Instructions for Completing NRC's Uniform Low-Level Radioactive Waste Manifest

U.S. Nuclear Regulatory Commission

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INSTRUCTIONS FOR COMPLETING NRC'S LOW-LEVEL RADIOACTIVE WASTE MANIFEST

LISTED IN THESE INSTRUCTIONS ARE THE ITEMS OF INFORMATION THAT ARE FEDERALLY REQUIRED OR OTHERWISE NEEDED FOR THE COMPLETION OF THE UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST (NRC FORMS 540, 541, AND 542). AN EXPLANATION OR REFERENCE FOR EACH ITEM IS INCLUDED TO ASSIST YOU IN PROPERLY COMPLETING EACH FORM. PLEASE CALL THE DESIGNATED CONSIGNEE, THE U.S. NUCLEAR REGULATORY COMMISSION (301-415-6196), OR THE U.S. DEPARTMENT OF TRANSPORTATION (202-366-4488) IF YOU SHOULD NEED CLARIFICATION OF ANY OF THE ITEMS.

OBTAIN COPIES OF NRC'S UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST FORMS AND THE GENERAL INSTRUCTIONS FROM THE GRAPHICS AND ELECTRONIC COMPOSITION SECTION OF THE PUBLISHING SERVICES BRANCH, MAIL STOP T-4 E16, U. S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001 OR TELEPHONE 301-415-5877 OR E-MAIL ADDRESS <INTERNET:BAM1@NRC.GOV>.

SAMPLE NRC FORMS 540, 541, AND 542 ARE SHOWN AS EXHIBITS AT THE END OF THESE INSTRUCTIONS.

THE ONLY CHANGES BETWEEN REV. 2 AND REV. 1 OF THESE INSTRUCTIONS ARE (1) UPDATED INFORMATION FOR REQUESTING FORMS AND INSTRUCTIONS, (2) UPDATED SAMPLE FORMS THAT SHOW THE CURRENT OFFICE OF MANAGEMENT AND BUDGET CLEARANCE NUMBER AND (3) A MINOR CLARIFICATION TO THE CERTIFICATION STATEMENT ON NRC FORM 540.

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The Uniform Low-Level Radioactive Waste Manifest consists of the following forms:

(1) NRC Form 540 and 540A[1]: Uniform Low-Level Radioactive Waste Manifest (Shipping Paper) and continuation page;

(2) NRC Form 541 and 541A: Uniform Low-Level Radioactive Waste Manifest (Container and Waste Description) and continuation page; and

(3) NRC Form 542 and 542A: Uniform Low-Level Radioactive Waste Manifest (Manifest Index & Regional Compact Tabulation) and continuation page.

The entities who must comply with manifesting regulations are defined in Appendix G, Section I, to 10 CFR Part 20. Typically, all shipments of low-level radioactive waste for which the consignee is a licensed low-level radioactive waste disposal facility are subject to NRC manifesting requirements.

With exceptions as defined in the regulations, shipments of low-level radioactive waste (as determined by the consignor within the definitions in the regulation) to waste processors or waste collectors, prior to ultimate disposal of the radioactivity at a licensed disposal facility, are also subject to these manifesting requirements. Note that State or

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[1]Forms 540 and 540A and their respective instructions are based on Department of Transportation regulations, including changes issued on September 28, 1995 (60 FR 50292).

Compact manifesting requirements may encompass shipments beyond those defined by the NRC.

NRC Form 540 is to be completed by specified shippers of low-level radioactive waste intended for ultimate disposal at a licensed land disposal facility.

NRC Form 541 is to be completed by specified shippers of low-level radioactive waste intended for ultimate disposal at a licensed land disposal facility, unless agreement has been reached between appropriate parties to transmit the required information electronically.

NRC Form 542 should be completed by processors and collectors of low-level radioactive waste who are shipping low-level radioactive waste attributed to others for ultimate disposal at a licensed land disposal facility, unless agreement has been reached between appropriate parties to transmit the required information electronically.

Note: The NRC requires all users of the Uniform Manifest forms to report information in metric units, and all the forms have been developed for the use of metric units. Metric units are used in NRC Form 540 as permitted by DOT regulations, and required after April 1, 1997, with the exception of Item 18 (Total Weight or Volume) in which DOT allows the shipper to specify appropriate units. DOT allows reporting of English units following the International System of Units (SI). NRC Forms 541 and 542 are designed for metric reporting. However, if the consignor, consignee, and others having authority over reporting requirements agree, metric and English units may be used. In this case, the shipper may need to add the English units to the forms in a manner that prevents misinterpretation.

Note: Information in these instructions that is typed in *italics* is not required by Federal law or regulation. Radioactive shipments that are not manifested under NRC regulations must continue to comply with Department of Transportation (DOT) regulations.

NRC FORM 540: UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST (Shipping Paper)

NRC Form 540 must be completed for shipments of low-level radioactive waste intended for ultimate disposal at a licensed land disposal facility. The majority of the information on NRC Form 540 is needed to meet DOT shipping paper requirements for radioactive material shipments. The following are general instructions. Details regarding DOT requirements can be found in 49 CFR Part 172.

1. **Emergency Telephone Number** - The shipper is to provide an emergency response telephone number or numbers for use in the event of an emergency. If a single number applies to every entry on the shipping papers, enter this number in the space provided. If there are multiple numbers, each individual number must be entered in Item 11 immediately following the applicable description of the radioactive material. *Enter the name of the organization responsible for providing the emergency response information.*

   Note that additional emergency response information must be available and presented in accordance with 49 CFR 172.602.

2. **Is This an "Exclusive Use" Shipment?** - The shipper answers by checking "yes" or "no." See 49 CFR 172.203. If "yes," then specific instructions for maintenance of exclusive use shipment controls must be provided by the shipper to the carrier and must be included with the shipping paper as required at 49 CFR 173.403.

3. ***Total Number of Packages Identified On This Manifest*** - *Indicate the total number of packages listed on this manifest.*

4. **Does EPA Regulated Waste Requiring a Manifest Accompany This Shipment?** - If the answer to this question is "Yes," the shipper completes the applicable EPA manifest and attaches it to the NRC Form 540. *The shipper should also identify the EPA manifest number in the space provided (if acceptable to the consignee, the manifest number appearing in Item 8 of NRC Form 540 may be identical to the EPA manifest number).*

5. **Shipper** - Indicate the company or facility name, facility address, *contact person*, and telephone number. *If applicable, indicate the permit or other similar number assigned to the shipper by the appropriate host State in which the designated licensed disposal facility is located.* Indicate whether the shipper is a waste generator, collector, or processor, as defined in the regulation, by checking the appropriate box. *If you are a generator, enter one of the following letter codes (Government - G, Fuel Cycle Industry - FC, Nuclear Power - NP, University (Academic) - A, Medical - M, Industrial - I, Other - O) in the "GENERATOR TYPE" space. The space for a shipper identification number is provided for the shipper to record the number, if any, assigned to the shipper by the consignee or the designated disposal facility operator. A space provided under the heading, "SHIPMENT NUMBER," is for any use deemed appropriate by the shipper.*

6. **Carrier** - Indicate either the carrier's name, address, *contact person*, and telephone number, or the carrier's name and EPA identification number. Also include the shipping date. *Upon receipt of the shipment, an authorized carrier representative will acknowledge shipment receipt by signing and dating in the space provided.*

7. Enter the total number of pages for **EACH** set of NRC Forms (i.e., Forms 540 and 540A, Forms 541 and 541A, and *Forms 542 and 542A). In addition, identify the number of pages of additional information (e.g., host State) that requires a separate page or pages and is a part of this manifest. If an EPA manifest accompanies the NRC Forms, do not include its pages in Item 7.*

   If NRC Form 542 or additional pages are not part of this manifest, enter "None" in the appropriate blank.

   If only NRC Form 540 (and 540A, if necessary) is intended to physically accompany the shipment (e.g., the shipper is electronically or otherwise providing NRC Forms 541 and 542 and any additional information separately to the consignee), then this must be indicated by placing parentheses around the number of pages entered for NRC Forms 541, *542, and additional information.*

8. **Manifest Number** - A traceable manifest number of at least four number/letter characters must be entered by the shipper. This number may be dictated by the consignee of the low-level radioactive waste (e.g., the

waste processor, waste collector, or licensed disposal site operator) prior to the shipment.

9. **Consignee** - Indicate the company or facility name, address, contact person, and telephone number. Upon receipt of the shipment, an authorized person at the facility will acknowledge receipt of the shipment by signing and dating in the space provided.

10. **Certification** - The certification on the manifest must be signed and dated by the person responsible for the packaging and labeling operations. The person must also be authorized to sign on the behalf of the shipping company or facility.

11. **U.S. Department of Transportation Description (Including Proper Shipping Name, Hazard Class, UN ID Number, and Any Additional Information)** - The requirement for providing this information is contained within DOT regulations at 49 CFR 172.202. For purposes of transportation in commerce, DOT regulations at 49 CFR 172.101 provide a listing of hazardous materials. If this information is required, the shipper must use the exact descriptors, in the order specified, in the DOT regulations. Additional description requirements (e.g., indication of Reportable Quantity and NRC Certificate of Compliance, if applicable) are specified at 49 CFR 172.203.

12. **DOT "Radioactive" Label** - See DOT regulations at 49 CFR 172.203 and 49 CFR 172.403. Indicate the type of radioactive label that appears on the package (White - I, Yellow II, or Yellow III). The shipper does not need to repeat the word "RADIOACTIVE."

6. **Carrier** - Indicate either the carrier's name, address, *contact person*, and telephone number, or the carrier's name and EPA identification number. Also include the shipping date. *Upon receipt of the shipment, an authorized carrier representative will acknowledge shipment receipt by signing and dating in the space provided.*

7. Enter the total number of pages for **EACH** set of NRC Forms (i.e., Forms 540 and 540A, Forms 541 and 541A, and *Forms 542 and 542A). In addition, identify the number of pages of additional information (e.g., host State) that requires a separate page or pages and is a part of this manifest. If an EPA manifest accompanies the NRC Forms, do not include its pages in Item 7.*

   If NRC Form 542 or additional pages are not part of this manifest, enter "None" in the appropriate blank.

   If only NRC Form 540 (and 540A, if necessary) is intended to physically accompany the shipment (e.g., the shipper is electronically or otherwise providing NRC Forms 541 and 542 and any additional information separately to the consignee), then this must be indicated by placing parentheses around the number of pages entered for NRC Forms 541, *542, and additional information.*

8. **Manifest Number** - A traceable manifest number of at least four number/letter characters must be entered by the shipper. This number may be dictated by the consignee of the low-level radioactive waste (e.g., the

waste processor, waste collector, or licensed disposal site operator) prior to the shipment.

9. **Consignee** - Indicate the company or facility name, address, contact person, and telephone number. Upon receipt of the shipment, an authorized person at the facility will acknowledge receipt of the shipment by signing and dating in the space provided.

10. **Certification** - The certification on the manifest must be signed and dated by the person responsible for the packaging and labeling operations. The person must also be authorized to sign on the behalf of the shipping company or facility.

11. **U.S. Department of Transportation Description (Including Proper Shipping Name, Hazard Class, UN ID Number, and Any Additional Information)** - The requirement for providing this information is contained within DOT regulations at 49 CFR 172.202. For purposes of transportation in commerce, DOT regulations at 49 CFR 172.101 provide a listing of hazardous materials. If this information is required, the shipper must use the exact descriptors, in the order specified, in the DOT regulations. Additional description requirements (e.g., indication of Reportable Quantity and NRC Certificate of Compliance, if applicable) are specified at 49 CFR 172.203.

12. **DOT "Radioactive" Label** - See DOT regulations at 49 CFR 172.203 and 49 CFR 172.403. Indicate the type of radioactive label that appears on the package (White - I, Yellow II, or Yellow III). The shipper does not need to repeat the word "RADIOACTIVE."

If no label is required by DOT, place "NA" in this column.

13. **Transport Index** - See DOT regulations at 49 CFR 173.403. This is a dimensionless number, which, for nonfissile material packages, is equivalent to the radiation dose rate in millirem per hour at one meter from the surface of the package. The Transport Index is placed on the label of a package to designate the degree of control necessary during transportation. If reporting of the Transport Index is not required, place "NA" in this column.

14. **Physical and Chemical Form** - See DOT regulations at 49 CFR 172.203. Describe the physical form of the contents of the package as "Solid," "Liquid," or "Gas." List the most prevalent chemical form, e.g., cellulose, cement, metallic oxides. Additional generic information on material description may be included, as needed, to satisfy requirements of shipment consignee. Further information on the physical and chemical description of the waste is required on NRC Form 541.

15. **Individual Radionuclides** - See DOT regulations at 49 CFR 172.203 and official abbreviations at 49 CFR 173.435. List the radionuclides (as determined in DOT regulations at 173.433(f)) that are present in the transport package. The element symbol may be immediately followed by the nuclide's mass number, i.e., a dash is not needed. A semicolon and space should separate the listing of multiple nuclides.

16. **Total Package Activity in SI Units** - Report the total activity in the transport package in SI units (e.g., megabecquerels). If desired, this activity may also be reported in units of millicuries, in parentheses below the listing in SI units.

17. **LSA/SCO Class** - See DOT Regulations at 49 CFR 172.203. For a shipment of low specific activity material or surface contaminated objects, provide the appropriate group notation.

18. **Total Weight or Volume** - See DOT regulations at 49 CFR 172.202. Using the most appropriate units, identify the total weight or total volume (net or gross as appropriate) of the material identified in Item 11.

19. ***Identification Number of Package*** - *For each package, a package identification number, unique among the individual package identification numbers within the shipment, should be provided. Both numbers and letters may be used.*

DO NOT WRITE IN THE AREA LABELED "FOR CONSIGNEE USE ONLY." THIS AREA HAS BEEN LEFT BLANK INTENTIONALLY TO ALLOW EACH DISPOSAL FACILITY TO RECORD DISCREPANCIES, BURIAL INFORMATION, ETC. (THE INFORMATION IN THIS SPACE IS TO BE DETERMINED BY THE INDIVIDUAL CONSIGNEES.)

Use NRC Form 540A if additional space is needed to describe this shipment. Indicate the page number, total Form 540 and 540A pages, and the manifest number reported in Item 8.

NRC FORM 541: UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST (Container and Waste Description)

This form must be completed by shippers of low-level radioactive waste as defined on pages 2 and 3, unless the information is being transmitted electronically, as noted on page 3 of these instructions.

If waste shipments are to a consignee other than the disposal facility operator or are uncontainerized, not all the information is required by NRC regulations. For shipments of containerized waste to a consignee other than the disposal facility operator, the information requested under Items 5 through 10 of "DISPOSAL CONTAINER DESCRIPTION" and Item 16, "Waste Classification," is not required by NRC regulations. (Note that container information, however, may be required by the consignee.)

For all shipments of uncontainerized waste, Items 5, 6, and 10 are not applicable; the volume of the waste would be reported in Item 7, the weight of the waste in Item 8, and surface radiation levels in Item 9. For those uncontainerized wastes shipped to a consignee other than the disposal facility operator, the information requested in Items 9 and 16 is also not required by NRC regulations.

1. **Manifest Totals** - Indicate the total number of low-level waste disposal containers described on this manifest *(the total number of packages may be listed, if the consignee is not a licensed low-level waste disposal facility)*, the total net waste volume (cubic meters), and the total net weight (kilograms). Appendix G of 10 CFR Part 20 requires separate

manifest totals for tritium (H-3), C-14, Tc-99, I-129, U-233, U-235, plutonium, and uranium and thorium in source material. For the first four nuclides, enter the totals in megabecquerels (MBq) in the appropriate boxes. If the radionuclides are not present, place "NP" in the appropriate space. If the radionuclides are present in any of the containers within a shipment, but are identified in Item 15 in quantities no greater than the lower limit of detection (LLD), the quantities of these nuclides must be recorded as the sum of the respective LLD values (with the summed value included in parentheses). (Note that Item 15, beginning on page 18, would also be expanded to reflect the reporting of tritium (H-3), C-14, Tc-99, and I-129 below LLDs). If both detectable and quantities based on LLD values of radionuclides exist in containers making up a shipment, the sum of the detectable and "LLD-based" values must be reported separately, the latter in parentheses. The total activity for all nuclides on the manifest (excluding LLD values) must be indicated in the "ALL NUCLIDES" column.

Also indicate the total manifested quantity of uranium and thorium in source material (kilograms) and special nuclear material (grams), including uranium and thorium in unimportant quantities defined in 10 CFR 40.13. Note: The mass being requested is not the weight of the waste containing these nuclides. Ensure that the totals in grams for U-233, U-235, and plutonium equal the grand total of the weight of these nuclides in Special Nuclear Material.
Indicate the total number of disposal containers containing

each type of Special Nuclear Material in parenthesis after the quantity listing.

2. **Manifest Number** - Transfer the manifest number from NRC Form 540, Item 8.

3. Page 1 of _____ page(s) - Include the total number of Form 541 and 541A pages.

4. **Shipper Name *and ID Number*** - Same as reported in Item 5 of NRC Form 540.

   NOTE: SEE PREVIOUS DISCUSSION REGARDING THE COMPLETION OF ITEMS 5 THROUGH 10 ON FORM 541 .

5. **Container Identification Number/Generator ID Number(s)** - Provide a disposal container identification number unique among the individual container identification numbers within the shipment (both numbers and letters may be used). Also indicate ID number(s) of the generator(s) contributing waste to the disposal container. If more than one disposal container is assigned to a single generator, the generator ID number need not be repeated. Note that the definition of "generator" identified in this item includes (a) "waste generators" as defined in Appendix G of 10 CFR Part 20 and (b) those licensees to which waste can be reasonably attributed, in the context of the Low-Level Radioactive Waste Policy Amendments Act of 1985, as a result of processing, decontamination, or transfers of radioactive materials.

The spacing between the vertical listings of generator ID numbers in this column (if more than one generator contributes waste to a single disposal container) allows for the recording, on an individual generator basis, of all information required under the heading, "Waste Description for Each Waste Type in Container." Note that information on discrete waste types (i.e., activated material, contaminated equipment, mechanical filter, or sealed source/device wastes or individual disposal container wastes contained in different solidification/stabilization media) is requested. *No more than one generator should be listed per outlined row. Individual consignees (e.g., disposal facility operators) may require more extensive breakdowns of radiological descriptions (e.g., for Class AS or AU waste).*

6. **Container Description** - Using the codes found in Note 1 at the bottom of NRC Form 541, describe the disposal container. When Code 13 (High Integrity Container) is used, also identify the manufacturer and the model number. NRC and/or host State Certificate of Compliance Number(s) should be identified, as appropriate. If Code 19, "Other," is used, describe the container in Item 6. If the explanation is not entered in Item 6 (the preferred method), enter "see additional page" and provide the description on that page. The additional page must be included in the "additional information" total pages called for in Item 7 of NRC Form 540. If the container and waste require disposal in an approved structural overpack, the letters "-OP" must be entered following the appropriate code number.

7. **Volume (Cubic Meters)** - As a minimum, indicate the volume of the outside dimensions of each container to the nearest hundredth of a cubic meter. *Consignees (e.g., disposal facility operators) may require a greater sensitivity of measurement.* For volumes of less than 1 cubic meter, always include a zero in front of the decimal. For bulk unpackaged waste or unpackaged components or equipment, enter the estimated volume of the waste.

8. **Waste and Container Weight (Kilograms)** - List the combined weight, in kilograms, of the container plus the contents. For uncontainerized waste, provide the weight of the waste. *Consignees may require specific sensitivities of measurement.*

9. **Surface Radiation Level** (μSv/hr or mSv/hr) - Indicate the radiation level on contact with the disposal container or uncontainerized waste. If this level does not represent the highest radiation level on the disposal container, provide additional descriptive information. Select appropriate units for the entire page. Do not use "BKG" for background levels unless the background level is indicated in this column.

10. ***Surface Contamination (MBq/100 cm²):***
Alpha, Beta-Gamma *- Record the results of contamination surveys performed on the disposal container. Do not use "BKG" for background levels unless the background level is indicated in this column. Estimated values are acceptable if potential occupational exposures limit survey data collection.*

11. **Waste Descriptor** - Using the codes found in Note 2 at the bottom of NRC Form 541, indicate the codes that most specifically describe the type of waste in the container. For discrete waste types (i.e., activated material, contaminated equipment, mechanical filter, sealed source/device or for wastes contained in different solidification/stabilization media), the spacing between these vertical listings of waste descriptors or medias (if more than one waste type or media is included in a single disposal container) allows for the provision of radiological descriptions on an individual waste descriptor and individual solidification/stabilization media basis. *Individual consignees (e.g., disposal facility operators) may require more extensive breakdowns of radiological descriptions.* If Code 59, "Other," is used, a written explanation is required. The preferred option is to include the explanation in Item 11, but if additional space is required, enter "see additional page" in Item 11. The additional page must be included in the "additional information" total pages called for in Item 7 of NRC Form 540.

12. **Approximate Waste Volume(s) in Container** - Indicate the approximate volume in cubic meters of containerized waste, as applicable, by generator, waste descriptor (if activated material, contaminated equipment, mechanical filter, or sealed source/device waste or waste contained in different solidification/stabilization media). ">85%" may be entered if (1) the disposal container "fill volume" exceeds 85%; (2) the disposal container does not contain the aforementioned discrete wastes, together or mixed with other waste types, and does not contain

more than one solidification/stabilization media; and (3) the external volume reported in Item 7 is approximately equal to the internal disposal container volume.

13. **Sorbent, Solidification, Stabilization Media** - All shipments must use the codes found in Note 3 at the bottom of NRC Form 541. Indicate the code(s) that identifies the material used to solidify or absorb waste material. The spacing between the vertical listings of media descriptors (if more than one media descriptor is included in a single disposal container) allows for the provision of radiological descriptions on an individual "media-descriptor" basis. *Individual consignees may require more extensive breakdowns of radiological descriptions. Similarly, individual disposal facilities may require solidification of certain wastes (e.g., oil) in specified media and may require identification of media vendor (manufacturer) and brand name.* If Code 89 or 99, "Other," is used, a written explanation is required. The preferred option is to include the explanation in Item 13, but if additional space is required, enter "see additional page" in Item 13. The additional page must be included in the "additional information" total pages called for in Item 7 of NRC Form 540.

If the solidification process is intended to stabilize the waste in accordance with applicable NRC regulations at 10 CFR 61.56(b) and disposal site requirements, a letter, "-S", must be entered following the appropriate code number. Note that all Class B and C wastes must meet stability requirements. For all wastes claimed to meet the aforementioned stability

requirements, the vendor (manufacturer) and the brand name of the solidification media must be identified in this column.

14. **Chemical Description** - List the most prevalent chemical forms of the waste. Information in Item 14 should expand upon the chemical form description in Item 14 of NRC Form 540. If animal carcasses were coded in Item 11, the chemical form should include the word "LIME," if applicable, in addition to any other significant chemicals. Also indicate the name of the chelating agents that are present in amounts greater than 0.1% by weight of waste. Specify the percent in the column under the heading "Weight % Chelating Agent if >0.1%." If chelating agents are not present indicate "NP." If chelating agents represent less than 0.1% by weight, indicate "0." If wastes were generated from large decontamination processes (e.g., LOMI, Can-Decon, Citrox, etc.), indicate the process in this column. If an additional sheet describing the content of these wastes is needed, note this in Item 7 of NRC Form 540.

15. **Radiological Description** - This information may be presented in either of two ways. First, list all significant radionuclides followed by their respective activities in megabequerels that are present in the waste in each container and for each waste generator (e.g., if waste from more than one generator is contained in a single container). Daughter products must be either individually reported or, if within a factor of 2 of being in equilibrium with its (their) parent, reported as the parent with its activity listed, but with the symbol "D" or "NAT" indicating

daughter products in equilibrium (e.g., Cs-137D or ThNAT). For waste included within a single container, the significant radionuclides and their respective activities must be separately reported for discrete waste types (i.e., activated materials, contaminated equipment, mechanical filters, and sealed source/devices and wastes in solidification/stabilization media). Other wastes may be described by a combination of waste descriptor codes and, as a result, the radionuclides and activities may be reported as a combined total. When the radionuclides tritium (H-3), C-14, Tc-99, or I-129 are present, but the quantities are below the LLD, note the radionuclide and report the LLD value in parentheses. After listing the individual radionuclides as described above, enter the word "Total" on a new line and enter the total activity contained in the container. However, if any LLD values were included in the container, these values should not be included in the container sum because they will be totaled separately under Item 1.

OR, alternatively, for containers containing a single waste type, enter the total megabequerels in the container (for each waste generator, if waste from more than one generator is included in a single container) and enter the percent of each radionuclide. Always include the "%" sign when using this option.

Individual consignees may require more extensive breakdowns of radiological descriptions or may not allow the alternative method of reporting described above.

Note: The activity for uranium and thorium in source material and U-233, U-235, and plutonium in Special Nuclear Material must be reported in megabecquerels. The quantity of these isotopes must be reported, in kilograms for source material — including the abbreviation "kg", and in grams for Special Nuclear Material — including the abbreviation "g." The weight quantities must be reported in brackets, either adjacent to the activity listing or below the radionuclide listing.

A radionuclide is "significant" if it is contained in the waste in concentrations greater than 0.01 times the concentration of that nuclide listed in Table 1 of 10 CFR 61.55 or 0.01 times the smallest concentration of that nuclide listed in Table 2 of 10 CFR 61.55. A radionuclide other than one listed in the tables is considered significant if it is contained in the waste in concentrations greater than 0.26 megabecquerels/cm^3. Furthermore, any radionuclide whose activity represents a Reportable Quantity under DOT regulations or is 0.01 or more of the total activity within the disposal container should be listed even if the above concentration criteria are not exceeded. Listing only the most abundant radionuclides or the category "mixed fission products" is not acceptable. Use official abbreviations only.

To save space, two nuclides and their respective activities may be entered on each line in this bisected column. Additional nuclides and their respective activities may be entered on subsequent lines that may be included in each "outlined" row; that is, the lines separating rows are not intended to limit the vertical

reporting of nuclides and activities, but are provided to aid the transcription and readability of the provided information.

16. **Waste Classification** - Using the following codes, indicate waste classification and the structural stability of the waste in accordance with applicable NRC requirements or the radioactive material license applicable at the disposal facility to which the waste will be consigned. Waste generators shipping to processors need not complete this item.

    AS - Class A Stable
    AU - Class A Unstable
    B - Class B
    C - Class C
    BU or CU (unstable class B or C) may be used to classify waste requiring appropriate handling or processing at a disposal facility to achieve required stability. If Greater-than-Class C wastes are shipped, use "GTCC" (see 10 CFR 61.7(b)(5)).

Use NRC Form 541A if additional space is needed to describe this shipment. Indicate the page number, total number of Form 541 and 541A pages, and the manifest number from NRC Form 540, Item 8.

NRC FORM 542: UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST (Manifest Index and Regional Compact Tabulation)

1. ***Waste Collector/Processor*** *- Complete the collector or processor's name, ID number, and the shipping date. Space has also been provided for any use deemed appropriate by the shipper.*

   A waste collector or processor is an entity, operating under a Commission or Agreement State license, whose principal purpose for possessing the radioactive material or waste is as follows:

   - *A collector collects and consolidates waste generated by others and transfers this waste, without processing or repackaging, to another waste collector, processor, or licensed land disposal facility.*

   - *A processor processes, repackages, or otherwise treats low-level radioactive material or waste generated by others before the eventual transfer of the waste, or waste residue, to a licensed land disposal facility.*

2. ***Manifest Number*** *- Transfer the manifest number from NRC Form 540, Item 8.*

3. *Page 1 of ____ Page(s) - Include the total number of Form 542 and 542A pages.*

4. ***Generator Identification Number*** *- Each row should include one of the generator ID numbers from NRC Form 541, Item 5. All generator numbers associated*

with generators to whom low-level radioactive waste is being attributed should appear in this column.

5. ***Generator Name, Permit Number (if applicable) and Telephone Number*** - *Specify the information requested about the generator to whom waste is being attributed. List one and only one generator, and accompanying information, in each block. If the permit number is reported in Item 4, it need not be repeated here. Provide the generator information requested in Items 6 through 11 in the same row.*

6. ***Generator Facility Address*** - *List the complete address of the generator's facility that has contributed low-level waste to the shipment. List one and only one generator address in the block consistent with the generator information provided in Item 5.*

7. ***Preprocessed Waste (or Material) Volume*** - *Indicate the approximate volume in cubic meters (not including the container) of the preprocessed waste or material. This is the volume of waste or material received from the consignor's facility. This information may be that indicated on the consignor's NRC Form 541, Item 12, or the shipping paper used to facilitate the transfer of radioactive material.*

8. ***Manifest Number(s) Under Which Waste (or Material) Received and Date of Receipt*** - *List the previous manifest number(s) applicable to the low-level waste that has been attributed to the generator listed in Item 5, and date(s) of waste or material*

receipt by the shipper identified in Item 5 of NRC Form 540.

9. ***Waste Code: Processed or Collected*** *- Indicate the proper waste code, "P" or "C," using the definitions of waste processor and waste collector in Appendix G of 10 CFR Part 20. Do not mix processed and collected waste on the same line, list separately.*

10. ***Originating Compact Region or State*** *- Identify the originating compact region, or unaffiliated state. The information to be provided is for the original generator of the waste, as defined in Appendix G , Section I, of 10 CFR Part 20. For each generator listed in Item 5, provide the information in the same row. State abbreviations may be used. Compact abbreviations may be used when it cannot be confused with a State abbreviation (do not use 2 letter Compact abbreviations).*

11. ***As Processed/Collected Total*** *- For each original generator in Item 5, list the total Source Material (in kilograms), Special Nuclear Material (in grams), activity (in megabequerels) contained in the waste, and the volume (in cubic meters) attributed to that generator. Special Nuclear Material and Source Material are defined in 10 CFR 70.4 and 40.4, respectively.*

Total of All Pages (NRC Form 542 and 542A) - At the bottom of the page, indicate the totals for Items 11A through 11D that are reported on all pages of the NRC Form 542 and 542A. Do not include subtotals.

Use NRC Form 542A if additional space is needed to describe this shipment. Indicate the page number, total number of Form 542 and 542A pages, and the manifest number from NRC Form 540, Item 8.

APPROVED BY OMB: NO. 3150-0164
EXPIRES: 05/31/2001

Estimated burden per response to comply with this information collection request: 1.17 hours. This uniform manifest is required by NRC to meet reporting requirements of Federal and State Agencies for the same transportation and disposal of low-level waste. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0164), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

NRC FORM 540 (5-1998) **U. S. NUCLEAR REGULATORY COMMISSION**

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER *(Include Area Code)*

ORGANIZATION

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ==========>

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☐ NO
If "Yes," provide Manifest Number ==========>

EPA MANIFEST NUMBER

5. SHIPPER -- NAME AND FACILITY

SHIPPER I.D. NUMBER

☐ COLLECTOR
☐ PROCESSOR
☐ GENERATOR TYPE *(Specify)*

USER PERMIT NUMBER | SHIPMENT NUMBER

CONTACT | TELEPHONE NUMBER (Include Area Code)

6. CARRIER -- Name and Address

EPA I.D. NUMBER

SHIPPING DATE

CONTACT | TELEPHONE NUMBER (Include Area Code)

SIGNATURE -- *Authorized carrier acknowledging waste receipt* | DATE

7. NRC FORM 540 AND 504A PAGE 1 OF _____ PAGE(S)
NRC FORM 541 AND 541A _____ PAGE(S)
NRC FORM 542 AND 542A _____ PAGE(S)
ADDITIONAL INFORMATION _____ PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages)

9. CONSIGNEE -- Name and Facility Address

CONTACT

TELEPHONE NUMBER *(Include Area Code)*

SIGNATURE -- *Authorized consignee acknowledging waste receipt* | DATE

10. CERTIFICATION

This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the applicable requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE | TITLE | DATE

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES	16. TOTAL PACKAGE ACTIVITY IN SI UNITS	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME *(Use appropriate units)*	19. IDENTIFICATION NUMBER OF PACKAGE

FOR CONSIGNEE USE ONLY

NRC FORM **540A**
(3-95)

U. S. NUCLEAR REGULATORY COMMISSION

8. MANIFEST NUMBER
(Use this number on all continuation pages)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER (CONTINUATION)

PAGE _____ OF _____ PAGE(S)

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES			16. TOTAL PACKAGE ACTIVITY IN SI UNITS	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME *(Use appropriate units)*	19. IDENTIFICATION NUMBER OF PACKAGE

NRC FORM 540A (3-95)

APPROVED BY OMB: NO. 3150-0166
EXPIRES: 05/31/2001

Estimated burden per response to comply with this information collection request: 5.43 hours. The uniform manifest is required by NRC to meet reporting requirements of Federal and State Agencies for the safe transportation and disposal of low-level waste. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0166), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

NRC FORM 541
(5-1998)

U.S. NUCLEAR REGULATORY COMMISSION

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME (m^3)	NET WASTE WEIGHT (kg)	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	TOTAL

ACTIVITY (MBq) ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)

2. MANIFEST NUMBER

3. PAGE 1 OF _____ PAGE(S)

4. SHIPPER NAME

SHIPPER ID NUMBER

DISPOSAL CONTAINER DESCRIPTION

WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIP-TION (See Note 1)	7. VOLUME (m^3)	8. WASTE AND CONTAINER WEIGHT (kg)	9. SURFACE RADIATION LEVEL (μSv/hr) (mSv/hr)	10. SURFACE CONTAMINATION MBq/100 cm^2 ALPHA	BETA-GAMMA	PHYSICAL DESCRIPTION 11. WASTE DESCRIP-TOR (See Note 2)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER	13. SORBENT SOLIDIFICATION, STABILIZATION, MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT	16. WASTE CLASSIFI-CATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C

NOTE 1: Container Description Codes. For containers/ waste requiring disposal in approved structural overpacks, the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethylene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in item 6, or additional page

Note 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/Concentrates
39. CompactibleTrash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

Note 3: For solidification media that meet disposal site structural stability requirements, the numerical code must be followed by "-S." For all solidification media, the vendor (manufacturer) and brand name must also be identified in item 13. Code 100=NONE REQUIRED.

Sorption

60. Speedi Dri
61. Celetom
62. Floor Dry/ Superfine
63. Hi Dri
64. Safe T Sorb
65. Safe N Dri
66. Florco
67. Florco X
68. Solid A Sorb
69. Chemsil 30
70. Chemsil 50
71. Chemsil 3030
72. Dicaperl HP200
73. Dicaperl HP500
74. Petroset
75. Petroset II
76. Aquaset
77. Aquaset II
89. Other. Describe in item 13, or additional page

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required

NRC FORM **541A**
(3-95)

U.S. NUCLEAR REGULATORY COMMISSION

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

2. MANIFEST NUMBER

3. PAGE _____ OF _____ PAGE(S)

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER						
							PHYSICAL DESCRIPTION			CHEMICAL DESCRIPTION		RADIOLOGICAL DESCRIPTION	
5. CONTAINER *IDENTIFICATION* NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIP-TION (See Note 1)	7. VOLUME (m^3)	8. WASTE *AND* CONTAINER WEIGHT (kg)	9. SURFACE RADIATION LEVEL (μSv/hr) (mSv/hr)	10. SURFACE CONTAMINATION MBq/100 cm^2 ALPHA	BETA-GAMMA	11. WASTE DESCRIP-TOR (See Note 2)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER	13. SORBENT SOLIDIFICATION, STABILIZATION, MEDIA (See Note 3)	CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT	16. WASTE CLASSIFI-CATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C

NRC FORM 541A
(3-95)

U.S. NUCLEAR REGULATORY COMMISSION

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

2. MANIFEST NUMBER

3. PAGE _____ OF _____ PAGE(S)

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER						
							PHYSICAL DESCRIPTION			CHEMICAL DESCRIPTION		RADIOLOGICAL DESCRIPTION	
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1)	7. VOLUME (m^3)	8. WASTE AND CONTAINER WEIGHT (kg)	9. SURFACE RADIATION LEVEL (μSv/hr) (mSv/hr)	10. SURFACE CONTAMINATION MBq/100 cm^2 ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER	13. SORBENT SOLIDIFICATION, STABILIZATION, MEDIA (See Note 3)	CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C

APPROVED BY OMB: NO. 3150-0165
EXPIRES: 5/31/2001

Estimated burden per resonse to comply with this information collection request: 26 minutes. The uniform manifest is required by NRC to meet report requirements of Federal and State Agencies for the safe transportation and disposal of low-level waste. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0165), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

NRC FORM 542
(5-1998)

U.S. NUCLEAR REGULATORY COMMISSION

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

MANIFEST INDEX AND REGIONAL COMPACT TABULATION

List all original "PROCESSED WASTE" generators (if any) before "COLLECTED WASTE" generators.

1. WASTE COLLECTOR/PROCESSOR

NAME

IDENTIFICATION NUMBER

SHIPPING DATE

SHIPPER USE ONLY

2. MANIFEST NUMBER

3. PAGE 1 OF _____ PAGE(S)

4. GENERATOR IDENTIFICATION NUMBER	5. GENERATOR NAME, PERMIT NUMBER (IF APPLICABLE), AND TELEPHONE NUMBER	6. GENERATOR FACILITY ADDRESS	7. PREPROCESSED WASTE (OR MATERIAL) VOLUME (m^3)	8. MANIFEST NUMBER(S) UNDER WHICH WASTE (OR MATERIAL) RECEIVED AND DATE OF RECEIPT	9. WASTE CODE P = PROCESSED C = COLLECTED	10. ORIGINATING COMPACT REGION OR STATE	11. AS PROCESSED/COLLECTED TOTAL			
							A. SOURCE MATERIAL (kg)	B. SNM (g)	C. ACTIVITY (MBq)	D. VOLUME (m^3)
TOTALS OF ALL PAGES (NRC FORMS 542 AND 542A)										

NRC FORM **542A**
(3-95)

U.S. NUCLEAR REGULATORY COMMISSION

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

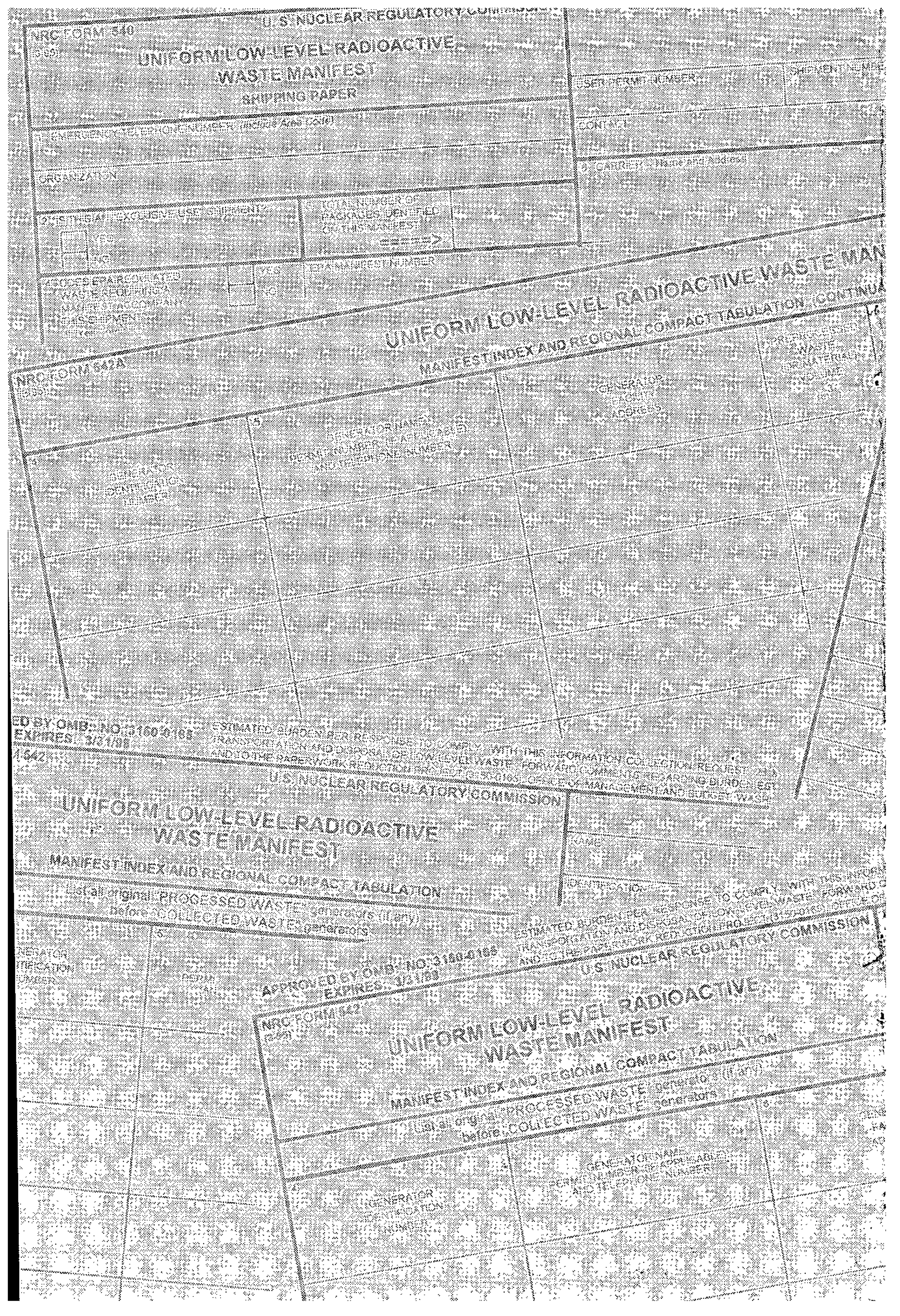
MANIFEST INDEX AND REGIONAL COMPACT TABULATION (CONTINUATION)

2. MANIFEST NUMBER

3. PAGE _____ OF _____ PAGE(S)

4. GENERATOR IDENTIFICATION NUMBER	5. GENERATOR NAME, PERMIT NUMBER (IF APPLICABLE), AND TELEPHONE NUMBER	6. GENERATOR FACILITY ADDRESS	7. PREPROCESSED WASTE (OR MATERIAL) VOLUME (m^3)	8. MANIFEST NUMBER(S) UNDER WHICH WASTE (OR MATERIAL) RECEIVED AND DATE OF RECEIPT	9. WASTE CODE P = PROCESSED C = COLLECTED	10. ORIGINATING COMPACT REGION OR STATE	11. AS PROCESSED/COLLECTED TOTAL			
							A. SOURCE MATERIAL (kg)	B. SNM (g)	C. ACTIVITY (MBq)	D. VOLUME (m^3)

Federal Recycling Program


U. S. NUCLEAR REGULATORY COMMISSION
NRC FORM 540
UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER
ORGANIZATION
TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST
NRC FORM 542A
UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
MANIFEST INDEX AND REGIONAL COMPACT TABULATION (CONTINUATION)
GENERATOR NAME, PERMIT NUMBER (IF APPLICABLE) AND TELEPHONE NUMBER
GENERATOR IDENTIFICATION NUMBER
EXPIRES: 3/31/98
U.S. NUCLEAR REGULATORY COMMISSION
UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
MANIFEST INDEX AND REGIONAL COMPACT TABULATION
List all original PROCESSED WASTE generators (if any) before COLLECTED WASTE generators
APPROVED BY OMB: NO. 3150-0165 EXPIRES: 3/31/98
U.S. NUCLEAR REGULATORY COMMISSION
NRC FORM 542
UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
MANIFEST INDEX AND REGIONAL COMPACT TABULATION
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GENERATOR NAME, PERMIT NUMBER (IF APPLICABLE) AND TELEPHONE NUMBER
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