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The Project will be designed for high reliability and efficiency. A detailed project description is provided in Section 2.0.

7.1 ORGANIZATION

Engineering standards and requirements are provided in Appendix D, Design Criteria. Details of the transmission system design are provided in Section 2.1.12.1, Electricity and Transmission Line. An overall description of the power plant design and operation can be found in Section 2.3, Power Generation. Design and engineering information is located in several places in this Application for Certification (AFC) Amendment as follows:

Power Generation	Section 2.3.2, Major Power Block Equipment Description; Additional information is also found in Appendix D, Design Criteria
Atmospheric Emission	Section 2.3.2.3, Emissions Controls Systems; Section 2.3.2.6, Emission Monitoring Systems; and Section 5.1, Air Quality
Waste Disposal System	Section 5.13, Waste Management
Noise Abatement	Section 5.5, Noise
Substations/Transformer	Section 2.3.3, Major Electrical Equipment and Systems; Section 4, Electrical Transmission; and Appendix C, Transmission Network Upgrade
Transmission System	Section 2.3.3, Major Electrical Equipment and Systems; Section 2.1.12.1, Electricity and Transmission Line; and Appendix C, Transmission Network Upgrade
Reliability	Section 2.9.2, Facility Reliability
Fire Control System	Section 2.5.11, Fire Protection

Information regarding design measures to provide for safe Project operation is contained in Section 2.8, Facility Safety Design.

A preliminary geotechnical investigation was performed by URS for the Project Site in 2009 (URS, 2009).

Additional engineering information is contained in Appendix D, Design Criteria—Engineering Construction Specifics:

Civil Engineering Design Criteria	Appendix D-1
Structural Engineering Design Criteria	Appendix D-2
Mechanical Engineering Design Criteria	Appendix D-3
Electrical Engineering Design Criteria	Appendix D-4
Controls System Design Criteria	Appendix D-5

7.2 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Laws, Ordinances, Regulations, and Standards (LORS) applicable to the Project are shown in Table 7-1, Applicable Laws, Ordinances, Regulations, and Standards. Please note that the design of structures and facilities will be based on the applicable building codes, specifications, industry standards, and regulations. Building permits will be reviewed during the building permit approval process by Kern County and their contractors.

7.3 INVOLVED AGENCIES AND AGENCY CONTACTS

Agency contacts regarding Project design are presented in Table 7-2, Involved Agencies and Agency Contacts.

7.4 REFERENCES

URS (URS Corporation), 2009. Preliminary Geotechnical Investigation, Proposed Hydrogen Energy California Project (HECA), Kern County, California, URS Job No. 289067571.

**Table 7-1
Applicable Laws, Ordinances, Regulations, and Standards**

Jurisdiction LORS	Applicability	Administering Agency or Professional Association ¹	Required Permit
CIVIL ENGINEERING AND FOUNDATION DESIGN CRITERIA			
Federal			
Regulatory Water Quality and Soil Resources	DESC (Drainage, Erosion, and Sediment Control) Plan	National Resource Conservation Service (NRCS)	None
Title 29, Code of Federal Regulations (CFR) Part 1910, Occupational Safety and Health Standards	Safety and health	U.S. Department of Labor, Occupational Safety & Health Administration (OSHA)	None
Title 40, Code of Federal Regulations (CFR) Part 112, Oil Pollution Prevention <i>et seq.</i>	Spill Prevention and Countermeasure Plan (SPCC)	U.S. Environmental Protection Agency (USEPA)	None
State			
California Business & Professions Code §6704 <i>et seq.</i> , §§ 6730 and 6736	State professional registration	Department of Consumer Affairs, California Board For Professional Engineers and Land Surveyors	None
California Vehicle Code § 35780 <i>et seq.</i>	Permits for heavy truck loads	California Department of Transportation (Caltrans)	Permits for heavy truck loads
California Labor Code § 6500 <i>et seq.</i>	Permit for trenches, scaffolding, false work	California Division of Occupational Safety and Health Administration (Cal/OSHA) Department of Industrial Relations	Permits for trenches, scaffolding, false work
State of California, Department of Transportation (Caltrans) Standard Specifications	Meet specifications	Caltrans	None
Title 24 California Code of Regulations, California Building Standards Code	Meet design and construction requirements	Kern County	Building permit
Title 8, California Code of Regulations (CCR), Division of Occupational Safety and Health	Construction safety orders, general industrial safety orders, and work safety requirements	Cal/OSHA	Building permit for boiler, trenching, and shoring

**Table 7-1
Applicable Laws, Ordinances, Regulations, and Standards (Continued)**

Jurisdiction LORS	Applicability	Administering Agency or Professional Association¹	Required Permit
State of California, Department of Water Resources	Encroachment permit	Department of Water Resources Division of Engineering, Real Estate	Encroachment permit
State of California, Water Resources Control Board	NPDES/DESC general permit	California Environmental Protection Agency	General permit
County			
Title Title 17, Buildings and Construction, Kern County Code, Chapter Chapter 17.20 Plumbing Code	Kern County requires a plumbing permit for the installation of any plumbing, gas, or drainage piping work or any fixture or water heating or treatment equipment in a building or premises as defined in subsection 17.20.060.	Kern County	Plumbing permit
Title 17, Buildings and Construction, Kern County Code, Chapter 17.28 Grading Code	Kern County requires a grading permit for any excavating or filling or combination thereof except for exempted work as defined in subsection 17.28.040.B. Grading permit covers drainage requirements	Kern County	Grading permit
Kern County Development Service Agency	Any off-site flooding and off-site sedimentation potential	Kern County	Drainage and compliance submittal checklist
Industry			
AREMA Rail Operations Design Criteria	Meet design criteria	American Railway Engineering and Maintenance-of-Way Association	None
ACPA Concrete Paving Design Criteria	Meet design criteria	American Concrete Paving Association	None

**Table 7-1
Applicable Laws, Ordinances, Regulations, and Standards (Continued)**

Jurisdiction LORS	Applicability	Administering Agency or Professional Association ¹	Required Permit
CASQA Storm Water Management BMPs	Meet design criteria	California Stormwater Quality Association	None
AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications	Meet design criteria	American Association of State Highway and Transportation Officials (AASHTO)	None
Standards and Specifications	Meet requirements	Asphalt Institute (AI)	None
Standards and Specifications	Meet requirements	American Concrete Institute (ACI)	None
Standards	Meet requirements	American National Standards Institute (ANSI)	None
Standards, Specifications, and Recommended Practices	Meet requirements	American Society of Testing and Materials (ASTM)	None
Standards and Specifications	Meet design and construction criteria	American Water Works Association (AWWA)	None
Codes and Standards	Meet design criteria	American Welding Society (AWS)	None
Standards	Meet requirements	Concrete Reinforcing Steel Institute (CRSI)	Building
Standards	Meet requirements	National Fire Protection Association (NFPA)	
Standards and Specifications	Meet design criteria	Steel Structures Painting Council (SSPC)	None
California Plumbing Code	Meet general regulations	International Association of Plumbing and Mechanical Officials	Building plumbing permit
ENGINEERING GEOLOGY CODES, STANDARDS, AND CERTIFICATIONS			
Federal None Apply			
State			
Warren–Alquist Act, Title 20, Appendix B	Require that the AFC address the geological and seismic aspects of the site	CEC and CCR	None

**Table 7-1
Applicable Laws, Ordinances, Regulations, and Standards (Continued)**

Jurisdiction LORS	Applicability	Administering Agency or Professional Association¹	Required Permit
California Environmental Quality Act (CEQA)	Require that potential significant effects, which include geological hazards, be identified	Office of Planning and Research	None
County			
California State Planning Law, Government Code Section 65302	Requires that seismic safety element be included in the general plan	Kern County	Building
California Building Code (CBC), 2010	Certify the placement of earthen fills and the adequacy of the site for structural improvements	Kern County	Building
Industry			
California Business and Professions Code, § 7835	Requires registration for geologists who practice for others	California Building Standards Commission	None
California Building Code (2010 Edition), Chapter 14 & Chapter 18	Earthquake regulations/foundations/excavation and grading	California Building Standards Commission	Building
STRUCTURAL AND SEISMIC DESIGN CRITERIA			
Federal			
Title 29 Code of Federal Regulations, Part 1910, OSHA	Occupational Safety and Health Standards	OSHA	None

**Table 7-1
Applicable Laws, Ordinances, Regulations, and Standards (Continued)**

Jurisdiction LORS	Applicability	Administering Agency or Professional Association ¹	Required Permit
State			
Business and Professions Code § 6704, <i>et seq.</i> ; §§ 6730 and 6736	Requires state registration to practice as a Civil Engineer or Structural Engineer in California	California Building Standards Commission	None
Labor Code § 6500, <i>et seq.</i>	Permit for trenches, demolitions, false work, and scaffolding	Department of Labor & Industry Relations	Permit for trenches, demolitions, false work, and scaffolding
California Building Code (CBC), 2010	Meet requirements	Kern County	Building
Title 24 (CCR), minimum legal building requirements	Adopts current edition of California Building Code as minimum legal building standard	Kern County	Building
Standard Specifications	Meet specifications	California Department of Transportation	None
Title 8 CCR § 1500, <i>et seq.</i> ; § 2300, <i>et seq.</i> ; and § 3200, <i>et seq.</i> describe general construction safety orders, industrial safety orders, and work safety requirements and procedures	Requirements as applicable	Cal/OSHA	None
Industry			
Building Code Requirements for Reinforced Concrete (ACI 318)	Meet design criteria	ACI	Building
Building Code Requirements for Concrete Masonry Structures (ACI 530)	Meet design criteria	ACI	Building
Environmental Engineering Concrete Structures (ACI 350)	Meet design criteria	ACI	Building
Specification for Structural Steel Buildings (ANSI/AISC 360-05)	Meet specifications	American Institute of Steel Construction (AISC)	Building

**Table 7-1
Applicable Laws, Ordinances, Regulations, and Standards (Continued)**

Jurisdiction LORS	Applicability	Administering Agency or Professional Association ¹	Required Permit
Code of Standard Practice for Steel Buildings and Bridges (ANSI/AISC 303-05)	Meet standards	AISC	Building
Manual of Steel Construction, 13th Edition	Meet standards	AISC	Building
Seismic Provisions for Structural Steel Building, Including Supplement No. 1 (ANSI/AISC 341-05)	Meet design criteria	AISC	Building
Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications (ANSI/AISC 358-05)	Meet design criteria	AISC	Building
Specification for Structural Joints using ASTM A325 or A490 Bolts, Research Council on Structural Connections (RCSC)	Meet specifications	AISC	Building
North American Specification for the Design of Cold-Formed Steel Structural Members, (NAS)	Meet specifications	American Iron and Steel Institute (AISI)	Building
Structural Welding Code-Steel	Meet standards	AWS	Building
Reinforced Masonry Engineering Handbook	Meet standards	Masonry Institute of America (MIA)	Building
Standard Specification for Carbon Structural Steel (ASTM A36)	Meet specifications	ASTM	Building
Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless (ASTM A53)	Meet specifications	ASTM	Building
Standard Specification for Steel Wire, Plain, for Concrete Reinforcement (ASTM A82)	Meet specifications	ASTM	Building
Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware (ASTM A153)	Meet specifications	ASTM	Building
Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement (ASTM A185)	Meet specifications	ASTM	Building

**Table 7-1
Applicable Laws, Ordinances, Regulations, and Standards (Continued)**

Jurisdiction LORS	Applicability	Administering Agency or Professional Association ¹	Required Permit
Standard Specification for Carbon Steel Bolts and Studs (ASTM A307)	Meet specifications	ASTM	Building
Standard Specification for Structural Bolts, Steel Heat Treated, 120/105 ksi Minimum Tensile Strength (ASTM A325)	Meet specifications	ASTM	Building
Standard Specification for Structural Bolts, Alloy Steel Heat Treated, 150 ksi Minimum Tensile Strength (ASTM A490)	Meet specifications	ASTM	Building
Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes (ASTM A500)	Meet specifications	ASTM	Building
Standard Specification for Carbon and Alloy Steel Nuts (ASTM A563)	Meet specifications	ASTM	Building
Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel (ASTM A563)	Meet specifications	ASTM	Building
Standard Specification for Low-Allow Steel Deformed and Plain Bars for Concrete Reinforcement (ASTM A706/A706M)	Meet specifications	ASTM	Building
Standard Specification for Hot-Rolled Carbon, Low-Alloy, High Strength Low-Allow and Alloy Steel Floor Plates (ASTM A786/A786M)	Meet specifications	ASTM	Building
Standard Specification for Steel Structural Shapes for Use in Building Framing (ASTM A992)	Meet specifications	ASTM	Building
Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High Strength Low-Alloy, High Strength Low-Alloy with Improved Formability, and Ultra-High Strength (ASTM A1011/A1011M)	Meet specifications	ASTM	Building

**Table 7-1
Applicable Laws, Ordinances, Regulations, and Standards (Continued)**

Jurisdiction LORS	Applicability	Administering Agency or Professional Association¹	Required Permit
Standard Specification for Hardened Steel Washers (ASTM F436)	Meet specifications	ASTM	Building
Standard Specification for Anchor Bolts, Steel, 36, 55 and 105-ksi Yield Strength (ASTM F1554)	Meet specifications	ASTM	Building
Standard Specification for “Twist-Off” Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength (ASTM F1852)	Meet specifications	ASTM	Building
Standard Specification for “Twist-Off” Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 150 ksi Minimum Tensile Strength (ASTM F2280)	Meet specifications	ASTM	Building
American Association of State Highway and Transportation Officials (AASHTO)	Meet design criteria	AASHTO	Building
Standards for Welding Steel Tanks (AWWA D100 or API 650 11 th Ed)	Meet standards	AWWA or API	Building
Standards for Prestressed Concrete Pressure Pipe, Steel Cylinder Type for Water and Other Liquids (AWWA C301)	Meet standards	AWWA	Building
Standards for Reinforced Concrete Water Pipe-Noncylinder Type, Not Prestressed (AWWA C302)	Meet standards	AWWA	Building
Heating, Ventilating, and Air Conditioning Guide (ASHRAE)	Meet design criteria	American Society of Heating, Refrigeration, and Air Conditioning Engineers	Building

**Table 7-1
Applicable Laws, Ordinances, Regulations, and Standards (Continued)**

Jurisdiction LORS	Applicability	Administering Agency or Professional Association ¹	Required Permit
ELECTRICAL ENGINEERING DESIGN CRITERIA			
Federal			
Advisory Circular AC 70/7460-1K (Obstruction Marking and Lighting)	Meet Standards	Federal Aviation Administration (FAA)	None
Industry			
Standards	Electrical specifications	American National Standards Institute (ANSI)	None
Standards	Electrical specifications	Institute of Electrical and Electronics Engineers (IEEE)	None
Standards	Electrical specifications	National Electrical Manufacturers Association (NEMA)	None
Standards	Electrical specifications	ASTM	None
Standards	Electrical specifications	Underwriters Laboratories (UL)	None
Standards	Electrical specifications	Factory Mutual (FM)	None
Standards	Electrical specifications	Occupational Safety and Health Act (OSHA)	None
Standards	Electrical specifications	National Fire Protection Association (NFPA)	None
Standards	Electrical specifications	North American Electrical Reliability Corporation (NERC)	None
Standards	Electrical specifications	American Petroleum Institute (API)	None
Standards	Electrical specifications	National Electrical Safety Code (NESC) (only for 230 kilovolt work)	None
Standards	Electrical specifications	National Electrical Code (NEC)	None
Standards	Electrical specifications	Insulated Cable Engineers Association (ICEA)	None

**Table 7-1
Applicable Laws, Ordinances, Regulations, and Standards (Continued)**

Jurisdiction LORS	Applicability	Administering Agency or Professional Association ¹	Required Permit
Standards	Electrical specifications	Association of Edison Illuminating Companies (AEIC) (for medium voltage cable only)	None
Standards	Electrical specifications	Illuminating Engineering Society of North America (IESNA)	None
Standards	Electrical specifications	International Electrotechnical Commission (IEC) standards may be used on motors and other electrical equipment such as large synchronous motor starting Load Commutated Inverter (LCI) manufactured outside of the United States.	None
MECHANICAL ENGINEERING DESIGN CRITERIA			
State			
Title 8 California Code of Regulations (CCR) Division 1, Chapter 4, subchapters –7	Meet standards	Cal/OSHA	Permits for boiler and asbestos contractor
Title 29, Code of Federal Regulations (CFR) Part 1910, Occupational Safety and Health Standards	Safety and health	U.S. Department of Labor, Occupational Safety & Health Administration (OSHA)	None
Title 40, Code of Federal Regulations (CFR) Part 60, Standards of Performance for New Stationary Sources	Protection of environment	U.S. Environmental Protection Agency (USEPA)	None
California Building Code (CBC)	Base plates, anchor bolts, saddles, platforms, pipe supports	Kern County	None
Flammable Liquids, Gases, and Vapors, Chapter 27 Fire Protection, Division 1, Chapter 4, subchapter 7, Group 27	Meet standards, prepare risk management plan	Kern County Department of Environmental Health	None

**Table 7-1
Applicable Laws, Ordinances, Regulations, and Standards (Continued)**

Jurisdiction LORS	Applicability	Administering Agency or Professional Association ¹	Required Permit
Industry			
Design specifications	Meet specifications	American Boiler Manufacturer's Association (ABMA)	None
Design specifications	Meet specifications	Antifriction Bearing Manufacturers Association (AFBMA)	None
Design specifications	Meet specifications	American Gear Manufacturers Association (AGMA)	None
Design specifications	Meet specifications	Air Movers Control Association (AMCA)	None
Design specifications	Meet specifications	American National Standards Institute (ANSI)	None
Design specifications	Meet specifications	American Petroleum Institute (API)	None
Design specifications	Meet specifications	American Society of Civil Engineers (ASCE)	None
Design specifications	Meet specifications	American Society of Heating, Refrigeration and Air Conditioning (ASHRAE)	None
Design specifications	Meet specifications	American Society of Mechanical Engineers (ASME)	None
Design specifications	Meet specifications	American Society for Nondestructive Testing (ASNT)	None
Design specifications	Meet specifications	American Society for Testing Materials (ASTM)	None
Design specifications	Meet specifications	American Welding Society (AWS)	None
Design specifications	Meet specifications	American Water Works Association (AWWA)	None
Design specifications	Meet specifications	Compressed Gas Association (CGA)	None
Design specifications	Meet specifications	Expansion Joint Manufacturing Association (EJMA)	None

**Table 7-1
Applicable Laws, Ordinances, Regulations, and Standards (Continued)**

Jurisdiction LORS	Applicability	Administering Agency or Professional Association ¹	Required Permit
Design specifications	Meet specifications	Heat Exchanger Institute (HEI)	None
Design specifications	Meet specifications	Hydraulic Institute Standards (HI)	None
Design specifications	Meet specifications	Institute of Electrical and Electronics Engineers (IEEE)	None
Design specifications	Meet specifications	Instrument Society of America (ISA)	None
Design specifications	Meet specifications	Manufactures Standardization Society of the Valve and Fitting Industry (MMS)	None
Design specifications	Meet specifications	Cooling Tower Institute (CTI)	None
Design specifications	Meet specifications	National Fire Protection Association (NFPA)	None
Design specifications	Meet specifications	National Bureau of Standards (NBS)	None
Design specifications	Meet specifications	National Electrical Code (NEC)	None
Design specifications	Meet specifications	National Electrical Manufactures Association (NEMA)	None
Design specifications	Meet specifications	Pipe Fabrication Institute (PFI)	None
Design specifications	Meet specifications	Steel Structures Painting Council (SSPC)	None
Design specifications	Meet specifications	Tubular Exchanger Manufactures Association (TEMA)	None
Design specifications	Meet specifications	Uniform Fire Code (UFC)	None
Design specifications	Meet specifications	Underwriters Laboratory (UL)	None
SYSTEM CONTROL ENGINEERING DESIGN CRITERIA			
Industry			
Design specifications	Meet specifications	ANSI/ISA	None
Design specifications	Meet specifications	ASME	None
Design specifications	Meet specifications	National Electric Code (NEC)	None

**Table 7-1
Applicable Laws, Ordinances, Regulations, and Standards (Continued)**

Jurisdiction LORS	Applicability	Administering Agency or Professional Association¹	Required Permit
Design specifications	Meet specifications	National Electric Manufacturers Association (NEMA)	None
Design specifications	Meet specifications	National Electric Safety Code (NESC)	None
Design specifications	Meet specifications	National Fire Protection Association (NFPA)	None
Design specifications	Meet specifications	American Petroleum Institute (API)	None
Design specifications	Meet specifications	Process Industry Practice (PIP)	None

Note:

¹ Please note that the design of all structures and facilities will be based on building codes, specifications, industry standards, and regulations and will be reviewed during the building permit approval process by Kern County.

**Table 7-2
Involved Agencies and Agency Contacts**

Agency	Contact/Title	Telephone
Kern County Building Inspection Division 2700 "M" Street, Suite 100 Bakersfield, CA 93301	Charles Lackey, Director	(661) 862-8650
Kern County Planning Department 2700 "M" Street, Suite 100 Bakersfield, CA 93301	Lorelei H. Oviatt, AICP Division Chief	(661) 862-8866
Caltrans North Region Permits Office MS #41 1823 14th Street Sacramento, CA 942874	Kien Le	(916) 322-6001
San Joaquin Valley Air Pollution Control District Southern Region 34946 Flyover Court Bakersfield, CA 93308	Leonard Scandura, PE Supervising Air Quality Engineer	(661) 392-5601
U.S. Environmental Protection Agency Air Permits Office 75 Hawthorne Street San Francisco, CA 94105	Gerardo Rios, Chief, Permits Office Air Division	(415) 972-3974
California Energy Commission 1519 Ninth Street Sacramento, CA 95814	Eileen Allen, Facilities Siting Program Manager	(916) 654-4082
California Department of Fish and Game Central Region Headquarters Office 1234 E. Shaw Avenue Fresno, CA 93710	Julie Vance, Senior Environmental Scientist	(559) 243-4014 x 222
County of Kern, Environmental Health Services Department (EHSD) 2700 M Street, Suite 300 Bakersfield, CA 93301	Matthew Constantine, Director	(661) 862-8700
State of California, Central Valley Regional Water Quality Control Board 1685 E Street Fresno, CA 93706	Doug Patterson, Senior Water Resource Control Engineer	(559) 445-5146
California Occupational Safety & Health Administration District Office 6150 Van Nuys Boulevard, Suite 405 Van Nuys, CA 91401		(818) 901-5403
Department of Water Resources Division of Engineering, Real Estate Board 1416 19th Street P.O. Box 942836 Sacramento, CA 94236	San Joaquin Field Division 4201 Sabodan Street Bakersfield, CA 93313	(661) 858-5513