GC-859
Revised (05/2013)
Average Burden 67.5 Hours

Energy Information Administration
U.S. DEPARTMENT OF ENERGY

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NUCLEAR FUEL DATA SURVEY
FORM GC-859

Legislative Authority:	Data on this mandatory form are collected under authority of the Federal Energy Administration Act of 1974 (15 USC Schedule 761 et seq.), and the Nuclear Waste Policy Act of 1982, as amended (42 USC 10101 et seq.). Failure to file after receiving Energy Information Administration (EIA) notification may result in criminal fines, civil penalties and other sanctions as provided by the law. Data being collected on this form are not considered to be confidential. Title 18 U.S.C. 1001 makes it a criminal offense for any person knowingly and willingly to make to any Agency or Department of the United States any false, fictitious, or fraudulent statements as to any matter within its jurisdiction.
Public Reporting Burden:	The public reporting burden for this collection of information is estimated to average 67.5 hours per response. The estimate by respondent category is 80 hours per response for operating nuclear reactors, 40 hours per response for permanently shutdown nuclear reactors, and 20 hours per response for storage facilities and research/test reactors. The estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Energy Information Administration, Office of Survey Development and Statistical Integration, EI-21, 1000 Independence Avenue, S.W., Washington, DC 20585, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, 735 17th Street, N.W., Washington, DC 20503.
Form Due Date:	This form shall be submitted by September 30, 2013. Data on the form should reflect the spent fuel status as of June 30, 2013.
EIA Contacts:	Refer all questions to: Marta Gospodarczyk at (202) 586-0527 or Jack Thorpe at (202) 586-0768. Return completed forms by email to: GC859@eia.gov or by mail to: Z, INC. 8630 Fenton St. Suite 510 Silver Spring, MD 20910

RESPONDENT IDENTIFICATION

Site Operator Name: _____

REPORT PERIOD

Begin Report Period: January 1, 2003
End Report Period: June 30, 2013

If this is a resubmission, insert X in the block ☐

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SCHEDULE A: SITE OPERATOR DATA

A.1 Site Operator Name/Identifier

A.1.1 Site Operator Name: _____

A.1.2 List all reactors being covered by this report.

See Appendix C, "Reactor and Spent Fuel Storage Site Identification Codes."

Reactor Identifier	Reactor Name

A.1.3 List all spent fuel storage facilities being covered by this report.

See Appendix C, "Reactor and Spent Fuel Storage Site Identification Codes."

Storage Facility Identifier	Storage Facility Name

A.2 Site Operator Point of Contact

Provide a site operator point of contact for verification of information provided on this form.

Name: _____

Title: _____

Mailing Address: _____

_____

_____

City: _____ State: _____ Zip Code: _____

Telephone Number: _____ Fax Number: _____

Email: _____

A.3 Authorized Signature/Certification

I certify as a cognizant individual that the historical information contained herein and in any associated electronic media supplied and other materials appended hereto are true and accurate to the best of my knowledge. (NOTE: Corporate Officer signature is not required, but the signatory must be appropriately authorized.)

Name: _____

Title: _____

Signature: _____

Date: _____

Provide in **Schedule G** at the end of this data collection form any comments you have concerning **Site Operator Data**. Label your comments by the **Schedule and Item Number** to which they refer.

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SCHEDULE B: REACTOR DATA

Complete a Schedule B for each reactor, including operating and shutdown reactors.

B.1 Reactor Point of Contact

Provide a reactor point of contact for verification of information provided on this form.

If the person is also the site operator point of contact, insert X in the block. ☐

Name: _____

Title: _____

Mailing Address: _____

_____

_____

City: _____ State: _____ Zip Code: _____

Telephone Number: _____ Fax Number: _____

Email: _____

B.2 Reactor License Data

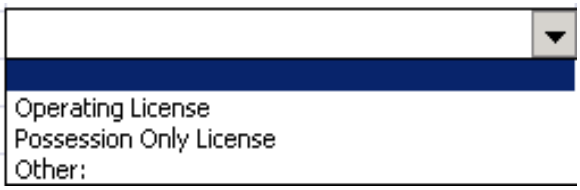
Complete a Schedule B.2 for each reactor, including operating and shutdown reactors.

B.2.1 Reactor Identifier

_____ (See Appendix C, "Reactor and Spent Fuel Storage Site Identification Codes.")

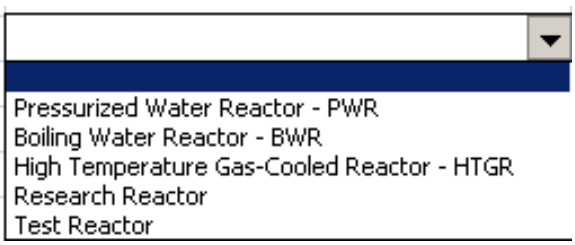
B.2.2 NRC License Expiration Date (MMDDYYYY): ___ ___ _____

B.2.3 NRC License Type:



Provide the expiration date of the reactor's NRC operating license as of the end of the reporting period for this data submission. If the reactor is permanently shutdown, provide the expiration date of the NRC possession only license.

B.2.4 Reactor Type:



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B.3 Cycle Data

Provide the following data for all operating cycles.

The first cycle of a reactor's operations is designated 01 and successive cycles are numbered consecutively. Operating cycles covered by this report should continue the sequential cycle numbering listed in the previous reporting period, which are provided.

If the reactor has experienced an outage in the midst of a cycle where fuel assemblies were temporarily or permanently discharged, indicate by providing subcycle numbers and start up and shutdown dates as if the subcycle were a complete cycle. Designate subcycles as a, b, c, etc. (example 16a, 16b, 16c). If no fuel assemblies were discharged, simply report the cycle number, start up and shutdown dates without regard to subcycles.

Cycle Number	Start Up Date (MMDDYYYY)	Shutdown Date (MMDDYYYY)

Provide in **Schedule G** at the end of this data collection form any comments you have concerning **Reactor Data**. Label your comments by the **Schedule and Item Number** to which they refer.

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SCHEDULE C: FUEL DATA

C.1 Data On Discharged Fuel Assemblies

The Form GC-859 survey collects data on an assembly-specific basis to ensure that all owners have been properly allocated spent nuclear fuel acceptance capacity in the *Acceptance Priority Ranking & Annual Capacity Report* (APR/ACR). For this reason, respondents are requested to report all discharged fuel - both fuel reported on previously submitted Form RW-859 surveys and fuel discharged during the current reporting period. Data reported on previous versions of the survey (formerly the Form RW-859) will be provided. Respondents are requested to update previously submitted data to reflect the currently required levels of precision. The assembly specific data to be reported are as follows:

Column	Data Element	Description
1	**Assembly Identifier**	The unique operator-assigned identifier or the American National Standards Institute (ANSI) identifier.
2	**Initial Heavy Metal Content**	The initial heavy metal content (uranium and/or plutonium) of the fuel assembly in kilograms (reported to the nearest thousandth of a kilogram).
3	**Initial Enrichment**	The initial enrichment of the assembly (reported to the nearest hundredth of a percent).
4	**Discharge Burnup**	The assembly burnup at discharge (reported in megawatt days thermal per metric ton of (initially loaded) uranium (MWD_t/MTU)).
5	**Last Cycle Number**	The cycle number for the assembly's final cycle of irradiation.
6	**Fuel Manufacturer**	The fuel manufacturer at the time the fuel was purchased.
7	**Lattice Size**	The fuel rod array size (e.g., 10 x 10, 17 x 17, etc.).
8	**Assembly Status**	Check the appropriate status indicators from the following table. Check all that apply.

Status Identifier	Description
8A	Non-standard assembly.
8B	Failed assembly.
8C	Containerized assembly; the assembly has been placed in a single-element container. Do not report assemblies that have been placed into a multi-element canister as containerized.
8D	Fuel rods have been removed from the original assembly.
8E	Fueled replacement rods have been inserted into the assembly (8D must also be checked for all 8E assemblies).
8F	Stainless steel or other non-fueled replacement rods have been inserted into the assembly (8D must also be checked for all 8F assemblies).
8G	Assembly has special characteristics that do not fall into the previous categories. Provide a description of these characteristics in Schedule G.

9	**Storage Location**	The pool or dry storage site identifier (from Appendix C) corresponding to the current storage location of the assembly. If all assemblies are stored in a common pool specific to the reactor, leave this field blank.

Note: Standard intact assembly, non-standard intact assembly, and failed assembly ***as defined in 10CFR 961.11 Appendix E***.

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DOE has provided respondents with a data collection system to facilitate their responses, but will accept data that includes the above elements at the required degree of precision as any commonly readable file type. The cycle shutdown date may be substituted for cycle number.

Your completed assembly-specific data (as an electronic file) should be transmitted by electronic mail, compact disk, DVD, or flash drive, to DOE at the addresses specified in the instructions and on the cover page of this form. Update (only changes or corrections are needed) all previously submitted data (which you have been provided) and enter the additional data on assemblies discharged since the last Form RW-859 Survey was collected.

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C.1.1 Data On Discharged Fuel Assemblies

Report discharged fuel assemblies only. If you are not certain if an assembly will be reinserted, prioritization rules suggest that it is in the site operator's interest to report it as discharged and modify the total burnup, last cycle number, and last cycle shutdown date later if the assembly is subsequently reinserted. See the Table in Section C.1 for descriptions of individual data elements in the table below.

1	2		3			4	5	6	7	8							9
										Assembly Status Indicators							
Assembly Identifier	Initial Heavy Metal Content		Initial Enrichment (Weight %)			Discharge Burnup (MWD_t/MTU)	Last Cycle Number	Fuel Manufacturer[1]	Lattice Size[1]	Non-Standard	Failed	Containerized	Fuel Rod(s) Removed	Replacement Rods (Fueled)	Replacement Rods (Non-fueled)	Other	Storage Location
	kgU	kgPu	U-235	Pu-239	Pu-241					8A	8B	8C	8D	8E	8F	8G	
								Areva Global Nuclear Fuel Westinghouse Electric ABB Combustion Engineering Advanced Nuclear Fuel Corporation Allis Chalmers ASEA Brown Boveri (ABB) Atom Babcock & Wilcox Company Combustion Engineering Exxon Nuclear Corporation (EXA) Framatome General Atomics GE Nuclear Energy Gulf General Atomics Gulf/United Nuclear Fuels Jersey Nuclear Nuclear Fuel Services Nuclear Materials and Equipment Corporation Siemens Nuclear Corporation United Nuclear Corporation Other:_____	4x4 5x5 6x6 7x7 8x8 9x9 10x10 11x11 13x14 14x14 14x15 15x15 15x16 16x16 17x17 17x18 Other:_____	❑	❑	❑	❑	❑	❑	❑	

[1] Frequently used lattice sizes that are currently associated with specific manufacturers are provided below. Single reactor and other less commonly used assembly types are not included here.

Areva (BWR)	8 x 8, 9 x 9, 10 x 10	B&W	15 x 15	GE	8 x 8, 9 x 9, 10 x 10
Areva (PWR)	14 x 15, 15 x 15, 16 x 16, 17 x 17	CE (now Westinghouse)	14 x 14, 16 x 16	Westinghouse	14 x 14, 15 x 15, 17 x 17

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C.1.2 Fuel Cycle History

For all assemblies irradiated in this reactor, including each assembly listed in Table C.1.1, identify the cycles during which the assembly was irradiated in the reactor core. Historical data reported on previous Form RW-859 surveys are being provided. Note that you may submit your official response covering your fuel cycle history as any commonly readable file type. Include data for all discharged assemblies and for assemblies that have been inserted but not yet discharged.

Assembly Identifier	Reactor Cycle Number (from Table B.3)																
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	…	39	40
	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	…	❑	❑
	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	…	❑	❑
	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	…	❑	❑
	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	…	❑	❑
	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	…	❑	❑
	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	…	❑	❑
	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	…	❑	❑
	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	…	❑	❑
	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	…	❑	❑

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C.2 Projected Assembly Discharges

Projections of discharged assemblies shall be reported on a group basis, where each assembly in the group has the following common characteristics:

- Assembly Type (same Manufacturer and Lattice Size)
- Reactor/Cycle History
- Initial Uranium Content (within 3 kg for BWR, 5 kg for PWR)
- Initial Enrichment (within nearest tenth of a percent)
- Projected Final Burnup (within 5% of the group average MWD_t/MTU). Round the final burnup to the nearest thousand MWD_t/MTU.

Report projections of discharged assemblies for at least the next five cycles.

Cycle Number	Planned Cycle Shutdown Date (MMYYYY)	Group Identifier	Projected Number of Assemblies Discharged in the Group	Initial Heavy Metal Content		Average Initial Enrichment (Weight %)			Projected Discharge Burnup per Assembly (MWD_t/MTU)
				Initial kgU	Initial kgPu	U-235	Pu-239	Pu-241	

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C.3 Special Fuel Forms

Report in this section, data on the following. Check all that apply.

____ Single Assembly Canisters (Complete Schedule C.3.1)

____ Uncanistered Fuel Rods/Pieces (Complete Schedule C.3.2)

____ Consolidated/Reconstituted/Reconstructed Assemblies; Non-standard Assemblies, & Failed Assemblies (Complete Schedule C.3.3)

C.3.1 Special Fuel Form – Canisters

A canister is defined as any single assembly canister designed to confine contents that may be delivered to a Federal facility. Within this schedule, canistered material may include damaged assemblies, reconstituted assemblies, intact fuel rods that have been removed from an assembly, and miscellaneous fuel. Empty canisters should not be reported.

Does your facility have single assembly canisters?

_____ Yes. Complete the remainder of **Schedule C.3.1**

_____ No. Skip to **Schedule C.3.2**

For all single assembly canisters, provide a detailed description.

C.3.1.1 Single Assembly Canisters Description

Canister Identifier	Canister Shape		Canister Dimensions (to the nearest 0.1 inch)			Loaded Weight (to nearest lb)	Storage Identifier[1]
	C	R	Length	Diameter/ Width	Depth		
	❑	❑					
	❑	❑					
	❑	❑					
	❑	❑					
	❑	❑					
	❑	❑					
	❑	❑					
	❑	❑					
	❑	❑					
	❑	❑					
	❑	❑					
	❑	❑					

C = cylindrical R = rectangular

[1]See Appendix C, “Reactor and Spent Fuel Storage Site Identification Codes.”

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C.3.1.2 Qualitative Canister Contents

For each canister identified in Schedule **C.3.1.1**, provide a qualitative description of the contents and identify, if applicable, the method used to close the canister. Also indicate whether the canister may be handled as a standard fuel assembly.

Canister Identifier	Description of Contents (check all that apply)	Canister Closure			Is Canister Handled As A Standard Fuel Assembly?	
		B	W	NS	Yes	No
	__ Intact failed fuel assembly __ Intact reconstituted/reconstructed fuel assembly __ Intact fuel rods __ Fuel debris (rod pieces, fuel pellets, etc.).	❑	❑	❑	❑	❑
	__ Intact failed fuel assembly __ Intact reconstituted/reconstructed fuel assembly __ Intact fuel rods __ Fuel debris (rod pieces, fuel pellets, etc.).	❑	❑	❑	❑	❑
	__ Intact failed fuel assembly __ Intact reconstituted/reconstructed fuel assembly __ Intact fuel rods __ Fuel debris (rod pieces, fuel pellets, etc.).	❑	❑	❑	❑	❑
	__ Intact failed fuel assembly __ Intact reconstituted/reconstructed fuel assembly __ Intact fuel rods __ Fuel debris (rod pieces, fuel pellets, etc.).	❑	❑	❑	❑	❑

B = bolted W = welded NS = not sealed

C.3.1.3 Detailed Canister Contents

For each canister identified in Schedule **C.3.1.1**, provide a detailed description of the contents.

Canister Identifier	Source Assembly Identifier	Number of Fuel Rod Equivalents from Assembly	Initial Heavy Metal Content		Discharge Burnup (MWD_t/MTU)
			Initial kgU	Initial kgPu	

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C.3.2 Special Fuel Form – Uncanistered Fuel Rods/Pieces

Does your facility have uncanistered fuel? Include all materials that were not listed in Schedule **C.3.1** (i.e., materials stored in baskets, materials to be repackaged, etc.).

_____ Yes. Complete the remainder of **Schedule C.3.2**

_____ No. Skip to **Schedule C.3.3**

For all uncanistered fuel rods and fuel pieces, provide a detailed description.

Source Assembly Identifier	Number of Uncanistered Fuel Rods or Pieces from Assembly	Initial Heavy Metal Content		Discharge Burnup (MWD_t/MTU)
		Initial kgU	Initial kgPu	

C.3.3 Special Fuel Form – Consolidated/Reconstituted/Reconstructed Assemblies; Non-standard Assemblies, & Failed Assemblies

C.3.3.1 Special Fuel Form – Consolidated/Reconstituted/Reconstructed Assemblies

Does your facility have consolidated/reconstituted/reconstructed assemblies? Include assemblies that have been modified by removing or replacing fuel rods.

_____ Yes. Complete the remainder of **Schedule C.3.3.1**

_____ No. Skip to **Schedule C.3.3.2**

For each consolidated/reconstituted/reconstructed assembly in the pool, give the assembly identifier for the source assembly and provide the following:

Current Location (Assembly Identifier)	Source Assembly Identifier	Number of Fuel Rods from Source Assembly	Initial Heavy Metal Content		Discharge Burnup (MWD_t/MTU)
			Initial kgU	Initial kgPu	

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C.3.3.2 Special Fuel Form – Non-standard Assemblies

Does your facility have non-standard assemblies?

_____ Yes. Complete the remainder of **Schedule C.3.3.2**

_____ No. Skip to **Schedule C.3.3.3**

For each non-standard assembly that is currently stored canistered or uncanistered in the pool, and requires special handling relative to intact assemblies for safety reasons, provide the assembly identifier and a generic description of why the assembly is considered "non-standard". "non-standard intact assembly" means a spent nuclear fuel (SNF) assembly that does not meet the general specification set forth in Appendix E of the Standard Contract.. Also included as non-standard are assemblies other than light water reactor (LWR) assemblies and consolidated assemblies.

"Standard intact assembly" means a SNF assembly that meets the following general specification:

Maximum Nominal Physical Dimensions

	Reactor (BWR)	**Reactor (PWR)**
Overall Length	14 feet, 11 inches	14 feet, 10 inches
Active Fuel Length	12 feet, 6 inches	12 feet, 0 inches
Cross Section*	6 inches x 6 inches	9 inches x 9 inches

*The Cross Section of the fuel assembly shall not include the channel.

For each non-standard assembly in the pool, give the assembly identifier for the source assembly and provide the following:

Assembly Identifier	**Description of Non-standard Assembly**

All fuel from this reactor is considered non-standard. ☐

C.3.3.3 Special Fuel Form – Failed Assemblies

Does your facility have failed assemblies?

_____ Yes. Complete the remainder of **Schedule C.3.3.3**

_____ No. Skip to **Schedule C.3.4**

For each failed fuel assembly that is currently stored canistered or uncanistered in the pool, and requires special handling relative to intact assemblies for safety reasons, provide the assembly identifier and a generic description of why the assembly is considered "failed". "Failed Fuel" means SNF assemblies that show visual evidence of structural deformity or damage to cladding or spacers which may require special handling, assemblies which are structurally deformed or have damaged cladding to the extent that special handling may be required, or assemblies that cannot be handled with normal fuel handling equipment.

For each failed assembly in the pool, give the assembly identifier for the source assembly and provide the following:

Assembly Identifier	Description of Failure

C.4 Potential High Level Waste

Has your utility entered into a contract for reprocessing any discharged fuel which will result in high level waste expected to be disposed of by the Federal government?

____ Yes.

____ No.

C.4.1 If Yes, is this contract with a domestic or international supplier of reprocessing services?

____ Domestic

____ International

____ Both Domestic and International

C.4.2 What quantity of discharged fuel will be reprocessed?

_____ (Metric Tons)

C.4.3 Provide details as to the type of waste anticipated to be generated.

Provide in **Schedule G** at the end of this data collection form any comments you have concerning **Fuel Data**. Label your comments by the **Schedule and Item Number** to which they refer.

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SCHEDULE D: STORAGE FACILITY DATA

D.1 Storage Facility Point of Contact

Provide a storage facility point of contact for verification of information provided on this form.

If contact information is the same as in Schedule A or B, insert X in the block. **A** ☐ **B** ☐

Name: _____

Title: _____

Mailing Address: _____

_____

_____

City: _____ State: _____ Zip Code: _____

Telephone Number: _____ Fax Number: _____

Email: _____

D.2 Storage Facility Information (Pool Storage)

Complete a Schedule **D.2** for each pool storage site.

D.2.1 Storage Site Identifier

_____ (See Appendix C, "Reactor and Spent Fuel Storage Site Identification Codes.")

D.2.2 Storage Capacity

	No. of Assemblies	
	BWR	**PWR**
Current NRC Licensed Storage Capacity		
Current Installed Storage Capacity		

Current NRC Licensed Storage Capacity -- report in number of assemblies. If the site is licensed for different types of fuel (PWR, BWR), note each in the appropriate column. Note any change from previous reporting period in the Comments Schedule (Schedule G).

Current Installed Storage Capacity -- report in number of assemblies. If the site is licensed for different types of fuel (PWR, BWR), note each in the appropriate column. Do not deduct inventory from current capacity.
Note in the Comments Schedule (Schedule G) if some of the storage capacity is unusable due to mechanical/physical limitations.

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D.2.3 Storage Inventory

Storage Inventory -- Provide the number of assemblies stored at the storage site. Also enter the number of assemblies discharged from each contributing reactor that are stored at the storage site.

Contributing Reactor Name	Number of Assemblies
Total Storage Site Inventory	

D.3 Storage Facility Information (Dry Storage)

If your company has implemented a dry storage cask storage system at your site, an independent spent fuel storage facility (ISFSI), provide the following information.

D.3.1 Storage Site Identifier

_____

(See Appendix C, "Reactor and Spent Fuel Storage Site Identification Codes.")

D.3.2 Multi-Assembly Canisters/Casks Inventory

Number of multi-assembly canisters/casks in service _____

Unique Canister/Cask Identifier	Vendor	Model Number	Date Loaded (MMYYYY)	Number of Assemblies Stored
Total Number of Assemblies in Dry Storage				

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D.3.3 Assemblies In Dry Storage

For each multi-assembly canister/cask, enter the assembly identifier for each assembly in that canister/cask.

Unique Canister/Cask Identifier	Assembly Identifier									

For each canister / cask also submit a diagram showing the loading pattern. This can be submitted in any readily available format. Examples may include, an attached pdf file of the face map which shows the location of the assemblies by ID number, paper copy diagrams, or a text or spreadsheet showing location identifiers and assembly ID's.

Provide in **Schedule G** at the end of this data collection form any comments you have concerning **Storage Facility Data**. Label your comments by the **Schedule and Item Number** to which they refer.

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SCHEDULE E: NON-FUEL DATA

All materials not listed in Schedule C.3, Special Fuel Forms, should be included here. Non-fuel components may be integral to an assembly (enter data in Schedule E.2), canistered (enter data in Schedule E.3), separate from an assembly and uncanistered (enter data in Schedule E.4).

E.1 Non-fuel Components

Does your facility have non-fuel components that may be delivered to a Federal facility?

_____ Yes. Complete the remainder of Schedule E

_____ No. Skip to **Schedule F**

Non-fuel components are defined in the Standard Contract, as including, but not limited to, control spiders, burnable poison rod assemblies, control rod elements, thimble plugs, fission chambers, and primary and secondary neutron sources, that are contained within the fuel assembly, or BWR channels that are an integral part of the fuel assembly, which do not require special handling and may be included as part of the spent nuclear fuel. Note: Fuel that does not meet these specifications shall be classified as non-standard fuel.

From the drop-down menu in the Type of Non-fuel Component column, select each type of non-fuel component currently stored at this storage facility. Provide the quantity of each type of non-fuel component identified.

Indicate in the Status Code columns how each type of non-fuel component is currently stored. Check all status codes that apply. The status codes are:
(I) – Stored as an integral part of an assembly (Enter the data in schedule E.2)
(C) – Stored in a single assembly canister or container (Enter the data in schedule E.3)
(S) – Stored separate from an assembly and uncanistered in the storage pool (Enter the data in schedule E.4)

Type of Non-fuel Component	Number of Individual Items	Non-fuel Components Status Code(s)		
		I	C	S
PWR - Control Rods PWR - Control Rods Spiders PWR - Thimble Plugs BWR - Cruciform Control Blades BWR - Fuel Channels BWR/PWR - Burnable Absorbers BWR/PWR - SF Disassembly Hardware BWR/PWR - In-core Instrumentation BWR/PWR - Neutron Sources BWR/PWR – Other:		❑	❑	❑
		❑	❑	❑
		❑	❑	❑

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E.2 Non-fuel Components – Integral to an Assembly

Does your facility have non-fuel components that are stored as an integral part of an assembly that are planned for delivery to a Federal facility?

_____ Yes. Complete the remainder of Schedule E.2

_____ No. Skip to Schedule E.3

For each assembly in which non-fuel components are stored, select each type of non-fuel component. Estimate the weight of the assembly including all the non-fuel components. If the storage of non-fuel components within an assembly classifies that assembly as non-standard according to the Standard Contract, check the Yes box in the Non-standard Assembly column. For example, changes to an assembly's maximum physical dimensions may cause it to be classified as non-standard.

Assembly Identifier	Type of Non-fuel Component	Estimated Total Weight (lbs)	Non–standard Assembly	
			Yes	No
	PWR - Control Rods PWR - Control Rods Spiders PWR - Thimble Plugs BWR - Cruciform Control Blades BWR - Fuel Channels BWR/PWR - Burnable Absorbers BWR/PWR - SF Disassembly Hardware BWR/PWR - In-core Instrumentation BWR/PWR - Neutron Sources BWR/PWR – Other:		❑	❑
			❑	❑
			❑	❑
			❑	❑
			❑	❑
			❑	❑
			❑	❑
			❑	❑
			❑	❑

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E.3 Non-fuel Components – Canistered

A canister is defined as a container designed to confine waste that may be delivered to a Federal facility. Report in this Schedule non-fuel components data for single assembly canisters or containers which are currently stored in a storage pool. Data for single assembly canisters that contain any spent nuclear fuel should also be reported in Schedule C.3, Special Fuel Forms.

Are there canisters or containers of non-fuel components in your pool planned for delivery to a Federal facility?

____ Yes. Provide the data requested in the table below for each canister

____ No. Skip to Schedule E.4

Canister Identifier	Canister Shape		Canister Dimensions (to nearest 0.1 inch)			Loaded Weight (lbs)	Type of Non-fuel Component	Number of Individual Items	Canister Closure			Is Canister Handled As A Standard Fuel Assembly?		Storage Location
	C	R	Length	Diameter/ Width	Depth				B	W	NC	Yes	No	
	❑	❑					PWR - Control Rods PWR - Control Rods Spiders PWR - Thimble Plugs BWR - Cruciform Control Blades BWR - Fuel Channels BWR/PWR - Burnable Absorbers BWR/PWR - SF Disassembly Hardware BWR/PWR - In-core Instrumentation BWR/PWR - Neutron Sources BWR/PWR – Other:		❑	❑	❑	❑	❑	
	❑	❑							❑	❑	❑	❑	❑	

C = cylindrical R = rectangular B = bolted W = welded NC = not closed

For each canister identified in Schedule E.3 in which non-fuel components are stored, list and estimate the number of each applicable type of non-fuel component that is stored in that canister. Estimate the loaded weight of the canister, including the non-fuel components, in pounds. Also indicate whether the canister may be handled as a standard fuel assembly, using the same equipment used to move assemblies. Note the storage location from Appendix C, “Reactor and Spent Fuel Storage Site Identification Codes”.

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E.4 Non-fuel Components – Separate from an Assembly and Uncanistered

Does your facility have uncanistered non-fuel components that are separate from an assembly and currently stored in a storage pool that are planned for delivery to a Federal facility?

_____ Yes. Complete the remainder of Schedule E.4.

_____ No. Skip to Schedule F.

List and estimate the number of each applicable type of uncanistered non-fuel component separate from an assembly and indicate the storage pool location from Appendix C "Reactor and Spent Fuel Storage Site Identification Codes".

Type of Non-fuel Component	Number of Individual Items	Storage Location
PWR - Control Rods PWR - Control Rods Spiders PWR - Thimble Plugs BWR - Cruciform Control Blades BWR - Fuel Channels BWR/PWR - Burnable Absorbers BWR/PWR - SF Disassembly Hardware BWR/PWR - In-core Instrumentation BWR/PWR - Neutron Sources BWR/PWR – Other:		

Provide in **Schedule G** at the end of this data collection form any comments you have concerning **Non-fuel Components Data**. Label your comments by the **Schedule and Item Number** to which they refer.

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SCHEDULE F: GREATER-THAN-CLASS-C WASTE DATA

DOE is requesting information on Greater-Than-Class C waste (GTCC) inventories. GTCC is waste in which the concentrations of radionuclides exceed the limits for Class C low-level radioactive waste established by the Nuclear Regulatory Commission (NRC) in 10 CFR Part 61.55, Tables 1 and 2.

F.1 Greater-Than-Class-C Waste Point of Contact

Provide a GTCC point of contact for verification of information provided on this form.
If contact information is the same as in Schedule A or B insert X in the block.

A ☐ **B** ☐

Name: _____

Title: _____

Mailing Address: _____

_____

_____

City: _____ State: _____ Zip Code: _____

Telephone Number: _____ Fax Number: _____

Email: _____

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F.2 Stored Inventory

Include in this section GTCC waste that is currently packaged and available for disposal as of June 30, 2013.

F.2.1 Activated Metals

Activated metals are removed from the reactor prior to decommissioning nuclear reactors. Portions of the reactor assembly and other components near the nuclear fuel are activated by neutrons during reactor operations, producing high concentrations or radionuclides. The major radionuclides in these wastes are typically cobalt-60, nickel-63, niobium-94, and carbon-14.

Packaged Volume (ft^3)[1]	Package Contents[2]	Packaging[3]		Package Dimensions				Loaded Weight of Package (lbs)	Date Packaged	Total Package Activity[4] (MCi)	Radionuclide[5]	Remotely Handled[6]		Date of Last Criticality (MM/YYYY)[7]	Latest Date of Segmentation (MM/YYYY)[8]
		Type	Number	External Length (in)	External Diameter (in)	External Volume (ft^3)	Internal Volume (ft^3)					Yes	No		
												❑	❑		
												❑	❑		
												❑	❑		
												❑	❑		
												❑	❑		
												❑	❑		
												❑	❑		
												❑	❑		
												❑	❑		
												❑	❑		

Packaging Type options:
- Shielded Activated Metal Container
- 55-Gallon Drum
- High Integrity Container
- NAC-MPC Canister
- NAC-UMS Canister
- NUHOMS Canister
- Energy Solutions Canister
- Fuel Solutions W-74 Canister
- Holtec Canister
- Sealed Sources
- Standard Waste Box
- Shipping Cask
- Other: _____

Radionuclide options:
- C-14
- C-14 in activated metal
- Ni-59 in activated metal
- Nb-94 in activated metal
- Tc-99
- I-129
- Alpha emitting transuranic nuclides *
- Pu-241
- Cm-242
- H-3
- Co-60
- Ni-63
- Ni-63 in activated metal
- Sr-90
- Cs-137

[1] **Packaged Volume (ft^3):** Combined volume of the waste and the storage container.
[2] **Package Contents:** Identify the contents of each package.
[3] **Packaging Type and Number:** Provide an entry for each waste stream indicating the type of package (for other, describe what the package is) and the quantity of packages.
[4] **Total Package Activity (MCi):** Report the total activity of the package in million curies associated with the activated metals.
[5] **Radionuclide:** Report the radionuclides that account for > 1% of total activity anticipated in the waste stream.
[6] **Remotely Handled:** If the package has a dose rate of greater than 200 mrem/hr on the surface of the package, indicate if the package must be remotely handled.
[7] **Date of Last Criticality:** The date of last criticality is the date the reactor was last critical from which the metal was derived.
[8] **Latest Date of Segmentation:** For activated metal waste, indicate the date when the waste segmentation was complete.
* Alpha emitting transuranic nuclides with half-life greater than 5 years

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F.2.2 Process Waste/Other Waste

Process and other waste includes GTCC waste that is not activated metals. It consists of contaminated equipment, debris, trash, filters, resins, scrap metal, and decontamination and decommissioning waste.

Packaged Volume (ft^3)[1]	Package Contents[2]	Packaging[3]		Package Dimensions				Loaded Weight of Package (lbs)	Date Packaged	Total Package Activity[4] (MCi)	Radionuclide[5]	Remotely Handled[6]		Date Contents Were Removed From Service[7]	RCRA Listed Hazardous Waste Constituents or Characteristics[8]
		Type	Number	External Length (in)	External Diameter (in)	External Volume (ft^3)	Internal Volume (ft^3)					Yes	No		
												☐	☐		
												☐	☐		
												☐	☐		
												☐	☐		
												☐	☐		
												☐	☐		
												☐	☐		
												☐	☐		
												☐	☐		
												☐	☐		
												☐	☐		

Packaging Type options:
- Shielded Activated Metal Container
- 55-Gallon Drum
- High Integrity Container
- NAC-MPC Canister
- NAC-UMS Canister
- NUHOMS Canister
- Energy Solutions Canister
- Fuel Solutions W-74 Canister
- Holtec Canister
- Sealed Sources
- Standard Waste Box
- Shipping Cask
- Other: _____

Radionuclide options:
- C-14
- C-14 in activated metal
- Ni-59 in activated metal
- Nb-94 in activated metal
- Tc-99
- I-129
- Alpha emitting transuranic nuclides *
- Pu-241
- Cm-242
- H-3
- Co-60
- Ni-63
- Ni-63 in activated metal
- Sr-90
- Cs-137

[1] **Packaged Volume (ft^3):** Combined volume of the waste and the storage container.
[2] **Package Contents:** Identify the contents of each package (e.g., resins, filters, etc .).
[3] **Packaging Type and Number:** Provide an entry for each waste stream indicating the type of package (for other, describe what the package is) and the quantity of package**s**.
[4] **Total Package Activity (MCi):** Report the total activity of the package in million curies associated with the process waste.
[5] **Radionuclide:** Report the radionuclides that account for > 1% of total activity anticipated in the waste stream.
[6] **Remotely Handled:** If the package has a dose rate of greater than 200 mrem/hr on the surface of the package, indicate if the package must be remotely handled.
[7] **Date Contents Were Removed From Service:** For multiple dates, use the latest date.
[8] **RCRA Listed Hazardous Waste Constituents or Characteristics:** If mixed waste, list any Resource Conservation and Recovery Act (RCRA) hazardous waste constituents or characteristics.
* Alpha emitting transuranic nuclides with half-life greater than 5 years

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F.3 Projected Inventory (2013-2065)

F.3.1 Activated Metals

Include GTCC waste not packaged and waste projected to be generated from licensed activities from 2013 through reactor decommissioning. Include all waste not in F.2.1.

Years Packaged	Description of Waste [1]	Estimated Unpackaged Volume [2] (ft^3)	Estimated Packaged Volume [3] [If known] (ft^3)
2013-2020			
2021-2030			
2031-2040			
2041-2050			
2051-2060			
2061-2065			

[1] **Description of Waste:** Identify the specific content of the waste.
[2] **Estimated Unpackaged Volume (ft^3):** Volume of only the waste without any storage container.
[3] **Estimated Packaged Volume (ft^3):** Volume of the waste including any storage container.

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F.3.2 Process Waste/Other Waste

Include process and other GTCC waste not packaged and waste projected to be generated from licensed activities from 2013 through reactor decommissioning. Include all waste not in F.2.2.

Years Packaged	Description of Waste [1]	Estimated Unpackaged Volume [2] (ft^3)	Estimated Packaged Volume [3] [If known] (ft^3)	RCRA Listed Hazardous Waste Constituents or Characteristics [4]
2013-2020				
2021-2030				
2031-2040				
2041-2050				
2051-2060				
2061-2065				

[1] **Description of Waste:** Identify the specific content of the waste. (e.g., resins, filters, etc .)
[2] **Estimated Unpackaged Volume (ft^3):** Volume of only the waste without any storage container.
[3] **Estimated Packaged Volume (ft^3):** Volume of the waste including any storage container.
[4] **RCRA Listed Hazardous Waste Constituents or Characteristics:** If mixed waste, list any Resource Conservation and Recovery Act (RCRA) hazardous waste constituents or characteristics.

Provide in **Schedule G** at the end of this data collection form any comments you have concerning **Greater-Than-Class-C Waste Data**. Label your comments by the **Schedule and Item Number** to which they refer.

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SCHEDULE G: COMMENTS

Provide all comments you have in the comment schedule below. Label your comments by the **Schedule and Item Number** to which they refer.

Schedule and Item Number	Comment

NUCLEAR FUEL DATA SURVEY

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APPENDIX A – INSTRUCTIONS FOR COMPLETING NUCLEAR FUEL DATA FORM GC-859

General Instructions

1. Purpose and Use of Data

The Form GC-859 Nuclear Fuel Data survey collects data that the Office of the General Counsel (GC) uses for assessing spent fuel storage and disposal requirements.

2. Who Should Submit

This form should be submitted by all owners and custodians of spent nuclear fuel and/or high-level radioactive waste.

3. When To Submit

This form shall be submitted by **September 30, 2013** following receipt of the form. Data on the form should reflect the spent fuel status as of **June 30, 2013**.

4. What To Submit

Data will be provided in both electronic and hard copy format.

Respondents will be provided with an electronic copy of their previous submittal to aid in the preparation of this form. They will also be provided with electronic files and blank paper forms to aid in the current submittal. Note that the detailed data requested on Schedule's C, D, E, and F may be submitted in any commonly readable file type.

The Form GC-859 updating system is automated and Microsoft Windows-based software is included in this package. The system is self-contained and no additional software is needed.

Documentation and operating instructions for the software may be found in Appendix E, "Form GC-859 Data Collection System Instructions". After completing the form, print the Form GC-859 to make sure the data are correct. Sign the statement certifying the accuracy of the historical data and return it with your data (as an electronic file) in database or in a spreadsheet format by electronic mail, compact disk, DVD, or flash drive, to the address in Section 5, below.

5. Where To Submit

Submit Form GC-859 and associated materials to:

Z, INC.
8630 Fenton St.
Suite 510
Silver Spring, MD 20910

The Form GC-859 files may be sent by electronic mail to the following email address:

GC859@eia.gov

If you send your completed survey data by electronic mail, mail a signed copy of **Schedule A** to the mailing address shown above.

You will receive a notice from the DOE confirming receipt of the files. If you have not received a confirmation notice within three days, contact DOE at the telephone numbers provided on the cover sheet of this form. You may also submit your forms by fax at (202) 586-3045.

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6. Legal Authority and Sanctions Statement

Data on this mandatory form are collected under authority of the Federal Energy Administration Act of 1974 (15 USC Schedule 761 et seq.), and the Nuclear Waste Policy Act of 1982 (42 USC l0l0l et seq.). Data being collected on this form are not considered to be confidential.

Specific Instructions

Instructions for filing the individual Schedules of the Form GC-859 survey are included within the schedules.

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APPENDIX B – GENERAL SPECIFICATION FROM APPENDIX E OF THE STANDARD CONTRACT

GENERAL SPECIFICATIONS FROM THE STANDARD CONTRACT, APPENDIX E

a. "Standard intact assembly" means a spent nuclear fuel (SNF) assembly that meets the following General Specifications:

Maximum Nominal Physical Dimensions

	Reactor (BWR)	**Reactor (PWR)**
Overall Length	14 feet, 11 inches	14 feet, 10 inches
Active Fuel Length	12 feet, 6 inches	12 feet, 0 inches
Cross Section*	6 inches x 6 inches	9 inches x 9 inches

*The Cross Section of the fuel assembly shall not include the channel.

b. "Non-standard intact assembly" means an SNF assembly that does not meet the general specification set forth above. Also included as non-standard are assemblies other than light water reactor (LWR) assemblies and consolidated assemblies.

c. "Failed Fuel" means SNF assemblies that show visual evidence of structural deformity or damage to cladding or spacers which may require special handling, assemblies which are structurally deformed or have damaged cladding to the extent that special handling may be required, or assemblies that cannot be handled with normal fuel handling equipment.

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APPENDIX C – REACTOR AND SPENT FUEL STORAGE SITE IDENTIFICATION CODES

Storage Location	Reactor ID	Pool ID	Note
Arkansas Nuclear One - Unit 1	0401	0401	
Arkansas Nuclear One - Unit 2	0402	0402	
Arkansas Nuclear One (ISFSI)	-	0401D	DC
Beaver Valley - Unit 1	1601	1601	
Beaver Valley - Unit 2	1602	1602	
Beaver Valley (ISFSI)	-	1601D	DC
Big Rock Point	1201	1201	
Big Rock Point (ISFSI)	-	1201D	DC
Braidwood - Unit 1	1001	1001	CP
Braidwood - Unit 2	1002	1001	CP
Braidwood (ISFSI)	-	1001D	DC
Browns Ferry - Unit 1	4803	4803	TC
Browns Ferry - Unit 2	4804	4803	TC
Browns Ferry - Unit 3	4805	4805	
Browns Ferry (ISFSI)	-	4803D	DC
Brunswick - Unit 1	0701	0701	
Brunswick - Unit 2	0702	0702	
Brunswick (ISFSI)	-	0701D	DC
BWXT Services (Lynchburg)	7101	7101	
Byron - Unit 1	1003	1003	CP
Byron - Unit 2	1004	1003	CP
Byron (ISFSI)	-	1003D	DC
Callaway	5101	5101	
Callaway (ISFSI)	-	5101D	DC
Calvert Cliffs - Unit 1	0501	0501	TC
Calvert Cliffs - Unit 2	0502	0501	TC
Calvert Cliffs (ISFSI)	-	0501D	DC
Catawba - Unit 1	1501	1501	
Catawba - Unit 2	1502	1502	
Catawba (ISFSI)	-	1501D	DC
Clinton	2301	2301	
Clinton (ISFSI)	-	2301D	DC
Columbia	5302	5302	
Columbia (ISFSI)	-	5302D	DC
Comanche Peak - Unit 1	4901	4901	TC
Comanche Peak - Unit 2	4902	4901	TC
Comanche Peak (ISFSI)	-	4901D	DC
Cook - Unit 1	5801	5801	CP
Cook - Unit 2	5802	5801	CP
Cook (ISFSI)	-	5801D	DC
Cooper Station	3001	3001	
Cooper Station (ISFSI)	-	3001D	DC
Crystal River 3	1701	1701	
Crystal River 3 (ISFSI)	-	1701D	DC
Davis-Besse	5001	5001	
Davis-Besse (ISFSI)	-	5001D	DC
Diablo Canyon - Unit 1	3501	3501	
Diablo Canyon - Unit 2	3502	3502	
Diablo Canyon (ISFSI)	-	3501D	DC
Dresden - Unit 1	1005	1005	
Dresden - Unit 2	1006	1006	
Dresden - Unit 3	1007	1007	
Dresden (ISFSI)	-	1005D	DC
Duane Arnold	2401	2401	
Duane Arnold (ISFSI)	-	2401D	DC
Enrico Fermi 2	1402	1402	
Enrico Fermi 2 (ISFSI)	-	1402D	DC
Farley - Unit 1	0101	0101	
Farley - Unit 2	0102	0102	
Farley (ISFSI)	-	0101D	DC
Fitzpatrick	3901	3901	
Fitzpatrick (ISFSI)	-	3901D	DC

Storage Location	Reactor ID	Pool ID	Note
Fort Calhoun	3401	3401	
Fort Calhoun (ISFSI)	-	3401D	DC
Fort St. Vrain	4101	4101	
Fort St. Vrain (ISFSI)	-	4101D	DC
GE-Hitatchi (Morris)	-	6601	
GE-Hitatchi (Vallecitos)	-	6201	
Ginna	4401	4401	
Ginna (ISFSI)	-	4401D	DC
Grand Gulf	2901	2901	
Grand Gulf (ISFSI)	-	2901D	DC
H. B. Robinson	0705	0705	
H. B. Robinson (ISFSI)	-	0705D	DC
Haddam Neck	5701	5701	
Haddam Neck (ISFSI)	-	5701D	DC
Harris	0703	0703	
Harris (ISFSI)	-	0703D	DC
Hatch - Unit 1	2001	2001	TC
Hatch - Unit 2	2002	2001	TC
Hatch (ISFSI)	-	2001D	DC
Hope Creek	4201	4201	
Hope Creek/Salem (ISFSI)	-	4201D	DC
Humboldt Bay	3503	3503	
Humboldt Bay (ISFSI)	-	3503D	DC
Idaho National Laboratory	-	7002	
Indian Point - Unit 1	1101	1101	
Indian Point - Unit 2	1102	1102	
Indian Point - Unit 3	3902	3902	
Indian Point (ISFSI)	-	3902D	DC
Kewaunee	5501	5501	
Kewaunee (ISFSI)	-	5501D	DC
Lacrosse	1301	1301	
Lacrosse (ISFSI)	-	1301D	DC
LaSalle County - Unit 1	1008	1008	TC
LaSalle County - Unit 2	1009	1008	TC
LaSalle County (ISFSI)	-	1008D	DC
Limerick - Unit 1	3701	3701	TC
Limerick - Unit 2	3702	3701	TC
Limerick (ISFSI)	-	3701D	DC
Maine Yankee	2801	2801	
Maine Yankee (ISFSI)	-	2801D	DC
McGuire - Unit 1	1504	1504	
McGuire - Unit 2	1505	1505	
McGuire (ISFSI)	-	1504D	DC
Millstone - Unit 1	3201	3201	
Millstone - Unit 2	3202	3202	
Millstone - Unit 3	3203	3203	
Millstone (ISFSI)	-	3201D	DC
Monticello	3301	3301	
Monticello (ISFSI)	-	3301D	DC
Nine Mile Point - Unit 1	3101	3101	
Nine Mile Point - Unit 2	3102	3102	
Nine Mile Point (ISFSI)	-	3101D	DC
North Anna - Unit 1	5201	5201	CP
North Anna - Unit 2	5202	5201	CP
North Anna (ISFSI)	-	5201D	DC
Oconee - Unit 1	1506	1506	CP
Oconee - Unit 2	1507	1506	CP
Oconee - Unit 3	1508	1508	
Oconee (ISFSI)	-	1506D	DC
Oyster Creek	1903	1903	
Oyster Creek (ISFSI)	-	1903D	DC

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Storage Location	Reactor ID	Pool ID	Note
Palisades	1204	1204	
Palisades (ISFSI)	-	1204D	DC
Palo Verde - Unit 1	0301	0301	
Palo Verde - Unit 2	0302	0302	
Palo Verde - Unit 3	0303	0303	
Palo Verde (ISFSI)	-	0303D	DC
Peach Bottom - Unit 2	3704	3704	
Peach Bottom - Unit 3	3705	3705	
Peach Bottom (ISFSI)	-	3704D	DC
Perry - Unit 1	0901	0901	
Perry (ISFSI)	-	0901D	DC
Pilgrim - Unit 1	0601	0601	
Pilgrim (ISFSI)	-	0601D	DC
Point Beach - Unit 1	5401	5401	CP
Point Beach - Unit 2	5402	5401	CP
Point Beach (ISFSI)	-	5401D	DC
Prairie Island - Unit 1	3302	3302	CP
Prairie Island - Unit 2	3303	3302	CP
Prairie Island (ISFSI)	-	3302D	DC
Quad Cities - Unit 1	1010	1010	TC
Quad Cities - Unit 2	1011	1010	TC
Quad Cities (ISFSI)	-	1010D	DC
Rancho Seco	4501	4501	
Rancho Seco (ISFSI)	-	4501D	DC
River Bend	2101	2101	
River Bend (ISFSI)	-	2101D	DC
Salem - Unit 1	4202	4202	
Salem - Unit 2	4203	4203	
Salem/Hope Creek (ISFSI)	-	4201D	DC
San Onofre - Unit 1	4701	4701	
San Onofre - Unit 2	4702	4702	
San Onofre - Unit 3	4703	4703	
San Onofre (ISFSI)	-	4701D	DC
Seabrook	5901	5901	
Seabrook (ISFSI)	-	5901D	DC
Sequoyah - Unit 1	4808	4808	CP
Sequoyah - Unit 2	4809	4808	CP
Sequoyah (ISFSI)	-	4808D	
Shoreham	2601	2601	
South Texas One - Unit 1	2201	2201	
South Texas One - Unit 2	2202	2202	
South Texas One (ISFSI)	-	2201D	DC

Storage Location	Reactor ID	Pool ID	Note
St Lucie - Unit 1	1801	1801	
St Lucie - Unit 2	1802	1802	
St Lucie (ISFSI)	-	1801D	DC
Summer	4601	4601	
Summer (ISFSI)	-	4601D	DC
Surry - Unit 1	5203	5203	CP
Surry - Unit 2	5204	5203	CP
Surry (ISFSI)	-	5203D	DC
Susquehanna - Unit 1	3601	3601	TC
Susquehanna - Unit 2	3602	3601	TC
Susquehanna (ISFSI)	-	3601D	DC
Three Mile Island - Unit 1	1901	1901	
Trojan	3801	3801	
Trojan (ISFSI)	-	3801D	DC
Turkey Point - Unit 3	1803	1803	
Turkey Point - Unit 4	1804	1804	
Turkey Point (ISFSI)	-	1803D	DC
Vermont Yankee	6001	6001	
Vermont Yankee (ISFSI)	-	6001D	DC
Vogtle - Unit 1	2003	2003	TC
Vogtle - Unit 2	2004	2003	TC
Vogtle (ISFSI)	-	2003D	DC
Washington Hanford	-	7007	
Waterford 3	2701	2701	
Waterford 3 (ISFSI)	-	2701D	DC
Watts Bar - Unit 1	4810	4810	CP
Watts Bar - Unit 2	4811	4810	CP
Watts Bar (ISFSI)	-	4810D	DC
Wolf Creek	2501	2501	
Wolf Creek (ISFSI)	-	1601D	DC
Yankee Rowe	5601	5601	
Yankee Rowe (ISFSI)	-	5601D	DC
Zion - Unit 1	1012	1012	CP
Zion - Unit 2	1013	1012	CP
Zion (ISFSI)	-	1012D	DC

TC: Transfer Canal
CP: Common Pool Serving Two or More Reactors
DC: Dry Storage Site
ISFSI: Independent Spent Fuel Storage Installation

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APPENDIX D – GLOSSARY OF TERMS

Activated Metals: Activated metals result from decommissioning nuclear reactors. Portions of the reactor assembly and other components near the nuclear fuel are activated by neutrons during reactor operations, producing high concentrations or radionuclides. The major radionuclides in these wastes are typically cobalt-60, nickel-63, niobium-94, and carbon-14.

ANSI Assembly Identifier: The serial numbering scheme adopted by the American National Standards Institute (ANSI) to ensure uniqueness of an assembly serial number.

Assembly Identifier: A unique string of alphanumeric characters which identifies an assembly, bundle, or canister for a specific reactor in which it has been irradiated. This identifier should be consistent with other submissions to the DOE/NRC, i.e., previous Form RW-859 and DOE/NRC Form 741.

Average Assembly Weight: Average initial loading weight in kilograms (kg) of heavy metal of fresh fuel assemblies in a batch before they are initially inserted into the reactor core.

Average Discharge Burnup: The average amount of energy produced by each assembly in a batch of spent fuel assemblies discharged from a nuclear reactor, reported in thousand megawatt days thermal per metric ton of uranium (MWDt/MTU).

Average Initial Enrichment: Average initial enrichment for a fresh fuel assembly as specified and ordered in fuel cycle planning. This average should include axial blankets, and axially and radially zoned enrichments.

Basket: An open container into which fuel and/or non-fuel components including rods, sections of rods, fuel pellets, garbage, debris, etc., are placed. Baskets are usually defined as rodlet or garbage and debris containers with dimensions less than that of a fuel assembly.

Batch: A batch (or group) is a logical grouping of assemblies with similar characteristics. All assemblies in a batch have the same initial average enrichment, the same cycle/reactor history, the same current location, the same burnup, the same owner, and the same assembly design characteristics.

Boiling Water Reactor (BWR): A light water reactor in which water, used as both coolant and moderator, is allowed to boil in the core. The resulting steam is used directly to drive a turbine.

Burnup: Amount of thermal energy generated per unit mass of fuel, measured in units of megawatt days thermal per initial metric ton of uranium (MWD_t/MTU).

Canister: A single assembly canister is defined as any container designed to confine waste that may be delivered to a Federal facility**.** A canister has dimensions that fit within the envelope defined by the Standard Contract and can be handled similar to an assembly.

Cell: A physical position in a rack in a storage pool or a dry storage module, which is intended to be occupied by an intact assembly or equivalent (that is, a canister or an assembly skeleton).

Consolidated Fuel: Fuel rods are removed from an assembly and placed into a canister in a grid with spacing closer than that of an intact assembly.

Core: The place in the reactor in which the nuclear fuel is irradiated and thermal energy is generated.

Core Size: The fixed number of fuel assemblies that can be irradiated at any one time in the reactor core.

Current Installed Capacity: Total number of assembly storage cells in the spent nuclear fuel pool. Both occupied and unoccupied cells are included in the current capacity.

Current Inventory: Number of spent nuclear fuel assemblies stored at a given site or spent nuclear fuel pool, at a given point in time.

Cycle: For the purposes of this form, a cycle is the time period beginning with the startup of a reactor after refueling (or initial fueling) to the time the reactor is considered subcritical. Refueling times should not be included in cycle lengths.

Enrichment: A nuclear fuel cycle process in which the concentration of fissionable uranium is increased above its natural level. Enrichment is the process that changes the isotopic ratio in a material.

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Failed Fuel Assembly: "Failed Fuel" means spent nuclear fuel assemblies that show visual evidence of structural deformity or damage to cladding or spacers which may require special handling, assemblies which are structurally deformed or have damaged cladding to the extent that special handling may be required, or assemblies that cannot be handled with normal fuel handling equipment. Included are spent nuclear fuel assemblies that will not fit into a spent fuel rack, cannot be lifted normally, or have already been canistered. An assembly is classified as failed if it contains any fuel rods having known or suspected cladding defects greater than pin holes or hairline cracks that would require canistering for shipment. Failed fuel means spent nuclear fuel that meets the specifications in 10 CFR 961.11 subparagraphs 1 through 3 of paragraph B and is classified as Failed Fuel Class F-1 through F-3 in subparagraph 6 of paragraph B.

Fuel Assembly: The basic unit of nuclear fuel. Uranium dioxide pellets are encased in cladding to form a fuel rod. Fuel rods are structurally connected to form a fuel assembly.

Fuel Cycle: The length of time a reactor is operated between refueling, typically 18 to 24 months, including the refueling time, measured from the startup of one cycle to the startup of the following cycle.

Greater Than Class C (GTCC) Waste: Greater-Than-Class-C waste (GTCC) is generated by licensees of the NRC. The waste has concentrations of certain radionuclides above the Class C limits as stated in 10 CFR 61.55. Most forms of GTCC waste are generated by routine operations at nuclear power plants. Examples of GTCC waste could include activated metal hardware (e.g., nuclear power reactor control rods), spent fuel disassembly hardware, ion exchange resins, filters and evaporator residues.

High-Level Radioactive Waste (HLW): The highly radioactive materials produced as byproducts of fuel reprocessing or of the reactions that occur inside nuclear reactors. HLW includes irradiated spent nuclear fuel discharged from commercial nuclear power reactors, highly radioactive liquid and solid materials resulting from the reprocessing of spent nuclear fuel, and other highly radioactive materials that the NRC may determine require permanent isolation.

High-Temperature, Gas-Cooled Reactor (HTGR): A reactor that is cooled by helium and moderated by graphite.

Independent Spent Fuel Storage Installation (ISFSI): A dry storage complex designed and constructed for the interim storage of spent nuclear fuel; solid, reactor-related, greater than Class C waste; and other associated radioactive materials. A spent fuel storage facility may be considered independent, even if it is located on the site of another NRC-licensed facility.

Initial Enrichment: The isotopic percentage of uranium-235 or plutonium, by weight, that is present in nuclear fuel.

Initial Loading Weight: Average weight in kilograms (kg) of heavy metal in a fresh fuel assembly before it is inserted into the reactor core.

Lattice Size: Lattice is the arrangement or array of fuel rods in a nuclear fuel assembly.

Light Water Reactor (LWR): A nuclear reactor that uses water as the primary coolant and moderator, with slightly enriched uranium as fuel. There are two types of commercial light water reactors: the boiling water reactor (BWR) and the pressurized water reactor (PWR).

Non-fuel Components: Non-fuel components include, but are not limited to, control spiders, burnable poison rod assemblies, control rod elements, thimble plugs, fission chambers, and primary and secondary neutron sources, that are contained within the fuel assembly, or BWR channels that are an integral part of the fuel assembly, which do not require special handling.

Non-standard Fuel: Non-standard fuel means a spent nuclear fuel assembly that does not meet one or more of the general specifications in 10 CFR 961.11 subparagraphs 1 through 5 of paragraph B. Also included as non-standard are assemblies other than light water reactor (LWR) assemblies and consolidated assemblies.

NRC Licensed Site Capacity: Maximum number of spent nuclear fuel assembly and canister slots licensed for use at a given site or spent nuclear fuel pool, as licensed by the Nuclear Regulatory Commission.

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Nuclear Fuel: Fissionable materials that are enriched to such a composition that when placed in a nuclear reactor will support a self-sustaining fission chain reaction, producing heat in a controlled manner for process use.

Permanently Discharged Fuel: Spent nuclear fuel for which there are no plans for reinsertion in the reactor core.

Planar Initial Enrichment: The average of the distributed fuel rod initial enrichments within a given axial plane of the assembly lattice.

Pressurized Water Reactor (PWR): A light water reactor in which heat is transferred from the core to a heat exchanger via water kept under high pressure, so that high temperatures can be maintained in the primary system without boiling the water. Steam is generated in a secondary circuit.

Pool Site: One or more spent fuel storage pools, which have a single cask loading area. Dry cask storage areas are considered separate sites.

Process Waste: Process and other waste includes Greater than Class C (GTCC) waste that is not activated metals or sealed sources. It consists of contaminated equipment, debris, trash, filters, resins, scrap metal, and decontamination and decommissioning waste.

Radioactivity: The rate at which radioactive material emits radiation, stated in terms of the number of nuclear disintegrations occurring per unit of time; the basic unit of radioactivity is the curie.

Radionuclide: An unstable isotope of an element that decays or disintegrates spontaneously, thereby emitting radiation. Approximately 5,000 natural and artificial radioisotopes have been identified.

Reconstituted Fuel: Spent nuclear fuel which has had a defective rod or rods removed and replaced with another rod or rods. The recipient fuel assembly is intended to be reinserted into a subsequent fuel cycle.

Refueling: The process of shutting down a reactor and replacing some of the spent nuclear fuel assemblies.

Reinserted Fuel: Irradiated fuel that is discharged in one cycle and inserted in the same reactor during a subsequent refueling. In a few cases, fuel discharged from one reactor has been used to fuel a different reactor.

Shutdown Date: Day, month, and year of shutdown for fuel discharge and refueling. The date should be the point at which the reactor became subcritical.

Spent Fuel Disassembly (SFD) Hardware: The skeleton of a fuel assembly after the fuel rods have been removed. Generally, SFD hardware for PWR assemblies includes guide tubes; instrument tubes; top and bottom nozzles; grid spacers; hold-down springs; and attachment components, such as nuts and locking caps. For BWR fuel assemblies, SFD hardware includes the top and bottom tie plates, compression springs for individual fuel rods, grid spacers, and water rods.

Standard Contract: The agreement (as set forth in 10 CFR Part 961) between the Department of Energy (DOE) and the owners or generators of spent nuclear fuel and high-level radioactive waste.

Standard Fuel: Standard fuel means a spent nuclear fuel assembly that meets all the general specifications set forth in 10 CFR 961.11 paragraph B.

Storage Site ID: Spent nuclear fuel storage pool or dry cask storage facility, usually located at the reactor site, as licensed by the Nuclear Regulatory Commission (NRC).

Temporarily Discharged Fuel: Fuel which was irradiated in the previous fuel cycle (cycle N) and not in the following fuel cycle (cycle N+1), and for which there are definite plans to irradiate in a subsequent fuel cycle.

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APPENDIX E – FORM GC-859 DATA COLLECTION SYSTEM (VERSION 2.3.23) SOFTWARE INSTRUCTIONS

I. Getting Started

The compact disk (CD) or DVD contains an install file where the Form GC-859 version 2.3.23 install resides. If you require a 64-bit version of the system, contact EIA. If you need to install the Form GC-859 on a network share, please see section B below.

You may need administrator rights on your machine. If you don't have administrator rights, contact your IT support department.

WARNING: Do not re-install the application after data entry begins; as all previously entered data will be overwritten.

A: Standard Install

1. Insert the Form GC-859 CD into your CD Drive. The install will automatically run, if it does not launch navigate to the D:\ (or your designated CD/DVD Letter) drive and double-click setup.exe.

2. Click Next > Next > Install > Finish. Reboot when prompted after the install.

3. To run the Form GC-859 application double-click the GC859 green icon from your Desktop or Start > Programs > GC859 > GC-859.

B: Network Install

1. Insert the Form GC-859 CD into your CD Drive. The install will automatically run, if it does not navigate to the D:\source (or your designated CD/DVD Letter) drive and double-click setup.exe.

2. Click Next. Change the default install directory to your desired network share, S:\GC859 for example. Click Next > Install > Finish. Reboot when prompted after the install.

3. Repeat Steps 1 and 2 for each additional desktop computer install and select the same network share as previous installs. This must be done before any data entry begins and should be only performed once per computer. **Do not use the application until ALL installs are complete. Installing an additional computer after data entry has begun will overwrite all previously entered data.**

4. To run the Form GC-859 application double-click the GC859 green icon from your Desktop or Start > Programs > GC859 > GC-859.

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IMPORTANT: You cannot enter data into the FORM GC-859 application from more than one computer simultaneously. The application can be installed on multiple computers and share the same database on a network drive but all installs must be completed before any data entry begins. Installing an additional computer to an active network install after data entry has begun will overwrite all previously entered data. If you need assistance with a shared network install please contact EIA.

II. System Features

A: Main Menu Screen

1. Reactor ID – Reactor Name. Select and highlight a reactor from the drop-down menu. Then click the button of the Schedule to be worked on. It is suggested that Schedules be filled out in alphabetical sequence.
2. Schedule buttons - Buttons allow navigation to any Schedule of the survey form.
3. Instructions – Instructions for filling out the Form GC-859 survey are imbedded within the survey form. The Instructions button here provides access to the entire set of survey instructions. Use the drop-down menu on the instructions screen, to go to a specific Schedule instruction. An Instructions button is also provided within each Schedule providing access to that Schedule's specific instructions.
4. Glossary – The Glossary button navigates to the glossary of terms in Appendix D of the survey form.
5. Reports – The Reports button is used for printing. Detailed instructions are provided under the "Printing Data" section of this Appendix.
6. Comments – The Comments button accesses Schedule G of the survey form, the Comments section. This button can be used to view, update, delete or enter new comments.
7. Quit – From the Main Menu use the Quit button to exit the application when you are finished filling out the database for a given period of time. A button that will take you to the Main Menu exists on every screen.
8. Back Up/Restore Database – When a decision is made to stop entering data, back up the database. Click the BackUp/Restore Database button at the Main Menu screen. A Back Up and Restore screen will appear. Click the Back Up button and the database will back up to the folder location on the computer created during the installation process. The file generated ends with the year, month and day as part of the name. It is recommended that an additional folder, outside of the Form GC-859 folder, be set up to store copies of the backup files.
9. Software Instructions – Click this button to view these software instructions in a Word document on the computer.

B: Other Schedule Screens

1. Reactor ID always shows on the top left of the screen.

2. Scroll Bars – Observe that there may be multiple scroll bars, one or more on the inside and one on the outside. The inside scroll bars are for moving around within that specific form section or subsection. The outside bar is for scrolling from top to bottom of a section.
3. Navigation Buttons – The following navigation buttons appear on all screens:
   - Main Menu – goes directly to the Main Menu screen
   - Next – navigates to the next screen or step from the current location
   - Previous – navigates to the previous screen or step from the current location
   - Instructions – navigates to the Instructions.
   - Comments – navigates to the Comments, Schedule G.
   - Quick Navigation drop down list – Allows access to a specific schedule, sub schedule, or screen.

   The following Navigation Buttons appear only on certain schedules:

   - Print – A Print button appears on Schedule C.1.1 and Schedule C.1.2. This button can be used to print Discharged Assembly Data (C.1.1) and Fuel Cycle History Data (C.1.2) without returning to the Main Menu.
   - Assembly Status Code – This button brings up a help screen describing the assembly status code. The descriptions shown here correspond to the columns on the survey form.

4. Drop Down Menus or List Boxes are included throughout the survey system. Drop Down Menus are included for Manufacturers and Lattice Types in Schedule C, Non-fuel Components in Schedule E, GTCC components and Radionuclides in Schedule F, etc. Drop down menus are also available to access previously entered data, such as Canister Identifiers. If a certain item does not appear in a Drop Down Menu, it can be entered as an "Other" row, which allows free-form data entry. Multiple entries under "Other" are allowed.
5. Pop Ups - The Assembly Status Codes button on Schedule C.1.1 displays the codes and what they mean. Other informational and warning pop-ups also exist throughout the system.
6. Hover Descriptions - in Schedule C.1.1, if the user hovers the mouse over the individual Assembly Status Code cell, a description of the code will display.

III. Entering Data

The Form GC-859 Data Collection System was designed using Microsoft Windows-based software. The system was designed using Microsoft Access 2010 and most of the schedules require data entry using Access. There are five tables that require extensive data manipulation that require the features of Microsoft Excel. An Excel like module has been incorporated in these tables so that the user can use the features of Excel to modify or enter their data.

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The five tables incorporating this spreadsheet models are:

- C.1.1 Data On Discharged Fuel Assemblies,
- C.1.2 Fuel Cycle History
- C.3.1.1 Special Fuel Form – Canisters
- C.3.3.1 Special Fuel Form – Consolidated/Reconstituted/Reconstructed Assemblies
- D.3.3 Assemblies in Dry Storage

Two things to keep in mind on these Excel type schedules.

1. **No columns can be inserted or deleted into any of the spreadsheet controls in C.1.1, C.1.2, C.3.1.1, C.3.3.1 and D.3.3. This would result in data saving errors, loss of data and/or data integrity breakdown.**
2. After navigating to another application outside of the Form GC-859 application, upon return, click into a cell to activate it for editing.

Various Functions (Access Tables) – The remaining schedules contain MS Access tables and data is entered starting on the left of the screen and tabbing (or moving via the mouse) to each subsequent entry area to the right. Drop down menus and date pop-up calendars are provided along with Y/N toggle buttons are used. New blank rows are added to a form as entry on the previous row of data is initiated. To delete a row of data, click to the left of a row of data, highlighting the row, and hit the delete key.

Various Functions (Excel Tables) – the spreadsheets identified above perform similar to MS Excel but with limited functionality. Several features of the spreadsheets are described below.

Copy/Paste - Normal copy and paste procedures exist if you would like to copy information entered from one into another row or into multiple rows. Either use your mouse to highlight by left clicking and dragging over the data set desired to be copied and pasted or use the keyboard to get to the cell(s) you would like to copy and paste. Of Note in Schedule C.1.1, Assembly Status Codes are set up to place an X automatically into the cell when clicking that cell. Because of this functionality, if you want to copy Assembly Status Codes to multiple other Assembly ID's; do the following:

- Scroll to the exact cell you would like to copy, hold the shift key and highlight the copy area. Hit "Ctrl and "C" at the same time. Click on the cell to paste the results and hit "CTRL and " V".

Sorting: - To perform a sort left click in the upper left corner of the spreadsheet on the first cell of data, do not include any header descriptions. Scroll down using the right scroll arrow to the end of the data entered, right scroll using the bottom scroll bar, and left-click on the bottom right cell while holding down the Shift key. This will highlight all data in the spreadsheet (excluding the headers). Right-click anywhere in the highlighted data and then left-click on Sort and again left-click on Custom sort. Select the column you wish to sort on in the Sort By drop-down and then the Sort On(if desired) and Sort Order(defaults to A to Z). Click OK. Note: If prompted with a Sort Warning choose "Sort numbers and numbers stored as text separately" and click OK.

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IV. Printing Data

Printing is done from the Reports button on the Main Menu. There are two exceptions. Schedule C.1.1 and C.1.2 both have their own print and save buttons which allows these two actions without navigating away from the schedule.

After clicking Reports pick an individual schedule, or the entire report, to print from the drop list. Click the Print button to open the schedule(s) to go through the printing process. A new screen will appear with the menu File and Print Preview at the top. A list of tabs showing the section(s) to print below these two boxes. Select the section to print, then click Print Preview. Once the selected page or pages appears, click the Print button located on the left of the screen/printing toolbar to generate a print out. Click the X or Close Print Preview button to exit the print preview and close the active tab. Click the Report tab and then click the Main Menu button to exit the printing mode and close all the open tabs. Once leaving the reports/print preview area all the schedules opened to print will close. This is important to note as the next time the print area is entered it will reflect any changes that have occurred to the database since the last time into the print area.

V. Miscellaneous Instructions (Instructions pertaining to individual sections of the survey form)

Schedule A - Once filled out, this Schedule will need to be printed so that the authorized person may sign. This signed page will need to accompany your submission. Printing instructions are included in a separate section of this document.

Schedule B.3 - Cycle numbers entered will be transferred to Schedule C.1.2 and displayed in the 2nd header row.

Schedule C.1.1 – Data on Discharged Fuel: Assembly Identifiers and/or ANSI Identifiers may be entered. Both are not required.

A number of columns have been added to Schedule C.1.1 to allow entering data on Non-Fuel Components Integral to Assembly here rather than in Schedule E.2. Entering the data here voids the need to re-enter assembly identifiers in Schedule E.2.

Schedule C.1.2 – Fuel Cycle Data: Assembly and Cycle data can be pasted directly from external sources into Schedule C.1.2. Use the first 2 columns for AssemblyID and Cycle, multiple AssemblyIDs per row per cycle for external data sources is acceptable.

Cycle data may be entered either in the columns provided or by entering an X in the boxes under the cycle numbers. These two options are provided for the convenience of the user. **Do NOT fill in both.**

Note that for both Schedules C.1 1 and C.1.2, data may be submitted in any format (spreadsheets, databases, core diagrams, etc.).

Schedule D.3.3 Assemblies in Dry Storage data can be submitted in any available format.

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Schedule E.2 Nonfuel Components Integral to an Assembly may be entered here or in the columns added to Schedule C.1.1 , where the assembly identifiers already are entered.

Schedule F GTCC data must be incorporated into this application even if it is entered by a different entity within your organization.

Schedule A: Operator Point of Contact Data (i.e. name, title, address etc.) may be copied to other Schedules such as B.1 Reactor POC; Schedule D.1 Storage Facility POC and Schedule F.1 GTCC Data POC. Copy the data by clicking on one of the 2 boxes (i.e. Use All-Site Operator Contact Data) in the each of the previous schedules.

Schedules C.3.1.1, C.3.1.2, C.3.1.3 Special Fuel Form Canister identifiers are copied from C.3.1.1 to the other 2 schedules for subsequent data entry. The Canister IDs are kept in sync among the Schedules as changes occur in one or the other.