

Nevada National Security Site Waste Acceptance Criteria Implementation Crosswalk (NIC), Revision 9

Generator Site: _____

The purpose of the NNSWAC Implementation Crosswalk (NIC) is to demonstrate that an evaluation of programmatic compliance with specified requirements has been performed. Implementation of our Quality Assurance Program Plan (QAPP) and applicable procedures, processes, or methods referenced herein will ensure compliance with NNSWAC requirements.

A controlled QAPP will be assigned to the Radioactive Waste Acceptance Program (RWAP) Manager. This approved NIC is also provided as evidence of our compliance evaluation. The WCO shall conduct an annual review and submittal of the NIC to ensure referenced data are current.

Approved by: _____ Date: _____
Waste Certification Official (WCO)

Instructions: The crosswalk identifies only key elements of NNSWAC, Revision 9 and should not be considered an all inclusive requirements matrix. Waste generators are responsible for ensuring their waste certification program satisfy every NNSWAC requirement. The NIC is a tool to assist generators in evaluating their program documents for programmatic compliance with NNSWAC requirements. Determination of applicability for each requirement is provided by the referenced procedure, process, or method.

Annual Reviews: The WCO shall perform an annual review of the NIC based on the last approval date. This signed coversheet can be forwarded to the RWAP Manager as evidence of completing the annual review. Resubmittal of the complete NIC is not required unless changes were made to referenced data.

Header Block Titles: Enter applicable information respectively in Blocks 2, 3, and 4 only.

1. *NNSWAC, Section and Requirement*: Identifies specific requirements contained in the NNSWAC that must be satisfied by the generator's waste certification program documents.
2. *QAPP Citation*: Enter the applicable QAPP section that describes or is applicable to the requirement
3. *Procedures / Processes / Methods (PPM)*: Enter the applicable procedure(s), process(es), and/or method(s) which controls or describes how the requirement is satisfied (i.e., approved procedure or instruction, inspection checklist, test data, process knowledge, or N/A). If one PPM describes how the entire section is satisfied, then reference that PPM in the section header block (shaded area). If more than one PPM is applicable, list the primary one in the header block, and reference others as they apply to the specific requirement in that section.

If a requirement is "not applicable," enter N/A, and provide a brief justification. RWAP may request additional information, if necessary, to support the N/A determination.

4. *Responsible Organization*: Identify the organization having primary responsibility for implementation in the shaded area. Other organizations may also be referenced, if different than the primary for each requirement, as applicable.

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Section	NNSWAC Rev. 9 Section Requirement	QAPP/WCPP Citation	Procedure/Process/Method	Responsible Organization
2.0	Approval Process			
2.1	Generator Document Requirements			
	2.1.1 Quality Assurance Program Plan			
	A controlled copy of the site Quality Assurance Program Plan (QAPP) or NNSWAC specific Waste Certification Program Plan (WCPP) <i>shall</i> be documented in accordance with Section 5.0 and issued to the RWAP Manager.	_____	_____	_____
	2.1.2 NNSWAC Implementation Crosswalk			
R9	The NNSWAC Implementation Crosswalk (NIC) <i>shall</i> be prepared and submitted annually or within 90 days after a revision of the NNSWAC to RWAP in accordance with Section 5.0	_____	_____	_____
	2.1.3 Waste Profiles			
	A Waste Profile (WP) <i>shall</i> be prepared and submitted to NNSA/NSO for each waste stream proposed for disposal.	_____	_____	_____
	2.1.4 Certification Personnel List			
	A current list identifying the Waste Certification Officials (WCOs), Alternate WCOs, and Package Certifiers <i>shall</i> be developed and submitted to RWAP in writing.	_____	_____	_____
	2.1.5 Required Notifications			
	Generators shall notify RWAP in writing of any changes to the generators QAPP or WCPP, waste profiles and/or key personnel.	_____	_____	_____
	Prior to implementation, the WCO <i>shall</i> immediately notify RWAP in writing of any critical process and/or procedure changes to the approved certification program.	_____	_____	_____
2.2	RWAP Review			
R9	NNSA/NSO Corrective Action Requests (CARs) may be issued when conditions adverse to quality are identified. CARs <i>shall</i> require the generator to document a root cause, corrective action, and action to preclude recurrence.	_____	_____	_____
	2.2.2 Waste Profiles			

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	The WCO <i>shall</i> perform a documented annual review of NNSS approved WPs, based on the current revision date of each profile, to ensure the characterization data, waste stream information, and referenced procedures are current.			
2.3	Approval			
	Approved waste generators shall ensure that the following documents are maintained current within the NNSA/NSO RWAP while their approval to ship waste is in effect: <ul style="list-style-type: none"> • Approved list of Authorized Certification Personnel • Latest Approved Waste Profile(s) (Active WPs Only) • Controlled Copy of the QAPP • NIC 			
3.0	Waste Criteria			
	Waste accepted at the NNSS shall be radioactive and shall meet the waste criteria outlined below. Generators shall ensure waste is handled, stored, and shipped in accordance with applicable DOE, DOT, U.S. Environmental Protection Agency (EPA), state, and local regulations and requirements.			
	3.1.1 Transuranics			
	The concentration of alpha-emitting transuranic nuclides with half-lives greater than 20 years <i>shall</i> not exceed 100 nCi/g.			
	The net weight of the waste (excluding the weight of the container and shielding) <i>shall</i> be used to calculate the specific activity of the waste in each container.			
	The following isotopes <i>shall</i> be considered when making the transuranic waste determination: ²³⁷ Np, ²³⁸ Pu, ²³⁹ Pu, ²⁴⁰ Pu, ²⁴² Pu, ²⁴⁴ Pu, ²⁴¹ Am, ^{242m} Am, ²⁴³ Am, ²⁴³ Cm, ²⁴⁵ Cm, ²⁴⁶ Cm, ²⁴⁷ Cm, ²⁴⁸ Cm, ²⁵⁰ Cm, ²⁴⁷ Bk, ²⁴⁹ Cf, ²⁵¹ Cf.			
	3.1.2 Radionuclide Content or Concentration			
	Radionuclide concentration <i>shall</i> be reported in accordance with Appendix E, "Radionuclide Characterization and Reporting Requirements."			
	3.1.3 Reserved (No Requirements)			
	3.1.4 Hazardous Waste			

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R9	Unless the material is classified, waste regulated solely under Title 40 CFR 261-268 and state of Nevada hazardous waste regulations <i>shall not</i> be accepted for disposal.	_____	_____	_____
R9	State of Nevada regulations require that waste regulated as hazardous in the state-of-generation <i>shall</i> be regulated as hazardous when brought into the state of Nevada; therefore, unless the material is classified, such waste <i>shall</i> not be accepted for disposal.	_____	_____	_____
	Environmental media from cleanup activities may be acceptable for disposal if: State of origin makes a “Contained-In Determination” for LLW environmental % media that was in contact with “listed” wastes. The generator <i>shall</i> submit this determination to NNSA/NSO for evaluation, and provide and demonstrate requirements of Section 3.1.4	_____	_____	_____
	3.1.5 Free Liquids			
	Liquid waste and waste containing free liquids <i>shall</i> be converted into a form that contains as little freestanding and noncorrosive liquid as is reasonably achievable.	_____	_____	_____
	The free liquid <i>shall</i> not exceed 1 percent of the volume of the waste when the waste is in a disposal container, or 0.5 percent of the volume of the waste processed to a solidified form.	_____	_____	_____
	Waste <i>shall</i> be evaluated to determine its potential to release liquid during handling, storage, and transportation.	_____	_____	_____
	Generators <i>shall</i> document the decision made when characterizing and determining sorbents for high moisture content waste (See paper 11/3/98).	_____	_____	_____
	3.1.6 Particulates			
	Fine particulate wastes <i>shall</i> be immobilized so that the waste package contains no more than 1 weight percent of less-than-10-micrometer-diameter particles, or 15 weight percent of less-than-200-micrometer-diameter particles.	_____	_____	_____
	Waste known to be in a fine particulate form or in a form that could mechanically or chemically be transformed to a particulate during handling and interim storage <i>shall</i> be	_____	_____	_____

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	immobilized.			
	3.1.7 Gases			
	Waste gases <i>shall</i> be packaged at a pressure that does not exceed 1.5 atmospheres absolute at 20° C.	_____	_____	_____
	Compressed gases as defined by Title 49 CFR <i>shall not</i> be accepted.	_____	_____	_____
	3.1.8 Stabilization			
	Where practical, waste <i>shall</i> be treated to reduce volume and provide a more stable waste form.	_____	_____	_____
	Wastes <i>shall</i> not react with other wastes or the packaging during storage, shipping, handling, and disposal.	_____	_____	_____
	Chemical stability and compatibility <i>shall</i> be demonstrated to ensure that no reactions occur and significant quantities of harmful gases, vapors, or liquids are not generated.	_____	_____	_____
	3.1.9 Etiologic Agents			
	Waste containing pathogens, infectious waste, or other etiologic agents as defined in Title 49 CFR <i>shall not</i> be accepted.	_____	_____	_____
	3.1.10 Chelating Agents			
	Waste packages containing chelating or complexing agents in amounts greater than 1 percent of waste <i>shall not</i> be accepted unless stabilized or solidified.	_____	_____	_____
	3.1.11 Polychlorinated Biphenyls			
	Waste containing Polychlorinated Biphenyls (PCBs) that meet the requirements for disposal in a solid waste or permitted hazardous waste landfill as specified in 40 CFR Part 761 and NAC 444.9452 <i>shall</i> be accepted.	_____	_____	_____
	PCB contaminated waste <i>shall</i> be packaged, marked, and labeled in accordance with the requirements of Title 40 CFR and Title 49 CFR and meets the applicable shipping requirements for the radioactive content of the package.	_____	_____	_____
	Waste containing PCBs that meet the requirements for disposal in a permitted hazardous waste landfill <i>shall</i> be segregated into a separate waste stream and profiled and packaged separately from other waste streams. These types	_____	_____	_____

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	of PCB wastes <i>shall</i> also meet the requirements listed in Section 3.3.5 and 3.3.6.2.			
	Generators shall provide written notice a minimum of 15 days in advance of the first shipment of each waste stream containing PCB remediation waste or bulk product waste. The notice <i>shall</i> be faxed to the NNSS at (702) 295-6852 and should contain information specified in 40 CFR 761.61 for PCB remediation waste and/or 40 CFR 761.62 for PCB Bulk Product Waste.			
	3.1.12 Explosives			
	Waste containing un-reacted explosives <i>shall not</i> be accepted at the NNSS. Such waste may have RCRA characteristics and shall be treated to meet LDRs before being acceptable for disposal at NNSS.			
	3.1.13 Pyrophorics			
	Waste <i>shall</i> not be pyrophoric.			
	Pyrophoric materials contained in the waste <i>shall</i> be treated, prepared, and packaged to be nonflammable.			
	3.1.14 Sealed Sources			
R9	Sources containing transuranic nuclides <i>shall</i> be individually evaluated against the transuranic criteria (NNSSWAC Section 3.1.1). The mass of the source and any component integral to the source <i>shall be used to determine the activity concentration (nCi/g) for reporting on the WP (Section D.6).</i>			
R9	Sealed sources that have an activity of 3.7 Mega (M) Becquerel(s) (Bq) (100 μ Ci) or greater <i>shall</i> be segregated from other waste and <i>grouped together and</i> profiled as a separate waste stream. Sealed sources <i>that have an activity of less than 3.7 MBq can either be a component of other waste streams or included with sealed sources that have an activity of 3.7 MBq or greater.</i>			
R9	The requirements found in NNSSWAC Section 3.2.4, Lead Shielding, <i>shall</i> be followed in new packaging with lead shielding is used.			
	3.1.15 Low-Level Waste Containing Regulated Asbestos			

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R9	Regulated Asbestos Low-Level Waste (RALLW) <i>shall</i> be packaged, marked, and labeled in accordance with the requirements of Title 40 CFR , State of Nevada Solid Waste Disposal Site Permit (SW 523, current revision), and state-of-generation regulations .			
	Packages containing RALLW <i>shall</i> meet the applicable shipping requirements for the radioactive contents of the package.			
	RALLW <i>shall</i> be wetted with a water and surfactant mixture and packaged in a plastic bag that is not less than 6 mil in thickness, a combination of plastic bags that equal 6 mil in thickness, or a container that is lined with plastic.			
	If free liquid is present, sorbent <i>shall</i> be added to ensure compliance with the free-liquids criteria.			
	Sharp edges and corners in the package shall be padded or protected to prevent damage to plastic bag during handling, shipping, and disposal.			
	Each container used to dispose of RALLW <i>shall</i> bear a label that contains one of the statements described in the NNSWAC, Section 3.1.15.			
	RALLW <i>shall</i> be profiled and segregated into a separate waste stream.			
	RALLW <i>shall</i> be packaged separately from other waste streams.			
	RALLW <i>shall</i> not be packaged into soft-sided containers as the only containment.			
R9	Asbestos Classified LLW <i>shall</i> also meet requirements listed in Section 3.3.5 and 3.3.6.2.			
	Pre-shipment notifications <i>shall</i> be faxed (702-295-1153) to NNSA/NSO at least 7 days prior to shipment arrival.			
	3.1.16 Radioactive Animal Carcasses			
	Animal carcasses containing, or contained in, radioactive materials <i>shall</i> be packaged with the biological material layered with lime and placed in a metal container meeting applicable requirements.			
	If the resultant waste matrix is capable of gas generation,			

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	the container <i>shall</i> be vented with a carbon composite High-Efficiency Particulate Arresting (HEPA) filtration device.			
	Animal carcasses preserved with formaldehyde <i>shall not</i> be accepted for disposal.			
	3.1.17 Low-Level Beryllium Waste			
	Beryllium-containing waste, and beryllium-contained equipment <i>shall</i> be packaged in sealed, impermeable bags (minimum 6 mil.), containers, or enclosures to prevent the release of beryllium dust during handling and transportation.			
	The bags, containers, and enclosures <i>shall</i> be labeled with the following information: "DANGER, CONTAMINATED WITH BERYLLIUM DO NOT REMOVE DUST BY BLOWING OR SHAKING. CANCER AND LUNG DISEASE HAZARD."			
	3.1.18 Classified Waste			
	Generators <i>shall</i> submit a signed DOE or NNSA Security Authorization for permanent burial without sanitization with their classified WP .			
R9	Classified waste (LLW, MLLW or non-radioactive) shall be profiled and segregated into a separate waste stream.			
	Generator's shipping classified waste that requires protection from visual observation, <i>shall</i> submit the "Advance Shipment Notification" form, identified in Appendix C.4, to the RWMC at least seven (7) days prior to shipment arrival.			
	3.1.19 Petroleum Hydrocarbon Burdened LLW			
R9	Petroleum hydrocarbon burdened LLW is only regulated when generated within the state of Nevada.			
	NSSS generated hydrocarbon waste <i>shall</i> be packaged separately from other LLW, the containers identified as "HYDROCARBON WASTE" near the bar code labels, and shipped under separate shipping documents (i.e., Bill of Lading, Manifest, Package Shipment Disposal Request			

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	[PSDR], Certification Statement, etc.).			
3.2	Waste Package Criteria			
	Waste packages <i>shall</i> meet applicable DOE Orders, Title 10 CFR, Title 40 CFR, and Title 49 CFR requirements such as design, nuclear safety, radiation levels, activity limits, nuclear heating, and multiple hazards.			
	Waste packages <i>shall</i> be capable of withstanding the stresses associated with the loading, handling, stacking, and shipping of the package.			
	3.2.1 Nuclear Criticality Safety			
	The quantity of fissionable (fissile) material in a waste package <i>shall</i> be limited so that an infinite array of such packages will remain subcritical under “as packaged” conditions and if the array were to be flooded with water to any credible degree.			
	Waste packages <i>shall</i> comply with the fissile material limits in Appendix E.			
	3.2.2 Package Activity Limitation			
	Package Activity limits at the NNSS are based on Plutonium-239 Equivalent grams (PE-g). The total PE-g for either a waste package or a shipment <i>shall</i> be calculated by multiplying the activity of each radionuclide by the PE-g conversion factor (Appendix B) and then adding each radionuclide PE-g to get the total PE-g.			
R9	The PE-g limit for all waste packages (e.g., drums, boxes, soft-sided packages, bulk or wrapped objects) is 300 PE-g total, except for DOT Type B Certificate of Compliance (COC) containers, for which there is no limit as long as the DOT Type B container is also the disposal container. DOT Type B certification shall be provided with profile submittal.			
	3.2.3 Closure			
	Waste package closures <i>shall</i> be designed to ensure they will withstand the effects of changing temperatures, weather, pressures, and/or vibrations under normal handling and shipping conditions and not breach or lose the package			

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	contents.			
	3.2.4 Lead Shielding			
	Generators <i>shall</i> maintain the following: Documentation demonstrating that standard packaging without lead shielding would not reduce the exposure rate to less than 0.005 rem/hr (5 mrem/hr) at 30 centimeters and the shielding is necessary for radiation protection; and, Documentation demonstrating that the amount of lead used for shielding is not excessive for each specific container of waste . The documentation <i>shall</i> include calculations demonstrating the amount of lead (thickness/quantity) in the container is not excessive by justifying the quantity of lead required in each given container, or on container-by-container basis.			
	3.2.5 Strength			
	The disposal package (packaging and contents) <i>shall</i> be capable of supporting a uniformly distributed load (compressive strength) of 16,477 kg/m ² (3,375 lbs./ft ²).			
	This requirement does not apply to bulk waste (e.g. supersacks, burrito wraps, and unpackaged waste items), waste packaged in steel drums, high integrity containers, cargo transport containers, or roll-off containers. These containers <i>shall</i> be sufficiently strong to ensure they will not breach under normal offloading conditions.			
	Bulk waste containers with a reasonable probability of breaching during offloading (i.e., burrito wraps), regardless of the type of transport vehicle (i.e., intermodals), <i>shall</i> meet the package activity limitations of Section 3.2.2.			
	3.2.6 Handling			
	Packages exceeding 1 mSv/hr (100 mR/hr) dose rate at 30 centimeters <i>shall</i> be considered for remote handling. Handling procedures and ALARA documentation <i>shall</i> be referenced on the WP for wastes requiring remote handling and made available to the disposal site upon request.			
R9	Prior to shipment, dose rates <i>shall</i> be forwarded to RWMC operations (fax 702-295-6852 or email to			

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	wminfo@nv.doe.gov) for internal packages when they are being removed for disposal (e.g. canisters removed from a Type B cask.)			
	Waste packages shall be provided with cleats, offsets, rings, handles, permanently attached or removable skids, or other auxiliary lifting devices to allow handling by means of forklift, cranes, or similar handling equipment.			
R9	All waste packages requiring cranes for off-loading shall have an approved lift plan generated by NNSS RWMC prior to shipment. Additional costs incurred by development and implementation will be the responsibility of the waste generator.			
	Auxiliary lifting devices for any portion of the package extending from the top of the waste package shall be no higher than 0.1 m (4 inches) in normal position.			
	Lifting devices shall be designed in accordance with the DOE Hoisting & Rigging Manual, DOE-STD-1090-Current Publication.			
	Lifting devices that are a structural part of the package shall be designed with a minimum safety factor of three-to-one against yielding when used to lift the package to ensure any failure of a lifting attachment under excessive load would not impair the integrity of the package.			
	Any other structural part of the package that could be used to lift the package shall be capable of being rendered inoperable for lifting the package during transport or shall be designed with strength equivalent to that required for lifting attachments.			
	Rigging devices (e.g., slings, spreader bars, rings, hooks) not permanently attached to the waste package that are provided by the generator for off loading shall have a current load test based on the requirements of the DOE Hoisting & Rigging Manual, DOE-STD-1090-Current Publication.			
	Non-permanently attached rigging devices shall have traceable certifications provided with the shipping			

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	documents. They <i>shall</i> not show any signs of corrosion, kinking, bird caging, or other deterioration.			
	Waste packages that have abnormal centers of gravity <i>shall</i> be clearly marked with the center of gravity.			
	Bulk waste shipments with complex geometries <i>shall</i> be loaded in the most stable configuration.			
	3.2.7 Size			
	Bulk waste <i>shall</i> meet the requirements of Title 49 CFR.			
	The transfer of unpackaged bulk material having external contamination, the contamination <i>shall</i> be fixed, covered, or contained sufficiently for safe transfer.			
	3.2.8 Weight			
	Weight limits for final waste packages <i>shall not</i> exceed the approved packaging design or NNSS limits of 4,082 kg (9,000 lbs) per box and 544 kg (1,200 lbs) per drum. These weight limits do not apply to bulk wastes.			
R9	Exception to the specified box weight limit is allowed if each of the following requirements are satisfied: <ul style="list-style-type: none"> • Final weight <i>shall</i> not exceed the approved manufacturer design limits; • Final weight of MLLW <i>shall not</i> exceed the NNSS RTR weight capacity of 1000 lbs; • Boxes exceeding 11,000 lbs. shall be shipped on a flatbed trailer and cribbed to a 4-inch minimum height to allow off loading with a forklift. 			
	3.2.9 Loading (Void Space)			
	Waste packages <i>shall</i> be loaded to ensure that the interior volume is as efficiently and compactly loaded as practical to minimize void space.			
	MW packages <i>shall</i> meet the void space criteria in Section 3.3.6.2.			
	3.2.10 Package Protection			
	Methods <i>shall</i> be employed to ensure that the integrity of the in-process waste package is not compromised.			
	Once the waste packaging activities have been completed and the container has been sealed, containers <i>shall</i> be stored			

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	in a secure area to prevent unauthorized intrusion and protected from the environment to maintain package integrity and prevent deterioration.			
	Tamper-indicating devices (TIDs), clips, or banding can be used to indicate that the package has not been opened. These devices <i>shall</i> not contain lead.			
	3.2.11 Marking and Labeling			
	Each waste package <i>shall</i> be marked and labeled according to Appendix C.			
	Markings and labels <i>shall</i> be intact and readable when the shipment arrives at the disposal site.			
	3.2.12 Bar Coding			
	The shipment and package numbers <i>shall</i> be bar coded in accordance with standards in Appendix C.			
	3.2.13 Contamination Levels			
	External contamination levels for waste packages and transport vehicles <i>shall</i> meet the release limits specified in Title 10 Code of Federal Regulations, Part 835, Appendix D.			
R9	Prior to shipment , internal contamination levels (i.e. internal contamination of a Type B cask for waste removal and return to the generator) <i>shall</i> be forwarded to RWMC operations (fax (702) 295-6852 or e-mail to wminfo@nv.doe.gov).			
	3.2.14 Waste Containers and Shipping Configuration			
	Generators <i>shall</i> ensure the following requirements are satisfied to improve transportation safety and off loading at the NNSS: <ul style="list-style-type: none"> • Waste containers used for shipping, at a minimum, will be Industrial Package-1(IP-1) meeting the requirements of 49 CFR 173.410 and 173.411). • Waste packaged in drums will be palletized and banded. Requirements do not apply to drums in groups of three drums or less. • Wastes packaged in drums from off-site facilities are to be shipped in a closed transport vehicle. 			

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	Waste containers not meeting the minimum requirements described above and/or alternative methods for transport of bulk waste items (SCO, LSA equipment, large machinery, etc.) will be approved on a case-by-case basis by the Waste Management Federal Project Director.			
3.3	Mixed Low-Level Waste			
	MLLW offered for disposal <i>shall</i> meet the applicable characterization, treatment, packaging, and disposal requirements of the NNSSWAC, Title 40 CFR, state of Nevada, and state-of-generation regulations.			
	3.3.1 Acceptable Hazardous Waste Numbers			
R9	MLLW offered for disposal <i>shall</i> have one or more of the EPA hazardous waste numbers listed below or <i>shall</i> be considered a hazardous waste in the state of generation. <u>Waste Codes</u> D004 through D043 F001 through F009, F039 P001 through P205 U001 through U249, U271, U278, U279, U280, U328, U353, U359, U364, U367, U373, U387, U389, U394, U395, U404, U411			
	3.3.2 Mixed Waste Treatment Notification			
	Generators with MLLW that requires treatment to meet the LDR standards, but the treatment has yet to occur, <i>shall</i> submit to NNSA/NSO the information contained in the "Pre-Treatment Notification Form" found in Appendix G of the NNSSWAC.			
	If treatment is performed by a commercial facility, it <i>shall</i> have a current DOE Consolidated Accreditation Program (DOE CAP) audit, or equivalent.			
	3.3.3 Mixed Waste Profiles			
	In addition to the NNSSWAC requirements for WP in Section 2.1.1, MWP's <i>shall</i> be profiled and packaged separately from LLW.			
	MWP's <i>shall</i> be approved for a finite volume of waste.			

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	MWPs <i>shall</i> include the number of containers, container sizes, and dose rates at 30 cm for the MLLW covered by the MWP.			
	MWPs have annual expiration dates and <i>shall</i> be recertified annually (based upon the profile revision date) to the NNSA/NSO with the information contained in Appendix G-2.			
	3.3.4 Land Disposal Restrictions			
	MW <i>shall</i> meet the LDR treatment standard requirements in Nevada Administrative Code (NAC) 444.8632 (incorporating Title 40 CFR 268.40 and 268.45), including standards for underlying hazardous constituents (UHCs).			
	LDR notifications/certifications <i>shall</i> be made in accordance with Section 6.3.4.			
	3.3.4.1 Determinations of Equivalent Technology			
	MW that has been treated based on a Determination of Equivalent Technology (DET) <i>will</i> require NDEP concurrence on the DET. NDEP will require the DET documentation, including EPA regions' determinations			
	3.3.5 Waste Form Criteria / Prohibited Items			
	MW accepted for disposal <i>shall</i> meet the general waste form criteria as described in Section 3.1 of the NNSWAC, except as indicated below.			
	3.3.5.1 Free Liquids			
	Free liquids <i>shall</i> be absorbed, stabilized, or otherwise removed from the waste. Containerized free liquids such as ampoules, small articles that contain free liquids required for the article to function (e.g., batteries or capacitors), are acceptable.			
	3.3.5.2 Sorbents			
	Sorbents <i>shall</i> be non-biodegradable and identified on the MWP. Examples of non-biodegradable sorbents according to Title 40 CFR 264.314(d) and/or 40 CFR 265.314e includes: refer to NNSWAC.			
	3.3.5.3 Compatibility			
	Incompatible wastes, or incompatible wastes and materials,			

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<p><i>shall not</i> be placed in the same container if such placement:</p> <ul style="list-style-type: none"> • Generates extreme heat or pressure, fire or explosion, or violent reaction; • Produces uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health; • Produces uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions; • Damages the structural integrity of the device or facility containing the waste; or • Through other like means threaten human health or the environment. 			
<p>3.3.6 Mixed Waste Package Criteria</p>			
<p>In addition to Section 3.2, MW packaged for disposal <i>shall</i> meet the waste package criteria below:</p>			
<p>3.3.6.1 Marking and Labeling</p>			
<p>In addition to the marking and labeling requirements in Appendix C, MW packages of 451 liters (119 gallons) or less <i>shall</i> be marked with the following:</p> <ul style="list-style-type: none"> • The words, “HAZARDOUS WASTE – Federal Law Prohibits Improper Disposal. If found, contact the nearest police or public safety authority of the U.S. Environmental Protection Agency.” • Generator’s Name and Address; • Manifest Document Number. 			
<p>The marking <i>shall</i> be durable, in English, displayed on a background of sharply contrasting color, printed or affixed to the surface of the package; or on a label, tag, or sign unobscured by other labels or attachments, located away from any marking that could substantially reduce its effectiveness.</p>			
<p>Marking and labeling of the waste packages <i>shall</i> be for the hazardous and radioactive characteristics of the waste.</p>			
<p>3.3.6.2 Void Space</p>			
<p>Containers of MW <i>shall</i> be at least 90 percent full when</p>			

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	placed in the landfill.			
	3.3.6.3 Package Protection			
	In addition to the requirements of Section 3.2.10, if a package has been inspected as part of the NNSS verification plan, the TID <i>shall not</i> be removed or altered. The package <i>shall</i> be loaded and transported to protect the TID from damage.			
	3.3.7 Analytical Data			
	Analytical data used to make MW determinations or LDR certifications <i>shall</i> be from a DOE CAP audited laboratory, or equivalent (i.e., State Certified or Carlsbad Field Office Certified).			
	Generators <i>shall</i> document their review and acceptance of the most recent certification audit for analytical laboratory used.			
	3.3.8 MW Verification			
	3.3.8.1 MW Verification Frequency			
	Generators <i>shall</i> provide the necessary authorizations, facilities, and personnel to allow for RWAP personnel to perform MW verification at the generator or treatment facility.			
	RWAP personnel <i>shall</i> be provided access to containers and facilities to allow for visual inspection of the contents of packaged containers, performing chemical screening on homogeneous samples of the waste, and split sampling.			
	3.3.8.2 Previously Rejected MW Packages			
	MW packages (parent packages) previously rejected that are repackaged and/or split into additional MW packages (progeny packages) <i>shall</i> be traceable to the original package number.			
	In addition to the transportation and shipping requirements of Section 6.0, generators <i>shall</i> notify NNSA/NSO prior to shipping previously rejected MW packages (parent and/or progeny) back to NNSS.			
3.4	NNSSWAC Deviations			
	The following information <i>shall</i> be provided with the WP			

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	<p>or as standalone document approved by the WCO:</p> <ul style="list-style-type: none"> - NNSSWAC requirement that cannot be satisfied - Justification for not meeting the requirement that includes a description of the item(s) and/or process affected - Duration of the deviation, and - Planned action(s) to correct the deviation, if applicable. 			
4.0	Waste Characterization			
	Generators shall characterize waste destined for disposal at the NNS.			
	Waste characterized as MW, generators shall demonstrate that the MW meets the applicable Title 40 CFR LDR and NNSSWAC.			
	When similar requirements are listed in separate regulations, the most stringent shall be met.			
	Generators shall characterize waste with sufficient accuracy to permit proper segregation, treatment, storage, and disposal.			
	The characterization methods and procedures employed by the generator shall ensure that the physical, chemical, and radiological characteristics of the waste are recorded and known during all stages of the waste management process.			
	Methods selected by the generator for waste characterization shall undergo a documented peer review.			
	The Data Quality Objectives (DQOs) process, or a comparable process, shall be used for identifying characterization parameters and acceptable uncertainty in characterization data			
	Generators shall prepare and submit a WP for each waste stream, which provides NNSA/NSO with a summary of waste characterization information.			
	Generators shall provide waste characterization documentation that supports the waste profile to NNSA/NSO for review during facility evaluations or upon NNSA/NSO request.			
	Waste Characterization documentation shall be traceable to the WP and disposal packages.			
	Isotopic distributions and corresponding activity concentrations shall be traceable to the package.			
	Traceability to a parcel level shall be required if characterization is being conducted at that level (e.g., individual sealed sources, bags, or components characterized on an individual basis but packaged together).			

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4.1	Process Knowledge			
	When PK relies on living memory, the individual's knowledge <i>shall</i> be documented and signed by interviewer and the interviewee.			
	For telephone interviews, a statement outlining relevant information <i>shall</i> be signed by the interviewer (and interviewee if possible).			
	Generators <i>shall</i> conduct a documented evaluation of compiled PK sources used for waste characterization.			
	The generator's evaluation <i>shall</i> identify uncertainties, inconsistencies, limitations, and usefulness.			
4.2	Sampling and Analysis			
	Generators <i>shall</i> ensure that all data be scientifically valid, defensible, and of known precision and accuracy to identify the chemical, physical, and radiological properties of waste.			
	When waste streams are characterized by sampling and analysis, the process <i>shall</i> be controlled and documented.			
	Propagation of error throughout the sampling and analytical process <i>shall</i> be evaluated and considered when ascertaining usability of data for characterization of waste.			
	Generators should determine the appropriate analysis (total vs. TCLP) for RCRA hazardous and UHC determinations. These results <i>shall</i> be reported in the WP on Table B-1 (page 4-5).			
	Generators <i>shall</i> demonstrate that controls are in place to trace each sample number to a specific package number.			
	4.2.1 Data Validation			
	Data <i>shall</i> be validated by technically qualified personnel who are independent of those performing the analyses.			
	When sampling and analysis is used as a method of characterization, data validation <i>shall</i> be conducted on a portion of chemical and radiological data per NNSS waste stream, prior to use of the data for characterization purposes			
5.0	QA Requirements for Waste Certification Programs			
	Generators <i>shall</i> develop, approve, and maintain a Quality Assurance Program Plan (QAPP) demonstrating compliance to the current revision of the NNSSWAC; DOE Order 435.1, "Radioactive Waste Management"; DOE Order 414.1, "Quality Assurance"; and/or Title 10 CFR, 830.122, "Quality Assurance."			
	A controlled copy of the generators site QAPP or WCPP			

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	<i>shall</i> maintained with the RWAP Manager.			
	Generators <i>shall</i> also complete the NNSSWAC Implementation Crosswalk (NIC) and submit it to the RWAP Manager.			
	The NIC <i>shall</i> reference the applicable quality-affecting procedures, processes, or methods and the organization or group directly responsible for implementation.			
R9	Within 90 days after a revision of the NNSSWAC or, at a minimum, annually, the WCO <i>shall</i> perform a review of the NIC to ensure <i>referenced</i> procedures, processes, and methods are current. Upon completion of this review, the WCO <i>shall</i> sign the NIC cover sheet and submit a copy of the NIC to the RWAP Manager.			
5.1	Program			
	Generators <i>shall</i> develop an organizational chart specific to the waste management and support organizations.			
	The organizational chart <i>shall</i> depict the organizational structure, functional responsibilities, levels of authority, and interfaces necessary to manage the waste certification program.			
	The chart <i>shall</i> identify the organizations that generate, characterize, package, inspect, assess, ship, and perform support functions (i.e., procurement, document control, RCRA oversight, and training).			
	Each generator <i>shall</i> designate a WCO and alternates), if applicable, who are responsible for verifying implementation of the QAPP or WCPP.			
	The WCO <i>shall</i> ensure that the waste certification processes, including waste, waste packages, supporting data, and waste shipments, comply with the requirements of the NNSSWAC.			
	The Alternate WCO <i>shall</i> report to the primary WCO for certification activities.			
	The organizational structure <i>shall</i> ensure the independence of the WCO, alternates), and package certifiers from the waste generator and allow for direct access to a			

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	management level (including the local DOE field office), having sufficient authority and organizational freedom, if necessary, to ensure compliance with the low-level waste program.			
	Generators may delegate the responsibility for signing the Package Certification Label (PCL) to Package Certifiers; however, the Package Certifiers <i>shall</i> report directly to the WCO for certification activities.			
5.2	Personnel Training and Qualification			
	Personnel <i>shall</i> be trained and qualified to perform their assigned functions and tasks.			
	The level and type of training <i>shall</i> be evaluated and documented.			
	Training <i>shall</i> be commensurate with the importance of the task and the activities affecting compliance with the NNSSWAC waste certification activities.			
	Personnel <i>shall</i> be provided training to ensure job proficiency with established requirements (e.g., processes, procedures, and instructions, etc) is maintained.			
	Records of training <i>shall</i> be specified and maintained to ensure personnel's training is current.			
5.3	Quality Improvement			
	Process controls to detect and prevent quality problems and verify conformance to specified requirements <i>shall</i> be established and implemented.			
	Performance of quality improvement processes <i>shall</i> be documented.			
	Control of nonconforming components and processes <i>shall</i> provide for the identification, documentation, evaluation, segregation (when practical), disposition, and notification to the affected organizations, including the WCO.			
	Nonconforming components <i>shall</i> be conspicuously labeled, tagged, or otherwise marked to ensure removal from the waste certification process and prevent inadvertent use.			
	The disposition of nonconforming components, services,			

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	and processes <i>shall</i> be reviewed for technical justification and disposition by authorized personnel.			
	When nonconforming conditions are identified that affect the quality of previously shipped waste, NNSA/NSO <i>shall</i> be notified.			
	A process <i>shall</i> be established for the identification and timely correction of quality problems.			
	The root cause, corrective action, action to prevent recurrence, and estimated completion date <i>shall</i> be documented.			
	The WCO and appropriate levels of management <i>shall</i> be involved in the corrective action process.			
	Corrective action documents <i>shall</i> be tracked until successful resolution can be demonstrated.			
5.4	Documents and Records			
	Activities affecting the quality of the waste certification program <i>shall</i> be prescribed and performed in accordance with written instructions, procedures, or drawings and available to those performing the work.			
	A document control system <i>shall</i> be established to assure that these documents are prepared, reviewed, approved, controlled, and revised.			
	The WCO <i>shall</i> document the review and concurrence of procedures (including revisions) critical to waste certification activities (i.e., generation, packaging, inspection, characterization, certification, etc.).			
	The records system <i>shall</i> be defined and implemented in accordance with written instructions, procedures, or other documentation.			
	Records documenting compliance with waste certification criteria <i>shall</i> be specified, prepared, reviewed, and signed by authorized personnel.			
	Records <i>shall</i> be compiled into a records management system that includes provisions for transmittal, distribution, retention, handling, correction, disposition, and retrievability.			

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	Completed records <i>shall</i> be protected from damage, loss, and deterioration.			
	The generator <i>shall</i> maintain records for time periods equivalent to on-site records retention requirements, but not less than three years (or for time periods designated by other regulatory authorities).			
5.5	Work Processes			
	Work <i>shall</i> be planned and performed to established technical standards and administrative controls using approved instructions, procedures, or other appropriate means.			
	Processes important to waste certification activities <i>shall</i> have controls or verification steps identified as part of operating procedures.			
	Controls <i>shall</i> be established to ensure that the Traceability of waste from the point of generation through shipment is maintained			
	Waste characterization documentation <i>shall</i> be traceable to the exact package in which waste was placed.			
	Waste containers <i>shall</i> be controlled through the life cycle of the component (e.g., receipt, handling, storage, packaging, and shipping) to prevent damage, loss, or deterioration.			
	Components used in the certification process such as waste containers, liners, sorbents, and solidifiers <i>shall</i> be controlled to ensure that only correct and acceptable items are used.			
	Identification <i>shall</i> be maintained on items or documents traceable to the items.			
	Measuring and Test Equipment (M&TE) used for process monitoring or data collection <i>shall</i> be uniquely identified, controlled, and calibrated.			
	Records of calibration <i>shall</i> be maintained, traceable to the equipment, and the equipment suitably marked to indicate calibration status.			
	M&TE marking <i>shall</i> include a unique identification, date			

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	of calibration, calibration due date, and any limitations			
	Calibration equipment for M&TE <i>shall</i> be traceable to a nationally recognized standard or equivalent means to assure accuracy.			
	Testing and validation of computer programs and verification of data results from those programs (i.e., Package Shipment Disposal Request (PSDR) data, radioactivity calculations) <i>shall</i> be conducted and documented.			
5.6	Design			
	Structures, Systems, and Components (SSCs) designed and/or constructed to ensure that waste will satisfy certification requirements <i>shall</i> be designed using sound engineering/scientific principles and standards and performed in accordance with established design processes.			
	Design adequacy of SSCs <i>shall</i> be verified or validated by qualified personnel other than those who initiated the design.			
	Verification and validation of SSC designs <i>shall</i> be completed and approved prior to implementation of the design or design changes.			
	Design interfaces <i>shall</i> be identified and controlled.			
	Waste generators <i>shall</i> document their review of product or process designs (e.g., waste containers, sorbents, waste treatment operations) when performed by others (e.g., suppliers or other generators) to ensure that they conform to established requirements and end-use application.			
	Design changes <i>shall</i> be approved commensurate with the same control measures that were applied to the original design.			
5.7	Procurement			
	Components and services critical to the waste certification program <i>shall</i> be procured under a controlled and documented system.			
	Procurement documents <i>shall</i> identify applicable technical			

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	requirements such as drawings, specifications, codes, standards, regulations, tests, inspection and acceptance criteria, and certification records.	_____	_____	_____
	Procurement documents <i>shall</i> be reviewed and approved by authorized personnel to ensure that they contain appropriate references and technical requirements.	_____	_____	_____
	Changes to procurement documents <i>shall</i> receive the same degree of review and approval as the original documents.	_____	_____	_____
	Selection of suppliers providing components and services critical to the waste certification program <i>shall</i> be evaluated and selected on the basis of specified criteria (e.g., waste packaging, waste treatment services).	_____	_____	_____
	The methods of evaluation (i.e., audits, surveillance, source inspection, receipt inspection, third party audits) <i>shall</i> be established and provide adequate confidence that the selected supplier can meet the established requirements.	_____	_____	_____
	When third-party audits are used to qualify a supplier, a documented evaluation of the report <i>shall</i> be performed by a qualified Lead Auditor identifying the activities, findings, conclusions, and basis for qualification.	_____	_____	_____
	Suppliers of components (e.g., off-the-shelf sorbents) that are tested or verified by the purchasing organization for conformance to technical requirements may not need to be evaluated (audited), provided the testing demonstrates the procured component conforms to design requirements. Conformance testing <i>shall</i> be documented.	_____	_____	_____
	A process to ensure approved suppliers continue to provide acceptable components and/or services <i>shall</i> be established and implemented.	_____	_____	_____
	Methods of evaluation <i>shall</i> be specified and documented.	_____	_____	_____
5.8	Inspection and Acceptance Testing			
	Inspection and testing of components, services, and processes critical to the waste certification program <i>shall</i> be conducted using established acceptance and performance criteria.	_____	_____	_____

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	In process inspections of waste certification activities <i>shall</i> be performed by qualified personnel having no responsibility for the work process or item being inspected.	_____	_____	_____
	Receipt inspections <i>shall</i> be performed to verify conformance of components received to the procurement documents and design criteria.	_____	_____	_____
	In-process inspections, including waste container pre-use inspections and waste packaging activities, <i>shall</i> be conducted throughout the waste certification process.	_____	_____	_____
	Final inspections <i>shall</i> be conducted to verify conformance of the waste, containers, and waste certification process to the NNSSWAC prior to shipment of the waste.	_____	_____	_____
	Records of inspection <i>shall</i> identify the type of inspection, component, service, or process inspected, date of inspection, inspector, inspection results, and action taken if nonconforming conditions are identified.	_____	_____	_____
5.9	Management Assessment			
	Management of Waste Certification Program elements described in this document (i.e., Sections 3.0 through 6.0, etc.) <i>shall</i> periodically assess their management processes to ensure conditions that preclude their organization from achieving objectives are identified and corrected.	_____	_____	_____
	Management assessment programs / processes <i>shall</i> ensure results of management assessments are documented in a final report and issued to the appropriate organizations) and the WCO for review.	_____	_____	_____
5.10	Independent Assessment			
	Assessment activities (audits and surveillances) <i>shall</i> be planned, scheduled, and conducted in accordance with a documented and approved process.	_____	_____	_____
	Assessment personnel <i>shall</i> be independent of the assessed areas and have sufficient authority and freedom to effectively carry out the assessment activities.	_____	_____	_____
	Waste certification programs <i>shall</i> be independently assessed annually to verify compliance with NNSSWAC program requirements to promote process improvement.	_____	_____	_____

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	When surveillances are used as the annual assessment, a final report <i>shall</i> be prepared identifying the assessed program elements / activities, conclusions, findings and corrective actions initiated to resolve them and their status.			
	Annual independent assessments and/or surveillance roll-up <i>shall</i> be performed and documented by a qualified Lead Auditor. An approved copy of the annual independent assessment report, including any findings issued, shall be forwarded to the RWAP Manager.			
	The WCO and/or supporting oversight organizations <i>shall</i> schedule and conduct periodic surveillances of specific activities critical to the waste certification program (e.g., personnel training, waste packaging, receipt inspection, control of M&TE, etc.). Personnel performing surveillances <i>shall</i> be qualified in the surveillance process and knowledgeable of the areas being assessed.			
	Results of assessment activities (audits and surveillances) <i>shall</i> be documented, approved, and reported to responsible management, including the WCO.			
	Deficiencies identified during an assessment activity <i>shall</i> be tracked until acceptable resolution is achieved and verified.			
6.0	Waste Transportation & Receipt Information			
6.2	Shipping Arrangements			
	6.2.1 Waste Receipt and Handling at NNSS			
	To expedite waste receipt and handling at NNSS, waste generators <i>shall</i> , at a minimum, comply with the following: <ul style="list-style-type: none"> • Prior to departure of a waste shipment to the NNSS, attach security seals to the shipping trailer’s door latches or to each package if not enclosed in a trailer. • Instruct transport driver on the importance of fully completing the “Drivers Questionnaire” at the NNSS before leaving the RWMC. • Enter the following pre-notification information on the HAZTRAK database. (Refer to NNSSWAC section for specific communication requirements.) 			

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	<ul style="list-style-type: none"> - Date and time shipment departed generator site - Estimated date and time of arrival (ETA) at NNSS - Shipment number, shipper's name, shipper's contact number - Carrier, driver's name (shall be a U.S. Citizen), driver's license number and state (information <i>shall</i> be legible) - Trailer number, seal number(s), DOT "Proper Shipping Name(s)" - Number of packages, package type (boxes, drums, cargo containers, burrito wraps, etc.) and gross weight - Waste stream number and description of waste 			
6.3	Shipping Documentation			
	6.3.1 Accountable or Special Nuclear Material Shipments			
	For accountable or special nuclear material shipments, a "Nuclear Material Transaction Report" (DOE/U.S. Nuclear Regulatory Commission [NRC] Form 741) <i>shall</i> be completed for transfers of nuclear material between facilities having different Reporting Identification Symbols.	_____	_____	_____
	The original Nuclear Material Transaction Reports <i>shall</i> accompany the shipment paperwork or submitted via e-mail to wminfo@nv.doe.gov prior to shipment arrival.	_____	_____	_____
	Generators shipping waste that require a DOE/NRC Form 741 <i>shall</i> also complete and fax a "Nevada National Security Site – Waste RIS VAB Accountable Nuclear Materials Authorization to Ship Waste" form to (702) 295-4125 seven or e-mail (klamanda@nv.doe.gov or pricem@nv.doe.gov) days prior to shipment.	_____	_____	_____
	Generators <i>shall</i> obtain authorization to ship from NNSS Material Control & Accountability (MC&A) prior to shipping the waste to the NNSS.	_____	_____	_____
	Applicable shipment numbers <i>shall</i> be included on both the Nuclear Material Transaction Report (DOE/NRC Form 741) and on the Nevada National Security Site – Waste RIS VAB Accountable Nuclear Materials Authorization to Ship Waste Form.	_____	_____	_____

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	6.3.2 DOT Regulated Shipments			
	For material regulated by DOT, complete shipping papers with shipper's certification, as required by Title 49 CFR, <i>shall</i> accompany each shipment.	_____	_____	_____
	A "Uniform Hazardous Waste Manifest" or equivalent state-of-generation manifest, accompanied by the appropriate documentation, <i>shall</i> be used when shipping MW.	_____	_____	_____
	6.3.3 PSDR Submittal			
	The original completed and signed Package Shipment and Disposal Request (PSDR), or the original of an equivalent, <i>shall</i> accompany each shipment.	_____	_____	_____
	An electronic version of the PSDR <i>shall</i> be transmitted to NNSS Operations prior to shipment arrival (e-mail wmdata@nv.doe.gov). Shipments <i>shall</i> not be accepted if an electronic PSDR is not on file.	_____	_____	_____
	6.3.4 Additional Certification Statements			
	A Waste Certification Statement <i>shall</i> be signed by an authorized WCO or Alternate WCO for LLW or MLLW (example of the required Waste Certification Statement in NNSSWAC, page 6-5).	_____	_____	_____
	An appropriate LDR Certification Statement <i>shall</i> be signed by a knowledgeable authorized individual, which may include the WCO or Alternate WCO for MW (see Title 40 CFR 268.7 for information required to be included in an LDR certification / notification). The LDR certification/notification is required for the initial shipment of the waste stream or when the WP/LDR information changes.	_____	_____	_____
6.4	Waste Transportation			
	Waste shipments consigned to the NNSS <i>shall</i> be made in accordance with applicable DOE, DOT, EPA, state, and local hazardous waste regulations and requirements.	_____	_____	_____
	Waste shipments to the NNSS <i>shall</i> be made by "exclusive-use vehicles" only. Sharing of conveyances with other DOE waste generators shipping directly to the NNSS is	_____	_____	_____

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	acceptable.			
	NNSA/NSO <i>shall</i> be notified when 1) the motor carrier(s) is being evaluated; 2) the motor carrier route selection is being reviewed; 3) a motor carrier discrepancy, noncompliance, or inadequate performance has been identified; or 4) there is a transportation incident or emergency situation.			
	Generators <i>shall</i> ensure a National Environmental Policy Act (NEPA) analysis (10 CFR 1021) of the potential waste transportation impacts is completed prior to waste shipment.			
	Waste transportation to the NNSS, regardless of DOT classification, <i>shall</i> avoid the Hoover Dam Bypass Bridge and Las Vegas.			
App. C	Marking and Labeling			
	C.1 Bar Code			
	<p>Barcodes (see Figure C-1) used on packages <i>shall</i> meet the following standards:</p> <ul style="list-style-type: none"> • Code 39 • Low-density to medium-density; low-density preferred. • 1-inch high bar code not to exceed 6 inches wide. • Human readable interpretation (HRI) ½ inch high, printed below the bar code. • Spacing between bar code and HRI will be 1/10 of an inch. • Minimum left and right margin (quiet zones) will be at least 1/25 inch. • Bar codes and HRI will be stacked with a minimum separation of ½ inch and in the following order: shipment number, container number. • A total of two bar code labels <i>shall</i> be placed on each package near the top and on opposite sides. Drums <i>shall</i> have a total of two bar code labels, one on top of the drum lid and one on the side near the top. • Labels <i>shall</i> be • Securely attached and able to withstand shipping conditions 			

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	<ul style="list-style-type: none"> • Weatherproof and not deform when wet or fade in the sun • Resistant to tearing, peeling, and cracking • Print <i>shall</i> be with permanent indelible ink and legible 			
C.2 Marking & Labeling				
	<p>Packages <i>shall</i> have the following markings and labels:</p> <ul style="list-style-type: none"> • Marking and labeling as required in Title 49 CFR; • For additional asbestos labeling, see Section 3.1.15. • For additional beryllium labeling, see Section 3.1.17. • For additional MW labeling, see Section 3.3.6.1 • Package Certification Label (PCL) (see Figure C-2), signed by the WCO or package certifier. If the waste is unpackaged bulk, a signed PCL <i>shall</i> accompany the shipment papers. • Shipment number in the following sequence: Two alpha character generator-site-designator codes assigned by NNSA/NSO/WMP (see Section C-3); one alpha character for type of waste (L for LLW, M for MW); two numerical characters for current fiscal year; three alpha numerical characters for shipment sequence. This number <i>shall</i> be on the bar code. • Package number <i>shall</i> be six characters (alpha, numeric, or combination) with no duplication within the shipment. This number <i>shall</i> be on the bar code. • Package weight in units of kilograms and pounds <i>shall</i> be included on the side of each waste package. 			
	<p>The activity of each nuclide in a waste package as documented on the Package Shipment and Disposal Request (PSDR) <i>shall not</i> exceed the corresponding maximum radionuclide concentration specified on the waste profile.</p>			
App. D	Package Shipment and Disposal Request (PSDR)			
	<p>The activity of each nuclide in a waste package as documented on the Package Shipment and Disposal Request (PSDR) <i>shall not</i> exceed the corresponding maximum radionuclide concentration specified on the waste profile.</p>			
App. E	Radiological Waste Characterization and Reporting			

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E.1	Radionuclide Reporting			
	Any radionuclides reported on the PSDR <i>shall</i> also be identified on the WP. (See Appendices D for examples of PSDR.)	_____	_____	_____
	Determination of activity concentrations reported on the WP (Sections D.5 and D.6) and the PSDR <i>shall</i> be documented and available for review.	_____	_____	_____
	Verification of calculations used to determine the radionuclide concentrations (data results) <i>shall</i> be conducted and documented.	_____	_____	_____
	E.1.A Reportable Radionuclides			
	Radionuclides known or reasonably expected to be present in a waste stream <i>shall</i> be reported as follows:	_____	_____	_____
	1. The activity concentration of the radionuclides in the final waste form exceeds 1 percent of the Action Level (Table E-1). These radionuclides require rigorous waste characterization and <i>shall</i> be reported on the PSDR and the WP.	_____	_____	_____
	2. Radionuclides that are alpha-emitting and transuranic with a half-life greater than 20 years that exceed 10 pCi/g <i>shall</i> be reported on the WP. The waste mass <i>shall</i> be determined as described in Section E.4. Transuranic waste radionuclides with concentrations that exceed 1 nCi/g require rigorous waste characterization methods and shall be reported on the PSDR and the WP.	_____	_____	_____
	3. Activity concentrations in the final waste form that exceed 1 percent of the total activity concentration <i>shall</i> be reported on the PSDR and section E.4 of the WP. The total activity concentration <i>shall</i> include the activity of all radionuclides except for those that are exempt from the reporting requirements as specified below. For these radionuclides and for those present at a level less than the detection limit of industry-accepted characterization methods, Process Knowledge (PK) should be sufficient for characterization.	_____	_____	_____
E.3	Radiological Characterization Methods			

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	E.3.B Gross Radiation Measurements			
	Generators using gross radiation measurements <i>shall</i> ensure that measurements correlate with activity concentration on a consistent basis.	_____	_____	_____
	Radionuclide distributions in the waste stream <i>shall</i> be initially determined and periodically verified through direct measurements or sampling and analysis.	_____	_____	_____
	Generators <i>shall</i> document all methods used to develop scaling factors that relate gross radiation measurements to the activity concentration.	_____	_____	_____
	When developing scaling factors, generators <i>shall</i> consider the waste package and detector geometry; shielding and attenuation effects; and the energy spectra and decay schemes of radionuclides in the waste.	_____	_____	_____
	E.3.D Sampling and Analysis			
	Radiological characterization using sampling and analysis, including swipes taken for characterization, <i>shall</i> be controlled.	_____	_____	_____
E.4	Determination of Waste Volume			
	Waste activity concentration <i>shall</i> be determined based on the volume of the final waste form as offered for disposal.	_____	_____	_____
	When these conditions are not met, for example when the package contains significant void space or contains irregularly shaped equipment or components, the volume <i>shall</i> be taken as the volume occupied by the waste in the container.	_____	_____	_____
	The activity concentration of transuranic radionuclides in units of nCi/g <i>shall</i> be based on the mass of the contents of a single waste container, excluding the mass of the container and any shielding present.	_____	_____	_____
E.7	Fissile Material Limits			
	The quantity of fissile material in a waste package acceptable for disposal <i>shall</i> be demonstrated to meet any of the following: 1. Meets criteria specified in 49 CFR 173.453, Fissile	_____	_____	_____

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	<p>Material - Exceptions.</p> <p>2. Does not exceed 350 grams of ²³⁵U FGE per package nor does it exceed 2 g of ²³⁵U FGE per kilogram of waste (mass of the package is not included in the mass of the waste) (graphite and beryllium <i>shall</i> not exceed 1% by mass of the waste). FGE is determined by completing Table E.3. Both limits <i>shall</i> not be exceeded. This criteria applies to 55-gallon metal drums or larger containers (i.e., 85-gallon drums, 4x4x6ft metal boxes) and is not applicable to drums <55- gallon or soft sided, wood, plastic containers.</p> <p>3. Does not exceed the limits and the waste package meets the conditions as specified in Table E.4.</p> <p>4. Does not exceed the limits and the waste package meets the conditions as specified in Tables E.5 and E.6.</p>			
	<p>If the waste stream contains enriched uranium . . . effective enrichment is required to be reported with the profile by completing Table E.3 for each enrichment range. The waste <i>shall</i> not exceed the total FGE as specified for the effective enrichment.</p>	_____	_____	_____
App. F	Requirements for Intermodal (Roll-Off Boxes)			
	<p>These requirements are specific to intermodal roll-off containers that will be emptied and returned to the generator facility. Intermodal (roll-offs) containers used for disposal of bulk LLW <i>shall</i> meet applicable NNSWAC requirements and the following: (see Appendix F for specific details for each heading below.)</p> <ul style="list-style-type: none"> • Prohibited Waste Types: • Acceptable Waste Types: • Dose rates and Radiological Concerns • Radionuclide Activities • Size, Weight, and Loading • Weights • Liners – Waste shall be placed in a liner within the roll-off container • Marking and Labeling • Container Design 	_____	_____	_____

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	• Off-Loading			
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