Sen. David Parks, Chairman
Legislature's Committee on High-Level Radioactive Waste
c/o Patrick Guinan
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Dear Senator Parks and HLW Committee Members,

Thank you for the public session this past week, and thank you for your continued and persistent work to make sure that radioactive waste is managed safely and appropriately.

I am writing as a spokesperson for the local group of the Sierra Club. The Club has almost 5,000 members in Nevada, and our outreach to members and friends in Nevada extends to several tens of thousands people.

The Sierra Club has a long-standing firm policy opposing Yucca Mountain as a high-level waste dump. I reiterate that opposition today. As you know, there are a multitude of design and process flaws that make the project at Yucca Mountain absolutely unacceptable as a waste dump.

The Sierra Club also opposes using nuclear power as an energy resource. http://www.sierraclub.org/policy/conservation/energy.pdf

Two of the three attached documents, "HOSS Principles" and "Sierra Club Statement on Draft Blue Ribbon Commission (BRC) Rec[ommendation]s," summarize in some detail the Sierra Club's formal position on storage of HLW and the management of entire nuclear cycle. The third attachment "Myths" comes from the Beyond Nuclear organization. http://www.beyondnuclear.org/storage/documents/THE%20MYTHS%20ABOUT%20THORIUM%20AS%20A%20NUCLEAR%20ENERGY%20SOLUTION.pdf U nfortunately, there are more and more people like the gentleman we heard on Tuesday from Occupy Carson City who are beguiled with thorium.

Here are some introductory remarks, but please refer to the attachments for a more complete narrative of our suggested management options and concerns.

Hardened On-Site Storage (HOSS), 2-page document (atch)

Several of the citizens testifying this past Tuesday to the Committee mentioned the hardened, on-site storage principles. The attached document includes the 2-page statement of storage principles and 6 pages of public health and environmental organizations that signed the statement of principles: 21 national organizations, and 151 state and local organizations.

EXHIBIT B - HLRW
Document consists of 19 pages.
Entire document provided.
Meeting Date 08-21-12

HOSS principles call for HLW to be removed from cooling pools and containerized in dry storage casks, then removed from flood plains and fault lines, but kept close to the site of generation in order to minimize the risks of transportation and further spreading of radioactive contamination. Additionally, the storage sites need to be hardened to withstand vandalism and terrorism.

The HOSS principles are vastly important for us here in Nevada because they demonstrate that a huge number of expert professionals and advocates across the nation absolutely do not support a waste dump at Yucca Mountain.

<u>Response to the Draft BRC Recommendations</u>, our 5-page document (atch)

The Sierra Club agrees with the BRC when it says,

"The overall record of the US nuclear waste program has been one of broken promises and unmet commitments."

That statement of the Blue Ribbon Commission on America's Nuclear Future is a pretty damning assessment.

Even while agreeing with this overall assessment by the BRC, you will see that the Sierra Club has concerns about every BRC recommendation.

The Sierra Club caveats even the BRC's recommendation to create a new waste management organization; Congressional oversight must be maintained and transparency and accountability to the public must be a part of the organizational culture.

The Sierra Club opposes interim storage sites for a variety of reasons, has concerns about consensus for siting that would include only a narrow slice of people affected by the site, etc.

The 5-page attachment has a few short paragraphs in response that address our concerns about each recommendation.

Additionally, I think it is important to note that the Sierra Club opposes the use of nuclear power, specifically because of its dangerous legacy of long-lived, deadly waste.

In the Club statement on the draft BRC recommendations (atchd), "[Sierra Club] maintain[s] that the safest, most effective nuclear waste management strategy hinges on ceasing the production of nuclear waste, phasing out the domestic use of nuclear energy, and moving to cleaner, safer, and cheaper energy solutions."

In our formal energy policy, the Sierra Club notes:

"Nuclear power produces less CO2 than fossil alternatives but more than energy efficiency and most forms of renewable energy on a life cycle basis. But nuclear power is not safe, affordable, or clean with currently available technology and practice. Mining uranium risks workers' health and creates toxic residues. All current plant designs are complex, prone to accidents and have severe security vulnerabilities. Nuclear waste transportation, storage and disposal problems remain unsolved. The industry is heavily subsidized by public subsidies, incentives and liability shielding everywhere it operates, dependencies that dramatically increased in recent federal legislation. The nuclear fuel cycle increases weapons proliferation and risk among nations and non-state entities.

The Sierra Club will continue to oppose nuclear power unless these deficiencies are eliminated. While it is possible that a different approach to nuclear power might substantially address these issues, the likelihood is remote given the decades of research and investment already made.

Clean energy resources are sufficient to address climate change and are cheaper than nuclear power. In addition, the huge investment to bring additional nuclear facilities online would siphon capital from much more cost-effective uses of financial resources, especially investments in efficiency.

Existing nuclear plants should be frequently inspected and thoroughly monitored. They should be retired upon the expiration of their licensed operating period, and should be shut down immediately if significant safety, security or environmental threats are found. It is imperative for spent fuel from operating nuclear plants to be moved into safer temporary storage and for an effective long-term storage strategy to be developed as quickly as possible."

http://www.sierraclub.org/policy/conservation/energy.pdf

Thank you for the work you are doing to protect the health and safety of the people, animals, plants and ecosystems of Nevada, for us and for our children and grandchildren.

Jane

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Once you choose hope, anything's possible. -- Christopher Reeve

Principles for Safeguarding Nuclear Waste at Reactors

The following principles are based on the urgent need to protect the public from the threats posed by the current vulnerable storage of commercial irradiated fuel. The United States does not currently have a national policy for the permanent storage of high-level nuclear waste. The Obama administration has determined that the Yucca Mountain site, which has been mired in bad science and mismanagement, is not an option for geologic storage of nuclear waste. Unfortunately, reprocessing proponents have used this opportunity to promote reprocessing as the solution for managing our nuclear waste. Contrary to their claims, however, reprocessing is extremely expensive, highly polluting, and a proliferation threat, and will actually complicate the management of irradiated fuel. Nor will reprocessing obviate the need for, or "save space" in, a geologic repository.

The United States has a unique opportunity to re-evaluate our nuclear waste management plan. We can make wise decisions about safeguarding radioactive waste or go down the risky, costly, and proliferation prone path towards reprocessing.

The undersigned organizations' support for improving the protection of radioactive waste stored at reactor sites is a matter of security and is in no way an indication that we support nuclear power and the generation of more nuclear waste.

- **Require a low-density, open-frame layout for fuel pools:** Fuel pools were originally designed for temporary storage of a limited number of irradiated fuel assemblies in a low density, open frame configuration. As the amount of waste generated has increased beyond the designed capacity, the pools have been reorganized so that the concentration of fuel in the pools is nearly the same as that in operating reactor cores. If water is lost from a densely packed pool as the result of an attack or an accident, cooling by ambient air would likely be insufficient to prevent a fire, resulting in the release of large quantities of radioactivity to the environment. A low density, open-frame arrangement within fuel pools could allow enough air circulation to keep the fuel from catching fire. In order to achieve and maintain this arrangement within the pools, irradiated fuel must be transferred from the pools to dry storage within five years of being discharged from the reactor.

- **Establish hardened on-site storage (HOSS):** Irradiated fuel must be stored as safely as possible as close to the site of generation as possible. Waste moved from fuel pools must be safeguarded in hardened, on-site storage (HOSS) facilities. Transporting waste to interim away-from-reactor storage should not be done unless the reactor site is unsuitable for a HOSS facility and the move increases the safety and security of the waste. HOSS facilities

must not be regarded as a permanent waste solution, and thus should not be constructed deep underground. The waste must be retrievable, and real-time radiation and heat monitoring at the HOSS facility must be implemented for early detection of radiation releases and overheating. The overall objective of HOSS should be that the amount of releases projected in even severe attacks should be low enough that the storage system would be unattractive as a terrorist target. Design criteria that would correspond to the overall objective must include:

- Resistance to severe attacks, such as a direct hit by high-explosive or deeply penetrating weapons and munitions or a direct hit by a large aircraft loaded with fuel or a small aircraft loaded with fuel and/or explosives, without major releases.
- Placement of individual canisters that makes detection difficult from outside the site boundary.

- **Protect fuel pools:** Irradiated fuel must be kept in pools for several years before it can be stored in a dry facility. The pools must be protected to withstand an attack by air, land, or water from a force at least equal in size and coordination to the 9/11 attacks. The security improvements must be approved by a panel of experts independent of the nuclear industry and the Nuclear Regulatory Commission.

- **Require periodic review of HOSS facilities and fuel pools:** An annual report consisting of the review of each HOSS facility and fuel pool should be prepared with meaningful participation from public stakeholders, regulators, and utility managers at each site. The report must be made publicly available and may include recommendations for actions to be taken.

- **Dedicate funding to local and state governments to independently monitor the sites:** Funding for monitoring the HOSS facilities at each site must be provided to affected local and state governments. The affected public must have the right to fully participate.

- **Prohibit reprocessing:** The reprocessing of irradiated fuel has not solved the nuclear waste problem in any country, and actually exacerbates it by creating numerous additional waste streams that must be managed. In addition to being expensive and polluting, reprocessing also increases nuclear weapons proliferation threats.

National

Leonor Tomero, Center for Arms Control and Non-Proliferation

John Issacs, Council for a Liveable World

Kevin Kamps, Beyond Nuclear

Lynn Thorp, Clean Water Action

Erich Pica, Friends of the Earth

Michele Boyd, Physicians for Social Responsibility

Jim Riccio, Greenpeace

Diane Kreiger, Nuclear Peace Age Foundation

Kevin Martin, Peace Action

Tyson Slocum, Public Citizen

Susan Gordon, Alliance for Nuclear Accountability

Arjun Makhijani, Institute for Energy and Environmental Research

Ken Bossong, SUN Day Campaign

Michael Mariotte, Nuclear Information and Resource Service

Anna Aurilio, Environment America

Winona La Duke, Honor the Earth

Dan Becker, Safe Climate Campaign

Dave Hamilton, Sierra Club

Geoffrey Fettus, Natural Resources Defense Council

Ed Lyman, Union of Concerned Scientists

Susan Shaer, Women's Action for New Directions (WAND)

Alaska

Stacy Fritz, No Nukes North

Alabama

Garry Morgan, Bellefonte Efficiency and Sustainability Team, Alabama Chapter of BREDL

Tom Moss, North Alabama Peace Network

Arkansas

Pat Youngdahl, Arkansas WAND

Arizona

Stephen M. Brittle, Don't Waste Arizona

Jack and Felice Cohen-Joppa, Nuclear Resister

Patricia Birnie, GE Stockholder's Alliance

Russell Lowes, SafeEnergyAnalyst.org

Barbara Warren, Arizona Physicians for Social Responsibility

California

Rochelle Becker, Alliance for Nuclear Responsibility CA

David Hartsough, PEACEWORKERS

Jane Williams, California Communities Against Toxics

Roland Valentine, Desert Citizens Against Pollution

Mary Beth Brangan, Ecological Options Network (EON)

Betty Winholz, SAVE THE PARK

Jacqueline Cabasso, Western States Legal Foundation

Molly Johnson, Grandmothers for Peace-San Luis Obispo County Chapter

Linda Seeley, Terra Foundation

Jane Swanson, San Luis Obispo Mothers For Peace Action Committee

Marylia Kelley, Tri-Valley CARES

Michael Welch, Redwood Alliance

Enid Schreibman, Center for Safe Energy

Jennifer Olarana Viereck, Healing Ourselves and Mother Earth

Dan Hirsch, Committee to Bridge the Gap

Pamela Meidell, Atomic Mirror

Colorado

Bob Kinsey, Colorado Coalition for the Prevention of Nuclear War

Sharyn Cunningham, Colorado Citizens Against Toxic Waste, Inc.

Judith Mohling, Rocky Mountain Peace and Justice Center

Connecticut

Nancy Burton, Connecticut Coalition Against Millstone

Judi Friedman, People's Action for Clean Energy

Sal Mangiagli, Connecticut Citizens Action Network, Haddam Chapter

Washington, DC

Louis Clark, Government Accountability Project

Delaware

Alan Muller, Green Delaware

Florida

Bob Krasowski, Florida Alliance for A Clean Environment, The Zero Waste Collier County Group

Georgia

Tom Ferguson, Foundatoin for A Global Community

Bobbie Paul, Georgia WAND

Glenn Carroll, Nuclear Watch South

Bob Darby, Food Not Bombs, Atlanta

Hawaii

Henry Curtis, Life of the Land

Iowa

Maureen McCue, PSR Iowa

Idaho

Beatrice Brailsford, Snake River Alliance

Chuck Broscious, Environmental Defense Institute

Illinois

Dave Kraft, Nuclear Energy Information Service

Carolyn Treadway, No New Nukes

Indiana

Grant Smith, Citizens Action Coalition of Indiana

John Blair, ValleyWatch, Inc.

Kansas

Dave Pack, Kansas City Peaceworks

Anne Suellentrop, Kansas City PSR

Kentucky

Mary Davis, Earth Island Institute

Louisiana

Nathalie Walker, Advocates for Environmental Human Rights

Massachusetts

Debbie Grinell, C-10 Research and Education Foundation

Deb Katz, Citizens Awareness Network

Mary Lampert, Pilgrim Watch

Maryland

Dagmar Fabian, Crabshell Alliance

Johanna Neumann, Maryland PIRG

Max Obuszewski, Baltimore Nonviolence Center

Lucy Duff, Peace and Justice Coalition-Prince George's County

Maine

William S. Linnell, Cheaper, Safer Power

Bruce Gagnon, Global Network Against Weapons & Nuclear Power in Space

Michigan

Keith Gunter, Citizens Resistance at Fermi Two

Michael Keegan, Coalition for a Nuclear Free Great Lakes

Georgia Donovan, Izaak Walton League-Dwight Lydell Chapter

Terry Miller, Lone Tree Council

Patricia Gillis, Voices for Earth Justice

Alice Hirt, Don't Waste Michigan

Nancy Seubert, IHM Justice, Peace, and Sustainability Office

Lynn Howard Ehrle, International Science Oversight Board-Organic Consumers Association

Kay Cumbow, Citizens for Alternatives to Chemical Contamination

Ronald and Joyce Mason, Swords Into Plowshares Peace Center and Gallery

David Gard, Michigan Environmental Council

Steve Senesi, Kalamazoo Non-Violent Opponents of War

Minnesota

Danene Provencher, West Metro Global Warming Action Group, Inc.

Glady Schmitz, Mankato Area Environmentalists

George Crocker, North American Water Office

Bruce Drew, Prairie Island Coalition

Missouri

Mark Haim, Missourians for Safe Energy

Kat Logan Smith, Missouri Coalition on the Environment

Mississippi

Louie Miller, Mississippi Sierra Club

Montana

Florence Chessin, Missoula Women for Peace, a branch of Women's International League for Peace and Freedom

North Carolina

Lewis Patrie, Western North Carolina Physicians for Social Responsibility

E.M.T O'Nan, Protect All Children's Environment

Avram Friedman, The Canary Coalition

Jim Warren, North Carolina Waste Awareness and Reduction Network

Janet Marsh, Blue Ridge Environmental Defense League

North Dakota

Kandi L. Mossett, Indigenous Environmental Network

Jodie L. White, The Environmental Awareness Committee, Save Our Sacred Earth Campaign

Nebraska

Buffalo Bruce, Western Nebraska Resources Council

Tim Rinne, Nebraskans for Peace

New Hampshire

Will Hopkins, New Hampshire Peace Action

New Jersey

Paula Gotsch, Grandmothers, Mother and More for Energy Safety

Norm Cohen, Coalition for Peace and Justice-UNPLUG Salem Campaign

New Mexico

Mervyn Tilden, Sovereign Dine' Foundation

Janet Greenwald, Citizens for Alternatives to Radioactive Dumping

Joni Arends, Concerned Citizens for Nuclear Safety

Scott Kovac, Nuclear Watch of New Mexico

Greg Mello, Los Alamos Study Group

Don Hancock, Southwest Research and Information Center

Nevada

Judy Treichel, Nevada Nuclear Waste Taskforce

Jim Haber, Nevada Desert Experience

New York

Joanne Hameister, Coalition on West Valley Nuclear Wastes

Anne Rabe, Center for Health, Environment, and Justice

James Rauch, For a Clean Tonawanda Site (FACTS)

Barbara Warren, Citizen's Environmental Coalition

Phillip Musegaas, Riverkeeper NY

Tim Judson, Central New York Citizens Awareness Network

Ohio

Chris Trepal, Earth Day Coalition

Terry Lodge, Toledo Coalition for Safe Energy

Sharon Cowdrey, Miamisburg Environmental Safety and Health Network

Oklahoma

Marilyn McCulloch, The Carrie Dickerson Foundation

Oregon

Dona Hippert, Oregon Toxics Alliance

Charles K. Johnson, Center for Energy Research

Nina Bell, Northwest Environmental Advocates

Kelly Campbell, Oregon Physicians for Social Responsibility

Gerry Pollet, Heart of America Northwest

Pennsylvania

David Hughes, Citizen Power

Katherine Dodge, Northwest Pennsylvania, Audobon Society

Gene Stilp, Taxpayers and Ratepayers United

Ernest Fuller, Concerned Citizens for SNEC Safety

Patricia Harner, Philadelphia Physicians for Social Responsibility

Dr. Lewis Cuthbert, Alliance for a Clean Environment

Rhode Island

Sheila Dormandy, Clean Water Action Rhode Island

South Carolina

Susan Corbett, South Carolina Sierra Club

Dr. Finian Taylor, Hilton Head for Peace

South Dakota

Deb McIntyre, South Dakota Peace and Justice Center

Charmaine White Face, Defenders of the Black Hills

Tennessee

Donald B. Clark, Network for Economic and Environmental Responsibility, United Church of Christ

Rev. Charles Lord, Caney Fork Headwaters Association

Rev. Douglas B. Hunt, Interfaith Power & Light

Ralph Hutchinson, Oak Ridge Environmental Peace Alliance

Rev. Walter Stark, Cumberland Countians for Peace and Justice

Ann Harris, We the People, Inc.

Texas

Eliza Brown, SEED Coalition

Mavis Belisle, JustPeace

Gary Stuard, Interfaith Environmental Alliance

Craig Tounet, Austin Physicians for Social Responsibility

Jill Johnston, Southwest Workers Union

Utah

Margene Bullcreek, Ohngo Guadedah Devia Awareness

Vanessa Pierce, HEAL Utah

Virginia

Scott Sklar, The Stella Group, Inc.

Elena Day, People's Alliance for Clean Energy

Vermont

Arnie Gundersen, Fairewinds Associates, Inc.

Clay Turnbull, New England Coalition on Nuclear Pollution

Chris Williams, Vermont Citizens Awareness Network

Margaret Harrington Tamulonis, Women's International League for Peace

Washington

Tom Carpenter, Hanford Challenge

Wisconsin

Charlie Higley, Citizens Utility Board

Bonnie Urfer and John LaForge, Nukewatch Wisconsin

Al Gedicks, Wisconsin Resources Protection Council

Judy Miner, Wisconsin Network for Peace and Justice

West Virginia

Gary Zuckett, West Virginia Citizens Action Group

Wyoming

Mary Woolen, Keep Yellowstone Nuclear Free

Sierra Club Statement on Draft Recommendations by the Blue Ribbon Commission on America's Nuclear Future

October 20, 2011

In 2009, President Obama commissioned a study of the nation's inventory of irradiated nuclear fuel. The Blue Ribbon Commission on America's Nuclear Future was charged with conducting a comprehensive review of policies for managing the back end of the nuclear fuel chain, and recommending a new plan. On July 29, 2011 the Commission released its draft recommendations. While we appreciate the Commission's webcasting of most of its meetings and providing document access on its website, we were disappointed with the Commission's interpretation of its mandate to spend so much of its time and resources exploring more nuclear power and reprocessing which make more wastes, while giving no consideration to stopping waste generation and barely acknowledging virtually unanimous public interest calls for hardened storage of the waste already generated.

The Sierra Club finds serious weaknesses that should be addressed before finalizing the recommendations. For example, we believe the conclusion of the RFCT subcommittee to continue pursuing nuclear technologies circumvents and detracts from the goal of responsibly isolating existing waste.

The *BRC has recommended changes* to the Nuclear Waste Policy Act in the following ways:

1) BRC recommends Establishing a new facility siting process *– The NWPA, as amended in 1987, now provides only for the evaluation and licensing of a single repository site at Yucca Mountain, Nevada. The Act should be amended to authorize a new consent-based process to be used for selecting and evaluating sites and licensing consolidated storage and disposal facilities in the future.*

Sierra Club response: We recognize the need for a high level waste disposal facility, based on scientifically sound siting criteria. The current amount of existing irradiated fuel from commercial reactors, coupled with high level waste from DOE sites make it possible that more than one geologic repository will be needed. However we are concerned that the "consent-based" process could extend only to the immediate location where a site would be placed, when, in effect, a whole region would be impacted by a permanent repository. The consent-based process must include and be based on a wider range of community input, not just localized parties interested in the jobs and tax revenues that a local project might provide. Transportation issues, potential groundwater and air releases, and long term security and maintenance issues make this more than just a "community" issue. Indeed, any site to be selected for a permanent repository should have statewide support, not just local support. We take this first opportunity to state our opposition to consolidated interim storage and will discuss this further.

2) BRC recommends Authorizing consolidated interim storage facilities *– The NWPA allows for the construction of one consolidated interim storage facility with limited*

capacity, but only after a nuclear waste repository is licensed. One or more consolidated storage facilities will be required, independent of the schedule for opening a repository. The Act should be modified to allow for multiple storage facilities with adequate capacity to be sited, licensed, and constructed when needed.

Sierra Club response: Sierra Club maintains that the inclusion of one or more consolidated interim storage facilities provides a counterproductive and costly step to the process of permanently housing high level nuclear waste. The first focus of the process should be to stabilize current waste by moving irradiated fuel rods from dangerous, vulnerable temporary pools into Hardened On-Site Storage (HOSS) – a lower risk, sensible step which is given little attention by the Blue Ribbon Commission. We fear that the BRC's determination to build consolidated interim storage facilities seems to be guided by the desire to take possession of waste and maintain a reprocessing option rather than to find the most direct solution for a permanent geological storage facility. HOSS keeps our eye on the ball by dealing with the urgent need to stabilize precariously stored fuel rods without changing focus to costly, time consuming interim facilities.

Not only does the siting and construction of consolidated interim storage facilities divert focus from less dangerous short-term containment and the search for permanent storage of high-level waste, it runs serious risk of becoming the end of the process. The Sierra Club opposes consolidated interim storage for several reasons, the most important being the likelihood of the nuclear waste being left permanently in one or two single geologically unsuitable sites and unnecessary transport risks. Interim storage leaves us vulnerable to changes in politics, policy, economics or other unforeseen developments that might force the interim site to become the de facto permanent site. The original wording of the policy makes it clear this is a genuine concern. We are also concerned that any consolidation of nuclear waste will facilitate the temptation to reprocess irradiated fuel, since the waste would already be in one or two locations where it could be easily accessed for reprocessing. Moving the waste multiple times creates more cost and greater risk to the public. With the exception of a few locations, waste at reactors sites should be immediately secured according to HOSS principles until the permanent solution is ready to receive it.

Finally, we emphasize that the best way to assure safe, permanent isolation of nuclear waste is to stop producing it. The process is made significantly more complicated and difficult by having to design a system to account for unknown quantities of waste being added in perpetuity. The Sierra Club believes that the spiraling cost, inherent danger, and physical vulnerability of nuclear power and the resulting waste should take new nuclear power off the table for the nation as a whole, not just for capital markets. We should minimize the quantity of waste in order to best house it in a way that assures the safety and security of future generations.

3) BRC recommends Establishing a new waste management organization *– Responsibility for implementing the nation's nuclear waste management program is currently assigned to the U.S. Department of Energy. Legislation will be needed to (1) move this responsibility to a new, independent, government-chartered corporation solely focused on managing irradiated nuclear fuel and high-level radioactive wastes and (2) to establish the appropriate oversight mechanisms.*

Sierra Club response: Our assessment matches the one in the draft report that "The overall record of the US nuclear waste program has been one of broken promises and unmet

commitments." The Sierra Club maintains that any plan to create a private corporation to deal with nuclear waste that fails to authorize direct Congressional oversight of the entity, its operations, and its financial activities will only continue this sad legacy of ineffectiveness and failure. Historically, the relationship between Congress and other chartered organizations has been largely a symbolic honorific one, giving the organization the aura of being "officially" sanctioned by the U.S. government. However Congress does not oversee or supervise organizations with the charter (other than receiving a yearly financial statement). The practice of Congress issuing charters to federal corporations was halted in 1992 due to questions of accountability. Since the granting of a charter does not include Congressional oversight, we have serious concerns about the accountability and transparency of any such chartered corporation. We call your attention to the conclusion from the 2004 CRS report to Congress on Congressional Chartered Title 36 Organizations, which stated that such organizations "send mixed signals to the public. Although the charter does not award any material governmental status to the nonprofit corporation (e.g., right of eminent domain) there is an understandable assumption on the part of the public that somehow the charter signifies U .S. government approval of the corporation's activities and that the corporation is being supervised. Neither assumption is merited."

It is our opinion that any entity or agency charged with the handling of nuclear waste must have a clearly defined chain of oversight and accountability, be transparent and easily accessible, and answerable to the people of the United States. We do not believe that a congressionally chartered corporation will meet the criteria needed for the balanced, inclusive, trustworthy, transparent, and accountable process needed for the siting of permanent nuclear waste facilities.

The safety and success of the process to permanently store high-level nuclear waste is critical and depends on direct federal oversight of its conduct and operations.
Conversely, any organization that is approved to manage the long term path for nuclear waste should structurally include advice and consultation from leading public health, public safety, environmental, scientific, and other experts that are not paid to advocate for nuclear power and will attain maximum sunshine and accountability for the entire process.

4. BRC recommends ensuring access to dedicated funding *– Current federal budget rules and laws make it impossible for the nuclear waste program to have assured access to the fees being collected from nuclear utilities and ratepayers to finance the commercial share of the waste program's expenses. We have recommended a partial remedy that should be implemented promptly by the Administration, working with the relevant Congressional committees and the Congressional Budget Office. A long-term remedy requires legislation to provide access to the Nuclear Waste Fund and fees independent of the annual appropriations process.*

Sierra Club response: As we do not agree that interim facilities are a useful or workable tool for reaching a permanent storage solution, the Sierra Club also opposes the use of Nuclear Waste Fund for any centralized interim storage. This dedicated stream was intended and should be used for the permanent geologic repositories which must be built to accommodate the current and future streams of irradiated fuel and other high level waste. With estimates as high as $100 billion dollars needed to build, fill and maintain any such geologic repository it is clear the current fund or its projected revenue does not begin to cover the costs of such projects. To open the fund up to being raided for interim centralized schemes is fiscally irresponsible to current and future generations. The Nuclear Waste Fund

was clearly designed to fund the permanent geologic repositories, and it is projected that we will need more than one for the waste generated thus far. Any other use of this money works against a permanent storage solution.

Finally, we emphasize that the best way to assure safe, permanent isolation of nuclear waste is to stop producing it. The process is made significantly more complicated and difficult by having to design a system to account for unknown quantities of waste being added in perpetuity. The Sierra Club believes that the spiraling cost, inherent danger, and physical vulnerability of nuclear power and the resulting waste should take new nuclear power off the table for the nation as a whole, not just for capital markets. We should minimize the quantity of waste in order to best house it in a way that assures the safety and security of future generations.

5) BRC recommendation Promoting international engagement to support safe and secure waste management *– Congress may need to provide policy direction and new legislation to implement some measures aimed at helping other countries manage radioactive wastes in a safe, secure, and proliferation-resistant manner.*

Sierra Club response: While the United States should always collaborate with other nations and use our expertise to assist them in safely managing and reducing the vulnerability of irradiated nuclear fuel, we do not believe that we should put our nation in the position of either becoming responsible for global management of nuclear waste, or literally becoming the world's nuclear waste dump. Nuclear power has proven to be very expensive, dangerous, water use intensive, and susceptible to geologic, climatic and political instabilities. For that reason, our most responsible course is to cease to encourage other countries to develop nuclear power, encouraging them instead to phase it out and turn to cleaner, safer and more affordable options that do not require international oversight or U.S. interference in their energy plans. Countries that already have substantial amounts of nuclear waste should be encouraged to cease future waste production and implement measures that will secure their waste from release by natural disaster, human error, or criminal act. Countries should not be encouraged to enrich uranium or start reprocessing of irradiated fuel, as both these practices produce weapons usable materials and risks the proliferation of nuclear weapons. The U.S. should have firm and clear policies discouraging and placing sanctions on countries that engage in these activities.

In conclusion, the Sierra Club recognizes the need for a serious plan to manage the disposition of high level nuclear waste; however we are in disagreement with much of what has been recommended in this first BRC draft.

- We maintain that the public is better served from an economic, safety, and environmental standpoint by going to Hardened On Site Storage at the various reactors around the country, pulling the fuel out of the irradiated fuel pools as soon as it is safe to do so, and securing it in dry cask storage as close as safely possible to the reactor site.
- Locations that are already closed or decommissioned deserve heightened security of the stored waste, and better containment, until such time it can be moved to the permanent repository. We do not believe moving the waste to one or more centralized temporary locations makes any sense economically. Rather, it only opens the door for the reprocessing argument to take root. Such a strategy would also require that the waste traverse our interstates thru our communities twice, adding to transportation risks and expenses.

- We do not support the idea of an independent corporation to manage this waste independent of direct Congressional oversight as we believe this will lead to a false veneer of government supervision, further secrecy, reduced accountability, and a lack of access or genuine dialogue with the public.
- We do not believe the U.S. should be engaged in promoting nuclear power in other countries, offering to take or manage their waste, or in any way enabling new nuclear programs that will generate more of a waste legacy for future generations.
- The Sierra Club supports the mission of the BRC to move the nation toward a permanent waste disposal solution as long as it pursues that singular mission. This draft raises serious concerns that the Commission has lost that focus in favor of enabling technologies and goals that will promote additional generation of nuclear waste over the safe isolation of the waste we already have. Such a diversion is an abdication of its primary responsibility and a disservice to all Americans and future generations. It is a recipe for the continued failure of the U.S. nuclear waste program.
- We maintain that the safest, most effective nuclear waste management strategy hinges on ceasing the production of nuclear waste, phasing out the domestic use of nuclear energy, and moving to cleaner, safer, and cheaper energy solutions.

Contact: **Dave Hamilton, Director, Global Warming and Energy Programs**
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BEYOND NUCLEAR FACT SHEET

TEN MYTHS ABOUT THORIUM AS A NUCLEAR ENERGY SOLUTION

Summary

Excerpted from: Thorium Fuel: No Panacea for Nuclear Power, By Arjun Makhijani and Michele Boyd. A Fact Sheet Produced by the Institute for Energy and Environmental Research and Physicians for Social Responsibility.

Thorium may be abundant and possess certain technical advantages, but it does not mean that it is economical. Compared to uranium, thorium fuel cycle is likely to be even more costly. In a once-through mode, it will need both uranium enrichment (or plutonium separation) and thorium target rod production. In a breeder configuration, it will need reprocessing, which is costly. In addition, inhalation of thorium-232 produces a higher dose than the same amount of uranium-238 (either by radioactivity or by weight). Reprocessed thorium creates even more risks due to the highly radioactive U-232 created in the reactor. This makes worker protection more difficult and expensive for a given level of annual dose. Finally, the use of thorium also creates waste at the front end of the fuel cycle. The radioactivity associated with these is expected to be considerably less than that associated with a comparable amount of uranium milling. However, mine wastes will pose long-term hazards, as in the case of uranium mining. There are also often hazardous non-radioactive metals in both thorium and uranium mill tailings.

1. **There is no "thorium reactor."** There is a proposal to use thorium as a fuel in various reactor designs including light-water reactors – the most prevalent in the United States – as well as fast breeder reactors.
2. **You still need uranium – or even plutonium - in a reactor using thorium.** Thorium is not a fissile material and cannot either start or sustain a chain reaction. Therefore, a reactor using thorium would also need either enriched uranium or plutonium to initiate the chain reaction and sustain it until enough of the thorium has converted to fissile uranium (U-233) to sustain it.
3. **Using plutonium sets up proliferation risks.** To make a "thorium reactor" work, one must (a) mix the thorium with plutonium that has been stripped of the highly radioactive fission products; (b) use the mixed-oxide thorium-plutonium fuel in a reactor, whereby the plutonium atoms fission and produce power while the thorium atoms absorb neutrons and are turned into uranium-233 (a man-made isotope of uranium that has never existed in nature); (c) strip the fission products from the uranium-233 and mix THAT with thorium in order to continue the "cycle"; in this phase, the U-233 atoms fission and produce power while the thorium atoms absorb neutrons and generate MORE uranium-233. And so the cycle continues, generating more and more fission product wastes. *(Gordon Edwards).*

4. **Uranium-233 is also excellent weapons-grade material.** Unlike any other type of uranium fuel, uranium-233 is 100 percent enriched from the outset and thus is an excellent weapons-grade material and as effective as plutonium-239 for making nuclear bombs. This makes it very proliferation-prone and a tempting target for theft by criminal and terrorist organizations and for use by national governments in creating nuclear weapons.
5. **Proliferation risks are not negated by thorium mixed with U-238**. It has been claimed that thorium fuel cycles with reprocessing would be much less of a proliferation risk because the thorium can be mixed with uranium-238. In fact, fissile uranium-233 must first be mixed with non-fissile uranium-238. If the U-238 content is high enough, it is claimed that the mixture cannot be used to make bombs without uranium enrichment. However, while more U-238 does dilute the U-233, it also results in the production of more plutonium-239, so the proliferation problem remains.
6. **Thorium would trigger a resumption of reprocessing in the US**. In most proposed thorium fuel cycles, reprocessing is required to separate out the U-233 for use in fresh fuel. Reprocessing chemically separates plutonium and uranium and creates a large amount of so-called low-level but still highly radioactive liquid, gaseous and solid wastes.
7. **Using thorium does not eliminate the problem of long-lived radioactive waste.** Fission of thorium creates long-lived fission products including technetium-99 (half-life of over 200,000 years). Without reprocessing, thorium-232 is itself extremely long-lived (half-life of 14 billion years) and its decay products will build up over time in irradiated fuel. Therefore, in addition to all the fission products produced, the irradiated fuel is also quite radiotoxic. Wastes that pose long-term hazards are also produced at the "front end" of the thorium fuel cycle during mining, just as with the uranium fuel cycle.
8. **Attempts to develop "thorium reactors" have failed for decades.** No commercial "thorium reactor" exists anywhere in the world. India has been attempting, without success, to develop a thorium breeder fuel cycle for decades. Other countries including the US and Russia have researched the development of thorium fuel for more than half a century without overcoming technical complications.
9. **Fabricating "thorium fuel" is dangerous to health.** The process involves the production of U-232 which is extremely radioactive and very dangerous in small quantities. The inhalation of a unit of radioactivity of thorium-232 or thorium-228 produces a far higher dose than the inhalation of uranium containing the same amount of radioactivity. A single particle in the lung would exceed legal radiation standards for the general public.
10. **Fabricating "thorium fuel" is expensive.** The thorium fuel cycle would be more expensive than the uranium fuel cycle. Using a traditional light-water (once-through) reactor, thorium fuel would need both uranium enrichment (or plutonium separation) and thorium target rod production. Using a breeder reactor makes costly reprocessing necessary.

CONCLUSION

From Dr. Gordon Edwards, Thorium Reactors: Back to the Dream Factory, July 13, 2011.

The bottom line is this. Thorium reactors still produce high-level radioactive waste. They still pose problems and opportunities for the proliferation of nuclear weapons. They still present opportunities for catastrophic accident scenarios -- as potential targets of terrorist or military attack, for example.

Proponents of thorium reactors argue that all of these risks are somewhat reduced in comparison with the conventional plutonium breeder concept. Whether this is true or not, the fundamental problems associated with nuclear power have by no means been eliminated.

Materials above were drawn largely from: "Thorium Fuel: No Panacea for Nuclear Power", by Dr. Arjun Makhijani and Michele Boyd, Institute for Energy and Environmental Research, January 2009 and available at: www.**ieer**.**org**/fctsheet/**thorium**2009factsheet.pdf. *Additional information was provided by* Dr. Gordon Edwards, *Ph.D.,* *President, Canadian Coalition for Nuclear Responsibility.*

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