

DOE O 420.2D, *Safety of Accelerators*, Fermilab Implementation Plan

Introduction

The updated DOE O 420.2D *Safety of Accelerators* (ASO) provides additional clarification for managing accelerators that are both managed under DOE O 420.2D as well as exempt and/or equivalent devices.

The overall approach to accelerator safety management remains largely unchanged. Fermilab does not perform radioisotope production, so all current accelerator machines will continue to be managed under the ASO. All required program elements listed in Section 2 of the updated Contractor Requirement Document (CRD) remain unchanged and are already established for Fermilab.

The revised Order updated Section 3 Applicability, and expanded discussion surrounding exemptions/equivalencies for DOE O 420.2D. Section 3.c.(3) lists equivalencies that may be used in lieu of the requirements of Section 4.b.(1) and 4.b.(2) of the Order. Each listed equivalency states “operated in accordance with” a specified standard. Although Section 6 states that this Order does not invoke any standards as required methods, use of language such as “in accordance with” in Section 3.c.(3) is a clear requirement statement, indicating that the referenced standard is now invoked (per DOE O 521.1D *Departmental Directives Program*, “invoked technical standard” definition). Therefore, exemptions and equivalencies not specifically listed in the Order must be processed in accordance with DOE O 251.1D Appendix E, *Equivalency and Exemption Process*.

The revised Order also now requires DOE Field Element Manager approval of the Unreviewed Safety Issue (USI) Process.

Although not explicitly required by the revised Order, the FY23 PEMP Goal 4 Notable asks the Lab to update, and externally validate, an updated Accelerator Safety Envelope (ASE) and Safety Assessment Document (SAD) to reflect the requirements in the DOE O 420.2D, the current configuration, and a consistent authorized operating limit. There have also been several letters sent to the Lab stating FSO concerns. Incorporating the plan to achieve this PEMP notable, and alleviate FSO concerns stated in the letters, with the DOE O 420.2D Implementation Plan will allow both processes to be in alignment with one another, and allow for the most efficient method for accomplishing both goals.

Implementation Plan

Discussion

The overall approach for implementing new and/or updated requirements as well as achieving the FY23 PEMP Goal 4 Notable will be systematically go through the seven (7) major Focus Areas, listed below, and ensure processes are updated and implemented appropriately to ensure robust compliance with DOE O 420.2D and achieve the FY23 PEMP Goal 4 Notable.

1. Radiation Generating Devices (RGDs)
2. Unreviewed Safety Issue (USI) Process

3. Safety Assessment Document (SAD)
4. Accelerator Safety Envelope (ASE)
5. Accelerator Readiness Review (ARR) Program
6. Training, Fermilab Environmental, Safety & Health Manual (FESHM) and Fermilab Radiological Control Manual (FRCM) Updates
7. Contractor Assurance System (CAS) & Reviews

While updating and improving the seven (7) major Focus Areas, until they are fully updated and implemented, the Lab will continue operating the accelerator and RGDs, conducting USI reviews and conducting ARR under the requirements of DOE O 420.2C and current Lab policies & practices.

A Working Group will be established for each of the seven (7) major Focus Areas including key stakeholders from the Lab. Each Working Group will be given a specific charge that will ensure their Focus Area subject will be adequately reviewed and updated to ensure robust compliance with DOE O 420.2D, address FSO concerns letters, and achieve the FY23 PEMP Goal 4 Notable.

Timeline

The following timeline describes the key milestones associated with implanting the revised DOE O 420.2D, taking FY23 PEMP Goal 4 Notable and FSO to FRA concerns letters into consideration. Each milestone is assigned a Responsible Party, which may further be assigned to a specific Working Group. Expected Completed Dates ensure the RGD Program and USI Process are compliant with DOE O 420.2D within seven (7) months of the issuance of the Order (4/9/2023) and full compliance with DOE O 420.2D and achieving the FY23 PEMP Goal 4 Notable by the end of FY23 (September 30, 2023), and have been agreed upon by FRA and FSO.

Table 1. Implementation Plan for DOE O 420.2D Including FY23 PEMP Goal 4 Notable

Milestone	Responsible Party	Expected Date	Status	Comments
Revised DOE O 420.2D issued	DOE	9/9/2022	Complete	Revised Order received final approval September 9, 2022.
Inclusion in FRA Contract		10/29/2022	Complete	Memo <i>CONTRACT NO. DE-AC02-07CH11359; Section J.9 Appendix I – DOE Orders and Notices</i> received by FRA from FSO October 5, 2022 requesting concurrence by October 26, 2022.

Milestone	Responsible Party	Expected Date	Status	Comments
				At that time, it will become an addendum to Appendix I of the contract.
Submit Implementation Plan to FSO Contracting Officer	FRA – RPO Dept Head	11/4/2022		
Run RGDs through updated ESH-RPO-RGD-01 procedure, ensuring compliance with applicable invoked standards	FRA – Working Group 1	2/28/2023		
Obtain DOE Field Element Approval for each RGD Equivalency/Exemption	FRA – SRSO	3/31/2023		
Issue RGD Authorization Document	FRA – Assigned RSO	4/9/2023		
Update RP Form 108 <i>List of Radiation Generating Devices</i>	FRA – RPO Dept.	4/9/2023		
Obtain DOE Field Element Approval of USI Process	FRA – RPO Dept Head	3/31/2023		
Update SAD Chapter Outline	FRA – Working Group 3	2/28/2022		
Review/Update all SAD Chapters	FRA – Machine Owner/RSO/DSO	6/30/2023		
Obtain Director Approval of updated SAD Chapters, notify FSO	FRA – SAD Review Subcommittee Chair	8/31/2023		
Establish RP Form to list Accelerator(s) Managed under DOE O 420.2D	FRA – Working Group 3	8/31/2023		
Review/Update ASE Limit Calculations	FRA – Working Group 5	4/30/2023		
Obtain Director and DOE Field Element Manager Approval of ASE	FRA – SAD Review Subcommittee Chair	8/31/2023		
Create standard ARR Process	FRA – Working Group 5	8/31/2023		

Milestone	Responsible Party	Expected Date	Status	Comments
Conduct external ARR to validate updated SAD and ASE	FRA	9/15/2023		
Update FRCM Article 362	FRA – Working Group 6	9/31/2023		
Update FESHM 2010	FRA – Working Group 6	9/31/2023		
Conduct external review of updated program elements to confirm robust compliance	FRA – Working Group 7	12/31/2023		
Complete update of accelerator safety documentation	FRA	9/30/2023		Full compliance after this task complete.
Conduct external review of implementation to verify compliance and ensure robust compliance	FRA	12/15/2023		