Full Testimony of Noah C. Shaw
General Counsel
New York State Energy Research and Development Authority

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DEFENSE ORIGIN OF THE NUCLEAR MATERIALS PROCESSED AND THE WASTES GENERATED AT THE WEST VALLEY NEW YORK SPENT NUCLEAR FUEL REPROCESSING FACILITY

I. Introduction

Chairman Shimkus, Ranking Member Tonko and members of the Committee, I'm Noah Shaw, General Counsel and Secretary of the New York State Energy Research and Development Authority, or NYSERDA. As NYSERDA's General Counsel, I have not only legal but also operational oversight of NYSERDA's work at the West Valley Nuclear Service Center in southwestern New York, also known as the West Valley site. It is my honor to be here today to present you with NYSERDA's analysis regarding the defense origin of nuclear waste present at the site and its view regarding the importance of H.R. 2389, which will reauthorize long-term federal appropriations for the ongoing clean-up of the site.

NYSERDA holds title to the Western New York Nuclear Service Center ("West Valley") site on behalf of the People of the State of New York. The State has owned the property since 1961 and, in 1966 operation commenced of the only non-federally owned spent nuclear fuel reprocessing facility in the United States. That operation ended in 1972. In 1980, Congress passed the West Valley Demonstration Project Act[1], WVDPA, pursuant to which the U.S. Department of Energy (DOE) is responsible for 90 percent of the costs of the majority of site

[1] Public Law 96-369 (1980).

clean-up. That clean-up operation – in coordination with NYSERDA – has been ongoing since then.

It is NYSERDA's position that the high-level radioactive waste (HLW) and transuranic waste (TRU) left at the site as a result of the reprocessing operation are "from atomic energy defense activities" as defined in the Nuclear Waste Policy Act (NWPA) – *i.e.*, they are "defense waste" – and are therefore eligible for disposal in the same manner, and in the same facilities, as other U.S. Department of Energy (DOE) defense HLW and TRU. The DOE disagrees, however, and has designated West Valley as a "commercial" site. But the facts and law support the conclusion that the remaining wastes are defense-related, and recognition of that fact would be consistent with the root intent of the parties as expressed during West Valley's operations and during the passage of the WVDPA. This testimony clarifies the origin and legal status of the HLW and TRU stored at the Center by the DOE West Valley Demonstration Project (WVDP) and provides the basis for Congress to properly classify the West Valley waste as waste that resulted from "atomic energy defense activities."

Moreover, Congressional reauthorization of the important appropriation for the clean-up of the site is essential to ensuring the least-cost, most efficient process. Insufficient appropriations lead to project delays, which lead to higher ultimate costs.

II. History of West Valley Activities

A. Spent Nuclear Fuel Reprocessing at West Valley

At the end of the Second World War, the federal government was solely responsible for atomic energy activities in the United States. In keeping with the federal government's desire to establish a civilian nuclear power industry, DOE's predecessor, the U.S. Atomic Energy Commission (AEC), established a program to commercialize the reprocessing of spent nuclear

fuel (SNF). As part of that commercialization program, the AEC embarked upon an initiative to make classified reprocessing technology available to private industry and committed to provide assistance in the form of a baseload of SNF – largely from defense-related sources – until additional civilian nuclear power plants could be constructed. The AEC program also allowed the use of AEC facilities for development work and training.[2]

The AEC's commercialization program led W.R. Grace and Company to establish Nuclear Fuel Services, Inc. (NFS) to design, build, and operate an SNF reprocessing facility on New York State-owned property near the hamlet of West Valley, approximately 25 miles south of the city of Buffalo. Because the AEC determined that a private entity was an improper long-term steward for the waste,[3] and at the request of the AEC, in 1963 NFS submitted an amendment to its application for an operating license indicating that New York State retained ownership of the site[4] and agreed to provide perpetual care for the waste.

The NFS reprocessing facility at West Valley, which operated from 1966 to 1972, was the only SNF reprocessing facility in the United States operated by an entity other than the federal government. After operating for six years, NFS shut down the facility to make modifications and process improvements. At the same time, the AEC was considering significant regulatory changes that would have required the solidification of high-level reprocessing wastes within five years of generation, shipment of the solidified waste to a federal repository within 10

[2] U.S. DOE, Western New York Nuclear Service Center Companion Report, TID21905 (1978) at pp. 1-3. Copies of any information referenced in these comments are available from NYSERDA.
[3] Letter, Robert Lowenstein, Director, Division of Licensing and Regulation, Atomic Energy Commission, to Oliver Townsend, Chairman of the New York State Atomic Safety and Development Authority (Feb. 13, 1963).
[4] *In the Matter of Nuclear Fuel Services, Inc., and New York State Atomic Research and Development Authority,* Amendment No. 1 to the Application for Licenses of the New York State Atomic Safety and Development Authority (Apr. 9, 1963); *see also* Letter, Oliver Townsend, Chairman of the New York State Atomic Safety and Development Authority, to Robert Lowenstein, Director, Division of Licensing and Regulation, Atomic Energy Commission, In Re: Nuclear Fuel Services, Inc. et al., Application for Licenses, AEC Docket No. 50-201 (, 1963).

years, and changing the seismic design considerations for fuel cycle facilities.[5] It was unclear whether the existing, highly contaminated West Valley structures would have met these new seismic requirements.[6] Given that uncertainty, and the estimated $600M cost of potential compliance, NFS announced in 1976 that it was withdrawing from the reprocessing business and would turn the West Valley reprocessing facility over to New York State.

During congressional deliberations that followed the NFS announcement, the West Valley site was recognized as "an artifact" of a premature federal program.[7] In fact, by the time the federal government's new policy on the solidification and shipment of reprocessing wastes was fully developed in 1971, 600,000 gallons of liquid HLW had already been placed in long-term storage in West Valley's underground tanks.[8] Had the federal government established its national policy regarding reprocessing facilities and wastes prior to the design, construction and operation of the West Valley facility, the design of the plant would likely have been "altered considerably."[9]

B. The West Valley Demonstration Project

i. The West Valley Demonstration Project Act

Between 1976, when NFS announced it would withdraw from reprocessing at West Valley, and 1980, the future of West Valley wastes was unclear. During that time, there were

[5] *See* Rochlin, G., et al., Bulletin of the Atomic Scientists, *West Valley: Remnant of the AEC* ("Remnant of the AEC") (Jan. 1978), 22-25, citing Siting of Commercial Fuel Reprocessing Plants and Related Waste Management Facilities; Statement of Proposed Policy, 34 Fed. Reg. 8712 (June 3, 1969).
[6] New York Congressman Lundine expressed doubt that the West Valley site could comply with the new seismic regulations for storage of waste. Hearings Before the Subcommittee on the Environment and the Atmosphere of the Committee on Science and Technology, 95th Congress, First Session, June 15, 16, 1977, No. 20 at 74 ("1977 Hearing").
[7] Statement of N. Richard Werthamer, Chairman of NYSERDA, to the Environment and the Atmosphere Subcommittee of the House Committee on Science and Technology Regarding Nuclear Reactor Decommissioning, U.S. Nuclear Regulatory Commission (June 15, 1977) (1977 Hearing at 3).
[8] *Id.*
[9] *Id.* at 60 (statement of Richard Cunningham, Acting Director, Fuel Cycle and Material Safety, Nuclear Regulatory Commission).

extensive state and federal discussions regarding what to do with the West Valley site, and whose responsibility it would be. In 1978, Congress directed DOE to conduct a study of options for West Valley. The options included federal aid for the clean-up, federal operation of the clean-up, and permanent federal ownership of the site.[10] The DOE study acknowledged the pervasive federal role in the creation of the reprocessing facility and indicated that DOE was neutral between the option of federal operation of the site and federal ownership of the site.[11]

After this study was completed, Congressional hearings were held on decommissioning, decontaminating, and remediating West Valley. Congressional discussion during this time period is replete with references to the federal government's responsibility for the site and the defense character of the waste at West Valley.

For example, Dr. John M. Deutch, then-Acting Secretary for Energy Technology at DOE, described the waste at West Valley to a Congressional subcommittee as "high-level waste which contain[s] both commercial and military wastes[.]"[12] He explained that discussions had begun between DOE and NYSERDA concerning the future of West Valley, whereby "[t]he Department of Energy would be responsible for the overall management and responsibility associated with the cleanup of the site" and that "[t]he Federal Government would agree to accept responsibility for the ultimate removal of spent fuel and high-level wastes from the site when a Federal repository was available."[13] On March 19, 1980, Senator Moynihan introduced the West Valley

[10] The Department of Energy Act of 1978 – Civilian Applications, Public Law 95-238 (Feb. 25, 1978), section 105.
[11] U.S. DOE, Western New York Service Center Study, Final Report for Public Comment, TID 21905-1, 1978, at. 39.
[12] Department of Energy Fiscal Years 1980-81 Authorization, Hearings Before the Senate Subcommittee on Energy Research and Development of the Committee on Energy and Natural Resources, Statement of Dr. John M. Deutch, Acting Assistant Secretary for Energy Technology at the Department of Energy (96th Cong., Mar. 9 – Apr. 5, 1977) at 981.
[13] *Id.* at 982.

Demonstration Project Act (WVDPA).[14] Senator Moynihan reiterated Dr, Deutch's point in hearings of the Senate Subcommittee on Nuclear Regulations on his bill, stating that "[it] is understood [ ] that the Federal Government has taken over as a matter of policy, has agreed to assume responsibility at West Valley."[15]

Similarly, on the House side, in the House Oversight Hearing before the Subcommittee on Energy and the Environment, Committee on Interior and Insular Affairs, DOE's then-Acting Deputy Assistant Secretary for Energy Technologies, Worth Bateman, acknowledged that damaged high level fuel elements from defense activities at Hanford were sent to West Valley.[16] Congressman Lundine noted that three-quarters of material reprocessed at West Valley was defense waste under the AEC base-loading agreement.[17] NYSERDA's then-President stated the same in sworn testimony to the same Congressional subcommittee.[18]

In subsequent hearings, the House Committee on Interstate and Foreign Commerce repeatedly stated in the WVDPA deliberations that the activities at West Valley had been, in large part, defense related. In particular, the committee stated:

> The Committee recognizes that a substantial quantity of this waste was produced in the course of fulfilling contracts with the Atomic Energy Commission and that most of such contracts were related to the military program. Because of the extensive past Federal involvement, the Committee is willing to have the government pay 90 percent of the cost of the project.[19]

[14] Public Law 96-369 (1980).
[15] *Hearings Before the Senate Subcommittee on Nuclear Regulations of the Committee on Environment and Public Works*, 96th Cong. 240 (1979) (statement of Senator Moynihan).
[16] Oversight Hearing before the Subcommittee on Energy and the Environment, Committee on Interior and Insular Affairs, Amending The Department of Energy Authorization Bill For Fiscal Year 1980, Regarding Remedial Action At West Valley, New York (May 31, 1979) ("1979 Hearing") at 20.
[17] *Id.* at 18.
[18] *Id.* at 42.
[19] Committee on Interstate and Foreign Commerce Report on the West Valley Demonstration Project Act, No. 96-100, Part II, 96th Cong. (Sept. 15, 1980) at 14 (emphasis added).

The defense-related activities at West Valley were so significant to the consideration of the bill that the committee reiterated the point, stating:

> Most of the reprocessing activities which occurred at the site were performed under contracts with the Atomic Energy Commission, and *a majority of these were a part of the military, as opposed to the commercial, program*. Because of this, and because of the benefits which will accrue to the Federal government as a result of demonstrating solidification technologies, this Committee has provided a greater Federal contribution than would normally be provided to a typical remedial action program.[20]

Similarly, Senator Moynihan, the WVDPA's sponsor and one of its most active proponents, explained in a 1982 interview after the WVDPA was passed that the reason why "the [federal] taxpayer [is] footing most of the bill" is that "the greatest share of the waste was placed at West Valley by the Defense Department . . . ."[21]

In 1980, Congress passed the WVDPA, which directed DOE to conduct and pay 90 percent of the costs of a high-level waste solidification and decommissioning demonstration project at the Western New York Nuclear Service Center. The project would include the following tasks:

- carry out a demonstration project to solidify the high–level radioactive waste in the underground tanks;
- develop containers suitable for the disposal of the solidified high-level waste;
- transport the solidified waste to a federal repository for permanent disposal;
- dispose of low–level and transuranic waste; and,
- decontaminate and decommission the facilities used in the solidification process.[22]

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[20] *Id.* at 15 (emphasis added). *See also* Statement of Representative Dingell, 126 CONG. REC. 25351 (1980) ("Furthermore, the past extensive Federal involvement in the development and operation of the re-processing activities at the site distinguishes this program from a typical remedial action program. Over 70 percent of the spent fuel reprocessed on the site was under contract with the Atomic Energy Commission, and most of this was for the military as opposed to the commercial programs") and 126 CONG. REC. 25353, Statement of Representative Royer ("The waste at West Valley is a result of both military activities and civilian reprocessing.").

[21] Reitz, Tom, *Success of West Valley Project Holds Key to Future of Nuclear Power*, Springville J. (Mar. 4, 1982).

[22] Public Law 96-368.

ii. The Cooperative Agreement

The WVDPA also required DOE to enter into a Cooperative Agreement with NYSERDA, which holds the West Valley site in trust for New York State.[23] The Cooperative Agreement, executed in 1980, grants DOE exclusive use and possession of the central 200 acres of the site, including most of the facilities containing radioactive materials, and restates DOE's obligation to decontaminate and decommission all facilities and premises used in conducting the project. The Cooperative Agreement also obligates NYSERDA to turn over the so-called "perpetual care fund," established in a 1963 Waste Storage Agreement between NYSERDA's predecessor, the New York State Atomic Research and Development Authority, and NFS,[24] to DOE upon delivery of the WV HLW to an appropriate federal repository for disposal.[25] NYSERDA obtained the perpetual care fund as part of a settlement between NYSERDA and NFS after NFS ceased operations, and has maintained the fund in an interest bearing account since that time. As of March 31, 2016, the fund contains $29.2 million.

iii. The West Valley Demonstration Project

Since the WVDPA was passed more than 30 years ago, DOE has made significant progress at the site. DOE completed the solidification of the high-level waste in 2002[26] (more than 98 percent of the liquid HLW was removed from the underground waste storage tanks and solidified into 19,000 drums of cemented low–level waste and 275 high-level vitrified waste in

[23] *Id;* the DOE-NYSERDA Cooperative Agreement is available here: http://www.wv.doe.gov/WVDP_WWW/Document_Index/DOE_NYSERDA_Cooperative_Agreement.pdf
[24] *See* Waste Storage Agreement, New York State Atomic Safety and Development Authority and Nuclear Fuels Services, Inc. (May 15, 1963).
[25] Notably, as explained in the Congressional record in years prior to the Cooperative Agreement's execution, "[t]he funding arrangement contemplated only the eventual transfer of the waste to new tanks, in perpetuity, and did not consider facility decommissioning during the early part of the license term." 1977 Hearing at 60 (Remarks of Richard Cunningham, Acting Director, Fuel Cycle and Material Safety, U.S. Nuclear Regulatory Commission).
[26] http://www.nyserda.ny.gov/Cleantech-and-Innovation/West-Valley/West-Valley-Demonstration-Project

steel canisters[27]); the 19,000 drums of cemented low-level waste were successfully shipped to the Nevada Test Site for disposal; and the high-level vitrified waste, which are contained in stainless-steel containers, are stored in shielded casks at an interim HLW storage facility constructed by DOE at the site.

DOE is presently conducting "Phase 1" decommissioning activities at West Valley, including demolition of the Vitrification Facility, waste processing and shipping, and the removal of contaminated systems, equipment, and asbestos from the massive, highly contaminated Main Plant Process Building in preparation for demolition.[28] DOE has stated that the HLW canisters will be stored at West Valley until a HLW repository is available to accept the canisters for permanent disposal, which could be decades away. And the D.C. Circuit recognized in a 2012 decision that the federal government's potential failure to secure a repository is a "possibility that cannot be ignored."[29]

III. The Nuclear Waste Policy Act

Two years after Congress passed the WVDPA and DOE executed the Cooperative Agreement with NYSERDA, and before the work of the WVDP had even begun, Congress passed the Nuclear Waste Policy Act (NWPA) in response to the accumulation of SNF at commercial reactors. The NWPA, as amended, provides, *inter alia*, a framework for the development of HLW repositories and establishes a program of research, development, and demonstration regarding the disposal of HLW and SNF. As part of that framework, the NWPA provides that "[t]he costs resulting from permanent disposal of high-level radioactive waste from atomic energy defense activities should be paid by the Federal Government."[30] The NWPA also

[27] *Id.*
[28] *Id.*
[29] *New York v. NRC*, 681 F.3d 471 (D.C. Cir. 2012).
[30] 42 U.S.C. § 10107(b)(2).

defines "atomic energy defense activity" as "any activity of the Secretary performed *in whole or in part*" in carrying out, among other things, "defense nuclear materials production, defense nuclear waste and materials by-products management, and defense research and development."[31] As discussed in Section V.A, below, the historical record shows that NFS conducted, in part, "defense nuclear materials production" at West Valley, and by virtue of conducting that activity, NFS also conducted "defense nuclear waste and materials by-products management" at West Valley -- as DOE does today. In addition, as discussed in Section V.B (below), records in NYSERDA's possession strongly suggest NFS also conducted "defense research and development" at West Valley. The historical record on the NFS operation at West Valley is extensive and demonstrates that the radioactive wastes at West Valley were generated as a result of "atomic energy defense activities."

IV. State and Federal Discussions Regarding Disposal of West Valley HLW

Despite the statements in the legislative history of the WVDPA and the facts described in Section VI below, DOE presently asserts that West Valley HLW is "commercial waste"[32] – *i.e.*, that the HLW at West Valley is *not* "from atomic energy defense activities" and therefore a fee for ultimate disposal of the waste should be borne by the State, which is the owner of the site and therefore the wastes. But DOE held a different position on the disposal fee issue prior to 1986 (1986, notably, was approximately the same time that DOE realized that the NFS perpetual care fund would not be sufficient to cover the costs of disposal).

[31] 42 U.S.C. § 10101(3)(emphasis added). Legislative history indicates the Congressional view that the NFS operation at West Valley was a research and development effort. *See* 1979 Hearing at 2 (Comments of Chairman Udall).

[32] U.S. Department of Energy, Assessment of Disposal Options for DOE-Managed High-Level Radioactive Waste and Spent Nuclear Fuel (Oct. 2014), at v ("Commercial waste (e.g., HLW at West Valley …) is not eligible for a repository exclusively for DOE-managed HLW and SNF from defense or DOE research and development activities.").

In 1983, when the perpetual care fund contained approximately $6 million, Robert Morgan, DOE's Project Director of the Nuclear Waste Policy Act Project Office, stated in a letter to NYSERDA that "[t]here is every indication that the perpetual care fund that will transfer to DOE upon completion of the project … will adequately cover the estimated disposal costs of the solidified wastes."[33] Furthermore, he recognized that DOE would manage the waste after it was delivered to a repository.[34]

In 1986, however, DOE's Inspector General (IG) issued a report on civilian contributions to the Nuclear Waste Storage Fund. In that report, the IG – without any apparent factual or legal analysis of the kinds of wastes or activities that had been undertaken at the site – listed West Valley along with other commercial sites, estimated West Valley HLW disposal costs to be $68.7 million and stated that DOE and the State of New York were required to enter into a fee contract for the costs of disposal.[35] This was the first time that DOE had indicated that the State would have to pay disposal fees in addition to what was held in the perpetual care fund, and, moreover, it was the first time DOE had designated the HLW at West Valley as non-defense waste under the NWPA. The IG's report acknowledged that the Cooperative Agreement required the State to turn over the perpetual care fund to DOE in 1997, and that DOE had assumed this fund with interest would adequately cover the estimated disposal costs of the solidified wastes, but nevertheless stated that an agreement – which would later be termed the "Standard Contract" – regarding additional fees was required.[36] DOE's 1986 change in position, contemporaneous

[33] Letter, Robert L. Morgan, Project Director, Nuclear Waste Policy Act Project Office, U.S. Department of Energy, to William Cotter, Chairman, New York State Energy Research and Development Authority (June 27, 1983).
[34] *Id.*
[35] U.S. Department of Energy, Office of Inspector General, Report on Accuracy of Fees Paid by the Civilian Power Industry to the Nuclear Waste Fund, DOE/IG-0231 (Oct. 27, 1986) ("IG Report").
[36] IG Report at 11-12.

with its significant upward revision to the estimated disposal costs, sparked 30 years of unsuccessful discussion and negotiation between DOE and NYSERDA to resolve this issue.

More recently, in October of 2016, members of the New York delegation urged DOE's leadership to correct the misclassification of West Valley waste,[37] and in January 2017, DOE's then-acting Assistant Secretary for Nuclear Energy responded to Congressman Higgins indicating openness to discussing "the potential disposal of West Valley HLW in a defense repository" with New York State.[38] Subsequent attempts to engage with DOE officials have been unavailing.

V. Atomic Energy Defense Activities at the West Valley Site

A. DOE Records and Other Public Records Indicate Atomic Energy Defense Activity

In addition to the statements in the legislative history regarding the defense-related character of West Valley activities, records in NYSERDA's possession and that NYSERDA has inspected show that the radioactive material shipped to and from West Valley was, in significant part, defense-related.

During its six years of operation, the NFS West Valley facility reprocessed approximately 640 metric tons of SNF. NYSERDA's review of the facility's historical records shows that approximately 25 percent of the SNF reprocessed at West Valley came from civilian nuclear power plants, and 15 percent came from research facilities or other power reactors under contract to the federal government. The majority of the fuel (60 percent or 380 metric tons) came

[37] Letter, Tom Reed, Member of Congress, at al., to The Hon. Dr. Ernest J. Moniz, Secretary, United States Department of Energy (Oct. 28, 2016).
[38] Letter, Raymond Furstenau, Acting Assistant Secretary for Nuclear Energy, United States Department of Energy, to The Hon. Brian Higgins (Jan. 13, 2017).

from the N-Reactor at the federal government's Hanford facility in Washington State under the AEC baseload agreement with NFS.

The N-Reactor was a "dual-use" nuclear reactor which generated plutonium for the nation's nuclear weapons program as well as electricity for the Washington Public Power Supply System.[39] NFS records from the time show that initial shipments of N-Reactor fuel sent to West Valley for reprocessing in 1966 had very low burn-ups, indicative of fuel from the N-Reactor that was intended for plutonium-production.[40] Records also show that the first two lots of N-Reactor fuel were received at West Valley for reprocessing prior to the initiation of electrical generation operations at the N-reactor, meaning that irradiated fuel, originating from the N-Reactor at the time it was in its weapons-production-only mode, was reprocessed at West Valley.[41]

The NFS West Valley plant produced plutonium nitrate and uranyl nitrate solutions. Approximately 80 percent of the plutonium nitrate recovered by NFS at West Valley was shipped directly back to Hanford.[42] As part of a directive from the DOE Secretary in the early 1990s to declassify plutonium information, DOE reviewed information on the plutonium provided to the AEC from West Valley.[43] DOE's analysis showed that, of the 1,530 kg of

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[39] Gerber, M., *The Plutonium Production Story At The Hanford Site: Processes And Facilities History* (June 1996) ("The Plutonium Production Story"), at 2-10 (indicating that in 1971, N-Reactor was ordered closed due to a diminished national need for defense plutonium production, making clear that defense plutonium production took place at the site in years prior).

[40] E.R. Johnson Associates Inc., *Review of the Operating History of the Nuclear Fuel Service, Inc. West Valley, New York Irradiated Fuel Processing Plant* (Dec. 26, 1980), Table 4-1 (Draft). The two, low burnup lots represent 20% of the N-Reactor reprocessing campaigns at West Valley.

[41] NFS Fuel Reception and Storage Logbook, p. 32, entries of shift staff Hartwell and Mosher, dated 3-11-1966.

[42] Plutonium & Uranium Recovery from Spent Fuel Reprocessing by Nuclear Fuel Services at West Valley, New York from 1966 to 1972, U.S. Department of Energy (Feb. 1996), *available at* http://pbadupws.nrc.gov/docs/ML1219/ML12194A610.pdf (last accessed May 2, 2016) ("Plutonium Recovery Report").

[43] *Id.*

plutonium received by the AEC from the West Valley facility, 635 kg originated from fuel or reactors that were AEC-owned and 895 kg came from commercial power-reactor fuel.[44] Of the 635 kg of AEC-origin plutonium, 534 kg of plutonium came from N-Reactor; 95 kg from the NFS facility in Erwin, TN; and 6 kg from the Bonus Reactor, an AEC-owned demonstration reactor in Puerto Rico.[45] DOE's 1996 report specifically acknowledges that not all of the recovered plutonium was used in the breeder reactor and zero power reactor programs at Hanford.[46] In addition, NFS records from the time show that the Pu-239 content of the initial shipments of plutonium nitrate to Hanford was very high (greater than 98 percent Pu-239), indicative of material that would have been used for weapons production.[47] In addition to plutonium, over 1.3 million pounds of uranium were recovered by NFS at West Valley for reuse. Approximately 99.8 percent of this uranium was shipped to the AEC's Fernald Feed Materials Production Center in Ohio.[48] This facility produced "high purity metals products for the U.S. defense program."[49] Fernald received enriched, natural and slightly depleted uranium from various sources, and processed those materials into uranium metal products for use by other sites in the nation's nuclear weapons complex.[50] At Fernald, depleted and slightly enriched uranyl

[44] *Id*. at 1.
[45] *Id*. at 13.
[46] *Id*. at 14 (stating that "[m]ost of the plutonium was used in the breeder reactor and zero power reactor programs.") (emphasis added).
[47] Plutonium Recovery Report at 10-12, 15; *see also* NFS shipping records in NYSERDA's possession and available upon request. For background, Pu-239 is the desirable isotope in weapons material along with a low Pu-240 content; Pu-240 is unwanted in nuclear weapons material. The more time that the fuel spends in the reactor, the more Pu-240 that is created in the spent fuel. AEC specifically "burned" fuel in the reactor for a much shorter time when they were looking to make weapons-grade plutonium. Regarding fuel entering West Valley, low burnup fuel is an indication of fuel that was "burned" for a weapons purpose; likewise, for recovered plutonium departing West Valley, a high Pu-239 content is indicative of weapons-grade material.
[48] *See* Plutonium Recovery Report at 2, indicating that 619.1 metric tons of uranium (MTU) out of 620 MTU was shipped directly to Fernald, and that the remaining 0.9 MTU of Highly Enriched Uranium was shipped to the Oak Ridge Y-12 plant.
[49] U.S. EPA Region 5 Superfund Fact Sheet, *available at* https://www3.epa.gov/region5/superfund/npl/sas_sites/ohio/OH6890008976.html (last visited May 9, 2016).
[50] See Fernald Production Processes and Products, https://www.lm.doe.gov/land/sites/oh/fernald_orig/50th/fppp.htm

nitrate solution (the form of the uranium received from NFS West Valley) was converted, through a number of chemical processes, to a uranium metal mass called a "derby."[51] Most of the Fernald derbies were melted into ingots, which were then extruded, heat treated, and machined into "target element cores."[52] The depleted uranium target element cores were shipped to the AEC's Savannah River Site, where they were bombarded with neutrons in the K-Reactor.[53] Through the neutron-capture process in the K-Reactor, the uranium-238 in the target element cores was converted into weapons-grade plutonium-239. The remaining 0.2 percent of the uranium recovered at West Valley (in the form of U-233) was shipped to the Oak Ridge Y-12 facility in Tennessee.[54]

Figure 1 below illustrates the origins and destinations of the nuclear materials processed and recovered during the NFS operation and shows the integrated nature of the NFS West Valley facility with the nation's nuclear weapons complex. Figure 2 is a detailed flow diagram showing the sequence of events whereby the 1.3 million pounds of depleted or low-enriched uranium recovered by NFS at West Valley would have been used in the weapons production process via the Fernald Feed Materials Production Center.

[51] *Id.*
[52] *Id*., and NIOSH, Feed Materials Production Center – Site Description, ORAU Team Dose Reconstruction Project, ORAUT-TKBS-0017-1, Rev 1, 2014.
[53] See Figure F.5, Head of the K Reactor, found at http://nonuclear.se/deltredici.f5.k.reactr.head.html
[54] Plutonium Recovery Report at 2.

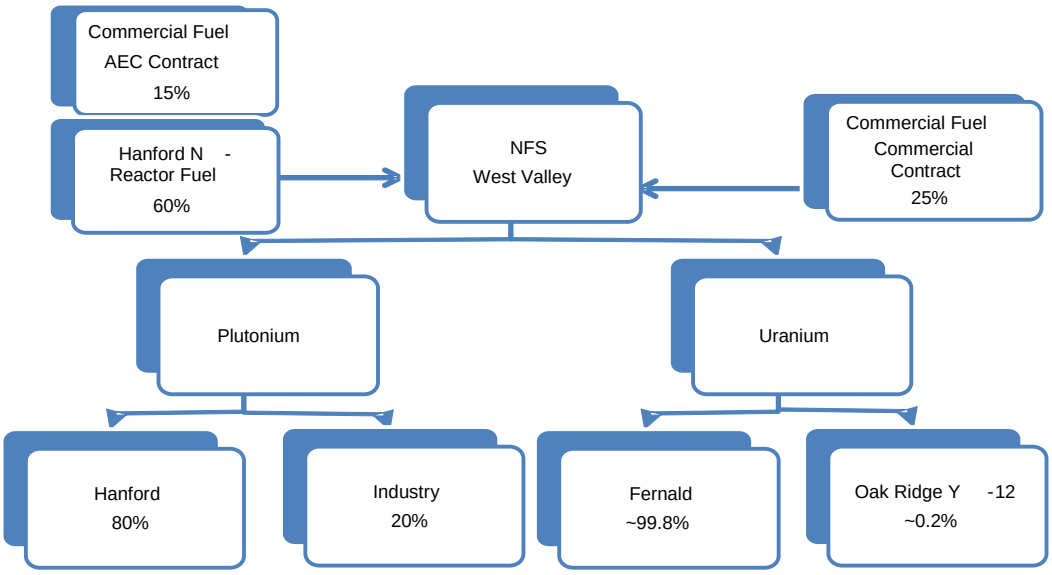

Figure 1. Origin and Destination of the Key Materials Received and Produced During Reprocessing Operations at West Valley.
Source: NYSERDA, based on review of historical NSF records

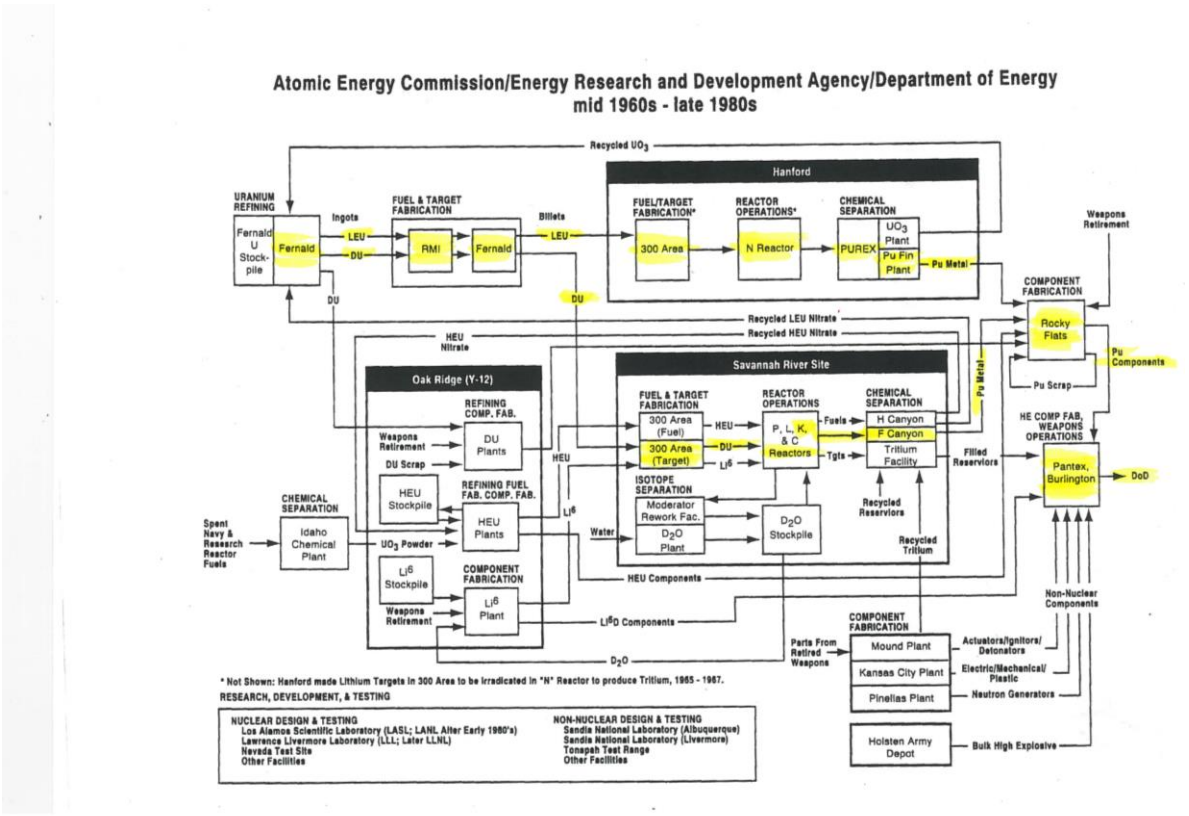

Figure 2. Process Path to Nuclear Weapons for Uranium Recovered by NFS at West Valley
Source: *Linking Legacies, Connecting the Cold War Nuclear Weapons Production Processes to their Environmental Consequences, DOE Office of Environmental Management, Jan 1997.*

B. Additional Indicia of Defense Activities at West Valley

Apart from the origin and destination of West Valley HLW, NFS records in NYSERDA's possession include references to additional defense-related work performed on the site. NFS and the West Valley facility served as a prime contractor for at least six U.S. Air Force contracts.[55]

[55] *See* National Archives, Military Prime Contract File (July 1, 1965-June 30, 1975); Records of Prime Contracts Awarded by the Military Services and Agencies (July 1, 1965-June 30, 1975), Record Group 330; *available at* Access to Archival Databases www.archives.gov (last accessed May 9, 2016). None of the six known U.S. Air Force contracts were synopsized, in accordance with Armed Services Procurement Regulation 1-1003.1 Exception 1, which states:

> Classified procurements, where the information necessary to be included in the Synopsis would disclose classified information or where the mere disclosure of the Government's interest in the area of the proposed procurement would violate security requirements, shall not be publicized in the Synopsis.[55]

These contracts, combined with other publicly available information, makes clear the defense-related nature of activities at West Valley. In particular:

(1) NFS employees were cleared through AEC channels, allowing for the dissemination of reprocessing information and information pertaining to the N-Reactor fuel elements, and another clearance path allowed NFS personnel to have access to Department of Defense (DOD) classified information at the SECRET level and below;[56]

(2) NFS was subject to regular inspections by the Defense Supply Agency (DSA), the first of which in available records was conducted on August 19, 1966 and focused on the security measures surrounding DOD classified information housed and generated within the West Valley facility;[57] and,

(3) in order to properly secure and maintain control of classified information, NFS established security protocols with the United States Post Office in West Valley, New York, which explicitly states that only three individuals were cleared to receive registered mail from either the AEC or the Air Force.[58]

This information and additional information that NYSERDA is seeking through requests for information to the Air Force and National Archives provide strong indicia that defense-related activities took place at West Valley, and it is reasonable to infer that the materials received and shipped from the facility were related to those defense activities.

From publicly available records at the National Archives it is possible to discern the potential nature of the contracts, based upon their federal supply class descriptions. Of the six contracts, three involved surveillance, two exploratory development, and the final contract provided consultant services.

[56] *See* Standard Practice Procedures Manual, Department of Defense Security Rules, Nuclear Fuel Services, Inc., 8.1-14, Rev. 3 (undated) at 3; *see also* Memorandum, R.B. Kelly, NFS Security Officer, to Employees Authorized to Use AEC Classified Documents (Sept. 25, 1970).

[57] Letter, Defense Supply Agency to NFS (Aug. 29, 1966) (summarizing DSA findings during an audit conducted on August 19, 1966).

[58] Letter, Milton A. Ausman to U.S. Post Office, West Valley, New York (Aug. 20, 1970).

C. Energy Employee's Occupational Illness Compensation Program

The federal government's Energy Employee's Occupational Illness Compensation Program (EEOICP) was established in 2001 to compensate individuals with a broad range of work-related illnesses throughout the Department of Energy's nuclear weapons complex.[59] Although DOE asserts that the West Valley waste is commercial waste, EEOICP materials identify the site during the period of 1966 through 1973 as an "atomic weapons employer, [60] and over $16 million in claims have been paid to date.[61] DOE's Office of Environment, Health, Safety, and Security webpage for the EEIOCP[62] includes the following information:

> **West Valley Demonstration Project**
>
> **Also known as**: Nuclear Fuels West Valley
> **Also known as:** Western New York Fuel Services Center
> **State:** New York
> **Location:** West Valley
> **Time Period:** Atomic Weapons Employer 1966-1973, Residual Radiation 1974-1979, DOE 1980 to present
> **Facility Type:** Atomic Weapons Employer/Department of Energy
>
> **Facility Description:** From 1966 to 1972, Nuclear Fuel Services, Inc., under contract to the State of New York, operated a commercial nuclear fuel reprocessing plant at the Western New York Nuclear Services Center. The plant reprocessed uranium and plutonium from spent nuclear fuel; sixty percent of this fuel was generated at defense facilities.

The characterization of the site as an atomic weapons employer from 1966 to 1973 by the EEOICP and DOE's Office of Environment, Health, Safety, and Security is consistent with the

[59] PUBLIC LAW 106–398—OCT. 30, 2000, NATIONAL DEFENSE AUTHORIZATION, FISCAL YEAR 2001
[60] DOE Covered Facility Database, Search term: West Valley, available at https://ehss.energy.gov; see also http://westvalleyctf.org/2008_Materials/2008-10-Materials/Energy_Employees_Occupational_Illness_Compensation_Program_Materials.pdf, at 5.
[61] https://https://www.dol.gov/owcp/energy/regs/compliance/statistics/WebPages/W_VALLEY_DEM.htm
[62]DOE Covered Facility Database, Search term: West Valley, available at https://ehss.energy.gov.

historical records that document the weapons complex activities conducted by NFS at West Valley during this time.

D. Disposal of N-Reactor Wastes

As described above, the N-Reactor at Hanford was used both for nuclear weapons plutonium production and for the generation of electricity. At Hanford, the K-Basin sludge (which consists largely of deteriorating N-Reactor fuel that was stored in the K-Basin after it was removed from the N-Reactor[63]), has been has been recovered, containerized, and is being stored prior to final repackaging for disposal at the Waste Isolation Pilot Plant (WIPP)[64]. The disposition of this material at WIPP suggests that DOE has determined that the N-Reactor sludges are defense waste, even though the N-Reactor was used for commercial power generation as well as weapons plutonium production. At West Valley, TRU wastes were also generated through defense and non-defense activities, but unlike the N-Reactor, DOE is labeling the West Valley waste as "commercial" rather than "defense" waste, effectively stranding the TRU at West Valley for the foreseeable future.

VI. DOE's GTCC EIS Does Not Provide a Viable Near-Term Disposal Path for West Valley TRU

Since the beginning of the West Valley Demonstration Project in 1982, DOE has generated approximately 34,000 cubic feet of TRU at West Valley. This waste must be stored on site, inconsistent with the requirement of the WVDPA that DOE dispose of the on-site TRU, because DOE's "commercial" designation of this waste makes it ineligible for disposal at WIPP.[65] This

[63] https://www.hanford.gov/page.cfm/K-Basins
[64] https://www.hanford.gov/page.cfm/STP
[65] The WIPP Land Withdrawal Act limits the mission of WIPP to the disposal of wastes from atomic energy defense activities.

creates a roadblock to the completion of the WVDP,[66] and means that scarce DOE Office of Environmental Management (EM) cleanup funds have to be expended for long-term TRU storage at West Valley.

In an effort to resolve the West Valley "orphan waste" TRU issue, DOE included the West Valley TRU in DOE's *Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Waste and GTCC-Like Waste* (DOE/EIS-0375)[67] (the West Valley TRU was evaluated in the GTCC EIS because DOE labeled it as "GTCC-like waste" for the purposes of the GTCC EIS[68]).

The GTCC EIS evaluated several disposal alternatives, including disposal at WIPP, disposal at other DOE sites, and disposal at generic commercial facilities. The preferred alternative identified in the EIS for the disposal of GTCC and GTCC-like waste was "land disposal at generic commercial disposal facilities and/or disposal at the WIPP geologic repository."[69]

In November 2017, DOE issued a report to Congress on GTCC disposal options and recommendations.[70,71] Unlike the approach identified in the preferred alternative in the GTCC FEIS, DOE's report to Congress eliminated the possibility of disposing the West Valley TRU at WIPP, stating that, "[because] full waste emplacement operations at WIPP are not expected until

[66] Section 2(a)(4) of the WVDP Act (Pub law 96-368) requires DOE to dispose of low-level waste and transuranic waste produced by the solidification of the high-level waste under the project.
[67] The GTCC Draft EIS was issued in February 2011, and the GTCC Final EIS was issued in February 2016.
[68] Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Waste and GTCC-Like Waste (DOE/EIS-0375)
[69] *Id.*
[70] The Energy Policy Act of 2005 requires that, prior to making a final decision on the disposal alternative or alternatives to be implemented regarding GTCC waste, the Secretary of Energy shall submit a report to Congress that describes the alternatives under consideration and await action by Congress.
[71] See *Alternatives for the Disposal of Greater-Than-Class C Low-Level Radioactive Waste and Greater-Than-Class C-Like Waste*, DOE Report to Congress, November 2017.

the 2021 timeframe, DOE is primarily considering disposal of the GTCC and GTCC-like waste at generic commercial facilities at this time."[72] The report to Congress also states that DOE has "no preference on the land disposal methods" that would be used at the generic commercial site.[73] This means that DOE's preferred option for disposing of the GTCC-like waste (*i.e.*, the West Valley TRU) does not include the identification of either a specific disposal facility or a disposal technology.

DOE has now completed the long-awaited GTCC FEIS and the required follow-up report to Congress. Unfortunately, the proposal for the disposal of GTCC-like waste identified by DOE is so general that it does not appear to identify an actionable path for disposal for the West Valley TRU.

VII. Long-Term Reauthorization of the Appropriation for West Valley Will Expedite and Make the Clean-up More Cost Efficient

NYSERDA also wishes to emphasize the importance of funding reauthorization. With a notable exception for the current fiscal year, funding for the West Valley cleanup has been lower than needed in recent years. A reauthorization of funding up to $75 million annually will ensure funding that is consistent with the $75 million annual funding level DOE presented in the 2010 Final Environmental Impact Statement; the funding level appropriated by Congress for the current federal fiscal year; and the funding level repeatedly requested by the West Valley Citizen Task Force. In the absence of appropriate funding levels, work is delayed, adding to the total project cost.

[72] *Id.*
[73] *Id.*

VIII. Conclusion

Reauthorization of the West Valley Demonstration project, and the appropriated annual funding included in H.R. 2389, is critical to New York. Without federal funds, West Valley is at risk for being the only DOE Environmental Management (EM) cleanup site in the nation where a state is responsible for the entire cost of disposing DOE-generated HLW. West Valley is also the only site in the nation where TRU waste, generated by DOE through an EM cleanup project, is prohibited from disposal at DOE's only operating, available TRU disposal facility because DOE has labeled the waste in a manner that is inconsistent with the NWPA. The issues discussed in this testimony, which continue to come into focus as NYSERDA gathers additional information from the extensive historical record at West Valley, make it ever-clearer that the HLW and TRU at West Valley originated from "atomic energy defense activities."

Over the last 36 years at West Valley, DOE and New York State have successfully overcome unique technical and legal challenges that could have delayed progress toward the safe and successful completion of the WVDP. Yet, DOE has offered no legal rebuttal to the clear points NYSERDA outlines above, leading NYSERDA to believe that legislation is the only path forward at West Valley. This designation will allow the TRU to enter the queue for disposal at WIPP and avoid delays in the shipment of HLW when a repository or consolidated interim storage facility becomes available.