INL/EXT-10-20044
Rev. 1

Remote-Handled Low-Level Waste Disposal Project Code of Record

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January 2011

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ABSTRACT

The Remote-Handled Low-Level Waste (LLW) Disposal Project addresses an anticipated shortfall in remote-handled LLW disposal capability following cessation of operations at the existing facility, which will continue until it is full or until it must be closed in preparation for final remediation of the Subsurface Disposal Area (approximately at the end of Fiscal Year 2017). Development of a new onsite disposal facility, the highest ranked alternative, will provide necessary remote-handled LLW disposal capability and will ensure continuity of operations that generate remote-handled LLW. This report documents the Code of Record for design of a new LLW disposal capability. The report is owned by the Design Authority, who can authorize revisions and exceptions. This report will be retained for the lifetime of the facility.

CONTENTS

FIGURES

ACRONYMS

ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
AWS	American Welding Society
CFR	Code of Federal Regulations
DOE	Department of Energy
IDAPA	Idaho Administrative Procedures Act
IEEE	Institute of Electrical and Electronics Engineers
INL	Idaho National Laboratory
LLW	low-level waste
NFPA	National Fire Protection Association
SJI	Steel Joist Institute

Remote-Handled Low Level Waste Disposal Project Code of Record

1. INTRODUCTION

Remote-handled low-level waste (LLW) in the form of activated metals is generated from operations at Idaho National Laboratory's (INL's) Naval Reactors Facility and the Advanced Test Reactor Complex. Activated metals also are planned to be generated from new missions and from segregation and treatment (as necessary) of remote-handled scrap and waste currently stored at the Materials and Fuels Complex. Remote-handled LLW ion-exchange resins are generated from operations at the Naval Reactors Facility and Advanced Test Reactor Complex. Disposal of remote-handled LLW in the disposal vaults of the existing INL waste disposal facility is planned through the end of Fiscal Year 2017. Continued remote-handled LLW disposal capability is critical to continuing the U.S. Department of Energy (DOE) Office of Nuclear Energy, Science, and Technology and Office of Naval Reactors missions conducted at INL.

The *Conceptual Design Report for the Remote-Handled Low-Level Waste Disposal Project* (INL/EXT-07-12901, Idaho National Laboratory, October 2010) identifies the highest ranked alternative (i.e., development of a new onsite remote-handled LLW disposal facility) for maintaining continued, uninterrupted INL remote-handled LLW disposal capability and presents the conceptual design for construction of such a facility at INL. The disposal facility will be capable of receiving remote-handled LLW beginning in Fiscal Year 2018 and continuing through at least the end of Fiscal Year 2037. The facility will include approximately 250 precast concrete vaults. The vaults will be designed and configured to receive the remote-handled LLW in waste containers (i.e., liners) transported in shielded shipping casks from INL generators.

1.1 Conceptual Design Summary

1.1.1 Facility Layout and Components

The facility includes the concrete vaults, vault plugs, access roads, and support infrastructure. Figure 1 shows the conceptual layout for the disposal facility. The conceptual design assumed that the facility will be a stand-alone facility that does not use the services of any existing INL facilities. The facility will be sited within INL boundaries and be operated by the INL site operating contractor. Perimeter fencing will be constructed to provide protection from human and animal intrusion and to allow for proper access control.

The following major components are included with the facility:

- Vaults
- Vault plugs
- Crane
- Cask-to-vault system
- Staging and storage area
- Administration and other supporting infrastructure.

1.1.2 Vaults

Initial construction of the new remote-handled LLW disposal facility will provide up to 250 new disposal vaults that are similar to the existing Radioactive Waste Management Complex vault design. The vaults will be constructed of precast concrete cylinders (i.e., pipe sections) stacked on end and placed

within an array as shown in Figure 2. This configuration provides the ability to dispose of the desired quantity of waste within the smallest footprint possible.

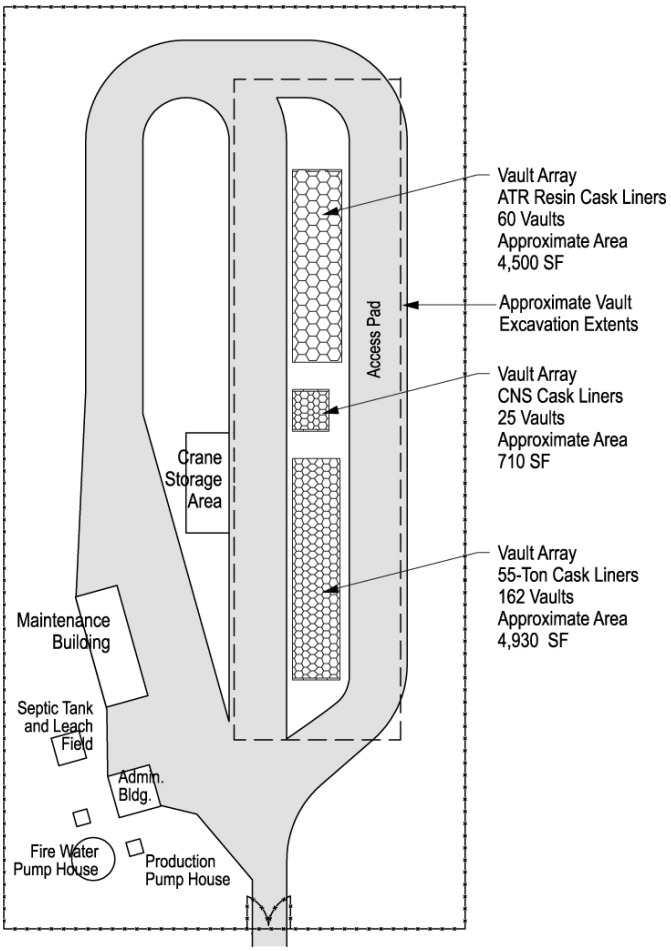

Figure 1. Conceptual layout for the remote-handled low-level waste disposal facility.

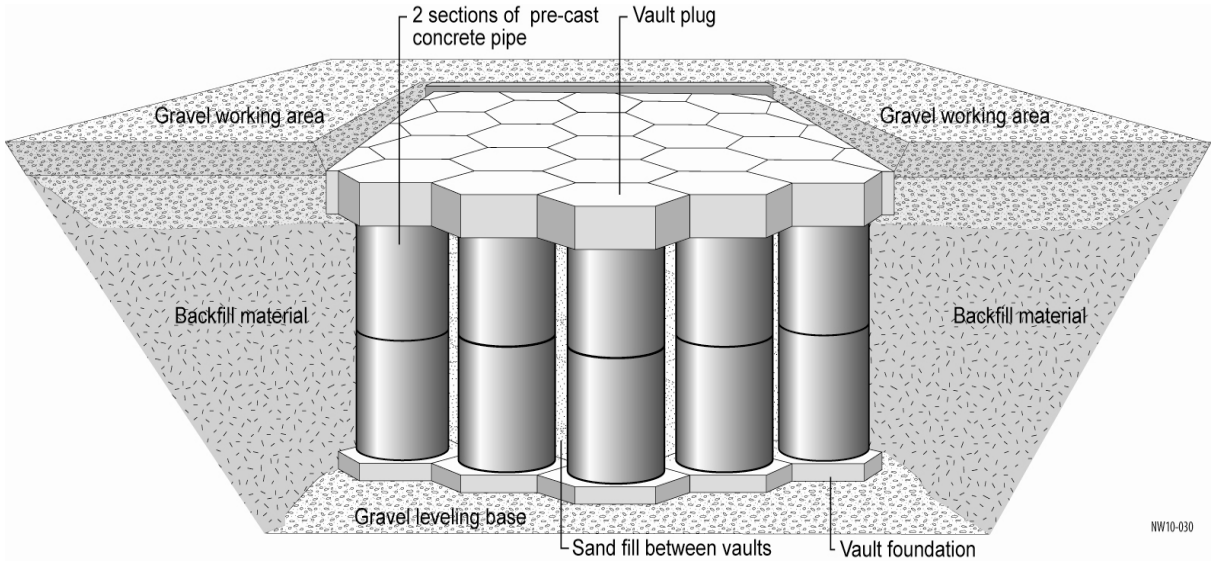

Figure 2. Concrete vault layout.

1.1.3 Administrative and Other Support Infrastructure

Additional support and administrative structures and services are included in the conceptual design as follows:

- Administration building:
  - Office space
  - Records storage
  - Equipment storage
  - Electrical distribution
- Maintenance enclosure:
  - Equipment maintenance
  - Temporary cask holding area
  - Equipment decontamination
  - Equipment storage
- Access roads:
  - Vehicle access within facility and around vaults
  - Facility road that provides access to and from major road
- Electrical power infrastructure
- Fixed communications system
- Combined fire/potable water system, including well and storage
- Sanitary sewer system, including septic and drain field
- Fire detection/protection system
- Perimeter fencing
- Video monitoring.

The primary utility needed to operate the new facility will be electrical power. At the present time, a portable generator is used to power all unloading and waste placement operations at the Radioactive Waste Management Complex. Operations at the new facility will use power provided by electrical pedestals that will be located near the disposal vaults. In addition, power will be needed for support infrastructure that currently is provided by Radioactive Waste Management Complex facilities. Other power needs include the administrative building, equipment maintenance and staging, and site control and monitoring capabilities. A location near an existing power source is a benefit but not necessarily a requirement for facility siting. Other utilities, such as fire detection and protection, telecommunication, sewer, and water, also are included in the conceptual design. During final design activities, each of the occupied buildings will be designed to incorporate the applicable sustainable building and energy conservation requirements outlined in DOE Order 430.2B, “Renewable Energy and Transportation Management.” These efforts will include any Leadership in Energy and Environmental Design certification criteria that can be incorporated at the given location.

Road access allowing transport of the loaded cask vehicles must be provided. A haul route will be identified or designed that will provide for passage of anticipated cask transport loads without damaging any existing infrastructure. The truck’s turning radius, maneuverability, unloading positioning, and drive slopes also will be taken into consideration when determining the haul route alignment. The 6-acre (2.4-ha) site area will be sufficient to design appropriate road access for transporting loads and vehicles within the disposal facility.

2. REGULATIONS, EXECUTIVE ORDERS, AND DEPARTMENT OF ENERGY ORDERS

Applicable regulations, executive orders, and DOE orders are summarized in the following subsections. These regulations, executive orders, and DOE orders should be reviewed and finalized against the current INL contract prior to preliminary or final design.

2.1 Regulations

- 10 CFR 434, 2007, "Energy Conservation Voluntary Performance Standards for New Buildings; Mandatory for Federal Buildings," *Code of Federal Regulations*, Office of the Federal Register, December 2007.
- 10 CFR 835, 2002, "Occupational Radiation Protection," *Code of Federal Regulations*, Office of the Federal Register, February 2002.
- 10 CFR 851, "Worker Safety and Health Program," *Code of Federal Regulations*, Office of the Federal Register.
- 10 CFR Part 860, 2004, "Trespassing on Administration Property," *Code of Federal Regulations*, Office of the Federal Register, March 2004.
- 29 CFR 1910, 2010, "Occupational Safety and Health Standards," *Code of Federal Regulations*, Office of the Federal Register, June 2010.
- 29 CFR 1926, 2010, "Safety and Health Regulations for Construction," *Code of Federal Regulations*, Office of the Federal Register, August 2010.
- 41 CFR Part 101, 2002, "Federal Property Management Regulation," *Code of Federal Regulations*, Office of the Federal Register, December 2002.
- IDAPA 07.02.06, "Rules Concerning Uniform Plumbing Code," *Idaho Administrative Procedures Act*, Idaho Department of Environmental Quality, Division of Building Safety.
- IDAPA 07.07.01, "Rules Governing Installation Of Heating, Ventilation, and Air Conditioning Systems," *Idaho Administrative Procedures Act*, Idaho Department of Environmental Quality, Division of Building Safety.
- IDAPA 58.01.01, "Rules for the Control of Air Pollution in Idaho," *Idaho Administrative Procedures Act*, Idaho Department of Environmental Quality, July 1, 2007.
- IDAPA 58.01.01.201, "Permit to Construct Required," *Idaho Administrative Procedures Act*, Idaho Department of Environmental Quality, April 11, 2006.
- IDAPA 58.01.01.202, "Application Procedures," *Idaho Administrative Procedures Act*, Idaho Department of Environmental Quality, July 1, 2002.
- IDAPA 58.01.08 , "Idaho Rules For Public Drinking Water Systems," *Idaho Administrative Procedures Act*, Idaho Department of Environmental Quality.
- IDAPA 58.01.16 , "Wastewater Rules," *Idaho Administrative Procedures Act*, Idaho Department of Environmental Quality.

2.2 Department of Energy Directives

- DOE Order 226.1A, "Implementation of Department of Energy Oversight Policy," U.S. Department of Energy.
- DOE Order 413.3B, "Program and Project Management for the Acquisition of Capital Assets," U.S. Department of Energy.

- DOE Order 414.1C, “Quality Assurance,” U.S. Department of Energy.
- DOE Order 420.1B, “Facility Safety.” U.S. Department of Energy.
- DOE Order 430.2B, “Renewable Energy and Transportation Management,” U.S. Department of Energy.
- DOE Order 435.1, “Radioactive Waste Management,” Change 1, U.S. Department of Energy.
- DOE Order 450.1A, “Environmental Protection Program”, U.S. Department of Energy.
- DOE Manual 470.4-2A, “Physical Protection,” U.S. Department of Energy.
- DOE Manual 470.4-4A, “Information Security Manual,” Change 1, U.S. Department of Energy.
- DOE Order 5400.1, “General Environmental Protection Program,” Change 1, U.S. Department of Energy, July 29, 1990. (Note: Specific paragraphs were cancelled by DOE Order 231.1, “Environmental, Safety, and Health Reporting.”)
- DOE Order 5400.5, “Radiation Protection of the Public and the Environment,” U.S. Department of Energy, January 7, 1993.
- DOE Order 5480.23, “Nuclear Safety Analysis Report,” U.S. Department of Energy, 1992.
- DOE-STD-1020-02, “Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities,” Change 1, U.S. Department of Energy.
- DOE-STD-1021-93, “Natural Phenomena Hazards Performance Categorization Guidelines for Structures, Systems, and Components,” Change 1, U.S. Department of Energy.
- DOE-STD-1027-92, “Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports,” U.S. Department of Energy, December 1992 (including Change 1, September 1997).
- DOE-STD-1090-01, “Hoisting and Rigging,” U.S. Department of Energy.
- DOE-STD-1189-2008, “Integration of Safety into the Design Process,” U.S. Department of Energy.
- DOE-STD-3009-94, “Preparation Guide for U.S. Department Nonreactor Nuclear Facility Safety Analyses,” Change Notice 3, U.S. Department of Energy, July 1994 (including Change 1, January 2000; and Change 2, April 2002).

3. DESIGN CODE OR RECORD

The Remote-Handled LLW Project design criteria for facility modifications or new construction are summarized in the following subsections. Edition dates are based on a Fiscal Year 2011 design schedule. If design is delayed, edition dates should reflect the latest current edition date at the start of preliminary or final design. This report will be reviewed and finalized at the start of preliminary or final design to assess required updates or changes.

3.1 General Design

- International Building Code, 2009 Edition.
- National Fire Protection Association (NFPA) 101, “Life Safety Code,” 2009 Edition.
- International Mechanical Code (IMC), 2009 Edition.
- NFPA 70, “National Electric Code (NEC),” 2011 Edition.
- INL-STD-139, “INL Engineering Standards,” Idaho National Laboratory.

- DOE Order 226.1A, “Implementation of Department of Energy Oversight Policy,” U.S. Department of Energy.
- DOE Order 420.1B, “Facility Safety,” U.S. Department of Energy.
- DOE Order 430.2B, “Renewable Energy and Transportation Management,” U.S. Department of Energy.
- DOE Manual 470.4-2A, “Physical Protection,” U.S. Department of Energy.
- DOE Manual 470.4-4A, “Information Security Manual,” Change 1, U.S. Department of Energy.

3.2 Civil, Structural, and Architectural

- AASHTO VLVLR-1, “Guidelines for Geometric Design of Very Low-Volume Local Roads,” American Association of State Highway Transportation Officials, First Edition.
- SSHC, “Standard Specifications for Highway Construction,” State of Idaho Transportation Department, Division of Highways, 2004 Edition.
- DOE Order 420.1B, “Facility Safety,” U.S. Department of Energy.
- DOE Order 450.1A, “Environmental Protection Program”, U.S. Department of Energy.
- DOE-STD-1020, “Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities,” U.S. Department of Energy.
- INL Welding Manual.
- International Building Code, 2009 Edition.
- American Society of Civil Engineers (ASCE)/Structural Engineering Institute 43, “Seismic Design Criteria for Structures, Systems, and Components in Nuclear Facilities,” 2005 Edition.
- ASCE 7, “Minimum Design Loads for Buildings and Other Structures,” 2008 Edition.
- American Concrete Institute (ACI) 318, “Building Code Requirements for Structural Concrete,” 2008 Edition.
- ACI 530, “Building Code Requirements for Masonry Structures,” 2008 Edition.
- ACI 530.1, “Specifications for Masonry Structures,” 2008 Edition.
- American Institute of Steel Construction (AISC) SCM, “Steel Construction Manual,” Thirteenth Edition.
- AISC 341-05, “Seismic Provisions for Structural Steel Buildings.”
- AISC 360, “Specification for Structural Steel Buildings,” 2005 Edition.
- American Iron and Steel Institute (AISI) S100-S214, “North American Specification for the Design of Cold-formed Steel Structural Members,” 2007 Edition.
- American National Standards Institute (ANSI)/American Nuclear Society 2.26, “Categorization of Nuclear Facility Structures, Systems and Components for Seismic Design,” 2004 Edition.
- ANSI/NC 1.0, “Standard for Noncomposite Steel Floor Deck,” Steel Deck Institute, 2006 Edition.
- ANSI/RD 1.0, “Standard for Steel Roof Deck,” Steel Deck Institute, 2006 Edition.
- ASCE 5, “Building Code Requirements for Masonry Structures,” 2008 Edition.
- ASCE 6, “Specifications for Masonry Structures,” 2008 Edition.
- ASCE 7, “Minimum Design Loads for Buildings and Other Structures,” 2008 Edition.

- ASCE 8, "Standard Specification for the Design of Cold-formed Stainless Steel Structural Members," 2002 Edition.
- ASCE/Structural Engineering Institute 43, "Seismic Design Criteria for Structures, Systems, and Components in Nuclear Facilities," 2005 Edition.
- American Society of Mechanical Engineers NOG-1, "Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)," 2004 Edition.
- American Welding Society (AWS) D1.1, "Structural Welding Code – Steel," 2004 Edition.
- AWS D1.3, "Structural Welding Code – Sheet Steel," 1998 Edition.
- AWS D1.4, "Structural Welding Code – Reinforcing Steel," 1998 Edition.
- PCI MNL 120, "Prestressed Concrete Institute Design Handbook for Precast and Prestressed Concrete."
- PCI MNL 116, "Manual for Quality Control for Plant and Production of Precast and Prestressed Concrete."
- Steel Joist Institute (SJI)-CJ-1.0, "Standard Specification for Composite Steel Joists, CJ-series," 2006 Edition.
- SJI-JG-1.1, "Standard Specification for Joist Girders," 2005 Edition.
- SJI-K-1.1, "Standard Specification for Open Web Steel Joists, K-series," 2005 Edition.
- SJI-LH/DLH-1.1, "Standard Specification for Longspan Steel Joists, LH-series and Deep Longspan Steel Joists," DLH-series, 2005 Edition.

3.3 Mechanical; Heating, Ventilating, and Air Conditioning; Piping

3.3.1 General

- INL Welding Manual
- IMC, "International Mechanical Code," 2009 Edition.
- IBC, "International Building Code," 2009 Edition.
- 10 CFR 434, "Energy Conservation Voluntary Performance Standards for New Buildings; Mandatory Energy Conservation" *Code of Federal Regulations*, Office of the Federal Register, December 2007.
- DOE Order 430.2B, "Renewable Energy and Transportation Management," U.S. Department of Energy.
- American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) 90.1, ANSI/IESNA Standard 90.1-2007, "Energy Standard for Buildings Except Low-Rise Residential Buildings," 2007 Edition.

3.3.2 Building Service Piping

- American Society of Mechanical Engineers B31.9, "Building Service Piping."
- American Water Works Association, "Cross Connection Control Manual, Accepted Procedure and Practice," Pacific Northwest Section of American Water Works Association.
- IDAPA 07.02.06, "Rules Concerning Uniform Plumbing Code," *Idaho Administrative Procedures Act*, Idaho Department of Environmental Quality, Division of Building Safety.

- IDAPA 07.07.01, "Rules Governing Installation of Heating, Ventilation, and Air Conditioning Systems," *Idaho Administrative Procedures Act*, Idaho Department of Environmental Quality, Division of Building Safety.
- IDAPA 58.01.08, "Idaho Rules for Public Drinking Water Systems," *Idaho Administrative Procedures Act*, Idaho Department of Environmental Quality.
- IDAPA 58.01.16, "Wastewater Rules," *Idaho Administrative Procedures Act*, Idaho Department of Environmental Quality.
- Uniform Plumbing Code, 2003 Edition.

3.3.3 Tanks and Utility Distribution

- American Water Works Association D100, "Welded Carbon Steel Tanks for Water Storage," American Water Works Association," 2005 Edition with 2007 Errata.
- National Association of Corrosion Engineers SP0169, "Control of External Corrosion on Underground or Submerged Metallic Piping Systems," 2007 Edition.
- NFPA 22, "Standard for Water Tanks for Private Fire Protection," 2008 Edition.

3.3.4 Potable Water and Sewer

- IDAPA 58.01.03, 2009, "Individual/Subsurface Sewage Disposal Rules," *Idaho Administrative Procedures Act*, Idaho Department of Environmental Quality, July 2009.
- IDAPA 58.01.08 , "Idaho Rules for Public Drinking Water Systems," *Idaho Administrative Procedures Act*, Idaho Department of Environmental Quality.
- Memorandum of Understanding between the Idaho Department of Environmental Quality and the Idaho Division of Building Safety Plumbing Bureau, April 2003.
- Uniform Plumbing Code, 2003 Edition.

3.3.5 Heating, Ventilating, and Air Conditioning and Ducting

- ASHRAE 90.1, "Energy Standard for Buildings Except Low-Rise Residential Buildings," 2007 Edition.
- ASHRAE 55, "Thermal Environmental Conditions for Human Occupancy," 2004 Edition.
- ASHRAE 62.1, "Ventilation for Acceptable Indoor Air Quality," 2007 Edition.
- NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems," 2009 Edition.
- NFPA 90B, "Standard for the Installation of Warm Air Heating and Air Conditioning Systems."
- IDAPA 07.07.01, "Rules Governing Installation of Heating, Ventilation, and Air Conditioning Systems, Division of Building Safety," *Idaho Administrative Procedures Act*, Idaho Department of Environmental Quality.

3.4 Fire Protection

3.4.1 National Fire Protection Association

- NFPA 1, "Fire Prevention Code," 2009 Edition.
- NFPA 10, "Standard for Portable Fire Extinguishers," 2010 Edition.
- NFPA 13, "Standard for the Installation of Sprinkler Systems," 2010 Edition.

- NFPA 14, “Standard for the Installation of Standpipe, Private Hydrant, and Hose Systems,” 2010 Edition.
- NFPA 20, “Standard for the Installation of Stationary Pumps for Fire Protection,” 2010 Edition.
- NFPA 22, “Standard for Water Tanks for Private Fire Protection,” 2008 Edition.
- NFPA 24, “Standard for the Installation of Private Fire Service Mains and Their Appurtenances,” 2010 Edition.
- NFPA 25, “Standard for the Inspection, Testing and Maintenance of Water Based Fire Protection Systems,” 2011 Edition.
- NFPA 30, “Flammable and Combustible Liquids Code,” 2008 Edition.
- NFPA 37, “Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines,” 2010 Edition.
- NFPA 55, “Standard for the Storage, Use, and Handling of Compressed Gasses and Cryogenic Fluids in Portable and Stationary Containers, and Tanks,” 2010 Edition.
- NFPA 70, “National Electrical Code,” 2011 Edition.
- NFPA 70E, “Standard for Electrical Safety in the Workplaces,” 2009 Edition.
- NFPA 72, “National Fire Alarm and Signaling Code,” 2010 Edition.
- NFPA 75, “Standard for the Protection of Electronic Computer/Data Processing Equipment,” 2009 Edition.
- NFPA 77, “Recommended Practice on Static Electricity,” 2007 Edition.
- NFPA 79, “Electrical Standard for Industrial Machinery,” 2007 Edition.
- NFPA 80, “Standard for Fire Doors and Fire Windows,” 2010 Edition.
- NFPA 80A,” Recommended Practice for Protection of Buildings from Exterior Fire Exposures,” 2007 Edition.
- NFPA 90A, “Standard for the Installation of Air-Conditioning and Ventilating Systems,” 2009 Edition.
- NFPA 90B, “Standard for the Installation of Warm Air Heating and Air-Conditioning Systems,” 2009 Edition.
- NFPA 101, “Life Safety Code,” 2009 Edition.
- NFPA 110, “Standard for Emergency and Standby Power Systems,” 2010 Edition.
- NFPA 170, “Standard for Fire Safety Symbols,” 2009 Edition.
- NFPA 220, “Standard on Types of Building Construction,” 2009 Edition.
- NFPA 221, “Standard for Fire Walls and Fire Barrier Walls,” 2009 Edition.
- NFPA 232, “Standard for the Protection of Records,” 2007 Edition.
- NFPA 262, “Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces,” 2007 Edition.
- NFPA 780, “Standard for the Installation of Lightning Protection Systems,” 2011 Edition.
- NFPA 801, “Standard for Fire Protection for Facilities Handling Radioactive Materials,” 2008 Edition.

3.5 Electrical

3.5.1 General Facility Electrical Codes and Standards

- NFPA 70, "National Electric Code (NEC)," 2011 Edition.
- NFPA 70E, "Electrical Safety Requirements for Employee Workplaces," 2009 Edition.
- Institute of Electrical and Electronics Engineers (IEEE)-C2, "National Electrical Safety Code," 2007 Edition.
- DOE-HDBK-O 420.1, DOE Handbook, "Design Considerations."
- DOE-HDBK-1092, DOE Handbook, "Electrical Safety," 2004 Edition.
- DOE-HDBK-1132, DOE Handbook, "Design Considerations," 1999 Edition.

3.5.2 Normal Power System Codes and Standards

- IEEE-STD 141, "IEEE Recommended Practice for Electric Power Distribution for Industrial Plants," Red Book, 1993 Edition (R1999).
- IEEE-STD 242, "IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power," Buff Book, 2001 Edition with Errata.
- IEEE-STD 493, "IEEE Recommended Practice for the Design of Reliable Industrial and Commercial Power Systems," Gold Book, 2007 Edition.
- UL-508A, "Industrial Control Equipment," 2001 Edition with Revision.
- International Electrical Testing Association NETA-ATS, International Electrical Testing Association, "Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems," 2009 Edition.

3.5.3 Lighting System Codes and Standards

- 40 CFR 261.24, "EPA Toxicity Characteristic Leaching Procedure (TCLP)," *Code of Federal Regulations*, Office of Federal Register.
- NFPA 101, "Life Safety Code," 2009 Edition.
- IESNA, "Lighting Handbook."
- ASHRAE 90.1, "Energy Standard for Buildings," 2007 Edition.

3.5.4 Grounding System Codes and Standards

- IEEE-80, "IEEE Guide for Safety in AC Substation Grounding," 2000 Edition with Errata.
- IEEE-STD 142, "IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems," Green Book, 2007 Edition.
- IEEE-1050, "IEEE Guide for Instrumentation and Control Equipment Grounding in Generating Stations," 2004 Edition.
- IEEE-1100, "Recommended Practice for Powering and Grounding Sensitive Electronic Equipment," Emerald Book, 2005 Edition.
- NFPA 77, "Recommended Practice on Static Electricity," 2007 Edition.

3.5.5 Lightning Protection System Codes and Standards

- NFPA 780, "Standard for the Installation of Lightning Protection Systems," 2011 Edition.
- UL-96A, "Installation Requirements for Lightning Protection Systems," 2007 Edition.

3.5.6 Telephone System Codes and Standards

- ANSI/TIA/EIA 568 C.0, “Generic Telecommunications Cabling for Customer Premises,” 2010 Edition.
- ANSI/TIA/EIA 568 C.1, “Commercial Building Telecommunications Cabling Standard,” 2010 Edition.
- ANSI/TIA/EIA 568 B.2, “Twisted Pair Cabling Components Standard,” 2009 Edition.
- ANSI/TIA/EIA 568 B.3, “Optical Fiber Cabling Components Standard,” 2008 Edition.
- ANSI/TIA/EIA 569 A, “Commercial Building Standards for Telecommunications Pathways and Spaces,” 2004 Edition.
- ANSI/TIA/EIA J-STD-607, “Commercial Building Grounding and Bonding Requirements for Telecommunications,” 2002 Edition.