RHS 8-7

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF RADIOLOGICAL HEALTH
William R. Snodgrass TN Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, TN 37243
615-532-0364

RADIOACTIVE MATERIAL LICENSE

Amendment 229

Pursuant to Tennessee Department of Environment and Conservation Regulations, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer radioactive material listed below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules and regulations of the Tennessee Department of Environment and Conservation and orders of the Division of Radiological Health, now or hereafter in effect and to any conditions specified below.

LICENSEE	
1. Name EnergySolutions Services, Inc.	3. License number R-79171-D27
	4. Expiration date April 30, 2027
2. Address 1790 Dock Street P.O. Box 13464 Memphis, Tennessee 38113	5. File no. R-79171

6. Radioactive Material (Element and Mass Number)	8. Chemical and/or physical form	9. Maximum Radioactivity and/or quantity of material which licensee may possess at any one time.
SEE SUPPLEMENTARY SHEETS		

10. Authorized Use

SEE SUPPLEMENTARY SHEETS

CONDITIONS

11. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.

For the Commissioner
Tennessee Department of Environment and Conservation

Date of Issuance: August 29, 2018

By: Charles Arnott

Division of Radiological Health
Charles Arnott, Environmental Consultant

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6. Radioactive Material (Element and Mass Number)	8. Chemical and/or Physical Form	9. Maximum Radioactivity and/or Quantity of Material Which Licensee May Possess at Any One Time
A. Mixed activation and fission products with atomic numbers 1-83 inclusive, and other radionuclides with atomic numbers 84-92 (except Uranium 233, Uranium 235, and Iron 55), and 95-100 inclusive	A. Any form suitable for transport under U.S. Department of Transportation Regulations (oxides metallic residues, organic and inorganic); not to include sealed sources	A. 750 Curies
B. Uranium enriched in the U-235 isotope	B. Same as 8A.	B. 350 grams of contained U-235 *
C. Uranium 233	C. Same as 8A.	C. 200 grams *
D. Plutonium	D. Same as 8A.	D. 200 grams * and 2 Curies
E. Iron 55	E. Same as 8A.	E. 250 Curies
F. Transuranics (not Pu or Am-241)	F. Same as 8A.	F. 2.5 Curies

* For each kind of special nuclear material, determine the ratio between the quantity of that special nuclear material and the quantity specified here for the same kind of special nuclear material. The sums of such ratios for all kinds of special nuclear material in combination shall not exceed "1" (i.e., unity).

G. Uranium (depleted and natural)	G. Same as 8A.	G. 20 Curies **(See Condition 31)**

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H. Any radioactive material (except special nuclear material)	H. Sealed sources (Model numbers listed in NRC Registry of Sealed Sources and Devices), surface-deposited disc and plane sources and volumetric reference sources	H. No single source to exceed 5 millicuries. Total not to exceed 10 millicuries
I. Cesium 137	I. Sealed source (Models listed in NRC Registry CA0598D106S)	I. One (1) source not to exceed 200 millicuries

10. Authorized Use

A. through G.

1. Receipt, possession, storage, handling, unpackaging, packaging, transport, transfer, processing, decontamination, sampling and analysis, release for unrestricted use, and the Bulk Waste Assay Program (BWAP) in the performance of Memphis Facility operations.

2. The licensee is authorized to receive, store, or transfer – as radioactive activation products inherent in, or radioactive contamination on - nuclear power plant components, (see note), accessories, (see note), and other equipment and components authorized by a license issued by the United States Nuclear Regulatory Commission, any Agreement State, a Licensing State, or by the Atomic Energy Act. This authorization shall be in accordance with conditions of this license provided the following condition is met:

   No items, other than nuclear power plant components, accessories, and reusable equipment owned by the company, clients, and others may be stored under this license for a period of time greater than 365 days.

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3. The licensee is authorized to modify nuclear power plant components, (see note), accessories, (see note), and other equipment and components.

4. The licensee is authorized to perform mechanical, physical, and chemical decontamination on nuclear power plant components, (see note), accessories, (see note), and other equipment, components and materials suitable for decontamination.

NOTE:
Nuclear power plant components and accessories are herein defined as follows:

Components - contaminated vessels and heads, control rods, pumps, steam generator tubes, steam generators, control rod drive assemblies, valves, heaters, heat exchangers, pressurizers, tanks, meters, fans, turbines, electrical generators, ejectors, dryers, separators, and any other item necessary to the operation or safety of an operating nuclear power plant.

Accessories - tools used in assembling, disassembling, testing, and handling of nuclear power plant components.

5. The licensee is authorized to receive and process radioactive material from unlicensed facilities or sites for decontamination or disposal.

H. For use in instrumentation standardization and calibration.

I. For use in a J. L. Shepherd Model 28-5A Low Range Beam Calibrator for purposes of calibration of portable radiation detection equipment.

Conditions (continued)

12. The licensee shall comply with applicable provisions of 0400-20-04, 0400-20-05, 0400-20-10, and 0400-20-13 of "State Regulations for Protection Against Radiation."

13. Radioactive material authorized by this license may be used and stored only at Energy*Solutions* Services, Inc., 1790 Dock Street, Memphis, TN.

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14. A. Radioactive material authorized by this license shall be used by, or under the supervision of,

Robert Collins	Ralph H. Pena, Jr.
Abigail Jimenez	Jason Wade

B. An authorized user shall be present on site during chemical decon operations, grit blasting operations, thermal cutting, and high radiation area work. An authorized user shall be available for telephone consultation during periods when other activities are being conducted on the site. A Health Physics Technician shall be on site during work in Radiologically Controlled Areas associated with this license.

C. The Radiation Safety Officer for this license is Ralph H. Pena, Jr.

15. A. The licensee shall develop and maintain a written radiation protection manual that ensures the implementation of the radiation protection program in accordance with "State Regulations for Protection Against Radiation" (SRPAR), ALARA, and documents referenced in conditions of this license. Changes to this manual require prior written approval from the Department. Departmental approval of the current revision of this manual [Energy*Solutions* Tennessee Radiation Safety Guide (RSG-1)] also conveys its approval under other Tennessee Energy*Solutions* licenses.

B. In addition, the licensee shall develop and implement written standard operating procedures to ensure all activities involving the handling and/or use of radioactive materials authorized by this license are carried out in a manner consistent with SRPAR, ALARA, the licensee's Radiation Protection Manual, and the documents referenced in conditions of this license.

C. These procedures may be modified without prior approval of the Department when deemed appropriate and documented by the Radiation Safety Officer. However, adherence to the current procedures as written shall be considered a condition of this license. The written procedures required by this condition shall be available for inspection by the Department. A copy of the current procedures shall be forwarded to the Department upon request.

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16. In addition to other requirements of this license or of 0400-20-05-.60 "State Regulations For Protection Against Radiation," the licensee shall conduct operations so that radiation levels in unrestricted areas would not cause an individual, assuming an occupancy of one (1), to receive a total effective dose equivalent in excess of 500 millirems in one calendar year. These radiation levels shall be appropriately monitored by the licensee, and records of such monitoring shall be maintained for inspection by the Department. For calculational purposes of this condition, the licensee shall base its anticipated exposure to a member of the public upon the sum of the maximally exposed dosimeter and the highest air concentration derived using the latest available pertinent data.

17. No radioactive material (excluding calibration and standardization sources and as referenced In Items 10.A.-G. 2. of this license and RSG-1) or radioactive waste may be possessed under this license, from its time of receipt, until its transfer from the facility, for a period of time greater than three hundred sixty-five (365) days.

18. No radioactive material or radioactive waste may be stored so as to exceed the following stacking limits except for 6400 square feet in Building D which may be stored up to 20 feet nominal:

Container Type	Stacking Limit
1. Drums	3 high
2. B-25 Boxes	3 high
3. B-12 Boxes	5 high
4. Sea-Land Containers	1 high
5. Any other strong tight container	10 feet nominal unless the natural height of the container exceeds 10 feet

This condition also includes "waste radioactive material" generated under the authority of this license.

19. The licensee shall maintain complete and accurate records of the receipt and disposal of radioactive material. The licensee shall, for radioactive material no longer useful for any purpose and for any equipment or supplies contaminated with such material for which further use and decontamination is not planned, define those materials as radioactive waste and treat them as such in accordance with the following provisions:

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A. Radioactive waste material shall not be stored with non-radioactive waste.

B. A written record of all radioactive waste material shall be maintained until it has been determined by a suitable survey or radioassay that it has decayed to background levels or until it has been shipped to an authorized recipient in accordance with all applicable regulations. Accountability of radioactive waste material prepared for shipment but not yet shipped from the licensee's premises shall be maintained by the licensee by an internal record system such that the licensee is constantly aware of the material's location and the proposed time of shipment. Individuals who are involved in the shipping of such material and/or the storage of such material prior to shipment, shall be trained in the precautions necessary for such handling and storage.

C. For material which has decayed to background levels as determined by radioassay or external level as measured with appropriately calibrated instruments, records shall indicate that the material was determined to be no longer radioactive and will indicate the methods and results of the survey or analysis.

D. Shipment records of radioactive waste material shall be maintained and the licensee shall require written confirmation from the authorized recipient of such material that this material has been received.

E. All records and written confirmations required by this condition shall be maintained for inspection by the Department.

The requirements for this condition are in addition to any other requirements for the handling and/or disposal of radioactive material contained in this license and "State Regulation for Protection Against Radiation."

20. The licensee shall not accept either radioactive waste and/or items contaminated or potentially contaminated with licensable quantities of radioactive material or radioactive materials or items from licensable activities for repackaging, processing, storage pending transfer/disposal, or transfer/disposal unless the shipper of such waste possesses a valid license for delivery issued pursuant to 0400-20-10-.32 of "State Regulations for Protection Against Radiation."

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21. Written assurances must be furnished by the facility shipping the radioactive material indicating that the facility may accept return of the material processed or unprocessed. In addition, for states outside the Southeast Compact the state or appropriate Compact must be a signatory to the Interregional Access Agreement for Waste Management or assurances shall be obtained from the appropriate state governor's office, the state radiation control program, and the appropriate Compact official, if any.

22. The licensee shall establish in every contractual obligation relating to radioactive materials the ability to return radioactive materials, processed or unprocessed, to the prior licensed or exempt possessor.

23. The licensee is authorized to store containers of licensed radioactive material outside in accordance with statements, representations, and procedures contained in documents referenced in conditions of this license.

24. The licensee is authorized to stage containers of radioactive material in areas not covered by financial assurance provided that no individual container is present for more than 12 hours. This authorization is for licensed material for future work or for licensed material that meets surface free release criteria as evidenced by survey. Except for surface contaminated material that meets free release criteria, waste shall be staged in closed containers on paved surfaces with no opening of containers or loading of wastes.

25. Radioactive material, contaminated equipment, and empty radioactive material containers may be stored in accordance with statements representations, and procedures contained in documents referenced in this license, provided that radiation levels for unrestricted areas are not exceeded. This material must be stored in either locked DOT intermodal containers as described in Title 49 Code of Federal Regulations (CFR), Part 171.8 or DOT approved strong tight containers. In addition to these requirements the following criteria and restrictions must be adhered to whenever radioactive materials are stored:

    1. Containers used for outside storage of radioactive materials must be capable of withstanding environmental conditions.

    2. Radiation levels from stored empty containers shall not exceed an average of 0.5 mR/hr, and hot spot activity shall not exceed 2 mR/hr.

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3. Outside storage of containers with radioactive waste and/or DOT Empty containers is only permitted in paved (asphalt or concrete) areas. Storage on grass, dirt, or gravel is specifically prohibited.

4. Soil samples must be collected and analyzed at least quarterly along the edges of outside asphalt or concrete pads where radioactive materials are stored and along the perimeter fence to ensure that there is no buildup of radioactive contamination. Data from these samples must be maintained for inspection by the Department.

5. Each designated outside storage area shall be equipped with identifiable markers (sign postings) at each corner to clearly identify the boundary of the bonded storage area. In addition, the space between these markers can be painted or otherwise marked to identify the storage area.

6. Energy*Solutions* Empty containers are permitted to be stored on any surface (e.g. paved, grass, dirt, or gravel) within any area of the facility that is routinely monitored by the environmental sampling program for radioactivity per the RSG-1.

7. Green is Clean Empty containers may be stored in any location within the facility.

26. The licensee in making disposal of radioactive wastes to the sanitary sewerage system shall do so in conformity with 0400-20-05-.122 of "State Regulations for Protection Against Radiation."

27. The following evaluations shall be performed for all process ventilation systems:

1) Air balance within the RCA at least semi-annually, and following any ventilation system or process changes which could potentially alter the effectiveness of the system.

2) Particulate removal efficiency of the main filtration system HEPA filters by DOP or comparable testing in accordance with pertinent ANSI standards immediately following installation of new HEPA filters or at least semi-annually.

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28. A. Sealed sources authorized by this license in Items H and I shall be tested for leakage and/or contamination at intervals not to exceed six (6) months. In the absence of a certificate from a transferor indicating that a test has been made within six (6) months prior to transfer, the sealed source shall not be put until use until tested.

    B. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surface of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak tests shall be kept in units of microcuries and maintained for inspection by the Department.

    C. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Department regulations. A report shall be filed within five (5) days of the test with the Division of Radiological Health, Tennessee Department of Environment and Conservation, William R. Snodgrass Tennessee Tower, 15th Floor, 312 Rosa L. Parks Avenue, Nashville, Tennessee, 37243, describing the equipment involved, the test results, and the corrective action taken.

    D. Tests for leakage and/or contamination shall be performed by the licensee or by other persons authorized by this Department, the U.S. Nuclear Regulatory Commission, or another Agreement State to perform such services.

29. The licensee shall not open or remove sealed sources containing radioactive material from their respective source holders.

30. Notwithstanding the periodic leak test required by Condition 28, any licensed sealed source is exempt from such tests when the source contains 100 microcuries or less of beta and/or gamma emitting material or 10 microcuries or less of alpha emitting material.

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31. **In addition to the possession limits in Item 9, the licensee shall further restrict the possession of licensed material to quantities below the limits specified in "State Regulations for Protection Against Radiation" (SRPAR) 0400-20-10-.13(20) which require consideration of the need for an emergency plan for responding to a release of licensed material. The possession of a single container in excess of fifty (50) kilograms (kg) of Uranium Hexafluoride (UF6) in accordance with SRPAR 0400-20-10-.13(20)(b)1.(i) is authorized until December 31, 2018.**

32. The licensee is authorized to receive, possess, and use any radioactive material distributed under a general license, issued by the U.S. Nuclear Regulatory Commission, or another Agreement State, without being specifically referenced in Items 6, 8, 9 and 10 of this license. Notwithstanding any other conditions of this license, the general licensee may possess and use radioactive material received under the provisions of 0400-20-10 of "State Regulations for Protection Against Radiation" in accordance with the requirements provided at the time of the transfer of the radioactive material under the terms of the general license.

33. The licensee is authorized to release solid materials and equipment for unrestricted use in accordance with the surface contamination criteria in NRC NUREG-1757, Volume 1, Revision 2, section 15.11.1.1, "Release of Solid Materials with Surface Residual Radioactivity" (Materials Licensees), and MARSAME NUREG-1575, Supplemental 1, Table E.2 for tritium.

34. The combined authorization for processing and storage granted by this license shall not exceed a total of 132,462 square feet. The licensee is required to provide $5,563,404.00 (five million five hundred sixty three thousand four hundred four US Dollars) in financial assurance monies in accordance with "State Regulations for Protection Against Radiation" 0400-20-10-.12(4).

35. Bulk Survey for Release (BSFR)

    A. The licensee is authorized to conduct the Bulk Waste Assay Program (BWAP) which includes Green is Clean (GIC) processing, Safe Check gamma processing, Safe Check non-gamma processing, and Decay Check processing. The BWAP shall be conducted in accordance with statements, representations, and procedures contained in

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documents referenced in conditions of this license. The Radium 226 disposal limit for North and South Shelby Landfills is 5 pCi/gram each.

B. The licensee is authorized to implement BWAP Safe Check and Decay Check Conditional Release Limits for North and South Shelby Landfills in accordance with statements, representations, and procedures contained in documents referenced in conditions of this license.

C. Records for all disposals made under this condition shall be submitted quarterly to the Division of Radiological Health, William R. Snodgrass Tennessee Tower, 15th Floor, 312 Rosa L. Parks Avenue, Nashville, TN 37243. Monitoring of materials for contamination for release as authorized by this condition is only to be conducted at the licensee's facilities specified in Condition 13, and not at customer or other job sites.

D. The licensee shall meet the requirements of the March 2017 "Licensing Requirements for Evaluation and Acceptance of Licensee Requests for the Disposal of Materials with Extremely Low Levels of Contamination in Class 1 (Subtitle D) Landfills."

E. For calendar year 2018 the licensee is approved to dispose of 871 tons of material in the North Shelby Landfill and 1279 tons of material in the South Shelby Landfill.

36. A. The Box Assay System shall be operated in accordance with the requirements and specifications found in the "Technical Basis for Design and Calibration of the Energy*Solutions* Box Assay System," Revision 2. Additionally, the waste density shall not exceed 3.0 g/cc, the volume of waste assayed in any single container shall have multiple counts to ensure each four-foot by six-foot cross section (or less) of the container or item is assayed by the system.

B. The GARDIAN Assay System shall be operated in accordance with the requirements and specifications found in the "Technical Basis for Design, Calibration, and Operation of the GARDIAN Mobile Assay System," Revision 0.

37. An exemption is granted to the requirements in 0400-20-05-.115(3) of "State Regulations for Protection Against Radiation" that a package received during normal

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working hours shall be monitored within 3 hours, and that a package not received during normal working hours shall be monitored no later than 3 hours after the beginning of the next working day. Instead, the licensee may monitor a package received during normal working hours within the shift that it is received, or for a package not received during normal working hours may monitor that package within the first shift of the next working day. This authorization does not relieve the licensee from monitoring packages as soon as practical after receipt.

This exemption may be withdrawn or modified by the Department at any time it is determined necessary to protect the public health and safety or if it is found that the conditions on which this exemption is based have been violated.

38. No provision of this license relieves the licensee from compliance with other Federal, State, and local laws, ordinances, and regulations applicable to the licensee's activities.

39. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material described in Items 6, 8, and 9 of this license in accordance with statements, representations, and procedures contained in the following:

- Application dated November 9, 2016, with attachments
- Letters dated February 22, 2017, with attachments, November 14, 2017, with attached Energy*Solutions* Tennessee Radiation Safety Guide (RSG-1), Revision 11, December 5, 2017, **April 3, 2018, with attachments, and August 23, 2018, with attachments**.