



FERMILAB SAFETY ASSESSMENT DOCUMENT

Revision 22 November 21, 2023

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SAD Approval Page

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Revision History

Author	Rev. No.	Date	Description of Change
Maddie Schoell & All SAD Chapter Authors	22	November 21, 2023	<ul style="list-style-type: none"> • Updated SAD Layout and Organizational structure • Updated all SAD Chapters to include detailed Risk Matrices following DOE-HDBD-1163-2020 methodology • Separated ASEs for Fermilab Main Accelerator Complex and FAST • Included new ASEs for test stand accelerators, falling under DOE O 420.2D • Split IV-3 into IV-3 Meson Switchyard 120 Experimental Areas and IV-9 Neutrino Switchyard 120 Experimental Areas • Inclusion of USI Program within SAD Appendix B • Based on the “Phased Review Approach to Ensure Readiness to Operate Under DOE O 420.2D”, select SAD chapters and ASEs will be reviewed over the course of eight (8) reviews. Only applicable chapters will be included in the current revision of the SAD. <ul style="list-style-type: none"> ○ IRR #1a applicable Chapters: <ul style="list-style-type: none"> ▪ Revision 3, Section I Chapters 1-10 <i>Overview of Fermilab Facilities</i> ▪ Various Revisions, Section II Chapters 1-7 <i>Support Facilities</i> ▪ Revision 3, Section III Chapter 1 <i>Linac</i> ▪ Revision 2, Section III Chapter 2 <i>400 MeV Test Area (MTA)</i> ▪ Revision 13, Appendix A, VII-A.1 <i>Accelerator Safety Envelope – Fermilab Main Accelerator</i> ▪ SAD Appendix B <i>Fermilab Accelerator Safety Policies and Programs</i> ▪ SAD Appendix C <i>Non-Accelerator Specific Hazard (NASH) Risk Matrix Tables</i>
Angela Aparicio	21	October 20, 2020	Revision 0, Fermilab SAD Section III, Chapter 6 1-10, Main Injector Neutrino Oscillation Search (MINOS) Experimental Hall, October 20, 2020.
Maddie Schoell	20	August 25, 2020	SAD Table of Contents: updated name for Chapter II-2 from <i>Muon Collider Test Area</i> to <i>400 MeV Test Area (MTA)</i> to align with repurposed facility.
Maddie Schoell			Appendix A – Accelerator Safety Envelope, Revision 12, August 25, 2020
Tom Kobilarcik Evan Niner			Revision 1, 400 MeV Test Area (MTA) SAD Chapter. August 25, 2020
Maddie Schoell	19	February 11, 2020	SAD Table of Contents: corrected abbreviation for RAF to Chapter V-4 title from V-5.
Maddie Schoell			Appendix A – Accelerator Safety Envelope, Revision 11, February 11, 2020
Jerry Annala			Revision 1, Muon Campus SAD Chapter. February 11, 2020.

Author	Rev. No.	Date	Description of Change
John E. Anderson Jr. John Anderson, Jr. Daniel R. Broemmelsiek John E. Anderson Jr.	18	November 12, 2019	Appendix A - Accelerator Safety Envelope, Revision 10, November 12, 2019. Revision 3, Fermilab Accelerator Science & Technology (IOTA/FAST) Electron Injector SAD chapter. November 11, 2019. Revision 2, Fermilab SAD Section I, Chapters 1 – 10, Overview of Fermilab Facilities. November 11, 2019.
Wayne Schmitt Thomas R. Kobilarcik	17	March 7, 2019	Revision 1, Meson Area SAD Chapter. January 18, 2019
Daniel R. Broemmelsiek	16	April 23, 2018	Revision 2, Fermilab Accelerator Science & Technology (IOTA/FAST) Electron Injector SAD chapter. April 23, 2018.
John E. Anderson Jr.	15	January 11, 2018	Appendix A - Accelerator Safety Envelope, Revision 9, January 11, 2018. Removed Experimental ORC requirement from the ASE. Updated reference to the Routine Monitoring Program to reflect ESH Centralization. Clarified when shielding deficiencies would be an ASE violation.
John E. Anderson Jr. Dean R Edstrom, Jr. Daniel R. Broemmelsiek	14	August 28, 2017	Appendix A - Accelerator Safety Envelope, Revision 8, August 28, 2017. Updated ASE energy limit for the Fermilab Accelerator Science and Technology (FAST) Facility. Revision 1, Fermilab Accelerator Science & Technology (IOTA/FAST) Electron Injector SAD chapter. August 28, 2017.
John E. Anderson Jr. Brendan Casey Jerry Annala	13	March 3, 2017	Appendix A - Accelerator Safety Envelope, Revision 7, March 3, 2017. Updated titles from ES&H reorganization, updated PPD ORC process to the FESHM ORC Process, and updated shielding assessment references for the Muon Campus and Booster accelerator areas. Safety envelope beam intensities did not change. Added Muon Campus 8 GeV beam on target intensity scaled from the 120 GeV intensity for clarity. Initial release of the Muon g-2 storage ring Chapter for the Fermi National Accelerator Safety Assessment Document (SAD). March 2, 2017 Initial release of the Muon Campus and g-2 Chapter for the Fermi National Accelerator Laboratory Safety Assessment Document (SAD). February 24, 2017

Author	Rev. No.	Date	Description of Change
John E. Anderson Jr. T.J. Sarlina Eric McHugh William Pellico	12	January 18, 2017	Revision 1, Fermilab SAD Section I, Chapters 1 – 10, Overview of Fermilab Facilities. January 4, 2017. Revision 1, Initial release of the Fermilab Meson and Neutrino Switchyard 120 Experimental Areas Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). January 15, 2017. Revision 0, Initial release of the Booster Accelerator Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). January 18, 2017.
Sue McGimpsey Kathy J. Graden Kathy J. Graden Matt Quinn David Hockin Jon Ylinen Rich Ruthe Sue McGimpsey	11	July 17, 2015	Initial release of the Railhead Storage Area Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, April 28, 2015 Initial release of the Other Radioactive Material Storage Areas Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, March 11, 2015 Initial release of the Radiation Physics Calibration Facility Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, June 12, 2015 Initial release of the Radionuclide Analysis Facility Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, June 10, 2015 Initial release of the Waste Handling Facilities Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, May 12, 2015 Initial release of the Technical Division Facilities Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, June 1, 2015 Initial release of the Shipping and Receiving Operations (Site 38) Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, June 9, 2015
John E. Anderson Jr. Elvin Harms Jr. John E. Anderson Jr. Angela Aparicio	10	January 6, 2015	Appendix A - Accelerator Safety Envelope, Revision 6, January 2, 2015. Added Safety Envelope beam intensity limits for the Advanced Superconducting Test Accelerator (ASTA) Injector. Changed Antiproton Source to Muon Campus. Updated references. Initial release of the Advanced Superconducting Test Accelerator (ASTA) Injector Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, December 31, 2014. D-Zero Detector Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 4, November 13, 2014.

Author	Rev. No.	Date	Description of Change
Angela Aparicio Angela Aparicio Catherine James Eric McHugh	9	September 26, 2014	Collider Detector at Fermilab (CDF) Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 3, September 26, 2014. Initial release of the Micro Booster Neutrino Experiment (MicroBooNE) Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, June 23, 2014.
John E. Anderson Jr. Craig Moore Eric McHugh, TJ Sarlina John E. Anderson Jr. Craig Moore	8	May 6, 2014	Initial release of the Meson Area Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, April 29, 2014. Initial release of the NuMI Off-axis Electron Neutrino (ν_e) Appearance (NO ν A) Experiment Near Detector Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, March 21, 2014. Initial release of the Booster Neutrino Beam Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, January 23, 2013.
John E. Anderson Jr. John E. Anderson Jr. Craig Moore	7	January 16, 2014	Appendix A - Accelerator Safety Envelope, Revision 5, January 3, 2014. Updated ASE text to reflect recommendations from the Accelerator Readiness Review conducted October 1-3, 2013. Changes included moving numerical beam operating intensity limits from the ASE to a Division Level document, scaling numerical beam safety envelope intensity limits to a 500 mrem accident condition, removing Operating surveillance limits, and removing industrial hazards such as oxygen monitoring, cryogenic relief valve monitoring, and flammable gas system monitoring. Initial release of the Switchyard Fixed Target Beam Lines Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, October 15, 2013.
John E. Anderson Jr. Craig Moore	6	October 7, 2013	Initial release of the Neutrinos at the Main Injector (NuMI) Beam Line Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, June 3, 2013.

Author	Rev. No.	Date	Description of Change
John E. Anderson Jr. John E. Anderson Jr. David Capista William Pellico, Fernanda G. Garcia	5	April 30, 2013	<p>Appendix A - Accelerator Safety Envelope, Revision 4, April 25, 2013.</p> <p>Updated DOE O 420.2B to DOE O 420.2C. Updated ASE text to reflect credible accident scenarios. Modified Operating and Safety Envelope beam parameters for the Main Injector, Recycler, and NuMI. Updated shielding assessment references for the revised Main Injector, Recycler, and NuMI shielding assessments. Updated Linac groundwater limit reference to new MARS calculations. Removed Operating and Safety Envelope beam parameters for Tevatron Circulating Beam, A0 and C0 Abort Absorbers, and the Pelletron; placing the areas in standby. Removed the Booster Radiation Damage Facility Operating and Safety Envelope beam parameters.</p> <p>Initial release of the Main Injector/Recycler Chapter for the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0. April 23, 2013.</p> <p>Initial release of the Linac Accelerator Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, March 18, 2013.</p>
John E. Anderson Jr. Thomas R. Kobilarcik John E. Anderson Jr. Eric McHugh	4	February 16, 2012	<p>Appendix A - Accelerator Safety Envelope, Revision 3, February 15, 2012. Added beam limits for the Neutrino Area.</p> <p>Initial release of the Neutrino Area Chapter for the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0 February 14, 2012</p> <p>Initial release of the 8 GeV Line Chapter for the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0 January 20, 2012</p> <p>Initial release of the MiniBooNE Detector chapter of the Fermilab Safety Assessment Document (SAD). Revision 0 January 9, 2012</p>
Peter Kasper Elmie Peoples-Evans Robert C. Webber John E. Anderson Jr.	3	March 21, 2011	<p>Initial release of the High Intensity Neutrino Source (HINS) Linac at Meson Detector Building (MDB) Chapter for the Fermi National Accelerator Safety Assessment Document (SAD) Revision 0 March 21, 2011</p> <p>Revision 2, Appendix A - Accelerator Safety Envelope. Added beam limits for HINS Linac.</p>
Herman B. White John E. Anderson Jr.	2	January 20, 2011	<p>Initial release of the MuCool Test Area (MTA) Chapter for the Fermi National Accelerator Safety Assessment Document (SAD) Revision 0 January 20, 2011</p> <p>Revision 1, Appendix A - Accelerator Safety Envelope. Added beam limits for MTA.</p>
John E. Anderson Jr.	1	October 26, 2010	<p>Revision 0, initial release of the Fermilab SAD Section ,I Chapters 1 – 10, Overview of Fermilab Facilities.</p> <p>Revision 0, initial release of Appendix B - Fermi National Accelerator Laboratory Shielding Policy</p>

Author	Rev. No.	Date	Description of Change
John E. Anderson Jr.	0	December 10, 2009	Revision 0, initial release of Appendix A - Accelerator Safety Envelope.

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