STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF RADIOLOGICAL HEALTH
WILLIAM R. SNODGRASS TENNESSEE TOWER, 15TH FLOOR
312 ROSA L. PARKS AVENUE
NASHVILLE, TENNESSEE 37243

April 25, 2017

Erwin Resin*Solutions*, LLC
151 T.C Runnion Road
Erwin, Tennessee 37650

Attention: Justin Fox, Radiation Safety Officer

This letter is written to notify you that we are in receipt of your application for renewal of Tennessee Radioactive Material License Number R-86011-E17. In accordance with "State Regulations for Protection Against Radiation" 0400-20-10-.18(2) (see below), this license will not expire until the application has been finally determined by this Department.

If anyone wishes to know the status of this renewal, please have them contact me at (615) 532-0364.

Sincerely,

Charles Arnott

Charles Arnott
Environmental Consultant
Division of Radiological Health

0400-20-10-.18

(2) In any case in which a licensee, not less than thirty (30) days prior to expiration of his existing license, has filed an application in proper form for renewal or for a new license authorizing the same activities, such existing license shall not expire until the application has been finally determined by the Department.

RHS 8-7

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

# RADIOACTIVE MATERIAL LICENSE

## Amendment 52

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: Erwin Resin*Solutions*, LLC | 3. License number: R-86011-E17 |
| | 4. Expiration date: May 31, 2017 |
| 2. Address: 151 T.C. Runnion Road, Erwin, Tennessee 37650 | 5. File no.: R-86011 |

| 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: September 12, 2017

By: _____
Division of Radiological Health
Ronald J. Parsons, Environmental Consultant

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## Supplementary Sheet

| 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 number 2-92 inclusive, except for C-14 and Fe-55 | A. Ion exchange resins and filter media; organic cleaning solutions of low activity used to clean the secondary side of the PWR steam generators and other heat exchangers; waste oils including hydraulic fluids and anti-freeze, and sludge, which can also be well characterized, which are non-hazardous (e.g., not mixed wastes), and which are very low activity; any form necessary for the operation of the pyrolysis process, and any secondary waste resulting from the pyrolysis process, including waste ion exchange resins and organic filter media. Sealed sources for disposal not to exceed 1 curie per single source, total aggregate source activity not to exceed 100 curies. | A. 5000 curies total |
| B. Hydogen 3 | B. Same as 8.A. | B. 2000 curies |
| C. Carbon 14 | C. Same as 8.A. | C. 3000 curies |
| D. Iron 55 | D. Same as 8.A. | D. 8000 curies |
| E. NARM | E. Same as 8.A. | E. 2 curies |
| F. Source material | F. Same as 8.A. | F. 200 pounds |

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| | | |
|---|---|---|
| G. Transuranics (excluding plutonium) | G. Any | G. 2.5 curies |
| H. Uranium 233 | H. Same as 8.A. | H. 200 grams * |
| I. Uranium enriched in isotope Uranium 235 | I. Same as 8.A. | I. 350 grams of Uranium 235 * |
| J. Plutonium | J. Same as 8.A. | J. 200 grams and not to exceed 2 curies * |
| K. Any radioactive material excluding special nuclear material | K. Sealed sources (any source that has been evaluated and approved for distribution under a license issued by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State, or Licensing State, as appropriate) | K. No single source to exceed the activity authorized for that source in the Registry of Sealed Sources and Devices maintained by the U.S. Nuclear Regulatory Commission. No single source to exceed 5 millicuries. |

* 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).

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10. Authorized use

A. through J. Thermal treatment (pyrolysis) of low-level radioactive waste in accordance with statements, representations, and procedures contained in documents referenced in conditions of this license. In addition the licensee may perform the following activities in support of this authorization:

- Shipment and receipt of radioactive material in accordance with SRPAR and D.O.T. regulations
- Packaging and repackaging of radioactive material and waste

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- Storage of waste, in-process material, and contaminated equipment and materials
- Decontamination of packages, materials, equipment, containers, buildings, and areas
- Disposal of calibration and reference standards
- Laboratory analysis and testing of samples
- Process development and testing activities
- Treatment of effluents
- Maintenance and repair of facilities, systems, packages, and portable process equipment
- Additional operations, maintenance, testing and modifications of permanent and portable process equipment directly related to equipment used to load and transport waste to the facility from the generator and to transport waste from the facility back to the generator or disposal site as described in Section 4.2.2 of the application
- Dewatering and drying of incoming, in-process, and secondary wastes
- Receipt of containers that contain inorganic generally non-compactable materials; where these materials have considerable void space; with the intention of packaging SPF reformed residue to consume void space of the container such that void space is less than 15%
- Receipt of containers that contain sludge materials which have been characterized radiologically and certified that the material is not a RCRA or TSCA regulated waste
- Receipt for possession, consolidation, packaging and transfer of sealed sources received for disposal only
- Sources amenable for processing would be introduced into the pyrolysis system in conjunction with the appropriate waste class and transferred to a container destined to be loaded with SPF RR

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K. Possession and use of calibration and reference standards.

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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 shall be used and stored at Erwin Resin*Solutions*, LLC, 151 T. C. Runnion Road, Erwin, TN.

14.A. Radioactive material authorized by this license shall be used by, or under the supervision of, individuals who have been designated as Authorized Users by the Radiation Safety Officer and who have satisfied the training requirements of the license. Records of designation and training shall be maintained for inspection by the Department. An Authorized User or his designee shall be on site during periods of operation involving the handling or processing of radioactive material.

B. The Radiation Safety Officer for this license is Justin Fox.

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. Department 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 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 Chapter 0400-20-05-.60 of "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 TLD (or equivalent dosimeter) and the highest air concentration derived using the latest available pertinent data.

17. No radioactive material (excluding calibration and standardization sources) 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. Exceptions are listed as follows:

    1. Equipment or a product, specifically licensed or otherwise authorized, and stored on-site for future use: (1) at a location authorized by an EnergySolutions Tennessee Radioactive Material License or (2) at a location where such material is authorized by the agency having jurisdiction.

    2. Up to 1000 cubic feet of radioactive waste may be stored for an unlimited period of time. Radioactive waste stored under this provision shall not include TRU wastes (wastes containing concentrations greater than 100 nCi/gm of transuranics) or mixed wastes (radioactive wastes which exhibit the characteristics outlined in Subpart C of 40 CFR Part 261 or radioactive wastes which contain hazardous wastes listed in Subpart D of 40 CFR Part 261). The licensee shall maintain records of the receipt and storage of this material such that its volume and location are readily identifiable.

18. No radioactive material or radioactive waste may be stored so as to exceed the following stacking limits:

| Container Type | Stacking Limit |
|---|---|
| Drums | 3 high |
| B-25 Boxes | 3 high |
| Sea Land Cont. | 1 high |
| HICS | 3 high |
| Thor Liners | 2 high |
| Any other strong tight container | 10 feet nominal |

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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:

    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 Regulations for Protection Against Radiation."

20. The licensee may release radioactive material into the sanitary sewerage system in accordance with 0400-20-05-.122 of "State Regulations for Protection Against Radiation."

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21. 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 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."

22. 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.

23. 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.

24. 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.

25. A. Sealed sources authorized by this license in Item K 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 into use until tested.

    B. The tests shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample, or in the case of radium, the escape of radon at the rate of 0.001 microcurie or more per 24 hours. 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.

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C. If the test reveals the presence of 0.005 microcurie or more of removable contamination, or in the case of radium, the escape of radon at the rate of 0.001 microcurie or more per 24 hours, 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 other persons authorized by this Department, the U. S. Nuclear Regulatory Commission, another Agreement State, or a Licensing State to perform such services.

E. Sealed sources need not be tested if they are in storage and are not being used; however, when they are removed from storage for use or transferred to another person and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source shall be stored for a period of more than 2 years without being tested for leakage and/or contamination.

26. Notwithstanding the periodic leak test required by Condition 25, any licensed sealed source is exempt from such leak 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.

27. The licensee shall not open sealed sources containing radioactive material.

28. The licensee shall conduct a physical inventory every six (6) months to account for all sealed sources received and possessed under this license. Records of inventories shall be maintained for inspection by the Department.

29. 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" 0400-20-10-.13(17)(a) which require consideration of the need for an emergency plan for responding to a release of licensed material.

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30. The licensee is authorized to use American National Standard Institute (ANSI) HPS N13.41-1997, Criteria for Performing Multiple Dosimetry, to calculate the effective dose equivalent (EDE) for external radiation exposures when demonstrating compliance with total effective dose equivalent (TEDE). The dose readings from all dosimeters used in making these calculations shall be maintained for inspection by the Department.

31. The licensee is authorized to release surface contaminated materials for unrestricted use as long as a survey confirms that contamination levels are below the clean area limits in 5.4.1 of the licensee's application dated October 12, 2006, with attachments.

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 "State Regulations for Protection Against Radiation", 0400-20-10 in accordance with the requirements provided at the time of transfer of the radioactive material under the terms of the general license.

33. The licensee has provided $814,128.00 US (eight hundred fourteen thousand one hundred twenty eight US Dollars) in financial assurance monies in accordance with "State Regulations for Protection Against Radiation" 0400-20-10-.12(4). This financial assurance shall be in accordance with letters from Energy*Solutions* dated March 4, 2014, with attachments, March 19, 2014, and March 20, 2014, with attachments.

34. Notwithstanding Condition 17 of this license, the licensee is authorized to possess the EDF sample of irradiated graphite originally received February 16, 2010, through June 15, 2015 in accordance with statements, representations, and procedures contained in letters dated November 12, 2010, August 4, 2011, November 22, 2011, and May 8, 2014.

35. Notwithstanding Condition 17 of this license, the licensee is authorized to possess material received December 16, 2013, until June 16, 2015, in accordance with statements, representations, and procedures contained in letter dated October 13, 2014.

36. Notwithstanding Condition 17 of this license, the licensee is granted a six month extension for storage on site of material identified as waste between December 11, 2013, and April 25, 2014, in accordance with statements, representations, and procedures contained in letter dated November 3, 2014.

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37. 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.

38. 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 October 12, 2006, with attachments
    - Letters received July 26, 2007, August 7, 2007, with attachments, December 19, 2007, with attachment, January 10, 2008, and February 22, 2008
    - Letters dated April 25, 2005, January 5, 2006, January 20, 2005, with attachments (received January 25, 2006), October 16, 2006, March 29, 2007, with attachments, April 25, 2007, with attachments, May 2, 2007, with attachments, and June 14, 2007, July 24, 2007, with attachments, August 18, 2008, with attachments, December 19, 2008, June 5, 2009, with attachments, September 4, 2009, with attachments, August 2, 2010, November 8, 2010, with attachments, November 12, 2010, May 31, 2011, July 8, 2011, August 4, 2011, November 22, 2011, May 3, 2012, with attachment, June 7, 2012, and October 26, 2012, with attachments, March 4, 2014, with attachments, March 7, 2014, March 19, 2014, March 20, 2014, with attachments, May 8, 2014, October 13, 2014, November 3, 2014, March 3, 2015, with attached Energy*Solutions* Tennessee Radiation Safety Guide (RSG-1), Revision 10, May 4, 2015, with attachments, August 6, 2015, with attachments, August 24, 2015, with attachment, November 30, 2015, with attachments, January 13, 2016, with attachments, and March 3, 2016, with attachments.