# Purpose:

This form is to classify a device as either a Radiation Generating Device (RGD), an Equivalent Accelerator, or a Non-Equivalent Accelerator. This form also documents the controls checked for each Device as outlined in ESH-RPO-RGD-01, Radiation Generating Devices. Upon completion of this form, a new Device is ready for operation. Attach any additional documentation to this form for review as noted in the steps or as needed to answer questions.

## Section 1 – to be Completed by Directorate/Division Management with RGD Custodian

### Device Information

|  |  |  |
| --- | --- | --- |
| **Make/Model/ S/N of Device\*** | **Brief Description of Device** | **Location of Device** |
|  |  |  |

\*Not all Devices may have this information, enter this if available.

A Radiation Generating Device Custodian is an individual who is trained and designated to maintain cognizance over accountability control of the Device assigned to them. By appointing the following individual as the RGD Custodian for the Device above, the Directorate/Division Manager verifies they are a trained, knowledgeable, and qualified to perform the RGD Custodian duties.

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Appointed RGD Custodian Name Fermi ID #

As the appointed RGD Custodian for this Device, I take full custody and responsibility for the safety, operation, and maintenance activities of this Device.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Appointed RGD Custodian Signature Title Date

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Directorate / Division Manager Name Title

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Directorate /Division Manager Signature Fermi ID # Date

## Section 2 – to be Completed by RGD Custodian with Assigned RSO Assistance

Yes  No The Device is a Deuterium-Based Neutron Generator. If “No”, skip to Site-Specific Documents.

If “Yes”, complete RP Form 113 and attach to / submit with this document.

### Site-Specific Documents

List the written Standard Operating Procedures (i.e. document number and title, Traveler name and title) and Emergency Procedures for the Device and the location of the procedures (DocDB, shared drive, printed only, etc.):

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

### Device Operational Conditions

List the maximum pulse repetition rate of the Device:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

List the normal running pulse repetition rate for the Device:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

List the maximum value of applied voltage and/or current:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

List the normal running applied voltage and/or current for the Device:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Describe the mechanical or electrical devices that restrict beam orientation or magnitude of radiation generated, and the degree of beam restriction or magnitude of radiation generated, with and without those devices:  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Is the Device fully enclosed with no ports, open windows, etc. that radiation may easily escape from? This could include internal beam stops, vendor supplied window covers, etc. Please describe:  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If the Device contains a radioactive source, list the source and activities here. Otherwise, list N/A:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ For sealed sources, identify the maximum exposed position of the source: Otherwise, list N/A:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If the Device contains a radioactive source, describe the physical characteristics of the source (i.e. solid, liquid, gas, sealed source, bonded with other materials, etc.). Otherwise, list N/A.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

### Training

The RGD Custodian and Operators must have the following courses on their ITNA:

* Radiological Worker – Classroom (Virtual) [FN000470/CR/01]
* Radiological Worker – Practical Factors [FN000471/OJ/01]
* Radiological Worker – Just in Time [FN000731/CB/01]

The RGD Custodian must develop a specific on-the-job training course in the official Fermilab Training Program for each Device. The training must be developed based on the vendor supplied manual or site developed Standard Operating Procedures for the Device. The assigned RSO must review and approve the course prior to entering it into the official Training Program and must review any revisions to the training. The RGD Custodian must ensure all operators are appropriately trained and qualified. Enter the course number and name for the new training: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

### Engineered Safety Controls:

List any engineered safety controls included in this device setup (i.e., shielding, filtered ventilation systems, remote controls, containment devices, temporary shielding, temporary confinement, and temporary ventilation systems). These may also be mentioned in the Shielding Assessment or Dose Assessment Calculation document.

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### Shielding

Attach Shielding Assessment or Dose Assessment Calculations.

Note where the official Shielding Assessment or Dose Assessment Calculations are located (i.e., specific DocDB and number, SharePoint site, etc.) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Yes  No Based on the Assessment, will the Device create an exposure rate of 5 mR/hr at 1 foot from any surface of the device? This is for an unmitigated (no additional shielding) Device. This is also for Normal Operations and Worst Case / Accident Conditions.

### Access Control and Safety Devices

Describe any access control and safety devices included in the Device. This includes locked entryways, locked or secured device panels, interlocked light beams, etc. See ESH-RPO-RGD-01 Section 8.8 for further guidance on access control and safety device considerations. These may also be listed in the official Shielding Assessment or Dose Assessment Calculations document.

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### Interlocks

Interlocks installed meet the requirements of FRCM Chapter 10.

Doors and/or access panels have installed fail-safe safety interlocks to prevent irradiation of an individual.

Yes  N/A When a radiation monitor is incorporated, the failure of the radiation monitor shall prevent normal access into the area or operation of the Device.

### Device Controls

One or more physical control devices are used to secure the Device to prevent unauthorized access and use. Describe these below:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Systems must be in place to ensure that the Device can only be operated by Authorized Personnel. Describe how you ensure only Authorized Personnel operate the Device:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Control devices used to limit Device time, position (irradiation geometry), current, voltage, beam intensity, or control panel lights or system indicators should be designed fail-safe. Describe these below:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

### Run-Safe and Emergency Shutdown Devices

Production of radiation cannot be resumed by reestablishing the interlock circuit at the location where the interlock was tripped. For example, if a radiation monitor trips off the device, resetting the radiation monitor will not automatically start the system without further operator interaction.

The safety circuit cannot be re-energized or reestablished automatically. If the safety system trips off there must be some operator interaction to restart the Device.

Interlocked warning lights are present and are either red or magenta in color.

TSW / ORC Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

RGD Custodian Signature FNAL ID Date

## Section 3 – Radiation Safety Officer and RGD Custodian to Complete

### DOE Order 420.2D Applicability and Equivalency Determination

1. Yes  No Is the Device capable of creating an exposure rate of 5 mR/hr at 1 foot from the unshielded and unmitigated Device?

If “Yes,” continue to Question 2. If “No,” this Device is a Radiation Generating Device.

1. Yes  No Is the Device’s Operating Accelerating Potential at or under 10 MeV or a Deuterium based Neutron Generator with an accelerating potential below 600 keV?

If “Yes,” continue to Question 3. If “No,” the Device falls under the requirements of DOE Order 420.2D. Consult with the Accelerator Safety Department for further guidance.

1. Determine the specific equivalency to use below:

Device is X-Ray Diffraction and/or Fluorescence Analysis Equipment – DOE O 420.2D CRD 1.c.(1)

Device is a Non-Medical X-Ray or Sealed Gamma-Ray Source with energies up to 10 MeV – DOE O 420.2D CRD 1.c.(2)

Device is Radiographic or Radioscopic Non-Medical X-Ray Equipment below 1 MeV – DOE O 420.2D CRD 1.c.(3)

Device is a Neutron Generator operated below 600 keV – DOE O 420.2D CRD 1.c.(4)

Device is operated at or below 10 MeV – DOE O 420.2D CRD 1.c.(5)

Based on the above information, we believe the Device is classified as:

Radiation Generating Device

Exempt / Equivalent Accelerator treated as RGD under 10 CFR 835

Non-Exempt / Non-Equivalent Accelerator treated under DOE O 420.2D

By signing below, I agree that the above classification of the Device is correct, and the appropriate controls are in place for the Device.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

RGD Custodian Signature FNAL ID Date

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Assigned RSO Signature FNAL ID Date

## Section 4 – Radiation Safety Officer to Complete

### Authorizations and Preparations

Senior Radiation Safety Officer and Directorate/Division Management of the Device has agreed with the Determination above (attach memo).

If determined to be a Non-Exempt Accelerator, Fermilab Site Office has agreed with Equivalency Determination above (attach memo).

Note any conditions of approval from the Fermilab Site Office below:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Authorization Document (RWP) generated for the Device based on conditions above and concurrence with the RGD Custodian? (List initial RWP number for future reference and attach).

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Walkdown of the Device with RGD Custodian complete.

If the Device contains a sealed radioactive source, verify an initial leak test for radioactive contamination and encapsulation integrity was performed and attach the results.

OJT and start-up survey plan for this specific Device has been developed. This includes generation of a Survey Map of the Device.

**NOTE: At this point the Device may start up with Radiation Safety present to perform the initial radiation survey.**

Initial start-up survey following documented survey plan is complete and attached.

### Area Postings

Radiological postings have been established using ESH-RPO-POST-01 requirements.

Additional postings such as “**CAUTION: RADIATION BEING PRODUCED OR RADIATION AREA EXISTS WHEN RED LIGHT IS ON**” have been added as appropriate.

Assigned RSO has completed walk-down of the Device to verify postings.

### Additional Required Documentation

The Device has been added to RP Form 108

The Device has been added to appropriate routine survey package (generally performed quarterly).

Appropriate Area Monitors have been installed and added to the Area Monitor list.

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Assigned RSO Signature FNAL ID Date

All information added to ESH DocDB Number for this record. Record Number:\_\_\_\_\_\_\_\_\_\_\_\_