RW-859 Revised (/) Energy Information Administration Form Approved

U.S. DEPARTMENT OF ENERGY

OMB NO. 1901-0287

Expiration Date: / /

NUCLEAR FUEL DATA SURVEY

FORM RW-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.

As described in Article VIII of the Standard Contract for Disposal of Spent Nuclear Fuel and/or High Level Radioactive Waste, you also have a contractual obligation to report any changes in the status of fuel assemblies covered by the one-time fee to the DOE on Annex B of Appendix G of the Standard Contract.

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 40 hours per response, including 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 aspects of this collection of information, including suggestions for reducing this burden, to the Energy Information Administration, Statistics and Methods Group, EI-70, 1000 Independence Avenue, S.W., Washington, DC 20585, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

Form Due Date: This form shall be submitted by February 15 of the year following receipt of the survey form. Data on the form should reflect the spent fuel status as of December 31 of the survey year.

EIA Contact: Refer all questions to: Jim Finucane at (202) 287-1966 or Jack Thorpe at (202) 287-1920 and return completed form to:

Energy Information Administration (EI-52)

U.S. Department of Energy

1000 Independence Ave. SW

Attn: Jim Finucane, EI-52

Room 6018, 950 L'Enfant Plaza

Washington, DC 20585-1615

RESPONDENT IDENTIFICATION

Site Operator Name: _____

REPORT PERIOD

Begin Report Period: January	**2**	**0**	**0**	**3**
End Report Period: December	**2**	**0**	**0**	**X**

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 D, "Reactor and Spent Fuel Storage Site Identification Codes."

Reactor Identifier	Reactor Name

A.1.3 List all storage facilities being covered by this report. See Appendix D, "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 F** at the end of this data collection form (page 15) 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

B.1 REACTOR POINT OF CONTACT

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

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

Name: _____

Title: _____

Mailing Address: _____

_____

_____

City: _____ State: _____ Zip Code: _____

Telephone Number: _____ Fax Number: _____

Email: _____

B.2 REACTOR LICENSE DATA

B.2.1 Reactor Identifier

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

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

B.2.3 NRC License Type:

- Operating License
- Possession Only License

B.2.4 Is an NRC License Extension Anticipated or Completed?

- Yes
- No
- Undetermined

B.2.5 NRC License Extension Status:

- Completed
- In Process
- Planned
- Undetermined

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B.3 CYCLE DATA

Provide the following data, including all cycles completed since your last report.

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

Provide in **Schedule F** at the end of this data collection form (page 15) 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: DISCHARGED FUEL DATA

C.1 DATA ON PERMANENTLY DISCHARGED FUEL

The Form RW-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 permanently discharged fuel - both spent nuclear fuel reported on previously submitted Form RW-859 surveys and spent nuclear fuel discharged during the current reporting period.

Assembly Identifier	This should be the site operator-assigned unique identifier. Note that non-intact assemblies may have more than one entry in this table with each piece of the assembly in a physically separate location being reported on a separate line.
Uranium Content	The initial contents of the fuel assembly in kilograms of uranium (should be reported to the nearest thousandth of a kilogram.)
Initial Enrichment	The average enrichment of the assembly (should be reported to the nearest hundredth of a percent.)
Discharge Burnup	Assembly burnups (should be reported in megawatt days thermal per metric ton of (initially loaded) uranium (MWD_t/MTU).)
Cycle Number	Report cycle number for the assembly's final cycle of irradiation. You need not report cycle number if the cycle numbers and corresponding dates were reported in Schedule B.3 above.
Cycle Shutdown Date	Report shutdown date for the assembly's final cycle of irradiation, regardless of when the fuel assembly was removed from the core.
Fuel Assembly Type	Assign the appropriate code from Appendix B, pages B-1 to B-11. If there is no appropriate code listed, include the type assigned by the manufacturer, call EIA for an appropriate code, or insert an "O" and provide details of the fuel assembly type in the Comments Schedule, Schedule F.
Assembly Status	Use the appropriate code from Appendix C, page C-1). Note that only permanently discharged assemblies are to be reported in this Schedule.
Storage Location	Select the appropriate pool storage site or dry storage site identifier from Appendix D, pages D-1 and D-2. If all assemblies are stored in a common pool specific to the reactor, these identifiers need not be included.

If possible, submit assembly-specific data in either database or spreadsheet format. You may use any readily-available database or spreadsheet. These data must include the above elements at the required degrees of precision. Note that these are minimum degrees of precision and more precise data are preferred.

Your completed assembly-specific data (as an electronic file) in database or in a spreadsheet format should be transmitted by electronic mail or on diskette or compact disk to DOE at the addresses specified in the instructions and on the cover page of this form. In lieu of submitting assembly-specific data in database or spreadsheet format, you may fill in the required data in Schedule C.1 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 during this reporting period.

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C.1 DATA ON PERMANENTLY DISCHARGED[1] FUEL

Assembly Identifier	Uranium Content (Initial kgU)[2]	Initial Enrichment (Weight %)[3]	Discharge Burnup (MWD_t/MTU)[4]	Last Cycle Number[5]	Last Cycle Shutdown Date (MM/DD/YYYY)[5]	Fuel Assembly Type Code[6]	Storage Location[7]	Assembly Status Code(s)[8]						
								N	F	C	R	P	B	O
								❑	❑	❑	❑	❑	❑	❑
								❑	❑	❑	❑	❑	❑	❑
								❑	❑	❑	❑	❑	❑	❑
								❑	❑	❑	❑	❑	❑	❑
								❑	❑	❑	❑	❑	❑	❑
								❑	❑	❑	❑	❑	❑	❑
								❑	❑	❑	❑	❑	❑	❑
								❑	❑	❑	❑	❑	❑	❑
								❑	❑	❑	❑	❑	❑	❑
								❑	❑	❑	❑	❑	❑	❑
								❑	❑	❑	❑	❑	❑	❑

1 Report permanently discharged fuel 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 permanently discharged (and modify the total burnup, last cycle number, and last cycle shutdown date later if the assembly is subsequently reinserted).

2 In kilograms to the nearest thousandth of a kilogram, consistent with data reported on the Nuclear Regulatory Commission Form 741, "Nuclear Material Transaction Report."

3 To the nearest hundredth of a percent.

4 In megawatt days thermal per metric ton of uranium.

5 Report either last cycle number or last cycle shutdown date.

6 See Appendix B, "Identification of Fuel Type Codes" If the fuel assembly type is not included in Appendix B, include the type assigned by the manufacturer here and put an "O" in the Assembly Status Code column for that item, or provide a description of the assembly type in the comments Schedule (Schedule F).

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

[8] See Appendix C, “Assembly Status Codes.” Note: Insert ALL codes that apply to this assembly – multiple codes permitted. Since only permanently discharged assemblies are to be reported in this Schedule, historical status codes (D = Discharged, T = Temporarily Discharged, and I = Incore) should not be included.

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C.2 REINSERTED FUEL DATA

Reinserted fuel data should include both assemblies previously reported as permanently discharged and in a storage pool at the end of the previous reporting period that were removed and reinserted into this reactor and assemblies that were discharged during this reporting period and subsequently reinserted during this reporting period.

C.2.1 Number of Reinserted Assemblies _____

C.2.2 Assembly Identifiers

Provide the Assembly Identifier for each reinserted assembly.

Assembly Identifier	Assembly Identifier	Assembly Identifier	Assembly Identifier	Assembly Identifier

C.3 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
- Reactor/Cycle History
- Initial Uranium Content (within 3 kgU for BWR, 5 kgU for PWR)
- Initial Enrichment (within nearest tenth of a percent)
- Estimated Final Burnup (within 5% of the group average GWD_t/MTU)

Projections of discharged assemblies must be reported for at least the next five cycles.

Cycle Number	Planned Cycle Shutdown Date (MMYYYY)	Group Identifier	Number of Assemblies Discharged in the Group	Projected Average Initial Uranium Content per Assembly (kgU)	Projected Average Initial Enrichment (Weight %)	Projected Discharge Burnup per Assembly (GWD_t/MTU)

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C.4 SPECIAL FUEL FORM – CANISTERS

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

C.4.1 Canisters in Pool

Are there canisters containing fuel in your pool that are planned for delivery to a Federal repository?

____ Yes. Complete Schedule C.4.2. Complete Schedule C.4.3 – C.4.4 for each canister identified in Schedule C.4.2.

____ No. Skip to Schedule C.5.

C.4.2 Canister Description

Canister Identifier	Canister Shape		Canister Dimensions (inches)			Loaded Weight (kg)
	C	R	Length	Diameter/ Width	Depth	
	❑	❑				
	❑	❑				
	❑	❑				
	❑	❑				
	❑	❑				

C = cylindrical R = rectangular

C.4.3 Qualitative Canister Contents

For each canister identified in Schedule **C.4.2**, provide a qualitative description of the contents and identify, if applicable, the method used to close the canister.

Canister Identifier	Description of Contents (check all that apply)	Canister Closure		
		B	W	NS
	__ 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.4.4 Detailed Canister Contents

For each canister identified in Schedule **C.4.2**, provide a detailed description of the contents.

Canister Identifier	Assembly Identifier	Number of Fuel Rod Equivalents from Assembly	Uranium Content (Initial kgU)	Discharge Burnup (MWD_t/MTU)

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C.5 SPECIAL FUEL FORM – UNCANISTERED FUEL RODS/PIECES

Does your facility have uncanistered fuel? Include all materials that were not listed in Schedules **C.4.1 to C.4.4** (i.e., materials stored in baskets, materials to be repackaged, etc.).

_____ Yes. Complete the remainder of **Schedule C.5**.

_____ No. Skip to **Schedule C.6**.

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

Assembly Identifier	Number of Fuel Rod Equivalents from Assembly	Uranium Content (Initial kgU)	Discharge Burnup (MWD_t/MTU)

C.6 SPECIAL FUEL FORM – NONSTANDARD ASSEMBLIES

For each nonstandard assembly that is currently stored uncanistered in the pool, and requires special handling relative to intact assemblies for safety reasons, provide:

Assembly Identifier	Description of Nonstandard Assembly

All fuel from this reactor is considered nonstandard. ☐

C.7 SPECIAL FUEL FORM – FAILED ASSEMBLIES

For each assembly that is currently stored uncanistered in the pool, and requires special handling relative to intact assemblies for safety reasons, provide:

Assembly Identifier	Description of Failure

C.8 SPECIAL FUEL FORM – CONSOLIDATED/RECONSTITUTED/RECONSTRUCTED ASSEMBLIES

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	Uranium Content (Initial kgU)	Discharge Burnup (MWD_t/MTU)

Provide in **Schedule F** at the end of this data collection form (page 15) 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

Complete a Schedule **D.2** for each storage site, including BOTH wet storage pools and dry storage sites.

D.2.1 Storage Site Identifier

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

D.2.2 Storage Capacity

	BWR	PWR
	(No. of Assemblies)	
Current NRC Licensed Capacity		
Current Installed Capacity		

D.2.3 Storage Inventory

Contributing Reactor Name	Number of Assemblies	Cumulative Number of Assemblies
Overall Pool Inventory		

D.2.4 Shipments/Transfers of Discharged Fuel

Report all shipments of fuel assemblies from this pool to another storage site (pool or dry storage) and to this pool from another storage site since the end of the previous reporting period.

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

Assembly Identifier	Former Storage Site Identifier	Current Storage Site Identifier

Assembly Identifier	Former Storage Site Identifier	Current Storage Site Identifier

D.2.5 Dry Storage

If your company has implemented dry storage at your site, provide the following additional information.

Multi-element Canisters/Casks Inventory

Number of Multi-element Canisters/Casks in Service _____

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

Provide in **Schedule F** at the end of this data collection form (page 15) any comments you have concerning **Storage Data**. Label your comments by the **Schedule and Item Number** to which they refer.

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SCHEDULE E: NON-FUEL DATA

E.1 NON-FUEL COMPONENTS

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

_____ Yes. Complete the remainder of Schedule E.

_____ No. Skip to **Schedule F**.

List each applicable type of non-fuel component currently stored at this storage facility. Provide the quantity and estimate the volume and weight of each type of non-fuel component identified.

Type of Non-fuel Hardware	Number of Individual Items	Total Volume, if not intact ($inch^3$)	Estimated Average Weight (kg)	Non-fuel Hardware Status Code(s)		
				C	S	D
PWR - Burnable Absorber Assemblies PWR - Control Rods PWR - Control Rod Spiders PWR - Cruicform Control Blades (limited use) PWR - Thimble Plugs BWR - Cruciform Control Blades BWR - Fuel Channels BWR/PWR - SF Disassembly Hardware BWR/PWR - In-core Instrumentation BWR/PWR - Neutron Sources BWR/PWR - Other (Specify in notes)				❑	❑	❑

The default Status Code is null and represents non-fuel components that are stored as an integral part of an assembly. Other status codes include canistered components (C), separated components (S), and components in dry storage (D).

E.2 NON-FUEL COMPONENTS – CANISTERED

A canister is defined as any container designed to confine waste that may be delivered to a Federal repository. Empty canisters should not be reported. A canister that contains ANY spent nuclear fuel should be reported in Schedule C.4.

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

____ Yes. Provide the date requested in Schedules E.2.1 – E.2.2 for each canister.

____ No. Skip to Schedule E.3.

E.2.1 Canister Description

Canister Identifier	Canister Shape		Canister Dimensions (inches)			Loaded Weight (kg)
	C	R	Length	Diameter/ Width	Depth	
	❑	❑				
	❑	❑				

C = cylindrical R = rectangular

E.2.2 Canister Contents

Canister Identifier	Description of Contents	Canister Closure		
		B	W	NS
		❑	❑	❑
		❑	❑	❑

B = bolted W = welded NS = not sealed

E.3 NON-FUEL COMPONENTS – SEPARATE FROM AN ASSEMBLY

Does your facility have uncanistered non-fuel components that are separate from an assembly that are planned for delivery to a Federal repository?

_____ Yes. Complete the remainder of Schedule E.3.

_____ No. Skip to Schedule E.4.

List and estimate the number, volume and weight of each applicable type of separated non-fuel component.

Type of Non-fuel Hardware	Number of Individual Items	Total Volume, if not intact ($inch^3$)	Estimated Average Weight (kg)
PWR - Burnable Absorber Assemblies PWR - Control Rods PWR - Control Rod Spiders PWR - Cruicform Control Blades (limited use) PWR - Thimble Plugs BWR - Cruciform Control Blades BWR - Fuel Channels BWR/PWR - SF Disassembly Hardware BWR/PWR - In-core Instrumentation BWR/PWR - Neutron Sources BWR/PWR - Other (Specify in notes)			

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E.4 NON-FUEL COMPONENTS – IN DRY STORAGE

Does your facility have non-fuel components in dry storage that are planned for delivery to a Federal repository?

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

_____ No. Skip to Schedule F.

List and estimate the number, volume and weight of each applicable type of non-fuel components in dry storage at your facility.

Type of Non-fuel Hardware	Number of Individual Items	Total Volume, if not intact ($inch^3$)	Estimated Average Weight (kg)
PWR - Burnable Absorber Assemblies PWR - Control Rods PWR - Control Rod Spiders PWR - Cruicform Control Blades (limited use) PWR - Thimble Plugs BWR - Cruciform Control Blades BWR - Fuel Channels BWR/PWR - SF Disassembly Hardware BWR/PWR - In-core Instrumentation BWR/PWR - Neutron Sources BWR/PWR - Other (Specify in notes)			

For each individual dry storage multi-element canister/cask containing non-fuel components, provide the following:

Vendor:_____ Model: _____

Date Loaded (MMYYYY): ____ _____

Contents: _____ (Describe contents)

_____ No. Skip to **Schedule F.**

Provide in **Schedule F** at the end of this data collection form (page 15) 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: COMMENTS

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

Schedule and Item Number	Comment

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APPENDICES

NUCLEAR FUEL DATA SURVEY

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

Appendix A – General Instructions

1. Purpose and Use of Data

Form RW-859 "Nuclear Fuel Data" collects data that the Office of Civilian Radioactive Waste Management (OCRWM) uses for assessing spent fuel storage and disposal requirements.

2. Who Should Submit

This form should be submitted by all owners and custodians of irradiated nuclear fuel.

3. When To Submit

This form shall be submitted by February 15 of the year following receipt of the form. Data on the form should reflect the spent fuel status as of December 31 of the survey year.

4. What To Submit

Data may be provided in electronic or in 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 assembly-specific data requested on Schedule C.1 should be submitted in database or spreadsheet format.**

The Form RW-859 updating system is automated and Microsoft Windows-based software is included in this package.

Complete documentation and operating instructions for the supplied software may be found in Appendix F, "Form RW-859 Data Collection Software". After completing the form, print the Form RW-859 to make sure the data are correct. Sign the statement certifying the accuracy of the historical data and return it with your data diskettes or compact disks to the address in Schedule 5, below.

5. Where To Submit

Submit Forms RW-859 and associated material to:

Energy Information Administration (EI-52)

U.S. Department of Energy

1000 Independence Ave., SW

ATTN: Jim Finucane, EI-52

Room 6018, 950 L'Enfant Plaza

Washington, DC 20585-1615

The Form RW-859 Access **database files** (mdb files) **and spreadsheet files** may be sent by electronic mail to the following email address:

RW859@eia.doe.gov

If you send your completed survey data by electronic mail, mail a signed copy of **Schedule A** (page 1) to the mailing address shown above.

After completing the survey using the Data Collection Software, click on "Tools/Database Utilities/Compact Database" to reduce the size of the file before submitting.

You may also transmit your files using the EIA's Secure File Transfer (SFT) System. You may access the SFT System at the following URL:

https://idc.eia.doe.gov/upload/noticerw859.jsp

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 number provided on the cover sheet of this form.

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.

7. Fee Status Changes

Any assemblies that were reported as irradiated prior to April 7, 1983, were assigned a status (D = Discharged, T = Temporarily Discharged, I = Incore). This status was used as a basis for calculating the one-time fee. A change of status of any of those assemblies and the corresponding adjustment to the one-time fee must be reported to the DOE Contracting Officer on Annex B to Appendix G of the Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste.

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Appendix A – Specific Instructions

SCHEDULE A: SITE OPERATOR DATA

A.1 Complete name of the utility or operating company assigned primary operating responsibility, and the names of the reactors and storage facilities. Also provide the reactor and storage facility IDs using the codes in Appendix D.

A.2 Complete name, title, address and telephone number of person with corporate (site operator-wide) responsibility who may be contacted to verify the data given on this form or verify changes between updates of this form.

A.3 Complete name, title and address of cognizant individual having the authority to certify and release the information included on this form. Be sure to sign and date the preprint. (NOTE: Corporate Officer's signature is not required.)

SCHEDULE B: REACTOR DATA

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

B.1 Complete name, title, address and telephone number of person who may be contacted to verify the data for this reactor or verify changes between updates of this form. If this person is also the site operator-wide contact, simply indicate this by placing an 'X' in the indicated box.

B.2 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.3 List all operating cycles covered in this reporting period. 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.

If the reactor has experienced a fuel 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. If the reactor is currently shutdown in a mid-cycle outage, you may indicate a shutdown date for the subcycle. This data may be changed at a later time if the subcycle is resumed without the discharge of fuel.

Verify the continued accuracy of previously submitted cycle data.

SCHEDULE C: DISCHARGED FUEL DATA

C.1 Data on Permanently Discharged Fuel

The Form RW-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, there is a need to update all previously submitted Form RW-859 survey data at the assembly level.

It is preferred that you submit assembly-specific data in either database or spreadsheet format. You may use any readily-available database or spreadsheet. In lieu of submitting these data in database or spreadsheet format you may complete Schedule C.1. Update all previously submitted data and enter new data for assemblies discharged during the reporting period.

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Provide the following for all permanently discharged fuel from this reactor:

Assembly Identifier	Provide a unique identifier for each assembly. This identifier may be assigned by the fuel vendor or by the site operator. Note that non-intact assemblies may have more than one entry in this table with each piece of the assembly in a physically separate location being reported on a separate line.
Uranium Content	Report initial uranium content of the fuel assembly to the nearest gram. Report in kilograms of uranium (kg U).
Initial Enrichment	Report the overall initial enrichment of the assembly to the nearest hundredth of a percent.
Discharge Burnup	Report the final discharge burnup of the assembly in MWD_t/MTU.
Last Cycle Number	Report cycle number for the final cycle of irradiation.
Last Cycle Shutdown Date	Report shutdown date for the final cycle of irradiation, regardless of when the fuel assembly was removed from the core.
Fuel Assembly Type	Use the appropriate code from Appendix B. If there is no appropriate code listed, contact the EIA for an appropriate fuel assembly type code.
Assembly Status	Use the appropriate code from Appendix C. Note that only permanently discharged assemblies are to be reported in this Schedule.
Storage Location	Select the appropriate pool storage site or dry storage site identifier from Appendix D.

C.2 Reinserted Fuel Data

Provide the assembly identifiers for all assemblies that had previously been reported as permanently discharged (and in this pool at the end of the previous reporting period), but which were 1) removed from this pool and, 2) reinserted in a reactor during this reporting period. Assemblies that were discharged and subsequently reinserted within the current reporting period should also be provided.

C.3 Projected Assembly Discharges

Projections of discharged assemblies shall be reported on a group basis, where each assembly in the group has common characteristics. These characteristics include: Assembly Type; Reactor/Cycle History; Initial Uranium Content (within 3 kgU for BWRs, 5 kgU for PWRs); Initial Enrichment (within nearest tenth of a percent); and Estimated Final Burnup (within 5% of the group average GWD_t/MTU).

The current operating cycle number is 1 greater than the last historical cycle number reported in Schedule B.3.

The group identifier is a combination of the cycle number and the number of unique groups in the cycle, e.g., 01-1, 01-2, 11-1, etc.

C.4 through C.8 Special Fuel Forms

These Schedules are used to report data on special fuel forms including canisters and their contents (Schedule C.4), uncanistered fuel rods and fuel pieces (Schedule C.5), nonstandard fuel assemblies (Schedule C.6), failed fuel assemblies (Section C.7), and consolidated, reconstituted, or reconstructed assemblies (Section C.8).

C.4 Canisters

In this Schedule, report all Canistered Material which is scheduled to be delivered to a Federal repository. It covers all materials in canisters (e.g., failed and nonfailed fuel). A canister is defined as the outermost container designed to confine waste that may be delivered to a Federal repository (excluding transport casks). It may contain vitrified high-level waste, intact or failed spent fuel assemblies, consolidated spent fuel rods, or spent fuel rod pieces. A canister may also contain non-fuel components. **Empty canisters should not be reported.**

C.4.1 Canisters in Pool. Are there canisters in your pool planned for delivery to the Federal repository? If the answer to this question is no, skip Schedules C.4.2 – C.4.4. If your answer is yes, complete a separate Schedule C.4.2 – C.4.4 for each canister.

C.4.2 Canister Identifier should be a unique alphanumeric designator. Also provide information on the canister shape, dimensions, and loaded weight.

C.4.3 Provide the information indicated. Checking more than one "Applicable Contents" item is acceptable. If the canister contains fuel rod pieces, provide the information in terms of intact rods, e.g., 0.5 rods, 2.3 rods, etc.

C.4.4 Provide a detailed description of the contents of each canister. Indicate which assembly specific fuel rods came from and their initial loading weight and discharge burnup.

C.5 Uncanistered Fuel Rods and Pieces

Include in this schedule all materials that were not listed as canistered in Schedules C.4.1 through C.4.4. Indicate which assembly specific fuel rods came from and their initial loading weight and discharge burnup.

C.6 Nonstandard Assemblies

Provide information on all assemblies classified as nonstandard. Nonstandard assemblies are those that require special handling. If all assemblies at this facility are considered nonstandard simply check the box.

C.7 Failed Assemblies

Provide information on all assemblies classified as failed. Failed assemblies are those that may require special handling.

C.8 Consolidated/Reconstituted/Reconstructed Assemblies.

Provide the information indicated. Provide information on both the source assembly and the current assembly.

SCHEDULE D: STORAGE FACILITY DATA

D.1 Complete name, title, address and telephone number of person who may be contacted to verify the data given on this form or verify changes between updates of this form.

D.2 Storage Facility Information

Complete a Schedule D.1 for <u>each</u> spent fuel storage site, including pools and dry storage facilities.

D.2.1 Storage Site Identifier -- Use the appropriate code from Appendix D in the Storage Site Identifier column.

D.2.2 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 F).

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 <u>not</u> deduct inventory from current capacity.

Note in the Comments Schedule (Schedule F) if some of the storage capacity is unusable due to mechanical/physical limitations.

D.2.3 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.

D.2.4 Shipments/Transfers of Discharged Fuel -- Report all shipments of fuel assemblies both from this storage site to another storage site (pool or dry storage) and to this storage site from another storage site since the end of the previous reporting period. Include all shipments or transfers since the last reporting period.

D.2.5 Dry Storage

Complete Schedule D.2.5 if your company has implemented dry storage at your site.

Provide dry storage site identifier (Appendix D, "Reactor and Spent Fuel Storage Site Identification Codes." If no code is listed for this site, assign the nearest pool identifier followed by a "D").

Provide the information indicated, including the number of assemblies stored in each multi-element canister/cask.

SCHEDULE E: NON-FUEL DATA

This Schedule should include all non-fuel hardware, non-fuel components, and other materials that need to be repackaged. All materials not listed in Schedule C.4 should be included here. Non-fuel components may be integral to an assembly (enter data in Schedule E.1), canistered (enter data in Schedule E.2), separate from an assembly (enter data in Schedule E.3), or in dry storage (enter data in Schedule E.4).

SCHEDULE F: COMMENTS

Comments on any item in Schedules A - E are to be recorded in Schedule F. Include the Schedule/Sub-Schedule number to which each comment applies with each individual comment.

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APPENDIX B – IDENTIFICATION OF FUEL TYPE CODES

The identification of Fuel Type Codes for your fuel is a three-step process (Steps 1, 2, & 3) or a two-step process (Steps 1 & 4) described below:

Step 1: Using the following list of reactors, identify the Assembly Class for your reactor. Proceed to either Step 2 or Step 4 as indicated.

Table 1 Reactor Assembly Class List

Reactor Name	Assembly Class	Go to	Reactor Name	Assembly Class	Go to
Arkansas Nuclear 1	B&W 15X15	Step 2	Millstone 2	CE 14 X 14	Step 2
Arkansas Nuclear 2	CE 16 X 16	Step 2	Millstone 3	WE 17 X 17	Step 2
Beaver Valley 1, 2	WE 17 X 17	Step 2	Monticello	GE BWR/2,3	Step 2
Big Rock Point	BIG ROCK POINT	Step 4	Nine Mile Point 1	GE BWR/2,3	Step 2
Braidwood 1, 2	WE 17 X 17	Step 2	Nine Mile Point 2	GE BWR/4,5,6	Step 2
Browns Ferry 1, 2, 3	GE BWR/4,5,6	Step 2	North Anna 1, 2	WE 17 X 17	Step 2
Brunswick 1, 2	GE BWR/4,5,6	Step 2	Oconee 1, 2, 3	B&W 15X15	Step 2
Byron 1, 2	WE 17 X 17	Step 2	Oyster Creek	GE BWR/2,3	Step 2
Callaway	WE 17 X 17	Step 2	Palisades	PALISADES	Step 4
Calvert Cliffs 1, 2	CE 14 X 14	Step 2	Palo Verde 1, 2, 3	CE System 80	Step 2
Catawba 1, 2	WE 17 X 17	Step 2	Peach Bottom 2, 3	GE BWR/4,5,6	Step 2
Clinton 1	GE BWR/4,5,6	Step 2	Perry 1	GE BWR/4,5,6	Step 2
Columbia	GE BWR/4,5,6	Step 2	Pilgrim 1	GE BWR/2,3	Step 2
Comanche Peak 1, 2	WE 17 X 17	Step 2	Point Beach 1, 2	WE 14 X 14	Step 2
Cook 1	WE 15 X 15	Step 2	Prairie Island 1, 2	WE 14 X 14	Step 2
Cook 2	WE 17 X 17	Step 2	Quad Cities 1, 2	GE BWR/2,3	Step 2
Cooper Station	GE BWR/4,5,6	Step 2	Rancho Seco	B&W 15X15	Step 2
Crystal River 3	B&W 15X15	Step 2	River Bend 1	GE BWR/4,5,6	Step 2
Davis-Besse	B&W 15X15	Step 2	Robinson 2	WE 15 X 15	Step 2
Diablo Canyon 1, 2	WE 17 X 17	Step 2	Salem 1, 2	WE 17 X 17	Step 2
Dresden 1	DRESDEN 1	Step 4	San Onofre 1	SAN ONOFRE 1	Step 4
Dresden 2, 3	GE BWR/2,3	Step 2	San Onofre 2	CE 16 X 16	Step 2
Duane Arnold	GE BWR/4,5,6	Step 2	San Onofre 3	CE 16 X 16	Step 2
Enrico Fermi 2	GE BWR/4,5,6	Step 2	Seabrook	WE 17 X 17	Step 2
Farley 1, 2	WE 17 X 17	Step 2	Sequoyah 1, 2	WE 17 X 17	Step 2
FitzPatrick	GE BWR/4,5,6	Step 2	Shoreham	GE BWR/4,5,6	Step 2
Fort Calhoun	FORT CALHOUN	Step 2	South Texas 1, 2	SOUTH TEXAS	Step 2
Ginna	WE 14 X 14	Step 2	St. Lucie 1	CE 14 X 14	Step 2
Grand Gulf 1	GE BWR/4,5,6	Step 2	St. Lucie 2	ST. LUCIE 2	Step 2

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Haddam Neck	HADDAM NECK	Step 4	Summer	WE 17 X 17	Step 2
Harris 1	WE 17 X 17	Step 2	Surry 1, 2	WE 15 X 15	Step 2
Hatch 1, 2	GE BWR/4,5,6	Step 2	Susquehanna 1, 2	GE BWR/4,5,6	Step 2
Hope Creek	GE BWR/4,5,6	Step 2	Three Mile Island 1	B&W 15X15	Step 2
Humboldt Bay	HUMBOLDT BAY	Step 4	Trojan	WE 17 X 17	Step 2
Indian Point 1	INDIAN POINT 1	Step 4	Turkey Point 3, 4	WE 15 X 15	Step 2
Indian Point 2, 3	WE 15 X 15	Step 2	Vermont Yankee	GE BWR/4,5,6	Step 2
Kewaunee	WE 14 X 14	Step 2	Vogtle 1, 2	WE 17 X 17	Step 2
LaCrosse	LACROSSE	Step 4	Waterford 3	CE 16 X 16	Step 2
LaSalle County 1, 2	GE BWR/4,5,6	Step 2	Watts Bar 1	WE 17 X 17	Step 2
Limerick 1, 2	GE BWR/4,5,6	Step 2	Wolf Creek 1	WE 17 X 17	Step 2
Maine Yankee	CE 14 X 14	Step 2	Yankee Rowe	YANKEE ROWE	Step 4
McGuire 1, 2	WE 17 X 17	Step 2	Zion 1, 2	WE 15 X 15	Step 2
Millstone 1	GE BWR/2,3	Step 2			

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Step 2: The tables in Step 3 are based on the current vendor name. Use the following list of historical vendor names to determine the appropriate Schedule of the fuel design tables to use in Step 3.

Table 2 Fuel Vendor List

Fuel Vendor (Original Name)	Short Name	Current Vendor Name
ABB Combustion Engineering	ABB CE	Westinghouse
Advanced Nuclear Fuel Corporation	ANF	Areva
Allis Chalmers	AC	N/A
Areva	Areva	Areva
ASEA Brown Boveri (ABB) Atom	ABB Atom	Westinghouse
Babcock & Wilcox Company	B&W	Areva
Combustion Engineering	CE	Westinghouse
Exxon Nuclear Corporation (EXA)	EX	Areva
Framatome	FR	Areva
GE Nuclear Energy	GE	Global Nuclear Fuel
General Atomics	GA	N/A
Global Nuclear Fuel	GNF	Global Nuclear Fuel
Gulf General Atomics	GGA	N/A
Gulf/United Nuclear Fuels	GULF	N/A
Jersey Nuclear	JN	Areva
Nuclear Fuel Services	NFS	N/A
Nuclear Materials and Equipment Corporation	NUMEC	N/A
Siemens Nuclear Corporation	Siemens	Areva
United Nuclear Corporation	UNC	N/A
Westinghouse Electric	WE	Westinghouse

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Step 3: Find the appropriate Schedule of Table 3 (in the Table Schedule Title) for the Current Vendor Name (See Table 2) for the fuel assemblies in question. Use the Descriptions (See Table Below) to identify the Fuel Design applicable to your assemblies. Use the individual tables to identify the fuel code for the assemblies. Insert this code into the appropriate field in the RW-859 Nuclear Fuel Survey form.

Table 3.1 Areva (for Babcock & Wilcox plants)

All operating B&W plants are B&W 15 x 15 Assembly Class plants.

Fuel Design	Description	Fuel Code
Mark B2	Mark B2 fuel uses a corrugated flexible grid spacer and a zirconium dioxide solid spacer between the fuel column and the fuel rod end plug.	B1515B2
Mark B3	Mark B3 characteristics are not well known.	B1515B3
Mark B4	Mark B4 fuel was the standard fuel from B&W for many years. These assemblies use Inconel spacer grids.	B1515B4
Mark B4Z	Mark B4Z fuel has Mark B4 features with 6 Zircaloy grid spacers in the core zone	B1515B4Z
Mark B5	Mark B5 fuel has a redesigned upper end fitting, eliminates retainers for Burnable Poison Rod Assembly holddown; and has a redesigned holddown spring made of Inconel 718 rather than Inconel X-750.	B1515B5
Mark B5Z	Mark B5Z fuel features 6 Zircaloy grid spacers in the core zone in addition to Mark B5 features.	B1515B5Z
Mark B6	Mark B6 fuel features 6 Zircaloy grid spacers in the core zone and a skirtless, removable upper end fitting.	B1515B6
Mark B7	Mark B7 fuel features, in addition to the Mark B6 features, include slightly longer fuel rods and a shorter lower end fitting. These features increase the plenum volume and fuel rod-to-nozzle gap and allow for increased discharge burnups.	B1515B7
Mark B8	Mark B8 fuel features a debris fretting resistant fuel rod design and includes Mark B7 fuel features.	B1515B8
Mark B9	Mark B9 fuel includes Mark B8 features plus slightly increased pellet diameter and reduced stack length.	B1515B9
Mark B10	Mark B10 fuel includes Mark B9 features along with a redesigned upper end fitting (a cruciform leaf-spring design replaces the helical holddown springs) and zone-loaded fuel enrichment variations.	B1515B10
Mark B11	Mark B11 fuel utilizes a new alloy, M5, for the fuel rod cladding.	B1515B11
Mark B12	Mark B12 fuel utilizes the M5 alloy for fuel rod cladding and guide tubes; incorporates the TRAPPER bottom nozzle, a fine mesh debris filter; and has a heavier uranium loading.	B1515B12
Mark BEB	Mark BEB fuel was a Lead Test Assembly design used to test extended burnup features, this fuel had a shorter active fuel length and was used only at Arkansas Nuclear 1.	B1515BEB
Mark BGd	Mark BGd fuel utilized gadolinia in the fuel rods as a neutron absorber and apparently had removable upper end fittings, the forerunner of the skirtless (Mark B6) upper end fitting.	B1515BGD
Mark B	Mark B fuel is a generic designation. Should not be used unless the specific fuel design cannot be determined.	B1515B
Mark BZ	Mark BZ fuel is a generic designation and is used for fuels with Zircaloy grid spacers, which encompass Mark B4Z, B5Z, B6, B7 and B8 fuels. Should not be used unless the specific fuel design cannot be determined.	B1515BZ

Fuel Design	Description	Fuel Code
Mark C	Mark C Fuel uses a 17x17 fuel rod array, designed for use in B&W 17x17 Class reactors. None of the reactors in this class (Bellefonte, WNP-1) were completed, but a limited number of Mark C lead test assemblies were irradiated in B&W 15x15 Class reactors.	B1717B

Table 3.2 Areva (for Combustion Engineering plants)

CE Reload Fuels – Reload fuel sold by ANF and their successors for CE power plants.

Assembly Class	Fuel Code
CE 14 x 14	C1414A
CE 16 x 16	C1616A
CE System 80	C8016A
Ft. Calhoun	XFC14A
St. Lucie	XSL16A

Table 3.3 Areva (for General Electric plants)

ANF – 7x7 fuel manufactured by Exxon Nuclear (and Advanced Nuclear Fuels). No water rods.

Assembly Class	Fuel Code
GE BWR/2,3	G2307A
GE BWR/4-6	G4607A

ANF – 8x8 fuel manufactured by Exxon Nuclear (and Advanced Nuclear Fuels). Uses one water rod.

Assembly Class	Fuel Code
GE BWR/2,3	G2308A
GE BWR/4-6	G4608A

ANF Prepressurized – 8x8 Fuel manufactured by Advanced Nuclear Fuels. Uses one water rod. Features prepressurized fuel rods.

Assembly Class	Fuel Code
GE BWR/2,3	G2308AP
GE BWR/4-6	G4608AP

ANF 9-1 – 9x9 fuel manufactured by Advanced Nuclear Fuels (and Siemens). Uses one water rod.

Assembly Class	Fuel Code
GE BWR/2,3	G2309A
GE BWR/4-6	G4609A

ANF 9-2 – 9x9 fuel manufactured by Advanced Nuclear Fuels (and Siemens). Uses two water rods.

Assembly Class	Fuel Code
GE BWR/2,3	G2309A2
GE BWR/4-6	G4609A2

ANF 9-5 – 9x9 fuel manufactured by Advanced Nuclear Fuels (and Siemens). Uses five water rods.

Assembly Class	Fuel Code
GE BWR/2,3	G2309A5
GE BWR/4-6	G4609A5

ANF 9X – 9x9 fuel manufactured by Advanced Nuclear Fuels (and Siemens). Central water replaces 9 fuel rod positions.

Assembly Class	Fuel Code
GE BWR/2,3	G2309A9X
GE BWR/4-6	G4609A9X

ANF IX – 9x9 fuel manufactured by Advanced Nuclear Fuels (and Siemens). Central water replaces 9 fuel rod positions. Internal claddling liner of pure zirconium.

Assembly Class	Fuel Code
GE BWR/2,3	G2309AIX
GE BWR/4-6	G4609AIX

ANF IX+ – 9x9 fuel manufactured by Advanced Nuclear Fuels (and Siemens). Central water replaces 9 fuel rod positions. Internal claddling liner of pure zirconium. High-performance thermal spacer grids.

Assembly Class	Fuel Code
GE BWR/2,3	G2309AX+
GE BWR/4-6	G4609AX+

Atrium – ATRIUM™ fuel is reload fuel for GE power plants. It is available in 9x9 and 10x10 rod arrays. ATRIUM fuels are distinguished by an internal square water channel that displaces a 3x3 array of fuel rods; load bearing support from tie rods (ATRIUM-9) or the water channel (ATRIUM-10); ULTRAFLOW grid spacers that increase the achievable critical power level; cladding with or without a zirconium liner; and advanced fuel channels.

Assembly Class	Array Size	Fuel Code
GE BWR/2,3	9 x 9	G2309ATR
GE BWR/2,3	10 x 10	G2310ATR
GE BWR/4-6	9 x 9	G4609ATR
GE BWR/4-6	10 x 10	G4610ATR

Table 3.4 Areva (for Westinghouse plants)

ANF Reload Fuel – Reload fuel manufactured by Siemens (and predecessor organizations) for Westinghouse plants, prior to the creation of Areva.

Assembly Class	Fuel Code
WE 14 x 14	W1414A
WE 15 x 15	W1515A
WE 17 x 17	W1717A
South Texas	XST17A

Top Rod Fuel – an ANF-manufactured fuel for WE 14 X 14 reactors with a longer, smaller diameter fuel rod than ANF reload fuel.

Assembly Class	Fuel Code
WE 14 x 14	W1414ATR

Part Length Fuel – an ANF-manufactured fuel for WE 15 X 15 reactors. Bottom 42 inches of the fuel rods contains stainless steel, rather than uranium to shield core support structure.

Assembly Class	Fuel Code
WE 15 x 15	W1515APL

Mark BW Reload Fuel – Reload fuel manufactured by B&W for Westinghouse plants, prior to the creation of Areva.

Assembly Class	Fuel Code
WE 14 x 14	W1414B
WE 15 x 15	W1515B
WE 17 x 17	W1717B
South Texas	XST17B

Mark BW (M5) Reload Fuel – Reload fuel manufactured by Areva for Westinghouse plants. Mark BW (M5) fuel uses the alloy M5 for fuel rod cladding.

Assembly Class	Fuel Code
WE 14 x 14	W1414BM5
WE 15 x 15	W1515BM5
WE 17 x 17	W1717BM5
South Texas	XST17BM5

HTP Fuel – High Thermal Performance (HTP) fuel from Framatome is designed for power plants built by Westinghouse. HTP is distinguished by improved cladding materials (optimized Zircaloy and Duplex cladding); HTP spacer grids that utilize flow channels to improve coolant mixing and enhanced fuel rod support to preclude grid-to-rod fretting, intermediate flow mixing grids, and the FUELGUARD^{TM} lower tie plate.

Assembly Class	Fuel Code
WE 14 x 14	W1414AHT
WE 15 x 15	W1515AHT
WE 17 x 17	W1717AHT
South Texas	XST17AHT

Alliance – Alliance fuel from Areva is designed for WE 17 x 17 power plants. Alliance fuels are distinguished by MONOBLOC™ guide thimbles for increased assembly stiffness and distortion resistance; M5™ cladding, guide thimbles and grids for reduced corrosion, reduced growth and lower creep; high performance mixing grids with wrap-around corner for ease of handling; and a TRAPPER™ bottom nozzle for superior debris protection.

Assembly Class	Fuel Code
WE 14 x 14	W1414ALL
WE 15 x 15	W1515ALL
WE 17 x 17	W1717ALL
South Texas	XST17ALL

Table 3.5 Global Nuclear Fuels (for General Electric plants)

GE-2 – GE-2 fuel was the original core fuel for most GE/BWR 2,3 Class reactors and for some BWR/4 plants. GE-2 fuels have a 7x7 fuel rod array.

Assembly Class	Description	Fuel Code
GE BWR/2,3	0.570-inch-diameter fuel rod	G2307G2A
GE BWR/2,3	0.563-inch-diameter fuel rod	G2307G2B
GE BWR/4-6		G4607G2

GE-3 – GE-3 or "Improved" fuel introduced a hydrogen getter in the fuel rod plenum and thicker fuel rod cladding. Active fuel lengths of 144" (GE-3a) and 146" (GE-3b) were used. GE-3 fuels have a 7x7 fuel rod array.

Assembly Class	Description	Fuel Code
GE BWR/2,3		G2307G3
GE BWR/4-6	144-inch active fuel length	G4607G3A
GE BWR/4-6	146-inch active fuel length	G4607G3B

GE-4 – GE-4 fuels were the original 8x8 fuel rod array and feature 63 fuel rods and a single "water rod."

Assembly Class	Description	Fuel Code
GE BWR/2,3		G2308G4
GE BWR/4-6	144-inch active fuel length	G4608G4A
GE BWR/4-6	146-inch active fuel length	G4608G4B

Retrofit Fuel – GE-5, or "Retrofit" fuels used an 8x8 fuel rod array, with 62 fuels rods and 2 water rods. GE-5 fuels also introduced natural uranium axial blankets.

Assembly Class	Fuel Code
GE BWR/2,3	G2308G5
GE BWR/4-6	G4608G5

GE Prepressurized Fuel – Prepressurized fuel used an 8x8 fuel rod array and other GE-5 features. The fuel rods were prepressurized to 3 Atmospheres to reduce fission gas release.

Assembly Class	Fuel Code
GE BWR/2,3	G2308GP
GE BWR/4-6	G4608GP

GE Barrier Fuel – Barrier fuel used an 8x8 fuel rod array and other “prepressurized” fuel features. It introduced a pure zirconium "barrier" on inside of cladding to reduce pellet-clad interactions.

Assembly Class	Fuel Code
GE BWR/2,3	G2308GB
GE BWR/4-6	G4608GB

GE-8 – GE-8 fuel used an 8x8 fuel rod array and increased the number of water rods from 2 to 4 and increased the fuel rod prepressurization to 5 Atmospheres. GE-8 fuel has the features of Barrier fuel and added burnable absorbers and axially zoned enrichment.

Assembly Class	Description	Fuel Code
GE BWR/2,3	2 water rods	G2308G8A
GE BWR/2,3	4 water rods	G2308G8B
GE BWR/4-6	2 water rods	G4608G8A
GE BWR/4-6	4 water rods	G4608G8B

GE-9 – GE-9 fuel used an 8x8 fuel rod array and has the features of GE-8 fuel. GE-9 fuel introduced a single large diameter water rod that displaces 4 fuel rod positions and a ferule-type spacer grid.

Assembly Class	Fuel Code
GE BWR/2,3	G2308G9
GE BWR/4-6	G4608G9

GE-10 – GE-10 fuel used an 8x8 fuel rod array and has the major features of GE-9 fuel. It introduced a new fuel channel, which is 100 mils thick at the corners and 65 mils thick on the sides. This new channel design reduces the parasitic material in core and uses flow directors on the inside of the channel to redirect the flow of water away from the channel wall and toward the center of the fuel bundle.

Assembly Class	Fuel Code
GE BWR/2,3	G2308G10
GE BWR/4-6	G4608G10

GE-11 – GE-11 fuel uses a 9x9 fuel rod array. It features a ferule-type space grid and two medium diameter water rods that replace seven fuel rod locations. GE-11 fuel also uses eight part-length fuel rods, which extend from the bottom of the assembly to the fifth spacer grid.

Assembly Class	Fuel Code
GE BWR/2,3	G2309G11
GE BWR/4-6	G4609G11

GE-12 – GE-12 fuel uses a 10x10 fuel rod array. It features a ferule-type space grid and two medium diameter water rods that replace seven fuel rod locations. GE-12 fuel also uses eight part-length fuel rods, which extend from the bottom of the assembly to the fifth spacer grid.

Assembly Class	Fuel Code
GE BWR/2,3	G2310G12
GE BWR/4-6	G4610G12

GE-13 – GE-13 fuel uses a 9x9 fuel rod array. It features a ferule-type spacer grid and two medium diameter water rods that replace seven fuel rod locations. It offers an increased bundle weight relative to GE-11 fuel and a choice of active fuel lengths.

Assembly Class	Fuel Code
GE BWR/2,3	G2309G13
GE BWR/4-6	G4609G13

GE-14 – GE-14 fuel uses a 10x10 fuel rod array. It features a ferule-type spacer grid and two medium diameter water rods that replace seven fuel rod locations. It offers an increased bundle weight relative to GE-12 fuel and a choice of active fuel lengths.

Assembly Class	Fuel Code
GE BWR/2,3	G2310G14
GE BWR/4-6	G4610G14

Table 3.6 Westinghouse (for Babcock & Wilcox reactors)

B&W Reload Fuels – Reload fuel sold by WE for B&W power plants.

Assembly Class	Fuel Code
BW 15 x 15	B1515W

Table 3.7 Westinghouse (for Combustion Engineering reactors)

CE Original Fuels – Original and reload fuel sold by CE for their power plants.

Assembly Class	Fuel Code
CE 14 x 14	C1414C
CE 16 x 16	C1616C
CE System 80	C8016C
Ft. Calhoun	XFC14C
St. Lucie	XSL16C

WE Reload Fuels – Reload fuel sold by WE for CE power plants (prior to their purchase of ABB CE).

Assembly Class	Fuel Code
CE 14 x 14	C1414W
CE 16 x 16	C1616W
CE System 80	C8016W
Ft. Calhoun	XFC14W
St. Lucie	XSL16W

CE Turbo – CE Turbo fuels are reload fuels sold by Westinghouse and used in power plants built by Combustion Engineering. Turbo fuels are distinguished by erbium integral burnable absorbers, an advanced fuel pellet design, axial blankets, Zircaloy mixing grids, and a Guardian debris-resistant grid.

Assembly Class	Fuel Code
CE 14 x 14	C1414WCT
CE 16 x 16	C1616WCT
CE System 80	C8016WCT
Ft. Calhoun	XFC14WCT
St. Lucie	XSL16WCT

Table 3.8 Westinghouse (for General Electric plants)

QUAD+ Design – A licensed version of the ABB Atom water cross fuel – 4 individual 4 x 4 arrays are separated by a water cross in a single assembly.

Assembly Class	Fuel Code
GE BWR/4-6	G4608W

CE ABB Atom Design – A 10 x 10 version of the ABB Atom water cross fuel – 4 individual 5 x 5 arrays are separated by a water cross in a single assembly.

Assembly Class	Fuel Code
GE BWR/4-6	G4610C

SVEA 96 Designs – Westinghouse SVEA 96 fuel designs are used in GE BWR plants. Each fuel assembly has four 5x5 sub-bundles separated by a double-wall structure that forms an internal water cross. Each sub-bundle consists of 24 fuel rods and a single water rod.

Assembly Class	Fuel Code
GE BWR/2,3	G2310W
GE BWR/4-6	G4610W

SVEA 96 Optima Designs – Westinghouse SVEA 96 Optima fuel designs are used in GE BWR plants. Each fuel assembly has four 5x5 sub-bundles separated by a double-wall structure that forms an internal water cross. Each sub-bundle consists of 24 fuel rods and a single water rod. Optima fuel use a larger diameter fuel rod and pellet and have twelve part-length fuel rods.

Assembly Class	Fuel Code
GE BWR/2,3	G2310WO
GE BWR/4-6	G4610WO

Table 3.9 Westinghouse (for Westinghouse plants)

WE Standard – Standard fuel from Westinghouse for original WE 14x14 and WE 15x15 Class reactors. Standard fuel used stainless steel guide tubes.

Assembly Class	Fuel Code
WE 14 x 14	W1414W
WE 15 x 15	W1515W

LOPAR – "Low Parasitic" or LOPAR fuel for WE 14x14, WE 15x15, and WE 17x17 Class reactors. LOPAR uses Zircaloy for guide tubes. In WE 17x17 reactors, LOPAR fuel is sometimes referred to as Standard fuel.

Assembly Class	Fuel Code
WE 14 x 14	W1414WL
WE 15 x 15	W1515WL
WE 17 x 17	W1717WL
South Texas	XST17WL

OFA – "Optimized Fuel Assemblies" or OFA fuel uses Zircaloy for spacer grids and has a smaller fuel pellet and fuel rod diameter. As a result, the initial U loading is lower than for Standard and LOPAR fuels.

Assembly Class	Fuel Code
WE 14 x 14	W1414WO
WE 15 x 15	W1515WO
WE 17 x 17	W1717WO
South Texas	XST17WO

Vantage 5 – Vantage 5 fuel from Westinghouse offers a set of 5 optional features. These features include integral zirconium diboride neutron absorbers, natural uranium axial blankets, intermediated flow mixers, removable top nozzle, and increased discharged burnup. Vantage 5 fuels use the Zircaloy spacers and the smaller fuel pellet and fuel rod found on OFA fuels.

Assembly Class	Fuel Code
WE 14 x 14	W1414WV5
WE 15 x 15	W1515WV5
WE 17 x 17	W1717WV5
South Texas	XST17WV5

Vantage 5 Hybrid – Vantage 5 Hybrid fuel from Westinghouse combines the advanced neutronic characteristics of Vantage 5 fuel with the larger diameter fuel rod associated with LOPAR fuel. This results in an increased quantity of uranium in the assembly.

Assembly Class	Fuel Code
WE 14 x 14	W1414WV5H
WE 15 x 15	W1515WV5H
WE 17 x 17	W1717WV5H
South Texas	XST17WV5H

Vantage 5+ – Vantage 5+ fuel from Westinghouse combines ZIRLO (a zirconium-niobium alloy) cladding with the advanced neutronic characteristics of Vantage 5 fuel.

Assembly Class	Fuel Code
WE 14 x 14	W1414WV5+
WE 15 x 15	W1515WV5+
WE 17 x 17	W1717WV5+
South Texas	XST17WV5+

Performance+ – Performance+ fuel is designed for power plants built by Westinghouse. Performance+ Fuel is distinguished by a removable top nozzle with easy aligning and engaging features; axial blankets; enriched annular axial blankets; intermediate flow mixer grids to enhance departure-from-nucleate-boiling margins; and extensive use of ZIRLO™ in cladding, instrumentation and guide thimbles, structural girds and intermediate flow mixers; zirconium diboride integral burnable absorbers; mechanical modifications that enhance fuel performance at extended burnups; and triple protection against debris-induced fuel rod damage.

Assembly Class	Fuel Code
WE 14 x 14	W1414WP+
WE 15 x 15	W1515WP+
WE 17 x 17	W1717WP+
South Texas	XST17WP+

Robust Fuel Assemblies – Robust Fuel Assemblies (RFA) are designed for power plants built by Westinghouse. The features of the RFA include the use of gadolinia as a neutron absorber and an inconel protective grid at the bottom of the fuel assembly.

Assembly Class	Fuel Code
WE 14 x 14	W1414WR
WE 15 x 15	W1515WR
WE 17 x 17	W1717WR
South Texas	XST17WR

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RFA 2 – Robust Fuel Assemblies - 2 are designed for power plants built by Westinghouse. In addition to RFA features, the RFA-2 grid design provides improved resistance to fuel rod fretting.

Assembly Class	Fuel Code
WE 14 x 14	W1414WR2
WE 15 x 15	W1515WR2
WE 17 x 17	W1717WR2
South Texas	XST17WR2

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Step 4: For single-reactor assembly classes, find the appropriate Schedule in the following table. Use the descriptions to identify the fuel codes for the assemblies and input this code into the appropriate field in the RW-859 Nuclear Fuel Survey form.

Table 4 Single Reactor Assembly Class List

Assembly Class	
Description	**Fuel Code**
BIG ROCK POINT	
Advanced Nuclear Fuel-manufactured 9 x 9 fuel	XBR09A
Advanced Nuclear Fuel-manufactured 11 x 11 fuel	XBR11A
GE-manufactured 7 x 7 fuel (center melt fuel)	XBR07G
GE-manufactured 8 x 8 fuel (center melt fuel)	XBR08G
GE-manufactured 9 x 9 fuel; includes E, EG, F, MEG, and PEG fuels	XBR09G
GE-manufactured 11 x 11 fuel; includes B, C, D1 and D2 fuels.	XBR11G
Nuclear Fuel Services-manufactured 11 x 11 fuel	XBR11N
DRESDEN 1	
Advanced Nuclear Fuel-manufactured 6 x 6 fuel	XDR06A
GE-manufactured 6 x 6 fuel (Type I)	XDR06G
GE-manufactured 6 x 6 fuel (Type III-B), erbium oxide burnable absorber	XDR06G3B
GE-manufactured 6 x 6 fuel (Type III-F), nonfueled gadolinia burnable absorber rod	XDR06G3F
GE-manufactured 6 x 6 fuel (Type V), gadolinia burnable absorber in selected fuel rods	XDR06G5
GE-manufactured 7 x 7 fuel (stainless steel clad)	XDR07G
GE-manufactured 7 x 7 prototype fuel (SA-1)	XDR07GSA1
GE-manufactured 8 x 8 prototype fuel (PF)	XDR08G
United Nuclear-manufactured 6 x 6 fuel	XDR06U
HUMBOLDT BAY	
Advanced Nuclear Fuel-manufactured 6 x 6 fuel	XHB06A
GE-manufactured 6 x 6 fuel	XHB06G
GE-manufactured 7 x 7 fuel (Type I – stainless steel clad)	XHB07G
GE-manufactured 7 x 7 fuel (Type II – Zircaloy clad)	XHB07G2
HADDAM NECK	
B&W-manufactured 15 x 15 fuel (stainless steel clad)	XHN15BS
B&W-manufactured 15 x 15 fuel (Zircaloy clad)	XHN15BZ
GULF-manufactured 15 x 15 fuel (stainless steel clad)	XNH15HS
GULF-manufactured 15 x 15 fuel (Zircaloy clad)	XNH15HZ
NUMEC-manufactured 15 x 15 fuel (stainless steel clad)	XNH15MS
NUMEC-manufactured 15 x 15 fuel (Zircaloy clad)	XNH15MZ
WE-manufactured 15 x 15 fuel	XHN15W

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Assembly Class	
Description	**Fuel Code**
INDIAN POINT 1	
WE-manufactured 13 x 14 fuel (non-square array)	XIP14B
B&W-manufactured 14 x 15 fuel (non-square array)	XIP14W
LACROSSE	
Allis Chalmers-manufactured 10 x 10 fuel	XLC10L
Advanced Nuclear Fuel-manufactured 10 x 10 fuel	XLC10A
PALISADES	
Advanced Nuclear Fuel-manufactured 15 x 15 fuel	XPA15A
Combustion Engineering-manufactured 15 x 15 fuel	XPA15C
SAN ONOFRE 1	
Westinghouse-manufactured 14 x 14 fuel (stainless steel clad)	XSO14W
Westinghouse-manufactured 14 x 14 fuel (Zircaloy clad)	XSO14WZ
YANKEE ROWE	
Advanced Nuclear Fuel-manufactured 15 x 16 fuel (non-square array)	XYR16A
Combustion Engineering-manufactured 15 x 16 fuel (non-square array)	XYR16C
UNC-manufactured 15 x 16 fuel (non-square array)	XYR16U
Westinghouse-manufactured 17 x 18 fuel (non-square array)	XYR18W

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APPENDIX C – ASSEMBLY STATUS CODES

Status Code	Description
	Standard intact assembly - blank or no code - This is the default.
N	Non-standard intact assembly
F	Failed assembly with cladding damage or mechanical damage (not canistered)
C	Canistered assembly
R	Canistered fuel rods
P	Canistered fuel debris (pieces)
B	Fuel in a basket
O	Other - provide description of other conditions in comment Schedule; for example, to identify an assembly type that is not included in Appendix B of the instructions; or to describe characteristics which require special handling, etc.

GENERAL SPECIFICATIONS FROM THE STANDARD CONTRACT, APPENDIX E

a. "Standard intact assembly" means a spent nuclear fuel (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 Schedule*	6 inches x 6 inches	9 inches x 9 inches

*The cross Schedule 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 D – 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	
Bellefonte - Unit 1	4801	4801	
Bellefonte - Unit 2	4802	4802	
Big Rock Point	1201	1201	
Big Rock Point (ISFSI)	-	1201D	DC
Braidwood - Unit 1	1001	1001	CP
Braidwood - Unit 2	1002	1001	CP
Browns Ferry - Unit 1	4803	4803	TC
Browns Ferry - Unit 2	4804	4803	TC
Browns Ferry - Unit 3	4805	4805	
Brunswick - Unit 1	0701	0701	
Brunswick - Unit 2	0702	0702	
Byron - Unit 1	1003	1003	CP
Byron - Unit 2	1004	1003	CP
Callaway	5101	5101	
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	
Clinton - Unit 1	2301	2301	
Columbia	5302	5302	
Columbia (ISFSI)	-	5302D	DC
Comanche Peak - Unit 1	4901	4901	TC
Comanche Peak - Unit 2	4902	4901	TC
Cook - Unit 1	5801	5801	CP
Cook - Unit 2	5802	5801	CP
Cooper Station	3001	3001	
Crystal River 3	1701	1701	
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	
Farley - Unit 1	0101	0101	
Farley - Unit 2	0102	0102	
Fitzpatrick	3901	3901	
Fitzpatrick (ISFSI)	-	3901D	DC
Fort Calhoun	3401	3401	
Fort St. Vrain	4101	4101	
Fort St. Vrain (ISFSI)	-	4101D	DC
GE Morris	-	6601	
GE Vallecitos	-	6201	
Ginna	4401	4401	
Grand Gulf	2901	2901	
H. B. Robinson	0705	0705	
H. B. Robinson (ISFSI)	-	0705D	DC
Haddam Neck	5701	5701	
Haddam Neck (ISFSI)	-	5701D	DC
Harris	0703	0703	
Hatch - Unit 1	2001	2001	TC
Hatch - Unit 2	2002	2001	TC
Hatch (ISFSI)	-	2001D	DC
Hope Creek	4201	4201	
Humboldt Bay	3503	3503	
Idaho National Laboratory	-	7002	
Indian Point - Unit 1	1101	1101	
Indian Point - Unit 2	1102	1102	
Indian Point - Unit 3	3902	3902	
Kewaunee	5501	5501	
Lacrosse	1301	1301	
LaSalle County - Unit 1	1008	1008	TC
LaSalle County - Unit 2	1009	1008	TC
Limerick - Unit 1	3701	3701	TC
Limerick - Unit 2	3702	3701	TC
Maine Yankee	2801	2801	
Maine Yankee (ISFSI)	-	2801D	DC

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Storage Location	Reactor ID	Pool ID	Note
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	
Monticello	3301	3301	
Nine Mile Point - Unit 1	3101	3101	
Nine Mile Point - Unit 2	3102	3102	
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
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	
Pilgrim - Unit 1	0601	0601	
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
Rancho Seco	4501	4501	
Rancho Seco (ISFSI)	-	4501D	DC
River Bend	2101	2101	
Salem - Unit 1	4202	4202	
Salem - Unit 2	4203	4203	
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	
Sequoyah - Unit 1	4808	4808	CP
Sequoyah - Unit 2	4809	4808	CP
Sequoyah (ISFSI)	-	4808D	
Shoreham	2601	2601	
South Texas Project - Unit 1	2201	2201	
South Texas Project - Unit 2	2202	2202	
St Lucie - Unit 1	1801	1801	
St Lucie - Unit 2	1802	1802	
Summer	4601	4601	
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	
Vermont Yankee	6001	6001	
Vogtle - Unit 1	2003	2003	TC
Vogtle - Unit 2	2004	2003	TC
Washington Hanford	-	7007	
Waterford 3	2701	2701	
Watts Bar - Unit 1	4810	4810	CP
Watts Bar - Unit 2	4811	4810	CP
Wolf Creek	2501	2501	
Yankee Rowe	5601	5601	
Yankee Rowe (ISFSI)	-	5601D	DC
Zion - Unit 1	1012	1012	CP
Zion - Unit 2	1013	1012	CP

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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 E – GLOSSARY OF TERMS

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 must be consistent with other submissions to the DOE/NRC, i.e., Annex B, previous Form RW-859 and DOE/NRC Form 741.

Assembly Type: Each assembly is characterized by a fabricator, rod-array size, and model type. An eight-digit assembly type code is assigned to each assembly type based on certain distinguishing characteristics, such as the number of rods per assembly, fuel rod diameter, cladding type, materials used in fabrication, and other design features (See Appendix B, "Identification of Fuel Type Codes.")

Average Assembly Weight: Average weight in kilograms (kg) of uranium of fresh fuel assemblies in a batch before they are initially inserted into the reactor core. To be included in a batch the initial uranium content of each assembly must be within 3 kg of the average weight (BWR assemblies) and within 5 kg of the average weight (PWR assemblies).

Basket: An open container into which fuel and/or non-fuel components including rods, Schedules of rods, garbage, debris, etc., are placed.

Burnup: Amount of thermal energy generated per unit mass of fuel, measured in units of gigawattdays thermal per initial metric ton of uranium (MWD_t/MTU), rounded to the nearest gigawatt day.

Canister: A canister is defined as any container designed to confine waste that may be delivered to a Federal repository **.**

Cask: A shielded container licensed by the NRC for shipping or storing canistered or uncanistered spent nuclear fuel and/or canistered high-level waste.

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

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 startup of the reactor following the subsequent refueling.

Cycle/Reactor History: A group of assemblies that have been irradiated in the same cycles in an individual reactor and are said to have the same cycle/reactor history.

Defective or Failed Assembly: Describes a fuel assembly that will not fit into a spent fuel rack, cannot be lifted normally, or has already been canistered. An assembly is classified as defective if it contains any fuel rods having known or suspected cladding defects greater than pin holes or hairline cracks that would require canning for shipment under the NRC Director's Decision, DD-84-9, April 1984.

Effective Full-Power Days: The number of effective full power days produced by a unit is a measure of the unit's energy generation. It is determined using the following ratio:

$$\text{EFPD} = \frac{\text{Heat generation (planned or actual) in megawatt-Days thermal } (MWD_t)}{\text{Licensed thermal power in megawatts thermal } (MW_t)}$$

Group: A group is a logical grouping of assemblies with similar characteristics. All assemblies in a group 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 type.

Initial Enrichment: Average 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.

Initial Loading Weight: Average weight in kilograms (kg) of uranium of fresh fuel assemblies in a batch before they are inserted into the reactor core.

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NRC Licensed Site Capacity: Number of assemblies for which the site is currently licensed to store.

Non-fuel Components: Components, which are not associated with a particular fuel. These include, but are not limited to, control spiders, burnable poison rod assemblies, control rod elements, thimble plugs, fission chambers, primary and secondary neutron sources, and BWR channels.

One-Time Fee: As defined in Article VIII of 10 CFR 961 (Schedule A.2.), the fee assessed a nuclear site operator for spent nuclear fuel (SNF) or solidified high-level radioactive waste derived from SNF, which was used to generate electricity in a civilian nuclear power reactor prior to April 7, 1983; and which is assessed by applying industry-wide average dollar per kilogram charges to four distinct ranges of fuel burnup so that equivalent to an industry-wide average charge of 1.0 mill per kilowatt-hour.

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

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

Reconstituted Fuel: Spent nuclear fuel, which has had a defective rod, removed and replaced with another rod. The recipient fuel assembly is intended to be reinserted into a subsequent fuel cycle. The replacement rod may be a blank, made of natural uranium, or a rod removed from a donor assembly.

Reinsertion: Reinsertion is the process of putting nuclear fuel that has been irradiated and then removed from a reactor, back into a reactor for further irradiation. Reinserted assemblies are assemblies that have been irradiated in a cycle, were not in the core in the prior cycle (cycle N), and which are in the core in the current cycle (cycle N+1).

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

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

Spent Fuel Disassembly 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, under which the DOE will make available nuclear waste disposal services to those owners and generators.

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 which you have definite plans to irradiate in a subsequent fuel cycle.

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APPENDIX F – FORM RW-859 DATA COLLECTION SYSTEM INSTRUCTIONS

The Form RW-859 Data Collection Software System will be modified prior to the next data collection to reflect changes made to the survey form. These instructions will be modified at that time.

Getting Started

Version 2.2.1 of the Form RW-859 Data Collection System is for use with Microsoft Access 97. Version 2.2.2 is for use with Microsoft Access 2000 or 2002/XP. If you require a different version of the system, contact EIA.

Insert the Form RW-859 CD into your CD Drive. Using the Windows Explorer or the My Computer icon, open the CD. Follow the instructions on the computer screen to install the software on your desktop. An 859 icon will appear on your desktop. Click on this icon to start the system.

When you reach the startup screen, you will notice that there are 3 buttons: NEXT, REPORT and EXIT. Use the NEXT button to bring up the system and enter data. Use the REPORT screen to print data. Use the EXIT key for closing your session.

Entering Data

Select a reactor from the drop-down menu. Click on the NEXT button. Once you have clicked on the NEXT button, you will see Schedule 1. Use the tabs at the top of the screen to move from Schedule to Schedule.

Observe that there are 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 Schedule or subSchedule. The outside bar is for scrolling from top to bottom of a Schedule.

Field shaded yellow represent primary keys within the system. You should enter data in all fields shaded yellow.

At any time if you enter data incorrectly, you may hit the ESC key and your last entry will automatically be undone. If you receive an error message you may also hit the ESC key to undo your last entry as well. If you get a “Run Time” error you must EXIT the system then reenter before entering additional data.

Any time you wish to leave the current screen and return to the startup screen, click the EXIT button.

Printing Data

Click on the EXIT button from any Schedule to return to the main screen. Select a reactor from the drop-down menu.

Once you have clicked the REPORT button, click the drop-down menu to select which Schedule you wish to print and then click the PRINT button. At any time you wish to return to the startup screen, click the CLOSE button.

Various Functions

Once within the Form RW-859 Data Collection System, there are a variety of ways you may manipulate your data:

> Delete Record. There are a number of options for deleting a record. You may highlight a row (a black arrow will appear to the left of the row). Pressing DELETE while this arrow is highlighted will delete the record. You may tab across a row, deleting each entry in that row. This option will leave a blank row. At the top of your computer screen, there is an EDIT button. Click on it and a drop-down menu will provide an option to DELETE RECORD. In certain Schedules, a DELETE button has been added. For example the DELETE CANISTER button in Schedule 4.6 will delete that canister and its

contents.

Insert Record. You may insert a record in a number of ways. Click on the Microsoft Access arrow on the Record line at the bottom of the screen. This will allow you to enter a new record. Click the INSERT button at the top of the screen and a drop-down menu provides an option to INSERT NEW RECORD. In some Schedules an ADD button has been added. For example the ADD CANISTER button in Schedule 4.6 will allow you to enter an additional canister. Note that when you insert a new record into a data table, that entry will automatically be inserted at the bottom of the table.

Sorting. Microsoft Access does not provide for an easy way to sort data. Based on comments provided by users on earlier versions of the Form RW-859 survey, the sort sequence for individual tables has been determined. Schedule 3, which contains detailed assembly-level data, is sorted by assembly identifier. In all other Schedules, the data appears in the order entered.

Instructions corresponding to individual Schedules of the survey form have been added to the system. Click on the INSTRUCTIONS button within each Schedule to display these instructions. To close the INSTRUCTIONS screen click on OK or hit the SPACE bar. To access the footnotes to Schedule 3, click on the FOOTNOTES button.

Comments pertaining to data in individual Schedules of the survey form should be entered in Schedule 7. You may access the Comments Schedule either by clicking on the Comments tab at the top of the screen or by clicking on the COMMENTS button from each Schedule of the form. The RETURN button will return you to the Schedule of the form you were working on when you exited to enter a comment.

Miscellaneous

Instructions pertaining to each Schedule of the survey form:

Schedule A – Site Operator Data

To be developed after the Form RW-859 Data Collection Software System is modified.

Schedule B - Reactor Data

To be developed after the Form RW-859 Data Collection Software System is modified.

Schedule C - Discharged Fuel Data

To be developed after the Form RW-859 Data Collection Software System is modified.

Schedule D - Storage Facility Data

To be developed after the Form RW-859 Data Collection Software System is modified.

Schedule E - Non-Fuel Data

To be developed after the Form RW-859 Data Collection Software System is modified.

Schedule F - Comments

To be developed after the Form RW-859 Data Collection Software System is modified.