NRC FORM 618 (8-2000) 10 CFR 71			U.S. NUCLEAR REGULATORY COMMISSION		
CERTIFICATE OF COMPLIANCE FOR RADIOACTIVE MATERIAL PACKAGES					
1. a. CERTIFICATE NUMBER	b. REVISION NUMBER	c. DOCKET NUMBER	d. PACKAGE IDENTIFICATION NUMBER	PAGE	PAGES
9001	40	71-9001	USA/9001/B( )F	1 OF	9

2. PREAMBLE

a. This certificate is issued to certify that the package (packaging and contents) described in Item 5 below meets the applicable safety standards set forth in Title 10, Code of Federal Regulations, Part 71, "Packaging and Transportation of Radioactive Material."

b. This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

3. THIS CERTIFICATE IS ISSUED ON THE BASIS OF A SAFETY ANALYSIS REPORT OF THE PACKAGE DESIGN OR APPLICATION

a. ISSUED TO *(Name and Address)*

EnergySolutions
140 Stoneridge Drive
Columbia, SC 29210

b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

VECTRA Technologies, Inc., application dated March 30, 1995, as supplemented

4. CONDITIONS

This certificate is conditional upon fulfilling the requirements of 10 CFR Part 71, as applicable, and the conditions specified below.

5.

(a) Packaging

(1) Model No.: IF-300

(2) Description

A stainless steel encased, depleted uranium shielded cask. The cask is cylindrical in shape, 64 inches in diameter, and a maximum of 210-inches long with maximum cavity dimensions of 37-1/2 inches in diameter by 180-1/4-inches long. Shielding is provided by 4 inches of depleted uranium, 2-1/8 inches of stainless steel, and a minimum of 4-1/2 inches (550 gallons) of a water ethylene glycol mixture.

Two closure heads are provided for the shipment of BWR and PWR fuel assemblies. The heads are 304 stainless steel forgings and end plates which encase the 3-inch thick depleted uranium shielding. Either closure head may be used for packaging solid irradiated hardware.

The closure heads are secured to the cask body by means of 32, 1-3/4 inch studs and nuts. The cask is sealed with a metallic ring gasket.

The cavity is penetrated by a vent line at the top and a drain line at the bottom. These lines are sealed by bellows stainless steel globe valves and valved quick-disconnect couplings. Stainless steel pipe caps or pipe plugs may be used in lieu of the quick-disconnect couplings. The vent line is also equipped with a 350-400 psig rated rupture disk. All valves are housed in protected boxes on the cask exterior.

5.(a) Packaging (continued)

(2) Description (continued)

Neutron shielding is provided by a liquid-filled, thin-walled, corrugated containment on the cask exterior. This cylindrical structure is separated into two longitudinal compartments, each equipped with two expansion tanks, fill and relief valves. The fill line from each compartment is terminated by a stainless steel globe valve in a protected box (separate from cavity boxes) on the cask exterior. The stainless steel globe valves may be replaced by stainless steel blind flanges. The vent line from each compartment goes to an expansion tank which is provided with a pressure relief valve set at 200 psig.

The cask has three types of fuel baskets which can be interchanged to accommodate various fuels. The PWR basket holds seven assemblies (except for Group III PWR contents, where six assemblies are authorized and the center cell does not contain a fuel assembly), the unchanneled BWR basket holds eighteen assemblies, and the channeled BWR basket holds seventeen assemblies. The channeled and unchanneled BWR fuel baskets may be provided with supplementary shielding (depleted uranium) near the cask closure.

The cask is shipped horizontally with the bottom supported in a tipping cradle between two pedestals and the upper end resting in a semi-circular saddle; the upper end is pinned to the saddle. The cask supports are welded to the framing of a 37-1/2-foot long by 8-foot wide structural steel skid. The skid may also have installed on it an auxiliary cooling system, consisting of two diesel engines driving two blowers which discharge cooling air to the corrugated surface of the cask via common ducting. Neither installation nor operation of all or part of this auxiliary cooling system is a requirement of this package approval.

The entire cask and cooling system is covered by a retractable aluminum enclosure. Access to the enclosure is via locked panels in the side and a locked door in one end. Although the Model No. IF-300 cask can be transported for short distances on the highway, its principal mode of transportation is by railroad.

The gross weight of the cask is approximately 140,000 pounds. The skid and other external components weigh approximately 45,000 pounds.

(3) Drawings

The Model No. IF-300 shipping cask is described by the following General Electric Company Drawing Nos.: 159C5238 - Sheet 1, Rev. 9; Sheet 2, Rev. 3; Sheet 4, Rev. 8; Sheet 5, Rev. 5; Sheet 6, Rev. 8; Sheet 7, Rev. 4; Sheet 8, Rev. 5; Sheet 9, Rev. 8; Sheet 10, Rev. 5; and Sheet 11, Rev. 2, GTS Duratek Drawing No.: C-110-B-57915-001, Rev. 1, Duratek Drawing No. C-002-044125-001, Rev. 0, and Pacific Nuclear Systems, Inc. Drawing Nos.: 420-11-3000, Sheets 1 through 9, Rev. 1; 420-11-3001, Sheet 1, Rev. 1; 420-11-3002, Sheets 1 and 2, Rev. 1; 420-11-3003, Sheets 1 and 2, Rev. 1; 420-11-3004, Sheets 1 and 2, Rev. 1; 420-11-3005, Sheets 1 and 2, Rev. 1; and 420-11-3006, Sheet 1, Rev 1.

5.(a)(4) Basic Components

The basic components of the Model No. IF-300 shipping cask that are important to nuclear safety are listed in Section IX, Table IX-1.

(b) Contents

(1) Type and form of material

(i) Irradiated PWR and BWR uranium oxide fuel assemblies. PWR assemblies may be shipped with or without control rods. Partial fuel assemblies, that is, assemblies from which fuel pins are missing, **must <u>not</u> be** shipped unless dummy fuel pins are used to displace an amount of water equal to that displaced by the original pins. The specific power of each fuel assembly must not exceed 40 kW/kgU. The BWR and PWR fuel assemblies must have the following dimensions and specifications:

<u>Group Ia fuel assemblies</u>

	<u>PWR</u>	<u>BWR</u>
Fuel form	Clad UO_2 pellets	Clad UO_2 pellets
Cladding material	Zr or SS	Zr or SS
Maximum initial U content/assembly, kg	465	198
Maximum initial U-235 enrichment, weight percent	4.0	4.0
Maximum assembly average burnup, MWd/MTU	35,000	35,000
Minimum cooling time, days	120	120
Maximum initial bundle cross section, in	8.75	5.75
Fuel pin array	14x14/15x15	7x7
Initial fuel diameter, in	0.380-0.460	0.500-0.600
Initial fuel pin pitch range, in	0.502-0.582	0.647-0.809
Maximum initial active fuel length, in	145	146

5.(b)(1)(i) Contents - Type and form of material (continued)

Group Ib fuel assemblies

	PWR
Fuel form	Clad UO_2 pellets
Cladding material	Zr or SS
Maximum initial U content/assembly, kg	439
Maximum initial U-235 enrichment, weight percent	4.0
Maximum assembly average burnup, MWd/MTU	45,000
Minimum cooling time, years	5
Maximum initial bundle cross section, in	8.75
Fuel pin array	15x15
Initial fuel diameter, in	0.380-0.460
Initial fuel pin pitch range, in	0.502-0.582
Maximum initial active fuel length, in	144

5.(b)(1)(i) Contents - Type and form of material (continued)

Group II fuel assemblies

	PWR	BWR
Fuel form	Clad UO_2 pellets	Clad UO_2 pellets
Cladding material	Zr or SS	Zr or SS
Maximum initial U content/assembly, kg	475	198
Maximum initial U-235 enrichment, weight percent	4.0	4.0
Maximum assembly average burnup, MWd/MTU	35,000	35,000
Minimum cooling time, days	120	120
Maximum initial bundle cross section, in	8.75	5.75
Fuel pin array	16x16/17x17	8x8
Initial fuel diameter, in	0.376-0.400	0.475-0.505
Initial fuel pin pitch range, in	0.496-0.507	0.630-0.645
Maximum initial active fuel length, in	150	150

5.(b)(1)(i) Contents - Type and form of material (continued)

Group III fuel assemblies

	PWR[a]	BWR[b]
Fuel form	Clad UO_2 pellets	Clad UO_2 pellets
Cladding material	Zr	Zr
Maximum initial U content/assembly, kg	442	187
Maximum initial U-235 enrichment, weight percent	4.25	4.25
Maximum assembly average burnup, MWd/MTU	45,000	45,000
Minimum cooling time, years	5	4
Maximum initial bundle cross section, in	8.75	5.75 (8x8) 5.75 (9x9)
Fuel pin array	15x15	8x8/9x9
Initial fuel diameter, in	0.424	0.483 (8x8) 0.440 (9x9)
Initial fuel pin pitch, in	0.563	0.640 (8x8) 0.566 (9x9)
Maximum initial active fuel length, in	144	150 (8x8) 146 (9x9)
Minimum initial top/bottom blanket length, in[c]	6	6 (8x8) 6 (9x9)

Notes:

[a] The center fuel assembly location in the PWR basket must not contain a fuel assembly, with the six PWR assemblies being placed in the six peripheral basket positions.

[b] This note is no longer applicable.

[c] Length of natural UO_2 fuel above and below the enriched portion of the active fuel.

5.(b)(1) Contents - Type and form of material (continued)

(ii) Solid irradiated hardware, which may include fissile material, provided the quantity of fissile material does not exceed a Type A quantity and does not exceed the mass limits of 10 CFR 71.15. As needed, appropriate component spacers must be used when loading irradiated hardware into the cask cavity to limit movement of the contents during accident conditions of transport. Use of a steel liner is authorized provided: (1) its outside dimensions are approximately those of the cask cavity inside dimensions, (2) constructed of single thickness of steel plate with full penetration welds, (3) thickness of steel plate does not exceed one inch, and (4) the liner is provided with a drain and vent to insure water removal.

(2) Maximum quantity of material per package

Maximum decay heat per package not to exceed 40,000 Btu/hr. Maximum 5,725 Btu/hr/PWR assembly. Maximum 2,225 Btu/hr/BWR assembly.

(i) Seven PWR fuel assemblies for Groups Ia, Ib and II as described in 5.(b)(1)(i).

(ii) Six PWR fuel assemblies for Group III as described in 5.(b)(1)(i). The center fuel assembly location in the PWR basket for Group III PWR contents must not contain a fuel assembly, with the six PWR assemblies being placed in the six peripheral basket positions.

(iii) Seventeen channeled BWR assemblies (for Groups Ia, II and III), or eighteen unchanneled BWR fuel assemblies (for Groups Ia and II), as described in 5.(b)(1)(i).

(iv) Above fuel assemblies to be contained in their respective fuel baskets as shown in GE Drawing No. 159C5238 - Sheet 6, Rev. 8 and GTS Duratek Drawing No. C-110-B-57915-001, Rev. 1, or PNSI Drawing No. 420-11-3000, Sheets 1 through 9, Rev. 1.

5. (c) Unloaded package - contents and maximum quantity of material

Greater than a Type A quantity of residual radioactive material consisting of mixed-fission and activation products adhering to interior cavity and fuel basket surfaces.

(d) Criticality Safety Index

For Groups Ia, Ib and II PWR and BWR fuel assemblies as described in 5.(b)(1)(i)	0.4
For Group III PWR and BWR fuel assemblies as described in 5.(b)(1)(i)	0.0

6. The end of life total calculated residual gas that could become available from the fuel pins must not exceed 0.50 lb moles for content 5.(b).

7. The maximum gross weight of the cavity contents must not exceed 21,000 pounds.

8. For the shipment of irradiated fuel assemblies, the cask cavity (containment vessel) must be promptly inerted following removal of the water from the cavity. The cask cavity must be purged at least three times with argon, nitrogen, or helium. Each purge volume must be equivalent to or greater than the cask cavity volume. After the final purge, the cavity must be promptly filled with argon, nitrogen, or helium at 1.0 atm pressure.

9. Known or suspected failed fuel assemblies (rods) and fuel with cladding defects greater than pin holes and hairline cracks are not authorized.

10. Prior to loading Group III PWR contents, a plug must be inserted into the center assembly location of the PWR basket and there must not be a Group III PWR assembly in the center basket location at any time.

11. Prior to each shipment, the licensee must confirm that the cask contains no more than 1 cubic foot of water in the cavity and the licensee must prepare the cask for shipment, in accordance with Subsection 10.1 of the application.

12. (a) The cask contents shall be so limited that under normal conditions prior to transport, 62 times the neutron dose rate plus 6.3 times the gamma dose rate will not exceed 560 mrem/hr at a distance of six feet from the side of the cask (ten feet from the cask center-line).

    (b) The cask content limitation of 12.(a) does not apply to:

        (1) Group II BWR fuel in the channeled fuel basket with a minimum planar average enrichment of 2.65 wt% ^{235}U.

        (2) Group III BWR fuel in the channeled fuel basket with a minimum planar average enrichment of 3.19 wt% ^{235}U.

13. The neutron shielding tanks must be filled with approximately a 50/50 volume percent mixture of ethylene glycol and water during the months of October through May.

14. Replacement globe valves other than the valve specified on Drawing No. 159C5238-Sheet 4, Rev. 8, must be tested as stated in Subsection 6.6.3.2 of the application.

15. The packaging must be maintained in accordance with the requirements of Subsection 10.2 of the application. During inactive periods, the maintenance and testing frequency may be disregarded provided that the package is brought into full compliance with these requirements prior to the next use of the package.

16. The cask cavity must be equipped with a rupture disk device with a burst pressure within the range of 350-400 psig (443°F) including all tolerances.

17. The uranium shielding material must be separated from all steel surfaces with a minimum copper thickness of 4-mils, except that the stud bolts attaching the shield assemblies to top of the unchanneled BWR basket must be coated with a minimum of ½-mil of copper.

18. A shutoff valve must not be installed between each neutron shield tank and its respective thermal expansion tank.

19. The cask may be wrapped with reinforced plastic during shipment, provided that the decay heat of the contents does not exceed 1.5 KW. The reinforced plastic used to wrap the cask must not be greater than 0.015 inches thick or have a thermal conductivity less than 0.0242 Btu/hr-ft-°F. The reinforced plastic wrapping cannot be used as the cask surface for purposes of complying with 10 CFR 71.87.

20. The package authorized by the certificate is hereby approved for use under the general license provisions of 10 CFR 71.17.

21. Transport by air of fissile material is not authorized. |

22. Revision 39 of this certificate may be used until October 1, 2008. |

23. Expiration date: October 1, 2008. This certificate is not renewable.

REFERENCES

VECTRA Technologies, Inc., application dated March 30, 1995.

VECTRA Technologies, Inc., supplements dated: April 27, and August 18, 1995; November 25, 1997;

Chem-Nuclear Systems supplements dated January 9, 1998; June 8 and June 21, 1999; January 14, February 17, March 16, June 16, July 14, October 11, October 20, and November 9, 2000; and April 23, 2001.

Duratek supplements dated February 4, September 9, October 21, 2002; August 25, 2004 and March 4, 2005.

EnergySolutions supplement dated May 15, 2007. |

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

/RA/

Robert A. Nelson, Chief |
Licensing Branch |
Division of Spent Fuel Storage and Transportation |
Office of Nuclear Material Safety
and Safeguards

Date: August 16, 2007