14.0 ATOMIC ENERGY ACT AND THE U.S. NUCLEAR REGULATORY COMMISSION

14.1 Summary of the Law

As discussed in Section 13.0, the AEA gives the NRC its authority to develop policies, issue orders, and promulgate regulations that address environmental, safety, and health protection aspects of radioactive waste and nuclear materials in the civilian sector. Regulations promulgated by the NRC under the AEA appear in 10 CFR Chapter I and establish standards for the management of nuclear material and the protection of the public against radiation. Additional NRC requirements apply to the licensing, packaging, preparation, and transportation of radioactive materials.

14.2 Status of Compliance With the Regulatory Requirements

The WIPP Project was authorized by Section 213 of the Department of Energy National Security and Military Applications of Nuclear Energy Authorization Act of 1980 (P.L. 96-164; 93 Stat. 1259, 1265) to demonstrate the safe disposal of radioactive waste materials generated by atomic energy defense activities. The Act exempted the WIPP Project from NRC regulatory authority. The 1992 LWA required the DOE to use NRC certified transportation packages for the transportation of TRU waste to WIPP. The NRC regulations that apply to WIPP are stated in 10 CFR Part 71, "Packaging and Transportation of Radioactive Material," and are limited to those parts applicable to design certification and fabrication QA. Compliance with the regulations and applicable parts is demonstrated by the NRC approval of the packaging applications with C of Cs. The NRC approved the packaging for transporting CH TRU waste to WIPP, which are the TRUPACT-II (C of C No. 9218, Revision 18, issued July 19, 2005) (NRC, 2005a) and the HalfPACT (C of C No. 9279, Revision 4, issued October 19, 2005) (NRC, 2005b). The NRC also approved packaging for transporting RH-TRU waste to WIPP, which are the RH-TRU 72-B Cask (C of C No. 9212, Revision 4, issued July 28, 2006) (NRC, 2006) and the CNS 10-160B (C of C No. 9204, Revision 12, issued September 26, 2007) (NRC, 2007). For purposes of this section, the term "packaging" implies the TRUPACT-II, the HalfPACT, the RH TRU 72-B Cask, and the CNS 10-160B Cask.

14.2.1 General License, 10 CFR §71.17(a)

> *A general license is issued to any licensee of the Commission to transport, or deliver to a carrier to transport, licensed material in a package for which a license, C of C, or other approval has been issued by the NRC.*

The DOE is not required to be a licensee. In addition the DOE does not ship "NRC Licensed Material" in the Type B Packages used at WIPP.

14.2.2 Exemption from Classification as Fissile Material, 10 CFR §71.15

Fissile material meeting the requirements of at least one of the paragraphs (a) through (f) of this section are exempt from classification as fissile material and from the fissile material package standards of §§71.55 and 71.59, but are subject to all other requirements of this part, except as noted.

The application for the CNS 10-160B Cask specifies that the contents are controlled to limit the amount of fissile material that may be shipped to exempted quantities. The NRC reissuance of the C of C confirms that the packaging continues to meet the applicable requirements of 10 CFR §71.15.

14.2.3 Contents of Application and Package Description/Evaluation, 10 CFR §§71.31 Through 71.39

The required contents of an application are described. The application must include a package description/evaluation and description of the packaging and proposed contents as described in 10 CFR §71.33 and must demonstrate that the package meets the appropriate NRC standards. In addition, the QA program for the design, fabrication, assembly, testing, maintenance, repair, modification, and use of the package must be described, along with established codes and standards. Any additional information requested by the NRC must be provided.

The applications for the packaging describe the design, specifications, and safety evaluation in accordance with the NRC requirements. The NRC reissuance of the C of C confirms that the packaging continues to meet the applicable requirements.

14.2.4 Demonstration of Compliance, 10 CFR §71.41

The tests specified in 10 CFR §§71.71 and 71.73 must be performed on the package to demonstrate compliance under normal conditions and hypothetical accident conditions, respectively.

The applications describe the analysis and testing to demonstrate compliance with both normal and hypothetical accident conditions of transport. The NRC reissuance of the C of C confirms that the packaging continues to meet the applicable requirements.

14.2.5 Standards for All Packages, 10 CFR §§71.43 and 71.45

Standards for all packages must be met. These include general standards such as size, seals and fastening devices, materials and construction of the package, valves, temperature, and prohibition of continuous venting during transport as well as lifting and tie-down standards.

The applications describe the packaging features, including tie-downs. The NRC reissuance of the C of C confirms that the packaging continues to meet the applicable requirements.

14.2.6 External Radiation Standards for All Packages, 10 CFR §71.47

A package must be designed and prepared for shipment so that the radiation level at any external contact surface of the package does not exceed 200 mrem per hour and the transport index does not exceed 10.

The applications discuss the fact that the packagings and contents limit the dose rate at the contact surface of the packaging to less than 200 mrem per hour. All packaging has a transport index that does not exceed 10.

14.2.7 Additional Requirements for Type B Packages, 10 CFR §71.51

Type B packages must be designed, constructed, and prepared for shipment so as to prevent loss or dispersal of radioactive material, no significant increase in external radiation levels occurs, and no substantial reduction in the effectiveness of the packaging during normal transport occurs. In addition, release of krypton-85 may not exceed 2,700 curies in one week, release of other radioactive material may not exceed a total amount A_2 in one week, and no external radiation dose rate may exceed 1 rem per hour at 1 meter from the external surface of the package during hypothetical accident conditions. Compliance with these requirements must not be predicated upon the use of filters or of a mechanical cooling system.

The applications discuss containment design and acceptance criteria. The NRC reissuance of the C of Cs confirms that the packaging continues to meet the applicable requirements of 10 CFR §71.51.

14.2.8 Requirements for All Fissile Material Packages, 10 CFR §§71.55 and 71.59

All packages used to ship fissile material must be designed and constructed in accordance with 10 CFR §§71.41 through 71.47 and, when required by the total amount of radioactive material, 71.51. In addition, each package must be designed and constructed and its contents so limited that the contents will remain subcritical during normal and accident transportation conditions and that the packaging will remain effective during normal transportation conditions. Specific standards for fissile material packages are described in 10 CFR §71.59.

The applications for the TRUPACT-II, the HalfPACT, and the RH-TRU 72-B Cask discuss criticality; the contents are controlled to limit the amount of fissile material that may be shipped. Fissile classes have been replaced with a Criticality Transport Index. The NRC reissuance of the C of C confirms that the packaging continues to meet the applicable requirements.

14.2.9 Special Requirements for Type B Packages Containing More Than 10^5A_2, 10 CFR §71.61

A Type B package containing more than 10^5A_2 must be designed so that its undamaged containment system can withstand an external water pressure of 2 MPa (290 psi) for a period of not less than 1 hour without collapse, buckling, or in-leakage of water.

The applications for the TRUPACT-II, the HalfPACT, the RH-TRU 72-B Cask, and the CNS 10-160B Cask describe the tests performed to demonstrate compliance with this requirement. The NRC reissuance of the C of C confirms that the packaging continues to meet the applicable requirements.

14.2.10 Special Requirements for Plutonium Shipments, 10 CFR §71.63

Shipments containing plutonium must be made with the contents in solid form if the contents contain greater than 0.74 TBq [terabecquerel] (20 Ci [curies]) of plutonium.

The applications for the TRUPACT-II, the HalfPACT, the RH-TRU 72-B Cask, and the CNS 10-160B Cask describe the allowable plutonium contents of the packaging. The NRC reissuance of the C of C confirms that the packaging continues to meet the applicable requirements.

14.2.11 Tests Under Normal Conditions of Transport, 10 CFR §71.71

The behavior of each package design under tests and conditions simulating normal transportation conditions must be evaluated. The tests include thermal insulation for both heated and cold conditions, increased and reduced external pressure, vibration, water spray, free drop, corner drop, compressive loading, and penetration.

The applications describe the analyses and/or tests performed to demonstrate compliance with the normal conditions of transport. The NRC reissuance of the C of C confirms that the packaging continues to meet the applicable requirements.

14.2.12 Tests Under Hypothetical Accident Conditions, 10 CFR §71.73

Evaluation of a package for hypothetical accident conditions is based upon the sequential application of tests in the order specified to determine their cumulative effect on a package or array of packages.

Tests include free drop, crush, puncture, thermal, and immersion as specified in 10 CFR §71.73.

The applications describe the analyses and/or tests performed to demonstrate compliance with the hypothetical accident conditions of transport. The NRC reissuance of the C of C confirms that the packaging continues to meet the applicable requirements.

14.2.13 Assumptions Regarding Unknown Properties, 10 CFR §71.83

When the isotopic abundance, mass, concentration, degree of irradiation, degree of moderation, or other relevant property of fissile material in any package is not known, the fissile material will be packaged as if the unknown properties have credible values that will cause the maximum neutron multiplication.

The applications limit the amount of fissile material that may be shipped in the packagings (see Subsections 14.2.2 and 14.2.8). The NRC reissuance of the C of C confirms that the packaging continues to meet the applicable requirements.

14.2.14 Special Opening Instructions, 10 CFR §71.89

Any special opening instructions must be sent or otherwise made available to the consignee prior to delivery of a package.

The operating and maintenance instructions manual provides instructions for preparation, use, operation, inspection, and maintenance of the packagings. MOC personnel have the responsibility for training of personnel at the generator sites in accordance with the manual. The MOC personnel also support the DOE in performing assessments and audits of the generator sites to ensure that WIPP-generated methods are being applied correctly. The NRC reissuance of the C of C confirms that the packaging continues to meet the applicable requirements.

14.2.15 Reports Regarding Decreased Effectiveness or Defects With Safety Significance, 10 CFR §71.95

Within 60 days, the licensee will report the following to the NRC: (1) any instance in which there was significant reduction in the effectiveness of any authorized packaging during use; (2) details of any defects with safety significance in packaging after first use and the means used to prevent recurrence; and (3) instances in which the COAs in the C of C were not observed in making a shipment.

The packaging maintenance program is defined and detailed in MOC procedures that address such topics as control of material, spare parts, and nonconformance reports. Maintenance records are maintained by the packaging maintenance engineers. No conditions causing decreased effectiveness have occurred to date. Surveillance

number S-06-05 of the packaging maintenance program conducted in December 2005 by CBFO Technical Assistance Contractor determined that all programmatic requirements for maintaining the packagings were being met adequately. In accordance with the requirements of 10 CFR Part 71, Subpart H, the next triennial surveillance assessment will be conducted in 2008.

During this reporting period, ten notifications were made to the NRC in accordance with the requirements of 10 CFR §71.95. There was no harm to human health or the environment due to these occurrences. Corrective actions have been taken to prevent recurrence of the issues identified in the notifications. A summary of the notifications are in the following table.

Date, Notification Personnel and Number	Description
June 29, 2006 Gregory to Rahimi (PK:06:011)	There was incorrect stenciling of a TP-II during annual maintenance activities. A complete verification of all CH Type B Packages in the fleet was performed to verify this as an isolated occurrence.
August 8, 2006 Gregory to Rahimi (PK:06:0015)	Payload certification documents did not reflect requirements for a 10-day controlled shipment from the Advanced Mixed Waste Treatment Project (AMWTP) to the WIPP site. A review of the applicable shipping documentation verified that the shipment was received within the required 10-day shipping period for the controlled shipment.
December 28, 2006 Gregory to Rahimi (PK:06:0029)	This notification concerned the omission of the Inner Containment Vessel seal test port plug O-ring from a TP-II prior to shipment from Savannah River Site to the WIPP site.
December 28, 2006 Gregory to Rahimi (PK:06:0030)	A ten-drum overpack (TDOP) did not have the same unique identification number listed on the applicable shipment summary report as was on the TDOP itself. A review of the documentation from the shipping site verified that one number was left off the label applied to the TDOP. Further review of the TDOP content documentation verified it as the correct TDOP.
March 21, 2007 Sellmer to Rahimi (PK:07:00009)	The notification concerned the incorrect evaluation of the hydrogen and methane concentrations in 12 individual 55-gallon drums shipped to the WIPP site. Independent calculations of the 12 drums verified that the concentrations were well within the Package C of C limits.
May 9, 2007 Sellmer to Rahimi (PK:07:00018)	Incorrect tracer gas was used during the pre-shipment leakage rate test of a HalfPACT on a shipment from AMWTP to the WIPP site. The shipment was received without incident at the WIPP site.
June 7, 2007 Sellmer to Rahimi (PK:07:00020)	Two TP-II packages in a shipment from AMWTP to the WIPP site had the upper and lower main containment rings in the incorrect O-ring grooves. The applicable shipment documentation confirmed that both packages successfully passed the required leakage rate test prior to shipment.
September 10, 2007 Sellmer to Rahimi (PK:07:00026)	This notification concerned a drum that was shipped from AMWTP to the WIPP site that had not been fully characterized in accordance with the package C of C requirements. A review of the drums applicable characterization data revealed that the drum did meet the package C of C requirements.

Date, Notification Personnel and Number	Description
December 14, 2007 Sellmer to Rahimi PK:07:00035)	Five 55-gallon drums were shipped with the incorrect shipping category identified. A review of the applicable documentation for the identified drums confirmed that the drums met the payload requirements for the package C of C.
February 18, 2008 Sellmer to Rahimi (PK:08:00005)	This notification was related to the shipment of a TP-II from the Savannah River Site to the WIPP site that had the incorrect Inner Containment Vessel O-ring installed in the Outer Containment Assembly upper main O-ring groove. A review of the applicable shipping documentation verified that the TP-II successfully passed the required preshipment leakage rate test.

14.2.16 Advance Notification of Shipment of Nuclear Waste, 10 CFR §71.97

> *As specified in paragraphs (b), (c), and (d) of this section, each licensee shall provide advance notification to the governor of a State, or the governor's designee, of the shipment of licensed material, through, or across the boundary of the State, before the transport, or delivery to a carrier, for transport, of licensed material outside the confines of the licensee's plant or other place of use or storage.*

The advance notification of shipments of nuclear waste as stated in 10 CFR §71.97 does not apply to WIPP. However, in cooperation and agreement with the states' organizations (e.g., Western Governors Association), the DOE has agreed to provide written notification of the first five shipments in a corridor fourteen days in advance. Further, the DOE will provide the states with an annual notification, including six-month updates, of the shipments planned for the coming year. The states receive the eight-week rolling schedule on a weekly basis. The eight-week rolling schedule provides the detail of the annual plan. State officials designated for receipt of information (or their designee) are provided access to TRANSCOM (the DOE Transportation Tracking and Communication System). Through TRANSCOM, the states can view the eight-week rolling schedule, detailed shipment information (shipment's operational status, the location of the shipment, messages associated with the shipment) and shipment-specific emergency response and contact information.

14.2.17 NRC Quality Assurance Requirements, 10 CFR §§71.101 Through 71.137

> *Subpart H of 10 CFR Part 71 (§§71.101 through 71.137) established the NRC QA requirements for packagings. The QA requirements pertain to design, purchase, fabrication, handling, shipping, storage, cleaning, assembly, inspections, testing, operation, maintenance, repair, and modification of components of packaging that are important for safety. The requirements address the licensee's QA organization (§71.103); QA program (§71.105); package design control (§71.107); procurement document control (§71.109); instructions, procedures, and drawings (§71.111); document control (§71.113); control of purchased material, equipment, and services*

> *(§71.115); identification and control of materials, parts, and components (§71.117); control of special processes (§71.119); internal inspections (§71.121); test control (§71.123); control of measuring and test equipment (§71.125); handling, storage, and shipping control (§71.127); inspection, test, and operating status (§71.129); nonconforming materials, parts, or components (§71.131); corrective action (§71.133); QA records (§71.135); and audits (§71.137).*

The DOE is not required to be a licensee. The DOE does not transport NRC licensed materials. Because the DOE is a federal entity the NRC does not require the DOE to have an "NRC approved program." The NRC does expect for the DOE to perform any required oversight of the program. The WIPP Quality Assurance Program Plan for Type "B" Packaging (WP 08-PT.03) has addressed the 18 criteria specified within Annex 2 of the NRC Regulatory Guide 7.10, promulgated by the Office of Nuclear Regulatory Research (WTSf). The title of this guidance document is *Establishing Quality Assurance Programs for Packaging Used in the Transport of Radioactive Material*, Revision 2 (NRC, 2005c). The WIPP plan is reviewed and approved by the DOE; therefore, NRC approval is not required.

14.3 Status of Compliance With the Certificate of Compliance

The NRC has issued C of Cs to the DOE for the packaging as registered user. Packages are designed, fabricated, assembled, tested, procured, used, maintained, and repaired in accordance with the C of Cs.

14.3.1 Allowable Decay Heat, C of C, 5(b)(2)

> *Decay heat per payload must not exceed the values given in the TRAMPACs (TRUPACT-II Authorized Methods for Payload Control) of the TRUPACT-II SAR (Rev. 21), the HalfPACT SAR (Rev. 4), and the RH-TRU 72-B cask SAR (Rev. 4), and the CNS 10-160B Cask SAR.* (Note: The Transuranic WAC for WIPP (Rev. 6.2) indicates that the CNS 10-160B does not require the preparation of a site-specific TRAMPAC.)

The decay heat within each payload container plus the measurement error shall be less than or equal to the decay heat limit specified in the packagings SARs. The total decay heat from all containers in a TRUPACT-II shall not exceed 40 watts. The total decay heat from all containers in a HalfPACT shall not exceed 30 watts. The total decay heat from the containers in a RH-TRU 72-B cask shall be in accordance with Section 5.2 of the SAR. The total decay heat from all containers in a CNS 10-160B Cask shall not exceed 100 watts.

The C of C identified the TRUPACT-II, the HalfPACT, and the RH-TRU 72-B cask as a fissile material packaging, and the CNS 10-160B as a fissile-exempted packaging.

Therefore, the requirements specified in 10 CFR §71.59 and 10 CFR §71.15, respectively, must be met.

The available methods for determining and controlling the physical form of the wastes are visual examination, radiography, acceptable knowledge, and sampling. The chemical properties of the waste are determined by the allowable chemical constituents within a given waste type and are restricted so that all of the payload containers are safe for handling and transport. Chemical compatibility within and between the waste and the packaging ensures that no chemical process will occur that might pose a threat to the safe transport of the payload in the packagings. The configuration of the payload container and content is controlled as described in the packagings specific to the TRAMPAC (DOE, 2003a). The CH-TRAMPAC (Rev. 2) Section 2.5 describes filter vent requirements for the authorized containers for CH packages (DOE, 2005c). The RH-TRAMPAC (Rev. 0) Section 2.4 describes filter vents for the authorized containers for the RH-TRU 72-B (DOE, 2006h). The CH-TRAMPAC Section 5.3 describes venting and aspiration requirements for CH packages and the RH-TRAMPAC Section 5.2 describes venting and aspiration requirements for the RH-TRU 72-B waste containers.

The isotopic inventory for each payload container and the fissile content are discussed in Section 3 of the TRUPACT-II and HalfPACT TRAMPACs, Section 3 of the RH-TRAMPAC, and Appendix 4.10.2 of the CNS 10-160B Cask SAR. Decay heat is discussed in Section 5 of the TRUPACT-II and HalfPACT TRAMPACs, Section 5 of the RH-TRAMPAC, and Appendix 4.10.2 of the CNS 10-160B Cask SAR.

The TRAMPACs and SARs discuss the payload shipping categories. The primary difference among the categories is their potential for gas generation and internal bagging configuration. For waste with an adequate margin of safety, an analytical prediction suffices. Wastes without such a margin of safety require testing as described in the TRAMPACs and SARs.