactors will become necessary. The Panel had a range of views on the probable timing and even the certainty of the requirement for breeders.

8. We believe that the general level of breeder development being carried out in Japan, Russia, Europe, and, until its recent termination, the United States, was adequate until the timing for need of the breeder becomes better defined. The issue of the proper level and structure of development on the breeder and other advanced reactor systems calls for further assessment. We urge that this be undertaken.

9. The recent U.S. decision to stop all development work on reprocessing and the breeder resulted in severe limitations on a promising approach to a proliferation-resistant fuel cycle and the termination of important work on liquid metal reactor technology. This decision should be reversed.

10. Three fuel cycle options are possible: the once-through cycle, with permanent disposal of spent fuel; the once-through cycle, with retrievable storage of spent fuel pending a decision on how to treat spent fuel; and the recycle fuel cycle. Regardless of the option chosen, the development of permanent waste repositories is essential, since these will be need for either spent fuel or fission product waste disposal. Since spent fuel placed in permanent waste repositories must remain retrievable for at least several decades to ensure safety, the first two options are, for practical purposes, equivalent, for the time being.

11. We see no need for international uniformity in selection of fuel cycle options. We believe that the recycle option is appropriate for countries with excellent nonproliferation credentials and an economic basis for selecting this option. Where recycle is utilized, accumulation of separated plutonium should be avoided by recycling recovered plutonium at the same rate it is recovered.

International Actions

12. The International Atomic Energy Agency (IAEA) is effectively safeguarding civil reprocessing plants and related plutonium recycle facilities. The IAEA should, however, place increased emphasis on containment and surveillance and other nonaccountancy safeguard measures.

13. The international community has a legitimate interest in the adequacy of national measures for protection of nuclear materials against subnational threats. The IAEA should be called on to review the adequacy of these measures and to assist in their strengthening. We recommend the adoption of an international convention to this effect.

14. It is essential that the IAEA be assured of the financial, technical, and manpower resources and the political support necessary to carry out its increasingly vital tasks.

RESPONDENTS STATEMENTS

ALLEN W. CONKLIN
Washington Department of Health

POSITION ON PLUTONIUM DISPOSITION

- Disposing of plutonium in manner consistent with national security needs is essential.

- The disposal option, when approved and begun, must proceed with current technology, and not with the ultimate hope of future, and yet undeveloped technology.

- Whatever option is chosen must not jeopardize public health in any way, must not adversely impact the environment, must meet all applicable environmental regulations and must not affect the Hanford clean-up.

- Safeguards and security must be sufficient to ensure and convince the public that the plutonium will not be susceptible to terrorist acts.

- When an option is ultimately chosen, it must have the full involvement of local and state government, of the general public and Indian Nations whose ceded lands and peoples may be impacted.

- There must be follow-through. There must be a commitment from the Department of Energy and Congress that, once started, it will proceed to completion.

DAVID CONRAD
Nez Perce Tribe
Department of Environmental Restoration and Waste Management

Introduction

The Nez Perce Tribe has been involved in nuclear waste issues since 1987 and the Basalt Waste Isolation Project (BWIP). Nez Perce involvement has always been somewhat constrained by the level of funding and the enormous task of wading through Department of Energy documents. Since 1992, however, the Nez Perce Department of Environmental Restoration and Waste Management (ERWM) has been attempting to define its own agenda. The way of the past was to provide input to decisions that were almost complete, we did so in a fashion that resembled a snap judgment. These decisions were mainly over aspects of different regulatory documents or the accuracy of data. Plutonium, however, provides us with a different challenge. We face this challenge knowing that funding constraints will again play a major part of our ability to participate in a politically and technically credible manner. We are also aware of a basic lack of understanding of why the Nez Perce Tribe is involved with nuclear issues at all. The plutonium question is therefore a challenge and an opportunity for the Nez Perce Tribe to develop a dialogue with tribal members, and at the same time educate those who would have Nez Perce input about the tribal decisionmaking process and mechanisms.

To answer the questions posed by plutonium, however, we are again entering a dialogue that has already begun, but there are those who are calling for a wait and see attitude. This track would give the Nez Perce Tribe, and other Indian tribes the time to discuss this topic and provide considered, and therefore more valuable input. The Nez Perce Tribe Department of Environmental Restoration and Waste management sees a need for such a dialogue among Indian people. The problems with such an approach will be laid out in more detail below as part of the discussion of the plutonium question.

Tribal Dialogue

Who, in their daily lives, comes into contact with the question of plutonium disposition? I would venture to say that most people can not distinguish between plutonium and uranium let alone how they can be handled and disposed of safely (or be disposed of at all). Yet the democratic principles we all adhere to demand that these have a say in what happens to this material. The longest lived radioactive materials are accompanied the highest obligation to solicit input regarding their disposition.

Accompanying the current dialogue is the need for long-lived social mechanisms to continue the dialogue and maintain the technical expertise and appropriate technology. The ethical implications of hiding facts and/or materials from future generations are too heavy for us to take on by ourselves. We must commit ourselves to imbed an accurate factual consciousness of plutonium and other long-lived radioactive materials in our society, so that people do not forget what they are, where they are, and how to deal with them if they should come into contact with them.

Tribes need to enter this dialogue as much as everyone else, however, the road to this involvement is fraught with political and social difficulties. Indian people have been on this continent for over ten thousand year, and plan to be here for at least that long into the future. Today's society in the United States finds Indian people tied to certain areas of land called reservations, many of these reservations are located in what were commonly thought of as wastelands, or areas of little exploitable natural wealth. Tribes find themselves today in the position of having some of the last energy resources in the U.S. and close to areas currently being used or considered for all types of radioactive waste disposal. So there exists a push to exploit Indian reservations for their resources and leave behind something no one wants, radioactive waste. So, one can see part of the picture faced by Indian people in the context of this dialogue. What many

Indian people see is a larger society who wants to take, take, and invent ways to take more, while at the same time coming up with ways to leave behind things they can not deal with.

This situation has given rise to a movement of anti-nuclear sentiment in Indian country, and rightfully so, however, even those of us who attempt to participate in the decisionmaking process for the betterment of our Tribes are sometimes viewed as being tainted by the nuclear money. At the same time we are viewed as a cumbersome political necessity by many in the technical world of nuclear waste management and are consequently "ghetto-ized" into the dark corner of "public participation."

The Nez Perce Tribe is not the public. Tribal governments have duties and obligations to their tribal public. If tribal governments can have the time and some limited resources they can facilitate a dialogue within their tribes to discuss a position of the disposition of plutonium. As of today, I doubt if many tribes, as a whole have even asked the question of "who, what, where, and how" to dispose of plutonium. Many tribes who rely heavily on their elders for wisdom and direction do not have words for plutonium and the other technical aspects of the question. For the Nez Perce tribal government to even ask the question of their constituents, we must develop a way to make the question culturally relevant to our people. Tribes need a dialogue about plutonium disposition, but we must do it in a way that employs appropriate cultural mechanism to guarantee fairness and openness.

How the question is asked is sometimes almost as important as the question itself. The tribal dialogue on plutonium disposition can be an attempt to transfer some tribal wisdom, about the democratic process and establishing low-tech longevity of information within a society. We must carefully ask the whole question of plutonium disposition in a way that shows the respect that we have for those we are asking. A carefully asked question will hopefully elicit a carefully considered answer. Perhaps tribes well not be willing to share the whole answer(s), or may not give the answer(s) the U.S. wants to hear, or may even give an ambiguous answer(s) that can stimulate further dialogue that can lead the U.S. to a better solution. In any case, it is a question, we feel, we must ask of our tribal publics, and one that will prove to be very useful.

Summary

Briefly, to summarize, the Nez Perce Tribe can begin the dialogue within the Tribe and with the United States, and eventually with the international community with the following assumptions:

- The Nez Perce Tribe has standing to participate in the dialogue. Tribes, in general, are affected by construction and production and testing of nuclear weapons. The Nez Perce Tribe has treaty, regulatory, and other interests that will be affected by likely treatment, storage and disposal technologies and their applications.

- The Nez Perce Tribe, as is the case with most of Indian Country and the rest of America, are generally ill-prepared to participate in the dialogue on plutonium treatment, storage, and disposal in a meaningful manner.

- The Nez Perce Tribe is not aware of the different approaches to plutonium treatment, storage, and disposal options being considered in the international community.

- The U.S. Department of Energy has an obligation to prepare the Nez Perce Tribe, and Indian tribes in general, to participate in the dialogue.

The implications of such assumptions are as follows, as we currently understand the situation:

The Nez Perce Tribe requires the information on environmental, health, financial, geographical, and other consequences of the various plutonium treatment, storage, and disposal technologies proposed by the U.S. and the international community. The Department of Energy should make such information available to the Nez Perce Tribe in order to begin a dialogue that can be a positive example for other tribes and intertribal organizations of a tribe tackling the plutonium question.

- The Nez Perce Tribe must carefully craft the international plutonium question against the array of tribal cultural, traditional, treaty, governmental, and other interests in order to develop a meaningful position for plutonium treatment, storage, and disposal options.

- It may be that none of the current treatment, storage, and disposal options are acceptable to the Nez Perce Tribe, or other tribes, and that we will instead establish criteria for treatment, storage, and disposal options.

- Additionally, the Department of Energy and other players in the plutonium arena should establish education and training programs, such as internships or temporary assignments, on plutonium treatment, storage and disposal technologies for tribal staff.

WILLIAM G. COUNSIL
Washington Public Power Supply System

Comments to the
Plutonium Roundtable,
Tri-Cities & Seattle, Washington,
Oct. 5-7, 1995

The Washington Public Power Supply System is in a distinct position to assist the U.S. Department of Energy in pursuing one of the most timely and credited methods for disposal of 50-100 metric tons of excess nuclear weapons plutonium. The Supply System is the state of Washington's only operator of a commercial nuclear power plant, which is located on the DOE's Hanford site.

The DOE is completing an Environmental Impact Statement on the treatment and disposal of the nation's excess weapons-grade plutonium from U.S. stockpiles, and is expected to announce a preferred method of treatment in the fall of 1996. The National Academy of Sciences, in numerous studies, has consistently concluded that using plutonium as fuel in nuclear reactors is one of the safest, most viable, and most timely methods for converting plutonium into a form difficult to recover for weapons use. Vitrification of the plutonium is also considered by NAS to be a viable treatment. Recently, the NAS announced that both reactor and vitrification options should be pursued simultaneously to expedite the development of these treatment methods.

As such, the Supply System has taken a leadership role to offer the U.S. government two important avenues for disposal of excess nuclear weapons:

- First, by offering a comprehensive program to fabricate and test up to eight new fuel assemblies in Plant 2 that contain a mixture of plutonium and uranium (mixed oxide fuel, or MOX). The testing would be done to confirm that current technology is suitable for safely operating U.S. commercial nuclear power plants with MOX fuel - which currently is used in 15 power plants in Europe, with 15 additional plants in Europe slated to use MOX fuel by the year 2000. All U.S. reactors are designed to operate using MOX fuel. This test program also would provide data to determine the performance of the plutonium in the fuel assemblies, which for disposal purposes would be greater than is currently used now in MOX fuel.

- Secondly, the Supply System announced in 1994 its concept for fueling one or both of its nuclear power plants at Hanford with MOX fuel to dispose of the surplus weapons-grade plutonium. Called the Dual Purpose Concept, the proposal includes Plant 2, in commercial operation since 1984, and WNP-1, a 65-percent complete plant.

Benefits Of the Supply System's Proposals:

There are many benefits to the Supply System's proposals to assist in the disposal of the nation's excess weapons plutonium, among them:

- A timely method for gathering needed information to calculate, test, and license new designs for MOX fuel assemblies. If the DOE were to concur with the Supply System's proposal by December 1995, the new assemblies could be tested in Plant 2 as early as the spring of 1998.

- Because Plant 2 is a boiling water reactor, no costly modifications would be needed to test the mixed oxide fuel assemblies, thus reducing the cost of the test program and allowing for test data to be gathered more quickly.
- The process for testing and licensing a mixed oxide fuel assembly is the same process for licensing fuel assemblies containing uranium, currently used in U.S. commercial reactors.
- Both Supply System proposals provide the DOE and Department of Defense with cost-effective, safe and efficient ways of using reactors to reduce U.S. stockpiles of weapons-grade plutonium.
- The concept to use Plant 2, and possibly WNP-1, keeps the generation of electricity with MOX fuel at one location--the Hanford site--which is dedicated to nuclear operations and waste clean-up.
- The federal Bonneville Power Administration would receive the power from Supply System plants using MOX fuel to supplement generation from the hydroelectric system, which has been significantly impacted due to low water levels and fish conservation programs.

For more information on this, contact Supply System Public Affairs, (509) 372-5659.

JOHN SAVAGE, Director

and

MIKE GRAINEY, Assistant Director
Oregon Department of Energy

NUCLEAR WEAPONS PLUTONIUM DISPOSAL: THE STATE OF OREGON'S PERSPECTIVE

October 5-7, 1995

The Oregon Department of Energy with the Oregon Hanford Waste Board is now conducting meetings in 18 cities throughout Oregon to determine what issues regarding plutonium storage or disposal are of greatest concern to Oregonians.

We recognize the importance of this issue to the region and to the nation. We have made this known as we have undertaken an intensive and unique public process to hear Oregonians' concerns.

We have had widespread participation through the use of meetings with civic groups, focus meetings of community leaders and public meetings to assure widespread and meaningful public involvement on this critical question. The final results of all of our meetings with Oregonians will be announced at the October 24 meeting of Oregon's Hanford Waste Board in Portland.

The State's final position will be developed after an intensive technical review of the Draft Environmental Impact Statement when the U.S. Department of Energy issues that document in 1996. However, there are some principles that will guide us in our review, principles important to the people of Oregon which we are hearing in our public meetings.

At the meetings we have held so far, we have heard consistently the following major themes, which also reflect the concerns of Governor John Kitzhaber and the Oregon Hanford Waste Board:

1. Continuing the cleanup of the nuclear weapons wastes already at Hanford is absolutely critical. No decision should be made regarding plutonium disposal or any other waste handling issues that will slow the cleanup effort or divert funding or resources from cleanup of Hanford.

2. No decisions should be made regarding the storage or disposal of plutonium or other nuclear weapons wastes that make the difficult job of Hanford cleanup even more difficult.

3. Shipments of any radioactive material into or out of Hanford must be done safely. Virtually all shipments into and out of Hanford travel for at least 200 miles through Oregon. USDOE must provide adequate resources to the state for effective emergency response capabilities in the event of a shipping accident. USDOE must also work closely with the state to assure that accident prevention measures are fully taken into account. These measures include avoiding shipping in bad weather, notification to the state of the timing and type of shipments, standards for shippers and other preventive actions.

4. Finally, and most important, Oregon must be given a full seat at the table in decisionmaking at Hanford. Oregon is vitally affected by decisions on nuclear weapons waste handling, transport and disposal. Oregonians insist on more than an advisory role to assure their interests are fully taken into account at Hanford.

Underlying these points is another fundamental concern, which has been a long-standing position of the Oregon Department of Energy and the Oregon Hanford Waste Board. Any facility or process chosen to store or dispose of plutonium, regardless of where it is located, must comply with all federal and state laws, including laws to protect the health and safety of the public, worker safety measures and prevent contamination of the environment. We must not repeat the mistakes at Hanford and at other federal facilities of exempting these facilities from accountability in the name of national security. We must not pass on to the next generation the problem of cleaning up a plutonium disposal facility exempted from environmental and safety standards in the name of national security.

MICHAEL LAWRENCE
Pajarito Scientific Corporation

PLUTONIUM DISPOSITION: A GLOBAL COMMITMENT AND RESPONSIBILITY

September 25, 1995

After nearly fifty years of producing tons of plutonium and highly enriched uranium, the United States and the Former Soviet Union are dismantling tens of thousands of nuclear weapons. These countries are faced with the task of ensuring to each other and to all Nuclear Nonproliferation Treaty signatories that this material will never again be used in nuclear weapons. The recent indefinite extension of the NPT would never have been possible without the commitment of the major nuclear weapons states to live up to their treaty obligations with the ultimate objective of eliminating nuclear weapons altogether. Despite its imperfections, the establishment of the NPT has provided the legal basis to detect and prevent nuclear proliferation, and its indefinite extension is a major accomplishment.

There is general agreement that excess highly enriched uranium can be blended down into low enriched fuel for use in nuclear power reactors. The blending process alone is considered adequate to render the uranium unusable for nuclear weapons since the enrichment needed to return the blended material back up to weapons grade, is the same for either fresh fuel or blended weapons uranium. Plutonium disposition options however are not readily agreed to. Since there is no ready supply of non weapons plutonium (such as plutonium 240) which could be used to dilute and denature plutonium, and even reactor grade plutonium can be fashioned into a crude nuclear device, a blending approach similar to uranium is not considered acceptable.

Plutonium can be made into power reactor fuel and burned up in a reactor. Ample experience exists in the fabrication and use of mixed oxide fuels containing plutonium. While the economics of using mixed fuels are not considered favorable, at least by the U.S. and especially in the near term, several countries use or plan to recycle plutonium as a matter of strategic national policy. While the United States has no such policy or strategy, Russia does plan to recycle plutonium both from spent fuel and excess weapons. The United Kingdom, France, Japan, China and several Western European countries also support plutonium recycle.

The United States plans on direct disposal of spent power reactor fuel. Direct weapons plutonium disposal in a geological repository in a glass form is under consideration. This would be difficult to recover and would be inaccessible for diversion except under extreme and easily detected means. It is questionable however if it would satisfy the requirements of other countries since it is reversible. If Russia is physically destroying their excess plutonium they are not likely to settle for anything less on the part of the United States. Even if the Untied States could convince Russia not to recycle but to store and dispose of vitrified plutonium, it is questionable if the non nuclear weapons state would be agreeable.

The burning of plutonium in the United State would create a number of problems. First, it is not part of fuel cycle plans for commercial reactors. The regulatory basis and facilities, both fuel fabrication and reactors, to enable plutonium burning to occur would have to be provided. There is no current economic or energy driving force for the U.S. plutonium utilization and there is substantial public opposition. But the objective of plutonium burning would not be wide scale commercial utilization of plutonium for power production, but the destruction of excess weapons plutonium so that this material could never be used in nuclear weapons. Facilities to dispose of the plutonium under any option, including vitrification, would have to be provided with the accompanying regulatory requirements and environmental impacts and risks. Both options, burning or disposal, would require tight government control and security as well as international safeguards by the International Atomic Energy Agency.

Given these considerations, the burning of plutonium has the advantages of first, destroying plutonium and making it impossible to use for future weapons; second, being consistent with the plans of Russia and other major nuclear countries; third, being irreversible and therefore, acceptable to other non nuclear states. fourth, can be accomplished based upon existing technology and fifth, power produced as a by product of burning can be used to offset some of the costs of plutonium destruction.

There are several locations in the United Stated where plutonium burning could be performed. It would be desirable to choose a location that would minimize transportation, further plutonium contamination, and new facility construction. Independent regulatory control should be required and international safeguards by the IAEA are essential. The pace at which the plutonium is destroyed, in my opinion, is not as important as beginning to make a start on the destruction.

The Hanford site has the facilities and experience to burn excess weapons plutonium in the next five to ten years but radically strengthened oversight and controls would be necessary. Other sites also have many of the same capabilities. Washington State has borne a large portion of the impact, both negative and positive, from past plutonium production. It has the capability to also play a major role in the solution to the plutonium disposition problem.

Regardless of which plutonium disposition option is chosen, and which location is selected, the United States has international obligations to greatly reduce its nuclear stockpile and permanently render its excess weapons material unusable for future weapons use. The U.S. cannot unilaterally select which option it will pursue, but must meet the approval of Russia and the international community. Strict safety regulations by an independent authority and safeguards by the IAEA are a prerequisite. The benefits from prompt and permanently beginning to destroy excess nuclear weapons material are too great not to pursue with the same determination and urgency as the Manhattan Project.

RUSSELL JIM
Yakama Nation
Environmental Restoration/Waste Management Program

The Yakama Nation (YIN) considers the NEPA process as a major component to be included in the Programmatic Environmental Impact Statement (PEIS) in the disposition of Plutonium along the lines of Environmental Justice and political equity issues. If redesigning NEPA is accomplished as proposed, the Yakama Nation should then be consulted and fully involved.

The Yakama find it difficult to support use of Plutonium in commercial reactor fuel, albeit it may be the cheapest and most expeditious option for disposal, but also is the highest risk from a security standpoint, because of the potential for unauthorized diversion of the material. (Low grade bomb making, for instance).

We have related other possible administration methods in past documents relative to Plutonium and other dangerous materials. The concept of multi-purpose casks may be worth considering, constructed of ductile iron, lined by recycled contaminated material, which would contain calcined material. This objective would be relatively cheap, the casks could be used for temporary storage, eventual transportation, and the waste package for permanent storage. To house such an facility for calcining, the PUREX plant has the melter capacity and could prove to be an advantage to DOE and the Yakama Nation. DOE funds would be available for environmental projects at Hanford rather than interim storage. (and security).

The contribution of the Yakama Nation to the parent legislation which became the Nuclear Waste Policy Act (NWPA) of 1982, was to effectuate the nuclear waste be moved to a permanent facility, a deep geologic repository, to prevent a long term liability on the land. This would satisfy legal Treaty obligations and would render the land usable for all future generations.

The "Holistic Approach to Environmental Management" has been the realm of the YIN for centuries. Far too long short term studies has dominated the process in restoration activities. The "Holistic" concept would consider the traditional 'institutional and technical methods and add the 'cultural' component. This triage would include consideration of all elements related to resources affecting restoration and practices. The traditional methods have historically placed production first and environment last. The 'Holistic' practice would turn this around for remediation and restoration in the long term. We consider, and recommend, the use of the cultures, since environmental and conservation methods of the Indigenous people has withstood the test of time.

MEDIA COVERAGE

TRI-CITY HERALD
Tri-Cities, WA
OCT 0 3 1995

H4

Plutonium hot topic in Tri-Cities, Seattle

By WANDA BRIGGS
Herald staff writer

Plutonium — it's explosive, toxic, radioactive and will remain dangerous almost forever.

Some people think it's an unlimited source of energy, others believe it's a tool for terror.

No one agrees on the way it should be permanently be stored.

A two-day discussion about how this nation's plutonium stockpile should be transported and protected will begin Thursday in Kennewick and Friday in Seattle.

The discussion in Kennewick will feature Nikolai Egorov, deputy minister of the Russian Ministry of Atomic Energy.

Washington Gov. Mike Lowry and Tom Grumbly, assistant secretary for Environmental Management for the U.S. Department of Energy, will attend the Friday night session in Seattle.

"Plutonium Roundtable: Risks and Solutions," is sponsored by Washington Physicians for Social Responsibility and the Washington state League of Women Voters.

In the Tri-Cities, a panel of experts will outline problems and proposed solutions Thursday night, followed by a workshop the next morning to give the public a chance to comment.

The panel discussion begins at 6:30 p.m. at Cavanaugh's, 1101 N. Columbia Center Blvd., Kennewick. Friday's workshop also is at Cavanaugh's from 8 a.m. to noon.

Sponsors say the problem is what to do with stockpiles of the highly toxic metal estimated to measure 370 metric tons.

Washington will play a key role in any national solution because Hanford stores much of the nation's plutonium stockpile.

The meetings are meant to present options for transportation, storage and disposal, and to frame issues and values of concern to the citizens of the Northwest, according to Betty Tabbutt, who represents the League of Women Voters on the Hanford Advisory Board.

The meetings are open to the public at no charge.

Thursday's session begins at 6:30 p.m. with remarks from Egorov.

Panelists during the 7:15-8:30 p.m. session are Tom Cochran, Natural Resources Defense Council; John Honekamp, Pacific Northwest Laboratory; Arjun Makhijani, Institute for Energy and Environmental Research and Richard Wilson of Harvard University.

Additional comments will come from Al Conklin, state Department of Health; Bill Counsil, Washington Public Power Supply System; Mike Grainey, Oregon Department of Energy; Russell Jim, Yakama Indian Nation; Mike Lawrence, Pajarito Scientific Corp.; Donna Powaukee, Nez Perce Tribe; John Savage, Oregon Department of Energy, and J.R. Wilkinson, Confederated Tribes of the Umatilla Indian Reservation.

Counsil, who will represent the nuclear utility industry during the question-and-answer session also will provide an update on the supply system's ability to test a new fuel design in Plant 2 at Hanford using a mixture of plutonium from excess U.S. defense stockpiles and uranium, conventional reactor fuel.

Concurrent workshops in Kennewick and Seattle will deal with implications for the Northwest, proliferation and international cooperation, and development of a farsighted political process including public involvement.

Organizations supporting the roundtable include Washington Department of Ecology, Hanford Environmental Action League, U.S. Department of Energy, Institute for Energy and Environmental Research, Westinghouse Hanford Co., Sierra Club, Oregon Department of Energy, Heart of America Northwest, University of Washington, School of Public Health & Community Medicine, Hanford Advisory Board.

TRI-CITY HERALD
Tri-Cities, WA
OCT 05 1995

Grumbly, Lowry will miss a lot

Tom Grumbly and Mike Lowry are busy people but they made a poor decision not to come to the Tri-Cities this time around.

Instead, they will attend only the second half—the Seattle half—of a public symposium, "Plutonium Roundtable: Risks and Solutions." Friday night. The first part of the symposium begins here this evening and resumes Friday morning.

Of course, like Lowry, Grumbly is no stranger here. He has made a number of visits since becoming head of the cleanup program for the Department of Energy. He has shown broad and deep understanding of Hanford's problems and potential. That reputation, while earned, needs careful tending.

With Hanford layoffs at 4,800 by December, the community is hungry for news of the future. It cannot be faulted if it worries about such information from the top being passed along from Seattle.

The two-day, two-city program is sponsored by Washington Physicians for Social Responsibility and the Washington League of Women Voters. It will address how the nation's plutonium stockpile should be transported and protected. Much of that stockpile is at Hanford.

Speaking at the opening session at Cavanaugh's will be Nikolai Egorov, deputy minister of the Russian Ministry of Atomic Energy. Other important speakers will be here, including Mike Lawrence, former manager of DOE at Hanford and now president of Pajarito Scientific Corp. of Los Alamos, N.M., a subsidiary of British Nuclear Fuels Inc.

Bill Counsil, president of the Washington Public Power Supply System, will provide an update on a proposal to mix surplus plutonium from the defense stockpile with commercial uranium fuel for WNP-2 to reduce the stockpile and reduce costs for electricity.

The most important part of the Plutonium Roundtable won't be the closing in Seattle but the discussions that lead up to it.

Grumbly and Lowry will be missing a lot by not coming. And Tri-Citians, who ordinarily don't wear their feelings on their sleeves, will miss having them here.

When the subject is Hanford, it's important that Hanford be involved every step of the way.

Seattle Post-Intelligencer • Thursday, October 5, 1995

The plutonium dilemma

Washington residents have an opportunity to influence the federal government's decision on what to do with plutonium being removed from U.S. and Russian nuclear warheads, thanks to the end of the Cold War.

A two-day forum on the latest nuclear dilemma sponsored by the League of Women Voters of Washington and Washington Physicians for Social Responsibility starts tomorrow at 6:30 p.m. at The Mountaineers, 300 Third Ave. W.

The sessions will examine the unpleasant options and what they might mean for Washington residents, who already are burdened with the Hanford Nuclear Reservation's monumental nuclear contamination and who likely also will find themselves participating in the solution to the nuclear problem.

A panel of experts, including Nikolai Egorov, deputy minister of the Russian Federation on Atomic Energy, will participate. Whatever options are chosen by the United States, they must be acceptable to the Russian government, which – unlike the United States – regards its plutonium more as a valuable economic resource than as an everlasting scourge on humanity.

The most immediate concern is to prevent weapons-grade plutonium from the warheads from being sold on the black market or stolen by terrorist groups or being obtained by outlaw states. In its present state, theft of the material is a relatively safe procedure. Methods of making it unsafe to steal will be among topics discussed.

Some 200 metric tons of weapons-grade material will be removed from weapons. Existing stockpiles of plutonium, including waste from civilian reactors, total 370 metric tons. Another 532 metric tons languish in Washington state alone, largely in the form of spent nuclear fuel that is said – on poor evidence – to be destined for deep disposal in Nevada. All of it must be rendered unusable for weaponry and safely disposed.

Whatever solution is chosen, citizens who will live with the consequences for thousands of years must have their say in it.

Nukes and the public

EVEN a few years ago, a strong case was made for secrecy surrounding the nation's nuclear arsenal and the production of weapons-grade plutonium. Now that the arms race is over, the question is how to dispose of that material. And secrecy is no longer necessary or appropriate.

That's why a broad-based coalition has set up three days of public panels and workshops beginning tonight in the Tri-Cities then moving to Seattle.

More than 500 tons of highly radioactive plutonium is stored at Hanford, with more due to be removed from dismantled weapons. Hundreds more tons are stored in Texas, in Europe and Russia and former Soviet Bloc nations. The stuff is frighteningly toxic, vulnerable to terrorism, and could remain so for thousands of years — unless good decisions are made in the near future.

Public health and international security are at risk. Citizens should have a say in deciding what to do. Which is the safest way to dispose of the material? Glassification? Dilute it with non-weapons grade materials? Shoot it into space? And how will our decisions affect plutonium policy in the volatile politics of Russia?

These are among the questions to be explored at the "Plutonium Roundtable," cosponsored by groups ranging from the League of Women Voters and Physicians for Social Responsibility to the Sierra Club and Westinghouse Hanford Corp.

A Seattle panel discussion begins at 6:30 p.m. tomorrow at The Mountaineers, 300 Third Ave. W. A public workshop follows at 8 a.m. Saturday. Both sessions are free and open to the public.

TRI-CITY HERALD A3
Tri-Cities, WA
OCT 0 6 1995

Experts probe plutonium problem

By WANDA BRIGGS
Herald staff writer

A dozen experts gathered around a table Thursday night in Kennewick to talk about how to get rid of the Cold War's plutonium stockpiles.

Proposals were complex and political, underlined with fear that countries, now friends, could turn once again to foes.

Nikolai Egorov, deputy minister of the Russian Federal on Atomic Energy, was on the hot seat during much of the four-hour debate, facing questions about nuclear thefts, nuclear deaths and nuclear damage to Russia's environment.

Russia wants to burn its plutonium stockpile, an objective shared by several on the Plutonium Roundtable panel, including Bill Counsil, managing director of Washington state's only commercial reactor. Counsil offered that Richland plant as a burn site.

It was 5 a.m. Russian time when Egorov introduced himself to the audience of about 120 people. At that time, he's usually asleep, he said. "But the problem of plutonium is becoming so serious in my country that it keeps me awake," he said through a translator.

However, plutonium isn't just Russia's problem. The United States has about 100 tons of stockpiled weapons-grade plutonium, about two-thirds of which was produced at Hanford. About 11 tons of plutonium remained stored at Hanford, with the majority of this nation's supply in Texas.

"The U.S. won't give up its stockpile when Russia is still producing plutonium," said Tom Cochran, of the Natural Resources Defense Council. "So how will we ever get rid of all this plutonium from weapons?"

Production of plutonium began 50 years ago and continued until the Cold War. Russia and the United States have agreed to stop plutonium production for nuclear weapons, but each country must now decide what to do with what's left over.

Some people such as Counsil think plutonium is an unlimited source of energy, while others, like Arjun Makhijani of the Institute for Energy and Environmental Research, believe it could be a tool for terror.

Egorov said Russia's stockpile can fuel an economy strained by the 1992 breakup of the former Soviet Union. "Ideally, we should develop the type of reactor — it would take two or three in each of our countries to burn our supplies in 10 or 15 years," he said.

Makhijani opposes burning plutonium. Instead, it ought to be vitrified and turned into hardened glass, he said.

"But there is no good solution without leadership from the top" in the United States and Russia, and that's lacking, he said.

Harvard University Professor Richard Wilson agreed. The slowness of the Clinton administration to deal with what the National Academy of Science described as a "clear and present danger," is "appalling," Wilson said.

About a year from now the Department of Energy will decide its preferred method for plutonium disposal.

And, Hanford could play a significant role.

The Washington Public Power Supply System wants to do a test burn in Plant No. 2 next year. And the two-thirds-finished Plant 1 in Richland is another option, Counsil said.

Speakers Thursday included Mike Lawrence, who managed Hanford for the DOE when defense production was shutting down. Lawrence said burning is the best way to destroy plutonium.

"I'll never live to see the day when those people in Washington state agree on nuclear power, but I think you could get an agreement on Washington's role in the disposal of plutonium," he said.

The program continues from 8 a.m. to noon today at Cavanaugh's in Kennewick.

TRI-CITY HERALD
Tri-Cities, WA
OCT 07 1995

Destroying plutonium won't halt Hanford cleanup

By WANDA BRIGGS
Herald staff writer

Environmental cleanup must not be stalled if the Department of Energy decides next year to destroy the nation's plutonium stockpile at Hanford.

"In fact, cleanup should be enhanced," Oil, Chemical and Atomic Workers local union boss Jim Watts said Friday at the last of the two-day conference on plutonium in Kennewick.

His opinion was universally shared by about 80 people at four sessions who grappled with complex and political issues surrounding disposal of 110 tons of stockpiled weapons-grade plutonium.

The session Watts and about 30 others attended dealt with implications to the Northwest of using Hanford to store or burn toxic leftovers from nearly a half-century of defense production.

Does Hanford have a moral obligation to deal with what's an international problem? asked Lynn Stembridge, director of the Spokane-based Hanford Education Action League.

"On one side, there is a consensus for no more nuclear waste in this state," she said. "Yet on the other side is the agreement that ridding this nation of excess plutonium is crucial and that Hanford may be better suited than other parts of the country."

Mark Hermanson, a Westinghouse Hanford Co. worker who serves on the Hanford Advisory Board, agreed Hanford employees have the technical know-how to safely handle plutonium disposal, but said compensation has to be part of any bargain.

Watts agreed.

"I recognize Hanford will be the nation's dump site for a long time because we've got the biggest problem right here. But this paralysis of action is keeping us from doing anything — it's never going to end unless it starts," he said.

Once the effort to get rid of plutonium begins, community leaders should leverage money they put into that project to provide stable funding for the current cleanup program, Watts said.

Nuclear engineer William Ruhlman said doing nothing with the stockpile is not an option.

Most plutonium is closely guarded at a federal site in Texas that sits at the mouth of the river that irrigates the Panhandle breadbasket — and at the end of an airport runway, Ruhlman said.

Alan Waltar, former president of the American Nuclear Society, said Hanford doesn't have favored-child status with Congress. "That's a political reality and I don't think we can accomplish cleanup (until) we show ... the investments that have been made at Hanford will help solve national problems."

But solving national problems by producing plutonium during World War II is what caused the Hanford's environmental mess — a project costing upward of $100 billion that will take about four decades to complete.

No easy plutonium disposal choices exist. And solving the problem won't be cheap, although estimates are uncertain. The Clinton administration is considering using plutonium as an energy source — which the Washington Public Power Supply System's Plant No. 2 could use — burying it in a deep hole at unfinished repository at Yucca Mountain in Nevada, or turning it into glass logs. The plutonium could be mixed into a fuel form at Hanford's Fuels Materials Examination Facility.

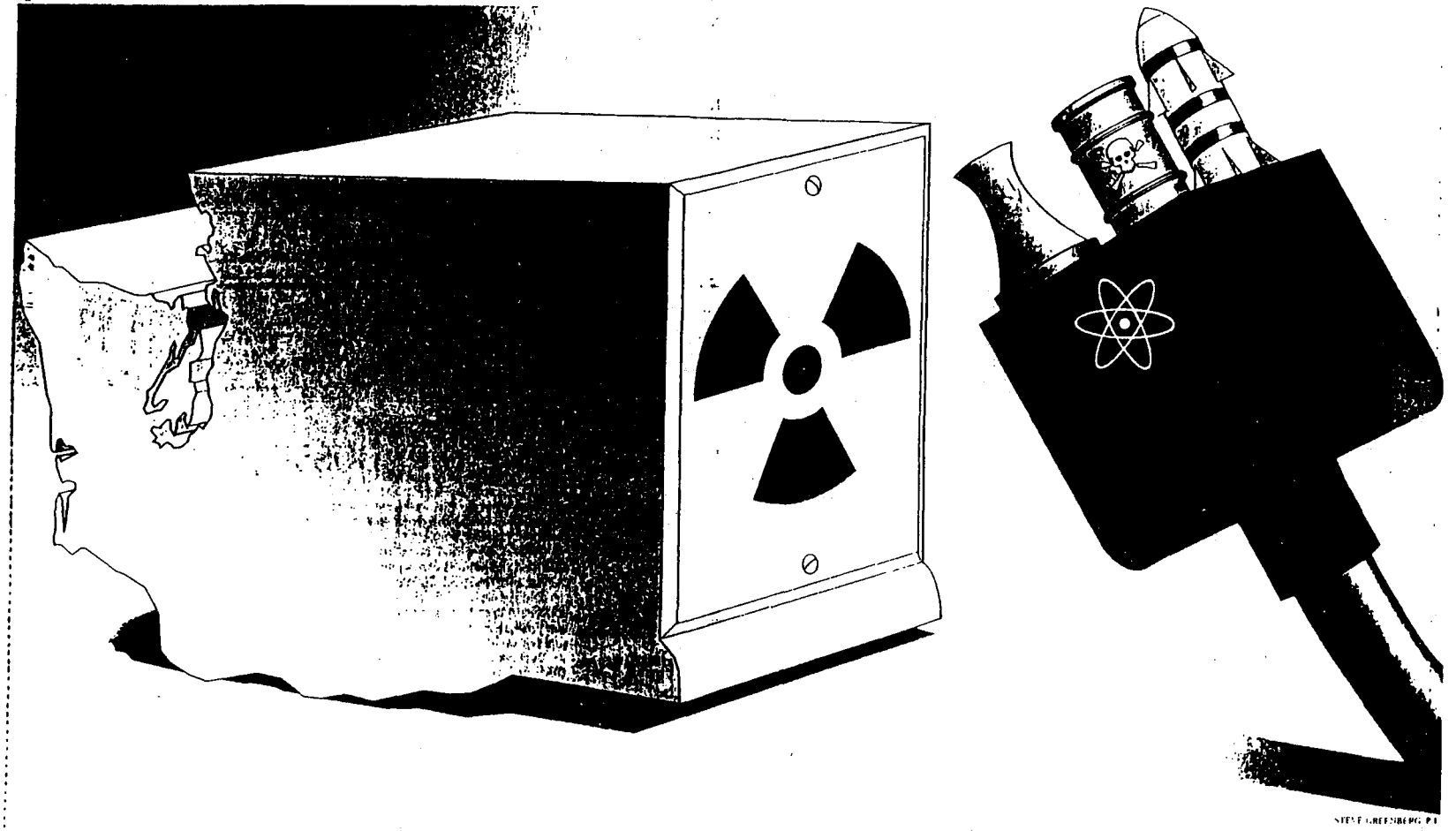
Several people at Friday's meeting urged DOE not to go ahead with plans to sell the facility.

Using the plutonium as fuel could drive down the cost of power produced in the supply system reactor.

WPPSS officials want to combine spending cuts already planned with savings gained from burning plutonium to drive the cost of No. 2 electricity from a current estimate of 2.8 cents a kilowatt-hour to 1.7 cents.

Seattle Post-Intelligencer
Sunday, October 15, 1995

FOCUS



THE DISPOSAL DILEMMA:

NO CHOICE A GOOD ONE

Surplus plutonium warheads may be destined for Hanford

Residents of Washington state, already burdened at the Hanford Nuclear Reservation with the western world's most voluminous concentration of nuclear waste, may be gifted with even more of the deadly leftovers of the arms race.

After years of adamant refusal to accept more of the nation's nuclear droppings at Hanford, suddenly Washington residents are confronting the possibility that it may nonetheless happen.

Solveig Torvik

The latest nuclear dilemma facing us is the Devil's own: are we willing to tolerate any additional radioactive risks at Hanford for the sake of halting the spread of nuclear weapons?

Before we say "No," we need to understand the problems and their possible solutions.

Since the end of the Cold War, the United States and Russia have been reducing the number of nuclear warheads in their arsenals. The United States has already declared 38 metric tons of its weapons-grade plutonium to be surplus. It may be possible to get as much as 100 metric tons out of the world's stockpile when all is said and done, which is still considerably less than half of what is thought to be out there. This does not include any of the civilian, commercial stores of plutonium nor the bomb-making garbage languishing in places such as Hanford.

Still, we have to start somewhere.

This happy event has its profoundly dark side, though. Among other fiendish products of wayward human ingenuity, these warheads contain plutonium, the most deadly substance known to mankind. A pencilprick of the right variation of it lodged in the lungs is fatal.

Ironically, the type of plutonium now bound up in the grapefruit-sized warheads called "pits" accumulating at the Pantex decommissioning plant in Amarillo, Texas, is not quite deadly enough to prevent it from being stolen. It's an exaggeration to say you could slip one into your purse and walk away with it and live to tell the tale, but not by much.

So the first, most urgent order of business is to make the plutonium theft-proof – to make it necessary to don a moon suit if you mean to steal it.

To do that, the plutonium unfortunately has to be treated to make it even more poisonous. And when it's made more poisonous, it also can be made practically inoperable in bombs, which would end the temptation to steal it in the first place.

So what's the problem, you say?

Would that anything nuclear be so simple.

Focus

■ The Seattle Post-Intelligencer Focus section presents a perspective on the news and the newsmakers. It offers analysis and background, debate and opinion, and is written and edited by the P-I staff. For views of the P-I Editorial Board, see the next page.

For one thing, making plutonium unusable in bombs cannot be done without creating more nuclear waste. However, nuclear experts participating in a plutonium roundtable in Seattle last weekend asserted that the amount would not add significant toxicity to Hanford's radioactive waste pile were it to be done there. (Department of Energy facilities at Savannah River, S.C.; Oak Ridge, Tenn.; Idaho Falls, Idaho; Amarillo, Texas, and Nevada are also under consideration by the Department of Energy for this honor.)

For another problem, the Russians treasure their plutonium and want to use it to make electricity, said Nikolai Egorov, Russian Federation on Atomic Energy deputy minister. He told participants at the roundtable that his country has paid too dear a price for it to simply throw it away unused.

This insistence by the Russians on keeping their warhead plutonium as fuel for electricity production is a serious stumbling block to arms reduction. The United States and Russia must agree on methods to rid themselves of plutonium. Otherwise each will suspect the other of cheating by storing the plutonium in a form that later could be used for bomb-making, and that would cause the arms reduction effort to fail.

Unlike the United States, the Russians used their nuclear reactors for dual purposes: generation of electricity and building bombs. Russia is desperately poor and frighteningly unstable politically, so few are keen to add to the country's chaos by suggesting the government turn off the lights.

However, it's hardly surprising that in that ever-more-lawless country where anything that isn't nailed down seemingly is apt to be stolen, excess Russian plutonium already has been spirited away to be intercepted outside that country's borders. The poor security surrounding Russia's plutonium stockpile is a grave worry to international arms control officials, who quite rightly fear it will find its way into the black market and fall into the hands of terrorist groups or outlaw states with dreadful consequences.

The Russians' need for nuclear fuel to make electricity is one reason why the U.S. government is considering two radically different solutions to the difficulties posed by the plutonium in the discarded warheads: processing it into fuel and burning it to make electricity, or vitrifying it unused into glass logs.

In either case, the end product is said – by government officials who ought to know better – to be destined for eventual permanent disposal at the semi-fictional deep repository at Yucca Mountain, Nev. A third option under consideration by the Department of Energy, direct disposal into a deep borehole, is considered unlikely since the plutonium would be too easily retrievable by bomb-builders.

Sadly, burning it in a reactor would rid humanity of only half of the plutonium. The dangerous, more deadly leftovers called spent fuel would still have to be disposed of in some way. And the efforts at Yucca Mountain notwithstanding, a disposal solution for this high level nuclear waste regrettably does not yet exist.

The other reason that burning the plutonium as fuel is being considered is that both the Canadians (who fortunately for us also would keep and cope with the resulting spent fuel) and the U.S. commercial nuclear industry want to do it.

At least, William Counsil, who runs the Washington Public Power Supply System's faltering No. 2 plant at Hanford, does. That plant is threatened with closure by Bonneville Power Administration head Randy Hardy because it takes more money to make electricity at WPPSS No. 2 than it can be sold for on the market. Counsil argued at the roundtable that his proposal would at least help pay some of the government's cost for the trouble of rendering warhead plutonium unusable for weapons.

And, of course, it would give WPPSS No. 2 a reason for being.

"We're ready to go. I wish the rest of the country were ready to go," Counsil told the gathering. He has applied to the DOE for permission to do a test burn at WPPSS No. 2 of what is called mixed oxide (MOX) fuel, which is the form in which the plutonium would be burned.

Hanford is "a logical place" to turn the warheads into MOX fuel, said Thomas Cochran, a highly-respected nuclear expert with the Natural Resources Defense Council who also participated in the session. While that processing step would add slightly to Hanford's garbage pile, the major addition to the cleanup job would be the decommissioning of the radioactive MOX plant where the fuel was made, he said.

"That's a small price to pay, in my view. But then I live in Washington, D.C.," Cochran conceded.

The Department of Energy is studying how and where to dispose of warhead plutonium declared surplus as a result of the nuclear arms reduction treaty signed by the United States with the Russian Federation. Hanford is among five sites under consideration where part of this task may be carried out.

To raise public awareness of the possible implications for this state and to promote public participation in the decision-making, the League of Women Voters of Washington and Washington Physicians for Social Responsibility last week convened a plutonium roundtable in Richland and Seattle. It featured leading, nationally-recognized nuclear experts, representatives from DOE, state and tribal governments and private organizations.

If the MOX fuel were then also burned at WPPSS No. 2 to make electricity rather than shipped elsewhere for burning, of course, it would add to the spent fuel storage and disposal problem already facing this state.

Mike Lawrence, former manager of the Hanford nuclear reservation and now president of Pajarito Scientific Corp. in Los Alamos, N.M, concurred: "I personally believe that plutonium burning is the best way to do it," he said, alluding to the nuclear weapons proliferation threat. "It's irreversible."

Harvard University's nuclear expert Richard Wilson also favors turning the plutonium into MOX fuel for burning. "If you wish for jobs at Hanford, mix oxide fuel," he advised dryly.

Not all the experts at the conference were so accepting of the MOX burning solution, however. Arjun Makhijani of the Institute for Energy and Environmental Research took vigorous exception to it.

Plutonium is a highly uneconomic source of power, he said, and no one can argue with that. But it may have the advantage of giving the nation's less than robust commercial nuclear industry a new lease on life that could last as long as plutonium does.

Countries such as Britain and France that are reprocessing nuclear materials into fuel are doing so solely with the subsidy of taxpayer money because competitively it doesn't pencil out, he said. "I've yet to see a free marketer take it on."

Indeed, if burning warheads becomes the solution, the government may well have to pay the commercial nuclear industry to take the plutonium off its hands, DOE officials admit.

The United States alone has had a policy against reprocessing nuclear materials into fuel due to fears that it opens the door to nuclear weapons proliferation. "I don't believe this government can be credible if it advocates the use of MOX fuels or advocates the use anywhere else," Makhijani said.

Despite some advantages of burning, " ... it would create an infrastructure for the long-term use of plutonium as a fuel in civilian power plants" that now use uranium. "This is highly undesirable from a non-proliferation standpoint and has no economic advantages whatsoever," Makhijani said.

He advocates vitrification, that is, immobilizing the plutonium in glass. To become unusable for weapons, the plutonium probably would have to be mixed with some nuclear material that would result in making it as deadly and unusable in weapons as it would have been if it had been burned and turned into spent fuel in a reactor. Otherwise, it would be accessible for retrieval for weapons use.

A vitrification plant is scheduled for construction at Hanford, chiefly to deal with the highly radioactive liquids stored in underground tanks. It could be designed to accommodate the warhead conversion.

And since the vitrification plant will be built in any case, the vitrification solution would not add to the inventory of buildings that would have to be decontaminated and disposed of later.

Cochran maintains that "an attractive option for Hanford" would be to hire a commercial firm to build and operate a vitrification plant and for the DOE to modify Hanford's Fuel and Material Examination Facility to mix plutonium with defense wastes prior to delivery to the commercial firm for vitrification.

If any part of the warhead plutonium problem comes home to roost at Hanford, certain assurances must be cast in concrete, Gov. Mike Lowry told the gathering.

The chief one, he correctly said, is that there be congressionally-tamper-proof quid-pro-quo guarantees for the decades-long Hanford cleanup effort. Nothing that is done about the warheads must in any way interfere with or reduce funding for that long-delayed work.

As we Washingtonians sort out this issue in the coming months, we should keep one thing in mind: there are no good answers when it comes to coping with the dangerous aftermath of the world's nuclear delusion. There are only bad choices to be made among worse ones.

■ Solveig Torvik is a member of the Editorial Board

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Plutonium burning meeting set in D.C.

By the Herald staff

The Washington Public Power Supply System's director of engineering plans to attend a meeting Thursday to hear tentative federal plans to burn weapons-grade plutonium.

Joe Burn, who has been leading planning to prepare a WPPSS proposal to possibly use plutonium fuel at the No. 2 nuclear plant north of Richland, will attend the Washington, D.C., meeting.

When peace broke out after the Cold War, the United States pulled about 220,000 pounds of plutonium out of warheads. There are two leading options to deal with it:

- Mix the plutonium in molten glass, a process called vitrification.
- Burn a portion of it in commercial nuclear reactors, leaving the remaining plutonium so radioactive terrorists would have great difficulty using it for atomic weapons.

The meeting, sponsored by DOE and the Nuclear Energy Institute, is DOE's attempt to "test the water," said George Tupper, a WPPSS spokesman.

"I think they're interested right now in seeing if anyone (in the industry) is interested in pursuing it," Tupper said.

In August, WPPSS submitted an unsolicited proposal to DOE offering to test plutonium-mixed fuel rods in plant No. 2 after its scheduled 1998 refueling and outage.

DOE has not responded to the proposal, Tupper said.

WPPSS is interested in burning plutonium in plant No. 2 for several reasons, but a major one is the fuel might be free.

WPPSS executives estimate if plant No. 2 were to burn plutonium, they could lower the cost of electricity from a current estimate of 2.8 cents a kilowatt-hour to as low as 1.7 cents a kilowatt-hour. That would make WPPSS power some of the cheapest in the region.

DOE says it expects to make a decision between burning or vitrification next summer.

Opinions sought on Tri-Party pact changes

By the Herald staff

Changes are being proposed in the Hanford cleanup agreement aimed at cutting costs, reducing red tape and speeding decisions.

The U.S. Department of Energy, U.S. Environmental Protection Agency and Washington state Department of Ecology want to hear from the public on proposed modifications to the Tri-Party Agreement.

The planned changes include:

- A new single regulatory approach, where, with few exceptions, either EPA or the Department of Ecology will be lead regulator for each cleanup milestone.

The nonlead agency will generally not be involved, allowing cuts in staffing and faster environmental reviews.

- Streamlining of the dispute process. Under this plan, TPA issues that can not be agreed to informally will be assigned to the Inter-Agency Management Integration Team, rather than the Dispute Resolution Committee, which would be eliminated.

"These changes demonstrate confidence by both DOE headquarters and the regulators that our project managers can get on with cleanup," Hanford manager John Wagoner said Monday.

The draft amendments will be submitted for public review during a 45-day comment period starting Nov. 1. The three agencies have agreed to immediately implement the changes.

"This is the first consent order modified to reflect EPA Administrator Carol Browner's directive for single regulators at federal sites" said EPA regional administrator Chuck Clarke.

More information is available by calling the Hanford toll-free hotline: 800-321-2008.