



SHIPPING & RECEIVING FACILITIES

SECTION II CHAPTER 06 OF THE FERMILAB SAD

Revision 1 August 3, 2023

This Chapter of the Fermilab Safety Assessment Document (SAD) contains a summary of the results of the Safety Analysis for the Shipping & Receiving Facilities of the Infrastructure Services Division (ISD) that are pertinent to understanding the risks to the workers, the public, and the environment due to its operation.

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SAD Chapter Review

This Section II, Chapter 06 of the Fermi National Accelerator Laboratory (Fermilab) Safety Assessment Document (SAD), *Shipping and Receiving Facilities*, was prepared and reviewed by the staff of the Infrastructure Services Division (ISD) in conjunction with the Environment, Safety & Health Division (ESH) Accelerator Safety Department.

Signatures below indicate review of this Chapter, and recommendation that it be approved and incorporated into the Fermilab SAD.



Line Organization Owner



Accelerator Safety Department Head



SAD Review Subcommittee Chair

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Revision History

Printed versions of this Chapter of the Fermilab Safety Assessment Document (SAD) may not be the currently approved revision. The current revision of this Chapter can be found on ESH DocDB #1066 along with all other current revisions of all Chapters of the Fermilab SAD.

Author	Rev. No.	Date	Description of Change
Dennis McAuliff	1	August 3, 2023	<ul style="list-style-type: none"> • Updated to align with new SAD format • Included Risk Matrix & hazard discussion
Sue McGimpsey	0	June 9, 2015	Initial release of the Shipping and Receiving Operations chapter of the Fermilab Safety Assessment Document

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Acronyms and Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
ACNET	Accelerator Control Network System
AD	Accelerator Directorate
AHJ	Authority Having Jurisdiction
ALARA	As Low As Reasonably Achievable
ANSI	American National Standards Institute
APS-TD	Applied Physics and Superconducting Technology Directorate
ARA	Airborne Radioactivity Area
ASE	Accelerator Safety Envelope
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASO	Accelerator Safety Order, referring to DOE O 420.2D <i>Safety of Accelerators</i>
⁷ Be	Beryllium-7
BLM	Beam Loss Monitor
BNB	Booster Neutrino Beam
BPM	Beam Position Monitor
BY	Boneyard
CA	Controlled Area
CA	Contamination Area
CAS	Contractor Assurance System
CC	Credited Control
CCL	Coupled Cavity Linac
CDC	Critical Device Controller
CERN	European Organization for Nuclear Research
CFM	Cubic Feet per Minute
CFR	Code of Federal Regulations (United States)
Ci	Curie
CLW	Co-Located Worker (the worker in the vicinity of the work but not actively participating)
cm	centimeter
CPB	Cryogenics Plant Building
CSO	Chief Safety Officer
CUB	Central Utility Building
CW	Continuous Wave
CX	Categorically Excluded
D&D	Decontamination and Decommissioning
DA	Diagnostic Absorber
DAE	Department of Atomic Energy India

DCS	Derived Concentration Standard
DocDB	Document Database
DOE	Department of Energy
DOT	Department of Transportation
DR	Delivery Ring
DSO	Division Safety Officer
DSS	Division Safety Specialist
DTL	Drift Tube Linac
DUNE	Deep Underground Neutrino Experiment
EA	Environmental Assessment
EA	Exclusion Area
EAV	Exhaust Air Vent
EENF	Environmental Evaluation Notification Form
EMS	Environmental Management System
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
ES&H	Environment, Safety and Health
Fermilab	Fermi National Accelerator Laboratory, see also FNAL
FESHCom	Fermilab ES&H Committee
FESHM	Fermilab Environment, Safety and Health Manual
FHS	Fire Hazard Subcommittee
FIRUS	Fire Incident Reporting Utility System
FNAL	Fermi National Accelerator Laboratory, see also Fermilab
FODO	Focus-Defocus
FONSI	Finding of No Significant Impact
FQAM	Fermilab Quality Assurance Manual
FRA	Fermi Research Alliance
FRCM	Fermilab Radiological Control Manual
FSO	Fermilab Site Office
FW	Facility Worker (the worker actively performing the work)
GERT	General Employee Radiation Training
GeV	Giga-electron Volt
³ H	Tritium
HA	Hazard Analysis
HAR	Hazard Analysis Report
HCA	High Contamination Area
HCTT	Hazard Control Technology Team
HEP	High Energy Physics
HFD	Hold for Decay

HLCF	High Level Calibration Facility
HPR	Highly Protected Risk
Hr	Hour
HRA	High Radiation Area
HSSD	High Sensitivity Air Sampling Detection
HVAC	Heating, Ventilation, and Air Conditioning
HWSF	Hazardous Waste Storage Facility
Hz	Hertz
IB	Industrial Building
IBC	International Building Code
ICW	Industrial Cooling Water
IEPA	Illinois Environmental Protection Agency
IEEE	Institute of Electrical and Electronics Engineers
INFN	Istituto Nazionale di Fisica Nucleare
IMPACT	Integrated Management Planning and Control Tool
IPCB	Illinois Pollution Control Board
IQA	Integrated Quality Assurance
ISD	Infrastructure Services Division
ISM	Integrated Safety Management
ITNA	Individual Training Needs Assessment
KeV	kilo-electron volt
kg	kilo-grams
kW	kilo-watt
LBNF	Long Baseline Neutrino Facility
LCW	Low Conductivity Water
LHC	Large Hadron Collider
LLCF	Low Level Calibration Facility
LLWCP	Low Level Waste Certification Program
LLWHF	Low Level Waste Handling Facility
LOTO	Lockout/Tagout
LPM	Laser Profile Monitor
LSND	Liquid Scintillator Neutrino Detector
LSO	Laser Safety Officer
m	meter
mA	milli-amp
MABAS	Mutual Aid Box Alarm System
MARS	Monte Carlo Shielding Computer Code
MC	Meson Center
MC&A	Materials Control and Accountability

MCI	Maximum Credible Incident
MCR	Main Control Room
MEBT	Medium Energy Beam Transport
MEI	Maximally Exposed Individual
MeV	Mega-electron volt
MI	Main Injector
MINOS	Main Injector Neutrino Oscillation Search
MMR	Material Move Request
MOI	Maximally-Exposed Offsite Individual <i>(Note: due to the Fermilab Batavia Site being open to the public, the location of the MOI is taken to be the location closest to the accelerator that is accessible to members of the public.)</i>
MP	Meson Polarized
mrad	milli-radian
mrem	milli-rem
mrem/hr	milli-rem per hour
MT	Meson Test
MTA	400 MeV Test Area
MTF	Magnet Test Facility
NASH	Non-Accelerator Specific Hazard
²² Na	Sodium-22
NC	Neutrino Center
NE	Neutrino East
NEC	National Electrical Code
NEPA	National Environmental Policy Act
NESHAPS	National Emissions Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NM	Neutrino Muon
NMR	Nuclear Material Representative
NOvA	Neutrino Off-axis Electron Neutrino (ν_e) Appearance
NPH	Natural Phenomena Hazard
NRTL	Nationally Recognized Testing Laboratory
NIF	Neutron Irradiation Facility
NTSB	Neutrino Target Service Building, see also TSB
NuMI	Neutrinos at the Main Injector
NW	Neutrino West
ODH	Oxygen Deficiency Hazard
ORC	Operational Readiness Clearance
OSHA	Occupational Safety and Health Administration
pCi	pico-Curie

pCi/mL	pico-Curie per milliliter
PE	Professional Engineer
PIN	Personal Identification Number
PIP	Proton Improvement Plan
PIP-II	Proton Improvement Plan - II
PHAR	Preliminary Hazards Analysis Report
PPD	Particle Physics Directorate
PPE	Personnel Protective Equipment
QA	Quality Assurance
QAM	Quality Assurance Manual
RA	Radiation Area
RAF	Radionuclide Analysis Facility
RAW	Radioactive Water
RCT	Radiological Control Technician
RF	Radio-Frequency
RFQ	Radio-Frequency Quadrupole
RIL	RFQ Injector Line
RMA	Radioactive Material Area
RMS	Root Mean Square
RPCF	Radiation Physics Calibration Facility
RPE	Radiation Physics Engineering Department
RPO	Radiation Physics Operations Department
RRM	Repetition Rate Monitor
RSI	Reviewed Safety Issue
RSIS	Radiation Safety Interlock System
RSO	Radiation Safety Officer
RWP	Radiological Work Permit
SA	Shielding Assessment
SAA	Satellite Accumulation Areas
SAD	Safety Assessment Document
SCF	Standard Cubic Feet
SCFH	Standard Cubic Feet per Hour
SEWS	Site-Wide Emergency Warning System
SNS	Spallation Neutron Source
SR	Survey Riser
SRF	Superconducting Radio-Frequency
SRSO	Senior Radiation Safety Officer
SSB	Switchyard Service Building
SSP	Site Security Plan

SWIC	Segmented Wire Ionization Chambers
TLM	Total Loss Monitor
TLVs	Threshold Limit Values
TPC	Time Projection Chamber
TPES	Target Pile Evaporator Stack
TPL	Tagged Photon Lab
TSB	Target Service Building, see also NTSB
TSCA	Toxic Substances Control Act
TSW	Technical Scope of Work
T&I	Test and Instrumentation
UPB	Utility Plant Building
UPS	Uninterruptible Power Supply
USI	Unreviewed Safety Issue
VCTF	Vertical Cavity Test Facility
VHRA	Very High Radiation Area
VMS	Village Machine Shop
VMTF	Vertical Magnet Test Facility
VTS	Vertical Test Stand
WSHP	Worker Safety and Health Program
μs	micro-second

II-6. Shipping and Receiving Facilities

II-6.1. Introduction

This Section II, Chapter 06 of the Fermi National Accelerator Laboratory (Fermilab) Safety Assessment Document (SAD) covers the Shipping & Receiving Facilities segment of the Infrastructure Services Division (ISD).

II-6.1.1 [Purpose/Function](#)

The Shipping and Receiving Facilities provides basic support functions to the entire Laboratory and user community

II-6.1.2 [Current Status](#)

The Shipping and Receiving segment of the Infrastructure Services Division (ISD) is currently: Operational.

II-6.1.3 [Description](#)

The Shipping and Receiving Facilities is responsible for identification, labeling, tracking, inventory, and control of all property items at the Laboratory. This includes processing of new items, disposition of used equipment, establishment of loan agreements, and scrap operations.

II-6.1.4 [Location](#)

The Shipping and Receiving segment of the Infrastructure Services Division (ISD) is located on the Fermilab site in Batavia, IL.

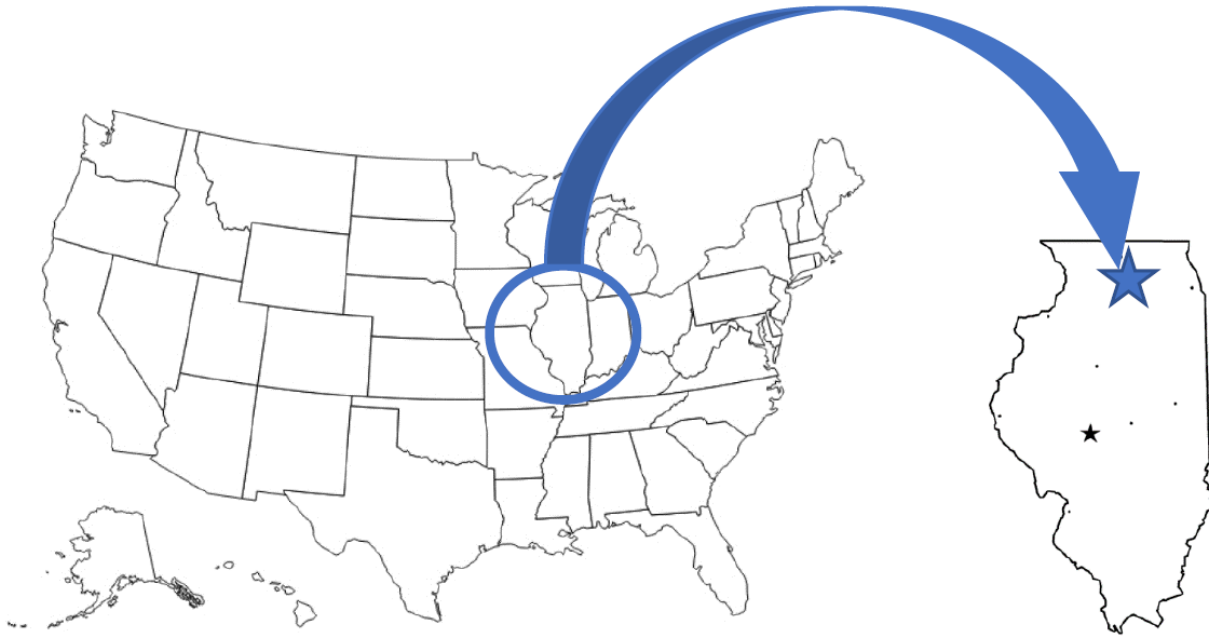


Figure 1. Regional view showing the location of the Fermilab site in Batavia, IL.

The Shipping and Receiving Facilities are located on the West side of the Fermilab site.

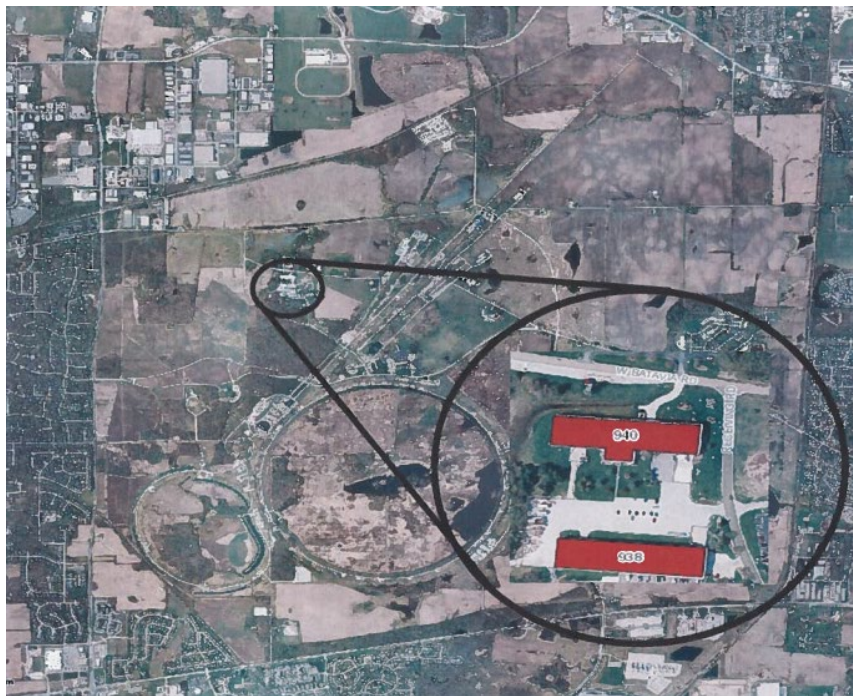


Figure 2. Aerial view of the Fermilab site, indicating the location of the Shipping & Receiving Facilities.

II-6.1.5 Management Organization

The Shipping and Receiving Facilities is under the management of Infrastructure Services Division (ISD).

II-6.1.6 Operating Modes

This functional area does not include any accelerator operations.

II-6.1.7 Inventory of Hazards

The following table lists all of the identified hazards found in the Shipping and Receiving Facilities. Section I-1.10 *Appendix – Risk Matrices* describes the baseline risk (i.e., unmitigated risk), any preventative controls and/or mitigative controls in place to reduce the risk, and residual risk (i.e., mitigated risk) for facility worker, co-located worker and Maximally Exposed Offsite Individual (MOI) (i.e., members of the public). A summary of these controls is described within Section I-1.2 *Safety Assessment*.

Prompt ionizing and Oxygen Deficiency Hazards due to cryogenic systems within accelerator enclosures have been identified as accelerator specific hazards, and as such their controls are identified as Credited Controls. The analysis of these hazards and their Credited Controls will be discussed within this SAD Chapter, and their Credited Controls summarized in the Accelerator Safety Envelope. The Shipping and Receiving Facilities do not have any hazards associated with accelerator operations that require Credited Controls.

All other hazards present in the Shipping and Receiving Facilities are safely managed by other DOE approved applicable safety and health programs and/or processes, and their analyses have been performed according to applicable DOE requirements as flowed down through the Fermilab Environment, Safety and Health Manual (FESHM). These hazards are considered to be Non-Accelerator Specific Hazards (NASH), and their analysis will be summarized in this SAD Chapter.

Table 1. Hazard Inventory for the Shipping and Receiving Facilities.

Radiological		Toxic Materials	
<input type="checkbox"/>	Prompt Ionizing Radiation	<input type="checkbox"/>	Lead Shielding
<input type="checkbox"/>	Residual Activation	<input type="checkbox"/>	Beryllium
<input type="checkbox"/>	Groundwater Activation	<input type="checkbox"/>	Fluorinert & Its Byproducts
<input type="checkbox"/>	Surface Water Activation	<input type="checkbox"/>	Liquid Scintillator Oil
<input type="checkbox"/>	Radioactive Water (RAW) Systems	<input type="checkbox"/>	Pseudocumene
<input type="checkbox"/>	Air Activation	<input type="checkbox"/>	Ammonia
<input type="checkbox"/>	Closed Loop Air Cooling	<input type="checkbox"/>	Nanoparticle Exposures
<input type="checkbox"/>	Soil Interactions	Flammables and Combustibles	
<input type="checkbox"/>	Radioactive Waste	<input checked="" type="checkbox"/>	Combustible Materials (e.g., cables, wood cribbing, etc.)
<input type="checkbox"/>	Contamination	<input checked="" type="checkbox"/>	Flammable Materials (e.g., flammable gas, cleaning materials, etc.)
<input type="checkbox"/>	Beryllium-7	Electrical Energy	
<input checked="" type="checkbox"/>	Radioactive Sources	<input type="checkbox"/>	Stored Energy Exposure
<input type="checkbox"/>	Nuclear Material	<input checked="" type="checkbox"/>	High Voltage Exposure
<input type="checkbox"/>	Radiation Generating Devices (RGDs)	<input type="checkbox"/>	Low Voltage, High Current Exposure
<input type="checkbox"/>	Non-Ionizing Radiation Hazards	Kinetic Energy	
Thermal Energy		<input checked="" type="checkbox"/>	Power Tools
<input type="checkbox"/>	Magnet Bakeouts	<input type="checkbox"/>	Pumps and Motors
<input type="checkbox"/>	Hot Work	<input type="checkbox"/>	Motion Tables
<input type="checkbox"/>	Cryogenic Liquids	<input type="checkbox"/>	Mobile Shielding
Potential Energy		Magnetic Fields	
<input type="checkbox"/>	Crane Operations	<input type="checkbox"/>	Fringe Fields
<input checked="" type="checkbox"/>	Compressed Gasses	Other Hazards	
<input type="checkbox"/>	Vacuum/Pressure Vessels	<input type="checkbox"/>	Confined Spaces
<input type="checkbox"/>	Vacuum Pumps	<input type="checkbox"/>	Noise
<input checked="" type="checkbox"/>	Material Handling	<input type="checkbox"/>	Silica
Access & Egress		<input checked="" type="checkbox"/>	Ergonomics
<input type="checkbox"/>	Life Safety Egress	<input type="checkbox"/>	Asbestos

II-6.2. Safety Assessment

All hazards for the Shipping and Receiving Facilities segment of the Infrastructure Services Division (ISD) are summarized in this section, with additional details of the analyses for accelerator specific hazards.

II-6.2.1 Radiological Hazards

The Shipping and Receiving Facilities presents radiological hazards in the form of Radioactive Sources. A detailed assessment addresses these hazards and provide a detailed analysis of the facility demonstrating the required controls to comply with the Fermilab Radiological Control Manual (FRCM)[1]. The baseline risk for this hazard was a R III. After control measure were evaluated, the residual risk level is a R IV.

II-6.2.1.1 Prompt Ionizing Radiation

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.1.2 Residual Activation

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.1.3 Groundwater Activation

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.1.4 Surface Water Activation

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.1.5 Radioactive Water (RAW) Systems

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.1.6 Air Activation

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.1.7 Closed Loop Air Cooling

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.1.8 Soil Interactions

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.1.9 Radioactive Waste

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.1.10 Contamination

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.1.11 Beryllium-7

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.1.12 Radioactive Sources

When Low Activity Sealed Radioactive Sources are received, the sources are controlled by qualified clerks and moved to a designated area immediately upon arrival. The Radioactive Source is logged into the secure area by trained Shipping and Receiving personnel and are held in the secure area until logged out and retrieved by ES&H Hazard Control personnel. The baseline risk for this hazard was a R III. After control measure were evaluated, the residual risk level is a R IV.

II-6.2.1.13 Nuclear Material

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.1.14 Radiation Generating Devices (RGDs)

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.1.15 Non-Ionizing Radiation Hazards

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.2 Toxic Materials

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.2.1 Lead

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.2.2 Beryllium

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.2.3 Fluorinert & Its Byproducts

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.2.4 Liquid Scintillator Oil

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.2.5 Pseudocumene

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.2.6 Ammonia

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.2.7 Nanoparticle Exposures

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.3 Flammables and Combustibles

This hazard has been evaluated within the common Risk Matrix Table included in SAD Section 1 Chapter 04 *Safety Analysis*. Work in the Shipping and Receiving Facilities involving this hazard implements the controls specified in the common Risk Matrix table. No unique controls are in use. The baseline risk for this hazard was a R I. After control measure were evaluated, the residual risk level is a R IV.

II-6.2.3.1 Combustible Materials

This hazard has been evaluated within the common Risk Matrix Table included in SAD Section 1 Chapter 04 *Safety Analysis*. Work in the Shipping and Receiving Facilities involving this hazard implements the controls specified in the common Risk Matrix table. No unique controls are in use. The baseline risk for this hazard was a R I. After control measure were evaluated, the residual risk level is a R IV.

II-6.2.3.2 Flammable Materials

This hazard has been evaluated within the common Risk Matrix Table included in SAD Section 1 Chapter 04 *Safety Analysis*. Work in the Shipping and Receiving Facilities involving this hazard implements the controls specified in the common Risk Matrix table. No unique controls are in use. The baseline risk for this hazard was a R I. After control measure were evaluated, the residual risk level is a R IV.

II-6.2.4 Electrical Energy

This hazard has been evaluated within the common Risk Matrix Table included in SAD Section 1 Chapter 04 *Safety Analysis*. Work in the Shipping and Receiving Facilities involving this hazard implements the controls specified in the common Risk Matrix table. No unique controls are in use. The baseline risk for this hazard was a R I. After control measure were evaluated, the residual risk level is a R IV.

II-6.2.4.1 Stored Energy Exposure

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.4.2 High Voltage Exposure

This hazard has been evaluated within the common Risk Matrix Table included in SAD Section 1 Chapter 04 *Safety Analysis*. Work in the Shipping and Receiving Facilities involving this hazard implements the controls specified in the common Risk Matrix table. No unique controls are in use. The baseline risk for this hazard was a R I. After control measure were evaluated, the residual risk level is a R IV.

II-6.2.4.3 Low Voltage, High Current Exposure

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.5 Thermal Energy

II-6.2.5.1 Bakeouts

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.5.2 Hot Work

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.5.3 Cryogenics

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.6 Kinetic Energy

This hazard has been evaluated within the common Risk Matrix Table included in SAD Section 1 Chapter 04 *Safety Analysis*. Work in the Shipping and Receiving Facilities involving this hazard implements the controls specified in the common Risk Matrix table. No unique controls are in use. The baseline risk for this hazard was a R I. After control measure were evaluated, the residual risk level is a R III, IV.

II-6.2.6.1 Power Tools

This hazard has been evaluated within the common Risk Matrix Table included in SAD Section 1 Chapter 04 *Safety Analysis*. Work in the Shipping and Receiving Facilities involving this hazard implements the controls specified in the common Risk Matrix table. No unique controls are in use. The baseline risk for this hazard was a R I. After control measure were evaluated, the residual risk level is a R III, IV.

II-6.2.6.2 Pumps and Motors

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.6.3 Motion Tables

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.6.4 Mobile Shielding

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.7 Potential Energy

This hazard has been evaluated within the common Risk Matrix Table included in SAD Section 1 Chapter 04 *Safety Analysis*. Work in the Shipping and Receiving Facilities involving this hazard implements the controls specified in the common Risk Matrix table. No unique controls are in use. The baseline risk for this hazard was a R I. After control measure were evaluated, the residual risk level is a R III, IV.

II-6.2.7.1 Crane Operations

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.7.2 Compressed Gasses

This hazard has been evaluated within the common Risk Matrix Table included in SAD Section 1 Chapter 04 *Safety Analysis*. Work in the Shipping and Receiving Facilities involving this hazard implements the controls specified in the common Risk Matrix table. No unique controls are in use. The baseline risk for this hazard was a R I. After control measure were evaluated, the residual risk level is a R III, IV.

II-6.2.7.3 Vacuum/Pressure Vessels/Piping

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.7.4 Vacuum Pumps

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.7.5 Material Handling

This hazard has been evaluated within the common Risk Matrix Table included in SAD Section 1 Chapter 04 *Safety Analysis*. Work in the Shipping and Receiving Facilities involving this hazard implements the

controls specified in the common Risk Matrix table. No unique controls are in use. The baseline risk for this hazard was a R I. After control measure were evaluated, the residual risk level is a R III, IV.

II-6.2.8 Magnetic Fields

II-6.2.8.1 Fringe Fields

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.9 Other Hazards

II-6.2.9.1 Confined Spaces

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.9.2 Noise

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.9.3 Silica

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.9.4 Ergonomics

This hazard has been evaluated within the common Risk Matrix Table included in SAD Section 1 Chapter 04 *Safety Analysis*. Work in the Shipping and Receiving Facilities involving this hazard implements the controls specified in the common Risk Matrix table. No unique controls are in use. The baseline risk for this hazard was a R I. After control measure were evaluated, the residual risk level is a R IV.

II-6.2.9.5 Asbestos

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.9.6 Working at Heights

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.10 Access & Egress

This hazard has been evaluated within the common Risk Matrix Table included in SAD Section 1 Chapter 04 *Safety Analysis*. Work in the Shipping and Receiving Facilities involving this hazard implements the controls specified in the common Risk Matrix table. No unique controls are in use. The baseline risk for this hazard was a R I. After control measure were evaluated, the residual risk level is a R IV.

II-6.2.10.1 Life Safety Egress

This hazard has been evaluated within the common Risk Matrix Table included in SAD Section 1 Chapter 04 *Safety Analysis*. Work in the Shipping and Receiving Facilities involving this hazard implements the

controls specified in the common Risk Matrix table. No unique controls are in use. The baseline risk for this hazard was a R I. After control measure were evaluated, the residual risk level is a R IV.

II-6.2.11 [Environmental](#)

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.11.1 [Hazard to Air](#)

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.11.2 [Hazard to Water](#)

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.2.11.3 [Hazard to Soil](#)

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.3. [Summary of Hazards to Members of the Public](#)

This SAD section is not applicable to Shipping and Receiving operations

II-6.4. [Summary of Credited Controls](#)

This SAD section is not applicable to Shipping and Receiving operations

II-6.4.1 [Passive Credited Controls](#)

This SAD section is not applicable to Shipping and Receiving operations

II-6.4.1.1 [Shielding](#)

This SAD section is not applicable to Shipping and Receiving operations

II-6.4.1.1.1 [Permanent Shielding Including Labyrinths](#)

This SAD section is not applicable to Shipping and Receiving operations

II-6.4.1.1.2 [Movable Shielding](#)

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.4.1.1.3 [Penetration Shielding](#)

This SAD section is not applicable to Shipping and Receiving operations

II-6.4.1.2 [Fencing](#)

This SAD section is not applicable to Shipping and Receiving operations

II-6.4.1.2.1 Radiation Area Fencing

This SAD section is not applicable to Shipping and Receiving operations

II-6.4.1.2.2 Controlled Area Fencing

This Hazard is Not Applicable to the Shipping and Receiving Facilities

II-6.4.2 Active Engineered Credited Controls

This SAD section is not applicable to Shipping and Receiving operations

II-6.4.2.1 Radiation Safety Interlock System

This SAD section is not applicable to Shipping and Receiving operations

II-6.4.2.2 ODH Safety System

This SAD section is not applicable to Shipping and Receiving operations

II-6.4.3 Administrative Credited Controls

II-6.4.3.1 Operation Authorization Document

This SAD section is not applicable to Shipping and Receiving operations

II-6.4.3.2 Staffing

This SAD section is not applicable to Shipping and Receiving operations

II-6.4.3.3 Accelerator Operating Parameters

This SAD section is not applicable to Shipping and Receiving operations

II-6.5. Defense-in-Depth Controls

This SAD section is not applicable to Shipping and Receiving operations

II-6.6. Machine Protection Controls

This SAD section is not applicable to Shipping and Receiving operations

II-6.7. Decommissioning

This SAD section is not applicable to Shipping and Receiving operations.

II-6.8. Summary and Conclusion

Specific hazards associated with the Shipping and Receiving Facilities are identified and assessed in this chapter of the Fermilab Safety Assessment Document. The designs, controls, and procedures to mitigate Shipping and Receiving Facilities specific hazards are identified and described. In addition to these specific

safety considerations, Shipping and Receiving Facilities are subject to the safety requirements, controls and procedures outlined in Section 1 Chapter 04 of the Fermilab Safety Assessment Document.

II-6.9. References

- [1] Fermilab Radiological Control Manual

II-6.10. Appendix – Risk Matrices

Risk Assessment methodology was developed based on the methodology described in DOE-HDBK-1163-2020. Hazards and their potential events are evaluated for likelihood and potential consequence assuming no controls in place, which results in a baseline risk. A baseline risk (i.e., an unmitigated risk) value of III and IV does not require further controls based on the Handbook. Events with a baseline risk value of I or II do require prevention and/or mitigation measures to be established in order to reduce the risk value to an acceptable level of III or IV. Generally, preventive controls are applied prior to a loss event, reflecting a likelihood reduction, and mitigative controls are applied after a loss event, reflecting a consequence reduction. For each control put in place, likelihood or consequence can have a single “bin drop”, resulting in a new residual risk (i.e., a mitigated risk). This risk assessment process is repeated for each hazard for Facility Workers (FW), Co-Located Workers (CLW), and Maximally-Exposed Offsite Individual (MOI). At the conclusion of the risk assessments, controls that are in place for the identified accelerator specific hazards are identified as Credited Controls and further summarized in Section I-1.4 of this Chapter.