

# Managing Spent Nuclear Fuel

**Recycling nuclear fuel to secure the countries safety, current and future inventory of nuclear fuel via recycling.**

The following are the efforts of Steven Curtis and his work with ANS, (American Nuclear Society) and Gary Duarte and the US Nuclear Energy Foundation. This proposal agrees with The Heritage Foundation and others that the Yucca Mountain Nuclear Repository construction and operational management should be transferred from the Department of Energy (DOE) to a **Public/Private Partnership** managed by several major non-profit foundations. This also would include plans for future development for complete recycling of spent nuclear fuel, current and future inventories. The U.S. SNF program has been a political roadblock for decades. It is critical for the safety and future need for new nuclear energy development that a path to SNF resolution be accomplished.

Via a PPP arrangement, lead industry professionals, Federal officials, and the public can engage in the efforts of managing the Spent Nuclear Fuel (SNF) disposition by contracting its operations through government approved qualified companies (e.g. AECOM, AREVA, etc.) already major government nuclear contractors. This would extend the product into new recycled fuels. The current U.S. SNF inventory of 70,000 tons is worth \$14-trillion-dollars RECYCLED! Such a project could generate a Carbon-Free National Laboratory designation and participate in the development of Small Modular Reactors (SMRs). These reactors are also being designed to “burn” specially prepared spent fuels via new fuels development, and part of the national micro-grid applied research.

## **Background:**

Nevada became the center of the cold war nuclear testing program. From the first above-ground test in 1950 until the last underground test in 1992, the outdoor laboratory for studying nuclear applications was known as the Nevada Test Site. The name changed to the Nevada National Security Site when the mission became more directed toward experiments related to a more diverse set of emergency management, science-based stockpile stewardship, and a plethora of multi-agency experiments best done away from prying eyes and population density, in the interest of national security and safety. For these reasons, the Yucca facility in the State of Nevada should be continued based on the science and engineering and NOT political opinion.

During the heyday of nuclear testing, ironically, the leadership of Nevada, including the Governor, the Clark County Commission, and the City of Las Vegas all signed endorsements for the spent nuclear fuel repository at Yucca Mountain. As the entertainment industry heated up in the 1980s and the work at the Nevada Test Site spun down, the attitude changed for unknown reasons. By 1987, the prospect of hosting the spent nuclear fuel in Nye County became an almost heretical protestation by candidates to boost their chances of election, supported by biased anti-nuclear media stories.

Local nuclear scientists and engineers were horrified at this approach. Technically, this move seemed like economic suicide as it remains today. Yucca Mountain became a household phrase and misinformation spread unfounded fear despite the great economic benefit possible. The Nuclear Energy Institute (NEI) opened an office in Las Vegas to promote the virtues of the Yucca Mountain Project. After Harry Reid became the majority leader in Congress and closed the program office in 2010, despite the fact that 90% of the public “touring” the facility was favorable to opening the site, the issue disappeared from the fabric of Las Vegas. The NEI Las Vegas office was shut down almost immediately.

Since that time, the project was declared “dead” by all candidates and the subject disappeared from the public arena until recently. A renewed interest in the economic potential rekindled interest among a group of community leaders. This pro-nuclear fervor spurred renewed opposition publicity. The main objections seem to be that such a project would devastate the entertainment business in Las Vegas, however, the project is about

100 miles from the Las Vegas Strip and it is difficult to see any impact on the entertainment market. In fact, the addition of a high-tech industry would add diversity to the economy and:

1. Would extend the possibility of professional and technical jobs to Nevada graduates,
2. Establish a diverse business in Nevada at least as large as the Tesla Gigafactory in Reno,
3. Increase the professional and high-paid technical jobs which predominantly support the entertainment business in Las Vegas.
4. Offer the opportunity to almost double the research portfolio of the Nevada universities, and
5. Enhance the College of Southern Nevada's education posture with nuclear technology trade.

A Nevada Waste Programs Office was formed and funded by the State of Nevada in the mid-1980s and was charged with developing legal delaying tactics through suits filed in the 9<sup>th</sup> Circuit Court of Appeals in California (Nevada is part of the 9<sup>th</sup> Circuit district). The budget for this office is paid by Nevada taxpayers. Ironically, the addition of the energy business to Nevada's portfolio, which Nevada is paying \$5+ million per year to fight, would greatly augment the tax base and attain many of their goals of economic diversity.

Within the last few years, the grassroots movement has experienced a resurgence. Since Harry Reid stepped down from the Senate in 2016, the issue has been in the media almost daily. Four groups in Nevada have been coordinating to bring a new perspective to the people of Nevada regarding the delivery of spent nuclear fuel to Nevada in light of the great potential for economic benefit in high-tech industry. They are: the Nevada chapter of the National Defense Industrial Association, the Nevada section of the American Nuclear Society, and the US Nuclear Energy Foundation. Reinvigoration of the next-generation nuclear business case in Nevada is certain to return more permanent high-tech jobs in the 10,000s for many decades to come. With advent of the Covid-19 epidemic in 2020, the Nevada casino industry has been devastated again demonstrating the need for economic diversification of the Nevada industry.

### **Introduction and discussion:**

The State of Nevada is facing a crossroads with the "Yucca Mountain Project". While they have enjoyed some early "victories" in the Congress for funding Yucca Mountain in President Trump's recent budgets, the preponderance of the nation is in favor of starting up the project to bury spent nuclear fuel in the Nevada desert, as evidenced by the overwhelming House vote (340-72) on H.R. 3053, The Nuclear Waste Policy Act of 2018<sup>1</sup>. Nevada realizes that they are weak in seniority in both the Senate and House, so they are expected to increase the number of law suits filed in the 9<sup>th</sup> Circuit Court to extract as many delays as they can to thwart the effort to secure a final resting place for the spent nuclear fuel from the United States' nuclear power plants. Since there appears, at least to the nuclear professional community, to be no material showstoppers for moving this program along and since it is the law of the Nation, it makes sense that the spent fuel is destined for Nevada eventually.

A recent poll taken in Nevada shows that Nevadans are about split on whether spent nuclear fuel should come to the Silver State if some sort of benefit program can be proposed. However, the polls also show that only about 10% of citizenry are "concerned or very concerned" about this issue<sup>2</sup>. The State leadership, however, remains almost unanimously opposed to the law as it is currently written. A concerted education program would bring the virtue of this business case to an atmosphere of understanding and agreement.

Overwhelmingly, when individuals are presented with the facts and the potential benefits, they favor proceeding with the program. As part of an ANS Operations and Power Division grant, ANS-Nevada has been

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<sup>1</sup> <https://www.congress.gov/bill/115th-congress/house-bill/3053/all-actions?overview=closed&q=%7B%22roll-call-vote%22%3A%22all%22%7D>

<sup>2</sup> Nevadans for Responsible Energy Solutions, Amplify Relations, Polling Results, February 23, 2017.

conducting outreach to organizations in northern and southern Nevada. Over the past 4 years, I have personally presented to 12 groups on nuclear basics and spent nuclear fuel facts (some on this grant and some independent of this grant). All of these groups were overwhelmingly in favor of recycling spent nuclear fuel if it led to benefits from the US Government and the potential for high-tech business development related to nuclear energy production. This would lead us to believe that, armed with facts and a picture of the economic development potential, Nevadans would be in favor of spent nuclear fuel acceptance and their priority for its inception would increase.

Four organizations are leading the charge for Nevada clean nuclear energy business development.

1. **The American Nuclear Society (ANS) – Nevada Section** – The nucleus of support for the acceptance of spent nuclear fuel in Nevada has been driven by the ANS section for more than 30 years. There is also a strong student chapter of ANS at the University of Nevada, Las Vegas. Technical presentations suited to the general public have been made all during this time and will continue into the future. Support from the National ANS hierarchy would greatly help promote and expand this program. The student section of ANS – Nevada has presented a Nuclear Science Merit Badge workshop for both Boy and Girl Scouts for more than 12 years. This program has been very successful in getting the word out to future citizens as well as their parents. (<http://www.ans.org/pi/edu/>). In addition, ANS Position Statement #80, 2009, supports, among other SNF disposition methods, expeditious processing of the Yucca Mountain license application in an open, technically sound manner (<http://ans.org>).
2. **The National Defense Industrial Association (NDIA), Southern Nevada Chapter (NDIA/SNV)** – Although organized about one year ago, this section has reached to the top levels of the DoD through the local Nellis AFB and Creech AFB leadership. The issue of primary concern in the local area is assured power for Creech AFB. The president of NDIA (Retired General Hawk Carlisle) has been to Nevada to emphasize the importance of assured energy to the group and to discuss its implications all the way to the Secretary of Defense. Leaders at Creech AFB have been involved in planning to become a prototype site for a Small Modular Reactor (SMR) for their assured energy program. NDIA/NV has inspired these discussions and has organized technical meetings in support of this program. Website: <https://ndia-snv.org/>.
3. **US Nuclear Energy Foundation, Reno-Sparks, NV:** – Formed in 2006, the US Nuclear Energy Foundation is a registered 501(c)(3) non-profit corporation, in the State of Nevada. USNEF held the first and largest non-partisan non-political public Yucca Educational Symposium in the country, November, 2013 at the Atlantis Casino Resort Spa, Reno, Nevada. USNEF has made inroads through public presentations education forums and publishing factual documents and materials. USNEF also has a YouTube site at: [https://www.youtube.com/results?search\\_query=usnef](https://www.youtube.com/results?search_query=usnef) The web site has been regarded as a definitive source of information and the public presentations have been active in the northern Nevada press. The mission is grassroots public education as participating stakeholders and advise government officials about the business case for recycling spent nuclear fuel as a model for improving the economic posture for Nevada and the national security posture of spent nuclear fuel for the United States. Another excellent point is made by nuclear scientist Peter F. Shaw at: <https://www.ktvn.com/clip/14811461/face-the-state-peter-shaw-nuclear-scientist> USNEF is a focused organization of nuclear advocacy and have a positive contact with the Trump Administration, which is motivated to resolve the Yucca Mountain issue. Website research available at: <http://usnuclearenergy.org>.

Through the efforts of the NDIA/NV leadership, a coalition of business and political leaders in Nevada has been focused on turning around the opposition in favor of securing a solid future in Nevada related to development of nuclear energy based on spent nuclear fuel coming to Nevada. While the current cadre of Congressional delegates from Nevada are publically vocal in their disagreement with “dumping” spent nuclear fuel in Nevada, there is an attitude, through their offices, to gain more understanding of “things nuclear” not evident in 35 years. The issue is “alive” in the State as evidenced by the almost daily appearance of some reference to “Yucca Mountain”. The tide is turning and there has never been a better time to revisit the issue than now.

- 1. Applied Engineering for Next-Generation Reactor Technical Transfer at the Nevada National Security Site (NNSS)** – NNSS is ideal for developing a remote, secure, secluded outdoor laboratory for transitioning research on fuel forms, next-generation designs, electricity delivery innovations, and DoD development of assured power sources based on SMR. Industry/Government partnerships could take advantage of the opportunity to locate an “Industrial Park” adjacent to the NNSS.
- 2. Development of a National Center for University Programs for Next-Generation Reactors** – Both major universities in Nevada (the University of Nevada, Las Vegas (UNLV) and the University of Nevada, Reno (UNR)) each have impressive nuclear engineering, health physics, and radiochemistry programs which grant advanced degrees and are working with national laboratories and industry on next-generation reactor, nonproliferation techniques, and emergency response programs. Part of the effort in the program office would be to inspire these university programs to better integrate with NNSS, NDIA, and ANS/NV to focus their efforts on next-generation nuclear in Nevada
- 3. Carbon-Free Energy National Laboratory (CAFE)** – The State of Nevada has emphasized renewable energy as its focus for accomplishing clean-energy goals. If nuclear energy is included in the clean energy portfolio, the synergies between renewable (solar, wind, geothermal) and sustainable (nuclear) can be explored in an atmosphere of total focus on a carbon-free energy program based in applied engineering and research in an atmosphere of public/private partnership.
- 4. DoD Assured Energy Development** – The NNSS is directly adjacent to Creech AFB. As such, it is the perfect place to introduce prototype SMR power systems for use on military bases and for mobile, tactical applications. This process is already embraced by NDIA in Nevada and has been advanced to the levels of the Secretaries of the Air Force and Army as well as the Secretary of Defense. Talks are already on-going between the DoD Strategic Capabilities Office (SCO) and DOE-Nuclear Energy. The NDIA Assured Energy Division was instituted by NDIA/SNV and is a supported division within NDIA.
- 5. Micro-Grid Applications Research** – DoD has already embraced the “islanding” of energy supply for both its strategic and tactical assets. The issues of EMP and vulnerability of the national electric grid can be reduced by migrating to a “micro-grid” energy supply posture. SMRs are the ideal energy sources for this effort based on their compact energy configuration and their protection from EMP since they will be employed in underground, shielded configurations. They will be designed to support the national grid, provide assured energy to civilian and military communities, allow for mobile power supply in emergencies and supply power exclusive of the national electric grid during times of grid failure.

The atmosphere, both politically and economically, in Nevada has significantly changed, even in the last five years. The State is openly seeking economic diversity, is coming to grips with their persistent lack of high-tech and professional businesses, has demonstrated a desire to improve its K-12 education posture through community-based as well as Government-funded programs, and has shown that it seeks to improve the economic posture of its rural counties. With an enhanced education program regarding the possibilities of nuclear industry and a greater presence from the nuclear industry, American Nuclear Society professional organization and pro-nuclear environmental organizations, Nevada is poised to embrace a future in energy development lead by next-generation nuclear applied engineering and research. Public relations messages, both in media and in person, could quickly inform the citizens to the vast opportunity and extremely low risk. The timing has never been better for a modest investment from the nuclear energy and pro-nuclear environmental community to secure the agreement of the State of Nevada to proceed with spent fuel initial storage leading to recycling of spent nuclear fuel and the possibilities inherent in their taking national leadership in the carbon-free energy goals established in most of the United States.

Steven Curtis  
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Current ANS Member

Gary Duarte  
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## Steven Curtis

Steven Curtis is president of Alphatech, Inc., a company formed to expand technology to fight counterterrorism. His clients include a number of Department of Defense (DOD) and Department of Energy (DOE) subcontractors. For 15 years, he has been a national response radiological counterterrorism field deployment team leader on the Nuclear Emergency Search Team (NEST) and the radiological Consequence Management teams. He was instrumental in the DOE modernization effort post 9/11. As a radiological expert, Steve has been deployed to field missions all around the world in support of DOD and DOE in response to counterterrorism incidents and scientific experiments. As an officer in both the active duty Army and Nevada National Guard, Steve served in leadership positions as an Armor officer and as a strategic communications design and installation engineer. Mr. Curtis has studied the Yucca Mountain since 1981, has written several papers related to the project, and has advised others on the technical aspects of the project. Mr. Curtis holds a BSEE and a Master's Degree in Health Physics and is a past president of both the Nevada Section of the American Nuclear Society and the Lake Mead Chapter of the Health Physics Society.



## Gary J. Duarte

Director, US Nuclear Energy Foundation. My knowledge of nuclear energy is that of an average citizen, I am not a scientist or an engineer. I served as Executive Vice President of the Maine Jaycees, organized the first statewide multi-chapter March of Dimes Walk-A-Thon. I started and operated Duarte Typesetting Company for 17 years, the first computerized book phototypesetting company in the State of Maine.

Founding the US Nuclear Energy Foundation when retiring in 2006 has been an obsession. A grassroots directive to educate America about the truth of nuclear technology and the development of nuclear waste management and reprocessing. I began my nuclear and research education by attending and participating in several national American Nuclear Society meetings and have accumulated a contacts list of nearly 1,400 nuclear scientists and engineers worldwide. I participated in several ANS "Focus on Communications" workshops under the Projects tab on the website; <http://www.usnuclearenergy.org/ANS.html>

At various times I make presentations to the American Nuclear Society, local civic clubs & organizations and have also addressed the need for the industry to support grassroots education on rebranding nuclear technology at the Advanced Reactor Technical Summit III at the Oak Ridge National Laboratory.