

# **Fermi National Accelerator Laboratory**

## **Safety Assessment Document**

**Revision 20**

**August 25, 2020**

**Operated by Fermi Research Alliance, LLC  
Under Contract with the United States Department of Energy**

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**SAFETY ASSESSMENT DOCUMENT**  
**ACCELERATOR READINESS REVIEW**  
**DOCUMENTATION FORM**

This form records the PSAD/SAD/ARR review process required for operations at Fermi National Accelerator Laboratory.

**PSAD/SAD/ARR TITLE AND DATE:** Fermi National Accelerator Laboratory  
Safety Assessment Document  
August 25, 2020

**THIS DOCUMENT DESCRIBES:**

New Facility	<u>                    </u>	New Experiment	<u>                    </u>
Existing Facility	<u>          X          </u>	Major Modification	<u>                    </u>
Entire Program	<u>                    </u>	Decommissioning	<u>                    </u>
Readiness Review	<u>                    </u>		

**FERMI NATIONAL ACCELERATOR LABORATORY**

Safety Assessment Document Approval   X        Completion of Readiness Review                       
Authorization to Operate Facility   X        Program/Facility Requires PSAD                     

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## Revision History

Author	Description of Change	Revision No. & Date
Maddie Schoell	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	Revision 20 August 25, 2020
Maddie Schoell	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.	Revision 19 February 11, 2020
John E. Anderson Jr.	Appendix A - Accelerator Safety Envelope, Revision 10, November 12, 2019.	
John Anderson, Jr. Daniel R. Broemmelsiek	Revision 3, Fermilab Accelerator Science & Technology (IOTA/FAST) Electron Injector SAD chapter. November 11, 2019.	
John E. Anderson Jr.	Revision 2, Fermilab SAD Section I, Chapters 1 – 10, Overview of Fermilab Facilities. November 11, 2019.	Revision 18 November 12, 2019
Wayne Schmitt Thomas R. Kobilarcik	Revision 1, Meson Area SAD Chapter. January 18, 2019	Revision 17 March 7, 2019
Daniel R. Broemmelsiek	Revision 2, Fermilab Accelerator Science & Technology (IOTA/FAST) Electron Injector SAD chapter. April 23, 2018.	Revision 16 April 23, 2018
John E. Anderson Jr.	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.	Revision 15 January 11, 2018

<p>John E. Anderson Jr.</p> <p>Dean R Edstrom, Jr. Daniel R. Broemmelsiek</p>	<p>Appendix A - Accelerator Safety Envelope, Revision 8, August 28, 2017. Updated ASE energy limit for the Fermilab Accelerator Science and Technology (FAST) Facility.</p> <p>Revision 1, Fermilab Accelerator Science &amp; Technology (IOTA/FAST) Electron Injector SAD chapter. August 28, 2017.</p>	<p>Revision 14 August 28, 2017</p>
<p>John E. Anderson Jr.</p> <p>Brendan Casey</p> <p>Jerry Annala</p>	<p>Appendix A - Accelerator Safety Envelope, Revision 7, March 3, 2017. Updated titles from ES&amp;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.</p> <p>Initial release of the Muon g-2 storage ring Chapter for the Fermi National Accelerator Safety Assessment Document (SAD). March 2, 2017</p> <p>Initial release of the Muon Campus and g-2 Chapter for the Fermi National Accelerator Laboratory Safety Assessment Document (SAD). February 24, 2017</p>	<p>Revision 13 March 3, 2017</p>
<p>John E. Anderson Jr. T.J. Sarlina</p> <p>Eric McHugh</p> <p>William Pellico</p>	<p>Revision 1, Fermilab SAD Section I, Chapters 1 – 10, Overview of Fermilab Facilities. January 4, 2017.</p> <p>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.</p> <p>Revision 0, Initial release of the Booster Accelerator Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). January 18, 2017.</p>	<p>Revision 12 January 18, 2017</p>

Sue McGimpsey	Initial release of the Railhead Storage Area Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, April 28, 2015	
Kathy J. Graden	Initial release of the Other Radioactive Material Storage Areas Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, March 11, 2015	
Kathy J. Graden	Initial release of the Radiation Physics Calibration Facility Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, June 12, 2015	
Matt Quinn	Initial release of the Radionuclide Analysis Facility Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, June 10, 2015	
David Hockin Jon Ylinen	Initial release of the Waste Handling Facilities Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, May 12, 2015	
Rich Ruthe	Initial release of the Technical Division Facilities Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, June 1, 2015	
Sue McGimpsey	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	Revision 11 July 17, 2015
John E. Anderson Jr.	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.	
Elvin Harms Jr. John E. Anderson Jr.	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.	
Angela Aparicio	D-Zero Detector Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 4, November 13, 2014.	Revision 10 January 6, 2015

Angela Aparicio	Collider Detector at Fermilab (CDF) Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 3, September 26, 2014.	
Angela Aparicio Catherine James Eric McHugh	Initial release of the Micro Booster Neutrino Experiment (MicroBooNE) Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, June 23, 2014.	Revision 9 September 26, 2014
John E. Anderson Jr. Craig Moore	Initial release of the Meson Area Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, April 29, 2014.	
Eric McHugh, TJ Sarlina	Initial release of the NuMI Off-axis Electron Neutrino ( $\nu_e$ ) Appearance (NOvA) Experiment Near Detector Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, March 21, 2014.	
John E. Anderson Jr. Craig Moore	Initial release of the Booster Neutrino Beam Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, January 23, 2013.	Revision 8 May 6, 2014
John E. Anderson Jr.	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.	
John E. Anderson Jr. Craig Moore	Initial release of the Switchyard Fixed Target Beam Lines Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, October 15, 2013.	Revision 7 January 16, 2014
John E. Anderson Jr. Craig Moore	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.	Revision 6 October 7, 2013



<p>John E. Anderson Jr.</p>	<p>Appendix A - Accelerator Safety Envelope, Revision 4, April 25, 2013. 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>John E. Anderson Jr. David Capista</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>William Pellico, Fernanda G. Garcia</p>	<p>Initial release of the Linac Accelerator Chapter of the Fermi National Accelerator Safety Assessment Document (SAD). Revision 0, March 18, 2013.</p>	<p>Revision 5 April 30, 2013</p>
<p>John E. Anderson Jr.</p>	<p>Appendix A - Accelerator Safety Envelope, Revision 3, February 15, 2012. Added beam limits for the Neutrino Area.</p>	
<p>Thomas R. Kobilarcik</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>John E. Anderson Jr.</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>Eric McHugh</p>	<p>Initial release of the MiniBooNE Detector chapter of the Fermilab Safety Assessment Document (SAD). Revision 0 January 9, 2012</p>	<p>Revision 4 February 16, 2012</p>

Peter Kasper Elmie Peoples-Evans Robert C. Webber	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	
John E. Anderson Jr.	Revision 2, Appendix A - Accelerator Safety Envelope. Added beam limits for HINS Linac.	Revision 3 March 21, 2011
Herman B. White	Initial release of the MuCool Test Area (MTA) Chapter for the Fermi National Accelerator Safety Assessment Document (SAD) Revision 0 January 20, 2011	
John E. Anderson Jr.	Revision 1, Appendix A - Accelerator Safety Envelope. Added beam limits for MTA.	Revision 2 January 20, 2011
John E. Anderson Jr.	Revision 0, initial release of the Fermilab SAD Section ,I Chapters 1 – 10, Overview of Fermilab Facilities.  Revision 0, initial release of Appendix B - Fermi National Accelerator Laboratory Shielding Policy.	Revision 1 October 26, 2010
John E. Anderson Jr.	Revision 0, initial release of Appendix A - Accelerator Safety Envelope.	Revision 0 December 10, 2009

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