EXHIBIT F

The Study Mandated by Arkansas Act 1092 - "The Study"

Arkansas Act 1092 was passed by the 2021 Arkansas Legislature to investigate the recycling of the spent nuclear fuel currently stored at Arkansas Nuclear One in Pope County, Arkansas. Arkansas Act 1092 received overwhelming support: In the Senate; 34 Yeas, 0 Nay, and 1 Non-Voting; in the House; 94 Yeas, 0 Nay, and 6 Non-Voting. The history for Act 1092 is in Appendix A.

Abstract
The state of Arkansas has nuclear waste sitting in a parking lot at the Nuclear One site in Russellville, Arkansas. This spent nuclear fuel can be reprocessed into a new fuel for use in a different kind of reactor - a Generation IV sodium-cooled fast reactor. The United States' current reactor fleet is on average over 50 years old and will need replacement in the next few decades. Further, one must look no further than the headlines of the day to recognize that the oncoming electric-car mandates and energy politics will require the United States to produce more electricity than renewable resources will be able to provide. For national security, for energy security, for the United States and countries allied with our values, the way forward is for Arkansas to lead with a reprocessing and fast reactors program to provide affordable, reliability, responsible, and sustainable energy.

Introduction
Spent nuclear fuel has been a political problem for the United States and is an environmental concern for the State of Arkansas. The United States government Department of Energy has contracted with Entergy for the disposal of the spent nuclear fuel waste, and Entergy has included the contracted disposal fee in the Arkansas rate base. Pursuant to the waste disposal contract, the United States Department of Energy was to begin the removal of waste fuel from Arkansas in 1998. No nuclear waste has been removed from the State and there is no realistic Department of Energy plan to comply with their contractual obligations. Compounding this political problem is that Entergy is being 'paid' to store the spent fuel on the parking lot of Arkansas Nuclear One from the non-discretionary 'Judgement Fund'. During the course of this endeavor it has become apparent that the solutions we have developed would not only work for the state of Arkansas, but could benefit the other states that have nuclear power plants within their borders and could provide an answer to the storage issue of spent nuclear fuel.

The Nuclear Waste Policy Act (NWPA) mandated that the Yucca Mountain site in the State of Nevada be the nuclear waste repository for the United States. Even though Nye County, Nevada has supported the Yucca Mountain nuclear waste repository, also known as a deep geological repository, the State of Nevada has objected and has thus far been able to impede and stop the project. The NWPA mandates that the cost to dispose of the spent nuclear fuel be funded by the nuclear power plants that generate

the nuclear waste. Because Arkansas is a regulated rate State, the cost to transport and dispose of spent nuclear fuel will be included in the rate base. The obvious conclusion is, Arkansas citizens have a huge contingent financial liability for the spent nuclear fuel. The Arkansas Plan is designed to flip the liability into a financial asset. For more information on the history and accounting for the Spent Fuel Trust Fund and payment for breach of contract see Appendix B.

Spent nuclear fuel is toxic and highly radioactive - The waste must be isolated from the environment for approximately one million years to allow sufficient time for nuclear decay to occur. However, there is a much better solution for spent nuclear fuel, which is the recommendation of many subject matter experts and is the focus of the Arkansas Act 1092 'Study'.

Bullet Point Benefits for the 'Study' Recommendation

- Eliminates safety concerns - Metal fuel liquid sodium fast reactions cannot meltdown
- Removes fossil fuels from the energy supply chain
- Meets the South Carolina plutonium removal agreement
- Meets the Idaho spent nuclear fuel removal agreement
- Complies with the Russian agreement to dispose of 34 metric tons of plutonium (Note 1)
- Rectifies the DOE 'Nuclear Waste Policy Act' contract default to accept spent nuclear fuel by 1998
- Provides a sustainable nuclear fuel supply-chain for advanced reactor research and commercial reactor deployment (i.e., the HALEU project)
- Provides a spent fuel interim storage facility
- Offers a permanent nuclear waste disposal facility for fission products
- Optimizes uranium as energy source (the existing inventory of "spent" fuel could provide 100% of the electrical power for the U.S. for 200 years)
- Eliminates nuclear proliferation concerns as the process makes weaponizing its byproduct impossible see Appendix C
- Proves to be cost-competitive with combined cycle power plant with natural gas based on $3.00 per million BTU without government subsidy
- Offers speed of deployment as the plan re-purposes existing coal power plants within a projected at 18 months

The 'Study' Recommendations

"This spent nuclear fuel is not waste - the waste is in our failure to tap into this valuable and abundant domestic source of clean energy in a systematic way (Note 2). The United States' nuclear power industry uses light water thermal reactors and a once-through fuel cycle. Those reactors utilize less than 1% of the available nuclear energy in the uranium. In addition, the residual waste disposal is expensive; is a long-term environmental liability, and is a political problem that has been un-solvable.

The proposed 'Arkansas Plan' is to use the pyro processing technology coupled with the fast reactor technology that was developed and tested by the Argonne National Laboratory to recycle the energy producing materials in the spent nuclear fuel. The technologies were demonstrated during the "Experimental Breeder Reactor (EBR-II) and Integral Fast Reactor (IFR) programs", and are being matured through ongoing R&D sponsored by the U.S. government. Comparing the light water technology nuclear reactor systems to the liquid sodium fast reactor systems - IFR; every issue, every concern is lessened by orders of magnitude with the fast reactor energy system.

Fuel utilization: natural uranium used for nuclear fuel is composed of two primary isotopes, U238 - 99.3% by mass and U235 0.7% by mass. Only the U235 is fissile in a thermal reactor which results in a fuel utilization of about 1%of the natural uranium. Fast breeder reactor systems can fission all heavy nuclides including the transuranic elements such as plutonium. The residual fission product waste can be classified into three groups; stable, radioactive with a short half-life (31 years or less), and radioactive with a long half-life (greater than 211,000 years). The stable fission products could be released into the environment, while the short half-life fission products are proposed to be reprocessed. The gamma emitting fission products could be used as in water purification and the beta emitting fission products will be inventoried in Arkansas for 10 half life cycles before disposal. The long half-life fission products will be disposed in a geological repository.

Energy Density: One metric ton of uranium fuel, at an initial enrichment of 4.5% U235 and a once-through fuel cycle is equivalent to 165,000 tons of coal. One ton of reprocessed spent nuclear fuel in a recycling fast reactor is equivalent to 2,400,000 tons of coal. To better understand the magnitude of these numbers, if the spent nuclear fuel stored on the parking lot at Arkansas Nuclear One is reprocessed and consumed in a fast reactor of the same size, and operated 24 hours a day, 7 days a week - there is over a 1,000 year inventory of fuel. If the related depleted uranium is used as fuel, the inventory exceeds a 10,000 years. No new uranium mining is need for a very long time.

Nuclear non-proliferation: the plutonium in recycled nuclear fuel is fissionable; however no country in the world has ever made a nuclear weapon out of low-grade plutonium recovered from commercial spent nuclear fuel. (Note 3) The complexity to design around the spontaneous fission of plutonium 240, the thermal heat released by the transuranic elements, and the intense gamma radiation makes it practically impossible to construct a weapon from commercial spent fuel. The distinction to understand is the difference between the spent fuel recycling systems: the Arkansas Plan uses pyro processing, which is very different from the Plutonium Uranium Reduction Extraction (PUREX) process that was specifically developed for weapons grade nuclear fuel and is the system used in other countries for reprocessing. For more information on non-proliferation, see Appendix C.

Safety: The fast reactor system cannot 'melt down'. It is impossible to have a Three Mile Island type accident; the same is true for a Chernobyl or Fukushima Daiichi type accident. The fast reactor uses metal fuel, which has a design thermal set point. If the

fuel exceeds the design set point, the nuclear chain reaction stops! It is not necessary to rely on safety systems, control rods, or back up pumps. The reactor is passively safe and does not require human intervention if an off-normal event were to occur. The system was tested in 1986 with the reactor at full power, the cooling pumps were stopped and the reactor was not SCRAMed. As expected, the nuclear chain reaction stopped without our any safety intervention. The decay heat was absorbed by the sodium pool. For more information on the EBR-II and IFR program see Appendix D.

Waste management: The recycling activities for each ton of spent fuel will yield approximately 96% (1920 pounds) of energy producing materials that can be used in fast reactor fuel, 2% (40 pounds) short half-life fission products, and 2% (40 pounds) long half-life fission products. Approximately .01% (32 ounces) of the spent fuel could be extracted as rare earth elements. Of the 2% short half-life, 35% (14 pounds) could be reutilized in a water treatment process similar to ultra –violet for water purification with the energy requirements needed to power ultra-violet.

It is important to note that the long half-life materials are equal to a boat load of bananas in terms of radiation emissions.

Economic Sustainability: The unique and surprising economic component for the 'Arkansas Plan' is the total projected cost is pre-funded and should not require any government support. The recommendation is for Congress to authorize a federal charter for closing the nuclear fuel cycle. The component parts include: a) transportation; b) interim storage; c) pyro processing and new fuel fabrication; d) the manufacturing and deployment of small modular liquid sodium fast reactor to consume the reprocessed fuel; e) geological repository to hold the long half-life fission product. The new Energy Corporation should be capitalized by the spent fuel trust fund. For more information on nuclear energy economics see Appendix E.

Transportation: Approximately 75 per cent of all nuclear power plants are located on a navigable river and the same is true for Arkansas Nuclear One. The size of the current dry cask storage containers prohibit travel by rail or road, thus barging the containers provides a viable mode of transportation safely and economically. The barge transportation option reduces the complexity for orphaned spent fuel, i.e. spent fuel located at decommissioned sites that no longer have spent fuel transfer systems.

The Arkansas Team has been in contact with barge manufacturers to assist in designing a barge with input from the United States Coast Guard for safety consideration and to determine the cost of building such a vessel.

Arkansas Nuclear One could be the first nuclear facility to benefit from the plan. The barge(s) would be loaded with the storage containers, which would be ferried to the nuclear fuel recycling site, unloaded, and moved to the recycling facility. The storage containers would be opened sequentially, placed in the recycling containment facility, and the recycling process would begin. In addition to a navigable river, the proposed reprocessing site has heavy rail and interstate access.

The recycling process would utilize the pyro processing technique (Note 4). As the spent nuclear fuel is introduced into the recycling line, chemical transformation will separate the various materials and the product of the recycling process will be fast reactor fuel (uranium, plutonium and minor actinides) and multiple by-products including rare-earth metals.

Arkansas Plan Federal Charter: Nuclear energy development in the United States has been accelerated and restrained over time by the politics of nuclear policy. The fundamental reason for the policy reversals were and are the misunderstanding between the two very different types of spent fuel reprocessing: a) the aqueous PUREX system specifically developed for weapons-grade fuel production; and b) the pyro processing system that was designed to increase the fuel cycle efficiency, decrease the problems with light water spent nuclear fuel disposal, and to have a system that cannot be used for nuclear weapons. The Carter administration 'Presidential Directive 1693X' (March 24, 1977) explicitly stated the objective was "…to prevent the spread of nuclear explosive - - or near explosive …" & "…[I]nitiate a program of assistance to other nations in the development of non-nuclear means of meeting energy needs." The Carter policy was "NO REPROCESSING OF SPENT FUEL". The PD 1693X did not distinguish the difference between the reprocessing methods. (Note 5) Four years later the Reagan Administration reversed the Carter 'No reprocessing directive' with National Security Decision #6 and #39 (Note 6) (Note 7). And again, the directive did not distinguish the difference between the two very different types of reprocessing. However the specific approval to assist Japan was limited to the pyro processing method. The next reversal occurred during the Clinton Administration with a Senate Vote to defund the EBR-II and IFR project (1994). The United States Senate debate is noteworthy - The anti-nuclear debate team leadership was Senator John Kerry with assistance from Senator Dale Bumpers (D-Arkansas). In summary, the EBR-II & IFR programs were de-funded for all the wrong reasons - pure politics (Note 8).

Why include this political yoyo story in the 'Study Report'? Because if the State of Arkansas starts down the pyro processing road, the system MUST be designed such that a political attack cannot stop the project and leave Arkansas with a nuclear waste dump. The solution is a Federal Charter for spent fuel reprocessing (Note 9&10).

The Federal Charter Energy Corporation should have two classes of stock: Class A which is owned by the generator of nuclear waste and are entitled to 5 Board Members. Class A stock owners will be jointly and severally liable for capital call. The original Class A Owners may sale their stock, however the associated contingent liability is not transferable unless the whole board approves the liability transfer. The Class A stock holders will own 75% equity interest in the Corporation. The Class B stock will own 25% equity known as the management corporation and are not subject to capital calls. They are entitled to four Board Members. One Board position will be nominated and selected by nationally recognized environmental NGOs. One Board position be nominated and selected by members of the Associated Press. This board position will have two non-voting alternates that will have full board privileges except voting

privileges. One Board position will be nominated and selected by a panel of nuclear energy subject matter experts convened by the Corporation. One Board position will be selected by the President of the University of Arkansas System. Two board positions will be selected by and approved by the Arkansas Legislature, one by the senate and one by the house. One board position will be selected by the governor of the state of Arkansas.

The Federal Charter Energy Corporation capital will be the transfer of the assets of the 'Spent Fuel Trust Fund' to the 'Corporation, and if necessary, capital inputs from the Federal Treasure, capital calls to Class A stock holders. The organization and management structure will be matrix-based (to impede silo solidification and classic bureaucratic ineptness.)

Next Step: To comply with the recommendations of the 'Blue Ribbon Commission on America's Nuclear Future (Note 11) and bring together the local, (Sebastian County Quorum Court), State, (Arkansas Department of Energy and Environment working with the Arkansas General Assembly); and Federal Government, The Senate Energy & Natural Resources Committee; the House Energy & Commerce Committee to draft both legislation and contracts to:

1) Complete a more detailed Economic analysis;
2) Set health and safety standards and recommendations for the State of Arkansas to expand their oversight of nuclear activities pursuant Section 274 of the Atomic Energy Act of 1954 as amended; (Note 12 & 13).
3) Complete a side by side comparison of options and recommendation to advance the "Commercial Application of Existing Technology to Reclaim and Repurpose Spent Nuclear Fuel Rods."

Referenced Notes

Note 1: Politco: Russia hasn't disposed of 34 tons of plutonium - < Plutoniun.pdf >

Note 2: Dale Klein PhD, remarks at the American Association for the Advancement of Science's (AAAS) annual meeting, in Washington, D.C. (2011) < *DaleKlein.pdf >

Note 3: https://world-nuclear.org/nuclear-essentials/what-is-nuclear-waste-and-what-do-we-do-with-it.aspx

Note 4: Dr. Mark Williamson - Argonne National Laboratory < Pyro processing Flowsheet.pdf >

Note 5: 'Carter' Presidential Directive NSC-8 <CarterEx-Order.pdf >

Note 6: 'Reagan' National Security Decision 6: < ReaganEX-Order6.pdf >

Note 7: ‘Reagan’ National Security Decision 39: < ReaganEX-Order39.pdf >

Note 8: Congressional Record, Vol 140 Issue 86 Thursday, June 30, 1994
note- the debate starts on pdf page 14 < CR Vol 140 I86.pdf >

Note 9: Rand Corporation - “Choosing a New Organization for Management and Disposition of Commercial and Defense High-Level Radioactive Material” < RAND.pdf >

Note 10: Congressional Research Service: “Congressional or Federal Charters: Overview and Enduring Issues” <FedCharter.pdf >

Note 11: BLUE Ribbon Commission on America’s Nuclear Future

Note 12: Arkansas Nuclear Agreement, Governor Faubus

Note 13: Arkansas Nuclear Agreement, Governor Huckabee

Appendix A
History of Arkansas Act 1092

A1 October 2014: Recommendation Letter from Dr. James Hendren & John Warmack distributed to Arkansas Leadership. Modeled on Leo Szilard's letter to Albert Einstein. < ArkansasNuclear.pdf >

A2 August 11, 2016: Arkansas Delegation trip to the Argonne National Laboratory to verify the technology. < Arkansas Delegation Agenda.pdf >

A3 October 26, 2016: Introduction Letter to the Arkansas Alternative Energy Commission. < AAEC.pdf >

A4 January 5, 2017: Arkansas Alternative Energy Commission Fourth Report to Governor Asa Hutchinson, Senate President Jonathan Dismang, House Speaker Jeremy Gillam. note: see paper page 24 & 91(pdf page 28 & 95)< Final Report.pdf >

A5/A6 August 28 & 29, 2017: Arkansas General Assembly 'Joint Committee on Energy' hearing. Agenda < A1.pdf > < A2.pdf >

A7 August 29, 2017: Transcript of the presentation by Dr. Donald Bobbitt at the Joint Committee on Energy hearing. < AJCE(Bobbitt).pdf >

A8 November 27, 2018: Joint Interim Committee on Energy meeting at Arkansas Nuclear One Minutes. < Minutes 11-27-2018.pdf >

A9 January 2019, General Assembly 'Concurrent Resolution'. < HCR1015.pdf >

A10 January 2021, General Assembly 'Act 1092'. < *Act1092.pdf >

Appendix B
Spent Fuel Trust Fund

B1 A proactive plan to address the complex legal issues regarding the Spent Fuel Trust Fund: <AGA-TT.pdf >

B1a The Nuclear Waste Policy Act as amended: < nwpa_2004.pdf >

B1b Civilian Nuclear Waste Disposal - Congressional Research Service< Nuclear Waste.pdf >

B2/B3 DC Circuit Court of Appeals: Spent Fuel Trust Fund - Zero Fee Order:< DC-#2.pdf > < DC-(final-order).pdf >

B4 Congress Budget Office Report

B5 Audit Report 2019 - Department of Energy's Nuclear Waste Fund< Waste Fund Report.pdf >

Appendix C
Nuclear non-Proliferation

C1 The ARC-100 Reactor: 'An Effective Answer to Nuclear Proliferation Concerns' note: the ACR-100 design was based on the EBR-II reactor and the discussion paper concepts are applicable to the proposed Arkansas Designed Reactor.
< Proliferation-ACR-100-Final.pdf >

C2 A different opinion - to be fair: < Reactor-Grade and Weapons-Grade Plutonium in Nuclear Explosives.pdf >

C3 Plutonium isotopes as a function of burn up: < Plutonium/BurnUp.pdf >

See Note 2 for information regarding Dr. Dale Klein

Dr. Dale Klein remarks at the American Association for the Advancement of Science's (AAAS) annual meeting, in Washington, D.C. (2011) < *DaleKlein.pdf >

Appendix D
EBR-II and IFR Program

D1 Executive Summary by Dr. John Sackett, Idaho National Laboratory for the Experimental Breeder Reactor program

D2 EBR-II IFR Prototype by Dr. Sackett, Idaho National Laboratory for the Experimental Breeder Reactor program

D3 IFR Overview

D4 IFR Project

Appendix E
Nuclear Energy Economics

E1 Economic/Business Case for the Pyro processing of Spent Nuclear Fuel: < Economic-Business Case for the Pyro processing of Spent Nuclear Fuel.pdf >