GTCC Waste Disposed at the Barnwell Disposal Facility

DHEC Approval Date	Waste Generator	Waste Type	Volume (cuft)	Activity (curies)
4/15/1999	GPU Nuclear, TMI	19 dewatered filters	9.6 (Packaged in a HIC)	49.71 (1.06 over Class C Limit)
1/9/2001	Duke Power, Oconee	Irradiated hardware	11.8 (place containers in (1) CNS 3-55 metal container	1.31 over Class C limit
2/12/2002	Consumers Energy, Big Rock Point	Irradiated metal items	Approx 0.04 (based on dimensions) (grouted into reactor vessel)	1.10 curies (highest fragment dose)
8/12/2003	Framatome ANP Generator - NASA Plum Brook	Irradiated beryllium components	8-120 cement in-situ container	1, 950 (1.47 over Class C limit)
11/22/2004	Duratek Bear Creek Generator - IP2	Seven super-compacted drums (pucks) of DAW	Packaged in (1) NUHIC-55	14.56 (TRU – 323.172 nCi/g

Approved April 15, 1999 - GPU Nuclear , Inc., Three Mile Island

The shipment consisted of 19 dewatered filters (9.6 cuft) packaged in a high integrity container. The total activity of the container is approximately 49.71 curies and H-3, Ni-63 and Fe-55 are the most abundant radionuclides present. The waste classification was based on the activity concentration of two batches of filters. The worst case batch exceeded the Class C limit by a factor of 1.06 and is due to the combined activity concentrations of the greater than five-year half-life transuranics (60.59 nCi/gm), Pu-241 (1061.16 nCi/gm), I-129 (0.01 µCi/cc) and Ni-59 (3.07 µCi/cc). The other batch does not exceed Class C limits.

Approved January 9, 2001 - Duke Power Company, Oconee Station

The shipment consisted of incore detector assemblies which included a portion of the assembly, the flange end, hot end and cold end. The projected waste volume was approximately 11.8 cuft. The projected final waste classification for the 18 containers ready for disposal were projected to exceed Class C limits by a factor of 1.31 (ranging from 1.18 to 1.52 for Ni-63). 27% of the activity is attributed to Ni-63. The average Ni-63 activity concentration based over the combined waste in these containers was calculated to be approximately 9140 µCi or 1.31 times the Class C limit. The 18 containers were placed in a CNS-5-55 metal liner for disposal. No container exceeded Class C limits by more than a factor of 2. Any additional waste generated would require additional approval and shall not exceed the Class C limit by a factor of 1.5.

Approved February 12, 2002 – Consumers Energy, Big Rock Point

The shipment consisted of irradiated steel fragments that were thought to have been generated during the processing and/or removal of irradiated hardware components from their reactor vessel. Each fragment was estimated to be in the size range and mass equivalent of a control rod roller (i.e. a cylinder 0.4 inches in diameter by 0.6 inches in length or 1.24 cubic centimeters) with a mass of 14.68 grams. The contact dose rate on the fragments has been calculated to be approximately 1500 R/hr. The worst case fragment was calculated to have an activity of 1.10 curies. It exceeds the Class C limit based on the activity concentration of the C-14 at 3.13e2 µCi/cc (3.90e-04 Ci total), Nb-94 at 2.43 µCi/cc (3.0e-06 Ci total), and Ni-63 at 2.26e5 µCi/cc (2.80e-01 Ci total) of waste. These activity quantities are well below those normally associated with irradiated hardware shipments, however the activities averaged over the small fragments exceed Class C limits. It was proposed to leave the fragments in the reactor vessel. Cement grout to be added to the vessel and the vessel to be placed within a steel shell for disposal. The interstitial space between the vessel and steel shell would be filled with grout. The approval was for a variance from Condition 31.F of the 097 license.

Approved August 12, 2003 – NASA Plum Brook Reactor Facility (requested by Framatome ANP)

The waste consisted of horizontal beam holes made of stainless steel, aluminum and beryllium and had a total activity of 1,950 Ci. Each beam was comprised of one to three concentric tubes. These tubes begin near the reactor core and extend radially outside the vessel wall. The waste exceeded Class C limits due to no other components available at the time to allow for activity concentration averaging in the package. The hardware exceeded the Class C Table 1 and 2 limits by a factor of 1.06 and 1.47, respectively. The most prominent radionuclide exceeding the Class C limit was Ni-63 at 10,300 µCi/cc. The container was not full; therefore additional metal waste may have been added but would not increase concentrations identified. The waste was to be shipped to the NSSF for encapsulation with a two-part urethane sealant (compatible with the beryllium) to prevent shifting in the container during transfer. At the NSSF, the waste was in-situ cement stabilized to complete the encapsulation prior to disposal.

Approved November 22, 2004 – Entergy Nuclear, Indian Point 2 Station (requested by Duratek Bear Creek facility)

The container had seven super-compacted drums (pucks) of DAW of which one puck exceeded the Class C limits. The remaining pucks were Class C waste. The pucks were packaged in a NUHIC-55 high integrity container. The greater than Class C puck had a total activity of 3.87 Ci with Co-60 and Fe-55 being the most abundant radionuclides. The combined activity concentration of the greater than five-year half-life alpha emitting transuranics was 323.172 nCi/gm (Class C limit <= 100 nCi/gm). The total activity for the combined waste pucks is 14.56 curies. This would make the waste a Class C waste if the classification was to be performed using the activity concentrations averaged over all the pucks. The activity concentration for the combined alpha emitting transuranics would have been 42.19 nCi/gm. Request justified based on waste is packaged in a HIC for stability, it was comprised of DAW that if averaged together would be Class C waste, transuranics are less than 1% of the total activity, and removal of the above Class C puck would not comply with the ALARA policy.