CalEPA
Fuels Guidance Document

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Acknowledgements

This guidance document was compiled and written by a multi-agency group consisting of the main state regulatory agencies overseeing motor vehicle fuels in commerce in California. Although the primary contributors are listed we would like to thank all those who contributed to this document through their input and assistance.

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I. Introduction

Alternative fuels have become an issue of national attention. There are at least three major reasons why alternative fuels have come to the forefront of both policy and public attention. Concerns about global warming have led to a movement away from conventional fossil fuels and toward renewable fuels. Increasing demand for energy is a major driver of growth in all fields of fuel production, including alternative fuels. Last, there is a movement by some individuals to lead more locally based lifestyles and it is possible to produce some alternative fuels on an individual or community scale.

It is the responsibility of the government of California to ensure that as new fuels enter into commercial and individual use in California, they do so in a way that is protective of the health of its populace and extraordinary environment. The state agencies who contributed to this document are the primary state agencies involved in the regulation of new fuels in California. The contributors to this document are the California Air Resources Board, the California Department of Food and Agriculture-Division of Measurement Standards, the Department of Forestry and Fire Protection - Office of the State Fire Marshal and the State Water Resources Control Board. These agencies regulate the health, safety, environment, and fair practices for Californians who buy fuels in the marketplace.

To those not immersed in the subject, the regulation of fuels can be confusing and difficult to understand. The purpose of this document is to help potential fuel users and producers to find answers about the regulations affecting their fuel of choice with a limited foray into technical and commercial issues associated with these fuels.

This document is separated into three main parts. In Chapter II there is a fuels matrix which identifies the major current and future fuels likely to enter the California market, and the technical or regulatory requirements of each agency participating in this document. In Chapter III the fuels are defined, for those not familiar with them, and the technical or regulatory terms are described in detail. Chapter IV lists each fuel and the specific technical or regulatory requirements for each fuel that remain to be completed before that fuel will be ready for introduction into commerce. It should be noted that some of the requirements listed in this document are not within the control of the agencies participating in this document and may be controlled by third party organizations.

This document does not address the requirements for the transportation of motor vehicle fuel. The requirements for transporting fuels in tank vehicles and/or tank cars on streets and highways is regulated by United States (U.S.) Department of Transportation, California Highway Patrol, Caltrans, or other regulatory agencies.

This document is not meant to cover federal regulations or local ordinances. The U.S. Environmental Protection Agency (U.S. EPA) is the federal agency responsible for

regulating fuels. More information on federal regulation of fuels is located at http://www.epa.gov/otaq/fuels/index.htm.

This document makes reference to California statutory and regulatory law. The most up to date legal language can be found in the appropriate California codes or regulations found at http://leginfo.legislature.ca.gov/faces/codes.xhtml or at https://govt.westlaw.com/calregs/Index?transitionType=Default&contextData=(sc.Default). In addition, there are references in this document to standards developed by non-governmental standards organizations. These standards are copyrighted and must be purchased from the relevant organization for personal or commercial use.

This document is not intended to, nor can it, replace personal assurance of compliance with the programs and regulations addressed herein. If you are unsure of compliance please contact the applicable regulatory agency to ensure compliance with the agency's programs and regulations.

All percentages referred to in this document are volumetric unless otherwise noted.

This document and the issues discussed within it are in a continual state of flux. To access the most current version of this document can be found at http://www.calepa.ca.gov/biofuels/.

Air Resources Board:

Contact: Chief, Program Planning and Management Branch
California Air Resources Board
(916) 322-8283
P.O. Box 2815
Sacramento, CA 95812

Scope of Program:
The California Air Resources Board (ARB) is a part of the California Environmental Protection Agency, an organization which reports directly to the Governor's Office in the Executive Branch of California State Government.

The Mission of ARB is: To promote and protect public health, welfare and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the state.

ARB is authorized to adopt fuel standards, rules and regulations to achieve the maximum degree of emission reduction possible from vehicular and other mobile sources in order to accomplish the attainment of the state ambient air quality standards at the earliest practicable date. ARB's regulations can be found under the California Code of Regulations title 13, division 3 and title 17, division 3.

In addition to reduction of direct and indirect air pollutants, ARB is authorized by the Global Warming Solutions Act of 2006 (AB 32) to take necessary actions to reduce the Greenhouse Gas Emissions to 1990 levels by 2020. This includes fuel based measures.

ARB is the state air pollution agency. There are also local air pollution agencies, commonly called Air Districts that have separate but related authority to regulate air pollution sources. Generally, ARB has authority to regulate mobile sources in California and the Air Districts have authority to regulate stationary sources. ARB has the sole regulatory authority of air pollution from transportation fuels in California.

Related Links:

ARB's website: http://www.arb.ca.gov/

ARB's Fuels website: http://www.arb.ca.gov/fuels/fuels.htm

ARB's AB32 website: http://www.arb.ca.gov/cc/ab32/ab32.htm

Air District Rules Database: http://www.arb.ca.gov/drdb/drdb.htm

CDFA, Division of Measurement Standards:

Contact: Allan Morrison, Senior Environmental Scientist
Fuels and Lubricants Laboratory
CDFA, Division of Measurement Standards
(916) 229-3046
6790 Florin Perkins Rd, Suite 100
Sacramento CA 95828

Scope of Program:

The California Department of Food and Agriculture, Division of Measurement Standards (CDFA) regulates the quantity and quality of motor vehicle engine fuels sold at retail. The laws and regulations governing the activities of CDFA can be found in the California Business and Profession Code division 5, chapters 1 to 17, the California Code of Regulations title 4, division 9, chapters 1 to 12 and the National Institute of Standards and Technology (NIST) Handbook 44, Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices.

Through the authority granted by division 5 of the California Business and Professions Code, the mission of CDFA is to protect the public and ensure a fair, equitable, and transparent marketplace for fuel producers and sellers. To ensure accurate delivery of fuel quantity, CDFA validates all retail motor fuel dispensers through the process of type approval. CDFA also oversees the activities of county weights and measure officials in testing and certifying retail fuel delivery systems used within the State. In addition, CDFA is responsible for maintaining the quality of the fuel delivered to consumers through the establishment and enforcement of quality standards. Finally, CDFA enforces advertising and labeling standards to ensure that the people of California are properly informed and can make accurate value comparison of the fuels they purchase.

The programs within CDFA that have jurisdiction over retail motor vehicle fuels are:

California Type Evaluation Program:

The California Type Evaluation Program (CTEP) is responsible for all commercial weighing and measuring devices including fuel delivery systems. All new prototype devices must be evaluated, tested and approved before their legal, commercial use in California. This process is known as "type evaluation". The Program may work independently, or with the National Type Evaluation Program (NTEP) of the National Conference of Weights and Measures (NCWM), to type approve all motor fuel delivery systems from bulk delivery to retail dispensers. (Bus. & Prof. Code, div. 5, ch. 5, Cal. Code Regs., tit. 4, div. 9, ch. 2, and Cal. Code Regs., tit. 4, div. 9, ch. 3, art. 1)

Measurement Compliance and Registered Service Agency Programs:

The purpose of the Measurement Compliance Program is to minimize the measurement error in commercial transactions through periodic inspection and testing of commercial measuring devices, including fueling devices. This Program works closely with the Registered Service Agency Program. According to State law, any person, firm, corporation, or association who installs or repairs commercial weighing and measuring devices for payment of any kind is a service agency. CDFA registers all service agencies performing such work and licenses their employees (agents) to ensure that commercial equipment is properly installed and serviced. (Bus. & Prof. Code, div. 5, ch. 2, §12210, chs. 5 and 5.5 and Cal. Code Regs., tit. 4, div. 9, ch. 4)

Metrology Laboratory:

The Metrology Laboratory maintains, in concert with the National Institute of Standards and Technology, the State's official length, mass, and volume standards. These precisely calibrated standards are used to certify the field standards used by state, county and registered service agencies to ensure all retail motor vehicle fuels are dispensed accurately. (Bus. & Prof. Code, div. 5, ch. 3)

Fuels and Lubricants Program:

The principal task of the Fuels and Lubricants Program is to regulate and enforce the advertising, labeling, quantity, and quality specifications for motor oils, engine fuels, alternative fuels, gear oils, brake fluids, automatic transmission fluids, and engine coolants. Program investigators, along with county inspectors, routinely inspect retail fueling stations for compliance, handle consumer complaints, and conduct investigations into possible fraudulent activities. (Bus. & Prof. Code, div. 5, chs. 14 and 15 and Cal. Code Regs., tit. 4, div. 9, chs. 6 and 7)

State law gives CDFA the authority to regulate the quality of spark-ignition and compression-ignition engine fuels. The law requires that CDFA adopt by reference the latest standards established by a recognized standards development organization such as ASTM International or SAE International. A fuel can only be sold to the public when such a standard has been developed. (Bus. & Prof. Code, div. 5, §§13441 and 13451)

Variances for Developmental Engine Fuels:

State law gives CDFA the authority to grant a variance for the sale of developmental engine fuels, for the purpose of collecting information to support the development of a consensus organization specification, so long as certain conditions are met. (Bus. & Prof. Code, div. 5, ch. 14, §13405, and Cal. Code Regs., tit. 4, div. 9, ch. 6, art. 5, §4145)

Alternative and Renewable Fuels Program:

The Alternative and Renewable Fuels Program is responsible for overseeing the fuel quality, dispenser accuracy, and advertising of emerging alternative and renewable fuels sold at retail. Currently, the Program is developing fuel quality specifications and test methods for low–carbon and renewable fuels that can be produced from agricultural waste.

California Agricultural Commissioners and Sealers:

Under the general direction and oversight of CDFA, county sealers and their staff enforce the laws and regulations of the California Business and Professions Code. They have the authority to enforce fuel quality, quantity, and advertising laws and regulations, and are responsible for testing and sealing commercial devices that dispense fuel. These enforcement programs protect and promote the local economy and commerce of each county. (Bus. & Prof. Code, div. 5, §12001 et seq.)

Related Links:

California Department of Food and Agriculture, Division of Measurement Standards Home page: www.cdfa.ca.gov/dms

Link to complete California Business and Professions Code Division 5: (http://www.leginfo.ca.gov/calaw.html)

Link to complete California Code of Regulations Title 4, Division 9: (http://ccr.oal.ca.gov/linkedslice/default.asp?SP=CCR-1000&Action=Welcome)

Extracts from the California Business and Professions Code and California Code of Regulations pertaining to Weights and Measures and Fuels (http://www.cdfa.ca.gov/dms/publications.html)

National Type Evaluation Program (NTEP) within the National Conference of Weights and Measures: (http://www.ncwm.net)

National Institute of Standards and Technology (NIST) Handbook 44: (http://www.nist.gov/pml/wmd/pubs/hb44.cfm)

ASTM International: Fuels Standards and Testing Methods: (http://www.astm.org/)

SAE International: Fuel Standards: (http://www.sae.org/)

California County Agricultural Commissioners and Sealers Contact Information: (http://www.cdfa.ca.gov/exec/county/county_contacts.html)

CAL FIRE - Office of the State Fire Marshal:

Contact: Paul Eck, Chief, Fire Engineering, Arson and Bomb Division
Steve Guarino, Chief, Fire and Life Safety Division (Northern Region)
CAL FIRE – Office of the State Fire Marshal
(916) 445-8200
1131 S Street
Sacramento, CA 95811

Scope of Program:

The Department of Forestry and Fire Protection (CAL FIRE) – Office of the State Fire Marshal (OSFM) is part of the Natural Resources Agency. The mission of OSFM is to protect life and property through the development and application of fire prevention engineering, education and enforcement. The Health and Safety Code section 13108 authorizes the State Fire Marshal to prepare and adopt building standards regulations by establishing minimum requirements for the prevention of fire, and for the protection of life and property against fire and panic which is including but not limited to regulations for storage, handling and use of hazardous materials and storage and/or dispensing fuels. The OSFM is responsible for the adoption of building standards regulations as authorized under Health and Safety Code section 18935.

Division 1 of title 19 of the California Code of Regulations contains the general fire and panic safety standards to establish minimum standards for the prevention of fire and for the protection of life and property against fire, explosion and panic. Health and Safety Code section 41956 authorizes the State Fire Marshal to be the only agency responsible for determining whether any vapor recovery component or system creates a fire hazard. OSFM regulations on vapor recovery systems are found in California Code of Regulations title 19, division 1, chapter 11.5. All phase 1 and 2 vapor recovery equipment shall be approved and certified by the OSFM.

California Code of Regulations title 24 is known as the California Building Standards Code and consists of 12 parts: Part 1 California Building Standards Administrative Code; Part 2 California Building Code; Part 2.5 California Residential Building Code; Part 3 California Electrical Code; Part 4 California Mechanical Code; Part 5 California Plumbing Code; Part 6 California Energy Code; Part 7 California Elevator Safety Construction Code (no longer published in California Code of Regulations title 24, see California Code of Regulations title 8); Part 8 California Historical Building Code; Part 9 California Fire Code; Part 10 California Existing Building Code; Part 11 California Green Building Standards Code; and Part 12 California Reference Standards Code.

The California Fire Code contains the requirements for motor fuel-dispensing facilities (including above/underground fuel tanks) and the storage, use and handling of flammable and combustible liquids, compressed gases, flammable gases, cryogenic fluids, liquefied petroleum gases, as well as many other hazardous materials. The

California Fire Code also contains the requirements for construction permits and installation of aboveground fuel storage tanks.

The 2013 edition of the California Fire Code is currently adopted by OSFM. OSFM, along with other state agencies, is in the process of developing and proposing building standards for the 2016 California Building Standards Codes. The 2016 California Building Standards Codes, including the 2016 edition of the California Fire Code will become effective January 1, 2017.

With regard to the building standards regulations in California Code of Regulations title 24, the OSFM is the enforcing agency or authority having jurisdiction on all state owned/occupied facilities. The local city and county fire departments and fire protection districts are the enforcing agency or authority having jurisdiction for facilities within their respective jurisdiction.

In addition, Health and Safety Code division 20, chapter 6.67 gives the OSFM oversight of the Aboveground Petroleum Storage Act (APSA) and the authority to adopt regulations to implement it. The APSA requires certain aboveground storage tank facilities with 1,320 gallons or more of petroleum to develop and implement a Spill Prevention, Control, and Countermeasure plan in accordance with the Code of Federal Regulations title 40, part 112. At the local government level, local Unified Program Agencies are responsible for the inspection and enforcement of the APSA and the California Fire Code, Hazardous Materials Management Plan and Inventory Statement programs within their jurisdiction. Most Unified Program Agencies have been established as a function of a local environmental health or fire department.

Related Links:

Office of the State Fire Marshal: http://osfm.fire.ca.gov/

OSFM Vapor Recovery Program:
http://osfm.fire.ca.gov/strucfireengineer/strucfireengineer_vaporrecovery.php

OSFM “CUPA” Program: http://osfm.fire.ca.gov/cupa/cupa.php

California Code of Regulations Title 24: http://www.bsc.ca.gov/Codes.aspx

California Code of Regulations Title 19:
http://www.oal.ca.gov/ or
https://govt.westlaw.com/calregs/Index?bhcp=1&transitionType=Default&contextData=(sc.Default)

National Fire Protection Association: http://www.nfpa.org/

Underwriters Laboratories Inc.: http://ul.com/

State Water Resources Control Board:

Contact: Laura S. Fisher, Chief
Underground Storage Tank Leak Prevention Technical Unit
State Water Resources Control Board
(916) 341-5870
1001 I Street
Sacramento, CA 95814

Scope of Program:

The State Water Resources Control Board (State Water Board) is a part of the California Environmental Protection Agency, an organization which reports directly to the Governor's Office in the Executive Branch of California State Government. The mission of the State Water Board is to preserve, enhance, and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations.

Underground storage tanks (USTs) used for the storage of hazardous substances are potential sources of contamination of the ground and underlying aquifers, and may pose other dangers to public health and the environment. The protection of the public and the environment from releases of hazardous substances is a statewide concern. The Legislature therefore declared that it is in the public interest to establish a continuing program for the purpose of preventing contamination from, and improper storage of, hazardous substances stored underground. It is the intent of the Legislature to establish orderly procedures that will ensure that newly constructed USTs meet appropriate standards and that existing tanks be properly maintained, inspected, tested, and upgraded so that the health, property, and resources of the people of the state will be protected.

The State Water Board provides regulatory oversight and technical guidance to the Unified Program Agencies to facilitate consistent and accurate implementation of the UST Program as developed by the State Water Board.

The laws and regulations governing USTs can be found in the Code of Federal Regulations parts 280 and 281, Health and Safety Code chapter 6.7 commencing with section 25280, and the California Code of Regulations title 23, commencing with section 2610.

Related Links:

State Water Board UST Program Website:
http://www.waterboards.ca.gov/water_issues/programs/ust/

State Water Board UST Program Alternative Compatibility Option Website:
http://www.waterboards.ca.gov/ust/alt_comp_opt.shtml

State Water Board UST Statutes and Regulations:
http://www.waterboards.ca.gov/water_issues/programs/ust/regulatory/index.shtml#regs

Code of Federal Regulations Part 280 and 28:
http://www.epa.gov/oust/fedlaws/index.htm

UST Program Guidance:
http://www.waterboards.ca.gov/water_issues/programs/ust/leak_prevention/lgs/index.shtml

California Approved Leak Detection Equipment:
http://www.waterboards.ca.gov/water_issues/programs/ust/leak_prevention/lg113/index.shtml

Federal Approved Leak Detection Equipment:
http://www.nwglde.org/

Underwriters Laboratories Certifications Directory:
http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.html

Underwriters Laboratories Alternative Fuels:
http://industries.ul.com/blog/alternative-fuels

II. Fuels Matrix

Fuel Type			Gasoline w/ E10	Gasoline w/ E15	Ethanol Fuel for Flex Fuel Vehicle	Gasoline w/ Butanol 16%	Gasoline ethanol blends E16-50		Diesel Fuel Oil	Biodiesel Blends B6-B20	Renewable Diesel Fuel R6-R100	Biodiesel Blends B21-B100		Natural Gas Liquefied or Compressed	Liquefied Petroleum Gas	Dimethyl Ether		Hydrogen	Electricity
	Consenses organization fuel specification	ASTM or SAE	ASTM D4814	ASTM D4814	ASTM D5798	ASTM D4814	ASTM D4814		ASTM D975	ASTM D7467	ASTM D975	None		WK 40094 & SAE J1616	ASTM D1835	ASTM D7901 14b		SAE J2719	None
Air Resources Board		Authority to Regulate	●	●	●	●	●		●	●	●	●		●	●	●		●	●
		Regulations	●	■	●	■	■		●	●	●	■		●	●	■		●	N/A
		U.S. EPA Requirements	●	●	●	●	■		●	●	●	●		●	●	●		●	●
		Multimedia	●	■	●	■	■		●	●	●	●		N/A	N/A	■		●	●
		Compatible with Petroleum Pipelines	◀	◀	◀	●	◀		●	◀	●	◀		N/A	N/A	N/A		N/A	N/A
		Vapor Recovery	●	■	◀	■	■		●	●	●	●		N/A	N/A	N/A		N/A	N/A
		Vehicle Issues	●	◀	●	◀	◀		●	◀	●	■		◀	◀	◀		◀	●
		Production Issues	●	●	●	■	●		●	●	●	◀		●	●	■		■	●
		Fueling Issues	●	■	●	■	■		●	●	●	●		●	●	■		■	◀
California Department of Food and Agriculture		ASTM/SAE	●	◀	●	●	■		●	●	●	■		◀	●	●		●	N/A
		Authority to Regulate	●	●	●	●	●		●	●	●	●		●	●	●		●	●
		Regulations	●	◀	●	●	◀		●	●	●	◀		●	●	●		●	●
		Quality Standard for Fuel Use	●	◀	●	●	◀		●	●	●	◀		●	●	●		●	●
		Quality Test Methods	●	●	●	●	●		●	●	●	●		●	●	●		●	●
		Quality Test Equipment	●	●	●	●	●		●	●	●	●		●	●	●		●	●
		Metering System	●	●	●	●	●		●	●	●	●		●	●	●		●	●
		Quantity Test Method	●	●	●	●	●		●	●	●	●		●	●	●		●	●
		Quantity Test Equipment	●	●	●	●	●		●	●	●	●		●	●	●		●	●
		Method of Sale	●	●	●	●	●		●	●	●	●		●	●	●		●	●
		Labeling	●	◀	●	●	◀		●	●	●	◀		●	●	●		●	●
		Advertising	●	●	●	●	●		●	●	●	●		●	●	●		●	●
State Fire Marshal		Regulated by APSA (Aboveground Petroleum Storage Act)	●	●	●	●	●		●	●	● R6-R99; N/A for R100	● B21-B99; N/A for R100		N/A	N/A	N/A		N/A	N/A
		Regulated by CA Fire Code	●	●	●	●	●		●	●	●	●		●	●	◀		●	●
		NFPA Standards	●	●	●	●	●		●	●	●	●		●	●	◀		●	●
		Vapor Recovery	●	■	◀	■	■		N/A	N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A
		Fuel Dispensing Systems/Components	●	◀	◀	■	◀		●	◀	◀	◀		●	●	■		●	●
		Storage Containers, Tanks, Cylinders, Vessels	●	●	●	●	●		●	●	●	●		●	●	●		●	N/A
State Water Resources Control Board		ASTM	●	●	●	●	●		●	●	●	■		●	●	●		●	●
		Regulated by CA Health & Safety Code	●	●	●	●	●		●	●	●	●		●	N/A	●		●	N/A
		Leak Detection Functional Testing	●	◀	●	◀	◀		●	●	●	■		■	N/A	■		■	N/A
		Testing Organization Approval	●	●	●	◀	●		●	●	●	◀		■	N/A	■		■	N/A
		Industry Code and Engineering Standards	●	●	●	◀	●		●	●	●	◀		■	N/A	■		■	N/A

● = There are no technical, or regulatory issues

◀ = There are technical issues with use of this fuel.

■ = There are significant technical issues, additional regulations are needed, or fuel does not meet existing regulations.

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III. Definitions of Fuels and Fuel Requirements

This chapter consists of definitions for current and future fuels, as well as descriptions of the technical or regulatory requirements of each participating agency for those fuels.

Fuel Definitions:

Gasoline w/ E10: A volatile mixture of liquid hydrocarbons with up to 10 percent ethanol, generally containing small amounts of additives, suitable for use as a fuel in spark-ignition internal combustion engines. The applicable ASTM standard for gasoline is ASTM D4814, *Standard Specification for Automotive Spark-Ignition Engine Fuel*.

Gasoline w/ E15: A volatile mixture of liquid hydrocarbons with 15 percent ethanol, generally containing small amounts of additives, suitable for use as a fuel in spark-ignition internal combustion engines. The applicable ASTM standard for gasoline is ASTM D4814, *Standard Specification for Automotive Spark-Ignition Engine Fuel*.

Ethanol Fuel for Flex Fuel Vehicles: A volatile mixture of 51 percent to 83 percent ethanol and 49 percent to 17 percent hydrocarbons, generally containing small amounts of additives, for use in automotive spark-ignition internal combustion engines. The applicable ASTM standard is ASTM D5798, *Standard Specification for Ethanol Fuel Blends for Flexible-Fuel Automotive Spark-Ignition Engines.*

Gasoline w/ Butanol 16 percent: A volatile mixture of liquid hydrocarbons with up to 15 percent butanol, generally containing small amounts of additives, suitable for use as a fuel in spark-ignition internal combustion engines. The latest applicable ASTM standard for gasoline is ASTM D4814, *Standard Specification for Automotive Spark-Ignition Engine Fuel.*

Gasoline Ethanol Blends E16-50: A volatile mixture of liquid hydrocarbons with 16 percent to 50 percent ethanol, generally containing small amounts of additives, suitable for use as a fuel in spark-ignition internal combustion engines. The applicable ASTM standard for gasoline is ASTM D4814, *Standard Specification for Automotive Spark-Ignition Engine Fuel.*

Diesel Fuel Oil: A hydrocarbon oil fuel used in compression-ignition engines that may contain up to 5 percent biodiesel (B5) or 5 percent renewable diesel (R5). The applicable ASTM standard for Diesel Fuel Oil is ASTM D975, *Standard Specification for Diesel Fuel Oils.*

Biodiesel Blends B6-B20: A blend of diesel fuel oil and biodiesel fuel used in compression-ignition engines that contains between 6 percent and 20 percent biodiesel. The applicable ASTM standard for B6 to B20 is ASTM D7467, *Standard Specification for Diesel Fuel Oil, Biodiesel Blend (B6 to B20).*

Renewable Diesel Fuel Blends R6-R100: A blend of diesel fuel oil and renewable diesel fuel oil used in compression-ignition engines that contains between 6 and 100 percent

renewable diesel. The applicable ASTM standard for R6 to R100 is ASTM D975, *Standard Specification for Diesel Fuel Oils.*

Biodiesel Blends B21-B100: A blend of diesel fuel oil and biodiesel used in compression-ignition engines that contains between 21 percent and 100 percent biodiesel. ASTM has not adopted a standard for B21 to B100 fuel. The applicable ASTM standard for B100 blendstock is ASTM D6751, *Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels.*

Natural Gas: A mixture of hydrocarbon gases, principally methane together with varying quantities of ethane, propane, butane, and other gases. Compressed Natural Gas (CNG) means natural gas that has been compressed to a pressure greater than ambient pressure. Liquefied Natural Gas (LNG) means natural gas that has been cryogenically cooled so as to liquefy it for use as a vehicle fuel. An ASTM Standard for natural gas is under development.

Liquefied Petroleum Gas (LPG): A mixture of petroleum gases, principally propane and butane, that have been pressurized and cooled so as to liquefy it for use as a vehicle fuel. The applicable ASTM standard for LPG is ASTM D1835, *Standard Specification for Liquefied Petroleum (LP) Gases.*

Dimethyl Ether (DME): A non-petroleum based fuel that can be produced from a variety of feedstocks, including natural gas or bio-methane. This specification covers DME for use as a fuel in engines specifically designed or modified for DME and for blending with liquefied petroleum gas (LPG). The applicable ASTM standard for DME is ASTM D7901-14b, *Standard Specification for Dimethyl Ether for Fuel Purposes.*

Hydrogen (H2): A fuel composed of the high purity hydrogen intended for consumption in an internal combustion engine or fuel cell. The applicable SAE standard is SAE J2719, *Hydrogen Fuel Quality for Fuel Cell Vehicles.*

Electricity: Electric current used as a source of power for a vehicle, typically stored as chemical potential energy in a battery. There is no applicable ASTM or SAE standard for electricity.

Fuel Blending Components Definitions:

Biodiesel: A liquid fuel consisting of fatty acid alkyl esters, produced from biologically derived fats, or oils and an alkyl alcohol. Most biodiesel is Fatty Acid Methyl Ester (FAME). Multiple feedstocks such as vegetable oil, animal fat or waste oil can be used in biodiesel production. Biodiesel is produced through a process called transesterification wherein a fat or oil feedstock undergoes reaction with an alcohol, typically methanol, and a catalyst, yielding biodiesel and glycerin.

Butanol: A four carbon alcohol, also called butyl alcohol. Butanol can be derived from biological sources through fermentation in a process similar to ethanol production.

Diesel Fuel Oil: A liquid hydrocarbon fuel containing hydrogen and carbon atoms with trace amounts of oxygen, nitrogen, and sulfur. Traditionally, diesel fuel oil has been produced from the fractional distillation of petroleum crude oil. Currently, diesel fuel oil may be produced by cracking of petroleum crude oil or by a Fischer-Tropsch synthesis from natural gas, coal, or other carbon source. Addition synthetic production pathways are possible.

Ethanol: A two carbon alcohol also known as ethyl alcohol. Ethanol used in motor vehicle fuel is rendered unfit to drink with the addition of 3 percent or less hydrocarbon denaturant. Ethanol is primarily produced commercially through fermentation of sugars derived from feedstocks such as corn, sugarcane, or sugar beets. Corn is currently the predominant ethanol feedstock in the United States. Ethanol can also be produced from cellulose using advanced techniques to convert the cellulose into fermentable sugars.

Gasoline: A volatile mixture of hydrocarbons containing hydrogen and carbon atoms with trace amounts of oxygen, nitrogen and sulfur. Traditionally, gasoline has been produced from the fractional distillation of petroleum crude oil. Currently, gasoline may be produced by cracking of petroleum crude oil or by other synthetic production processes.

Renewable Diesel: A liquid hydrocarbon fuel derived from biomass, containing hydrogen and carbon atoms with trace amounts of oxygen, nitrogen, and sulfur. Renewable diesel can be produced from the same biomass feedstocks as biodiesel. Currently there are four pathways for production of renewable diesel. The first is produced through a process called hydrotreating, wherein a fat or oil is reacted with hydrogen and a catalyst. The second is biomass gasification followed by a Fischer-Tropsch synthesis. The third pathway is biomass pyrolysis. The fourth is a biological production of a hydrocarbon oil. Additional synthetic production pathways are possible. The chemical properties of renewable diesel are indistinguishable from petroleum based diesel.

Air Resources Board Terms & Descriptions:

ASTM:
The consensus standard development organization ASTM International standard specification for the fuel, if one exists. ASTM enacts its specifications based on a consensus ruling of working groups consisting of people in the fuel production and engine manufacturing communities. ASTM has not introduced specifications for natural gas in any form for use as a motor vehicle fuel, but there are other specifications available for this fuel. For the remaining new liquid fuels, ASTM usually introduces a specification before U.S. EPA will issue specifications, making the fuel legal for entry into commerce.

Authority to Regulate:
This indicates whether the statutory authority to regulate the fuel in question has been granted to the ARB by the California Legislature.

Regulations:
All new fuels must have specifications set by ARB or CDFA to be commercially sold legally in California. Generally, if one specification is more restrictive it trumps the less restrictive specification.

U.S. EPA Requirements:
For fuels to be sold in the United States, they must be compliant with all U.S. EPA requirements. All gasoline or diesel fuels must be registered according to section 211 of the Clean Air Act.

Multimedia Evaluation:
Multimedia evaluation is a statutory requirement for an assessment of the potential impacts of new fuels on human and environmental health including air, water and soil that may result from the production, use, or disposal of the motor vehicle fuel that may be used to meet the state board's motor vehicle fuel specifications. The language for this requirement can be found in the Health and Safety Code section 43830.8. Multimedia evaluations are conducted jointly by the Multimedia Working Group (MMWG), comprised of ARB as a lead agency with the other boards and departments of the CalEPA. The outcome of a multimedia evaluation is reviewed by the California Environmental Policy Council (CEPC), which consists of the chairs and directors of the boards and departments of CalEPA. The CEPC must determine the acceptability of the fuel formulations proposed for use in the State.

Compatible with Petroleum Pipelines:
Whether or not a fuel can be transported by conventional petroleum pipeline is determined by the pipeline company, and is based primarily on its compatibility with jet fuel. Some fuels may also have more tendency to pick up water during transport than petroleum fuels, which is a major concern for pipeline companies.

Fuels which are currently not compatible with petroleum pipelines will remain so, unless a major policy decision is made by the pipeline companies, or a new pipeline for specific fuels is built. Although a fuel may not be compatible with petroleum pipelines, this does not mean there is no way to transport that fuel. Fuels that are not compatible with petroleum pipelines can still be transported by truck or rail to their destination.

Vapor Recovery:
All vapor recovery system for gasoline marketing operations must be certified by the Air Resources Board in accordance with Health and Safety Code Section 41954 and Title 17 California Code of Regulations Section 94010 et seq.

Vehicle Issues:
Addresses any vehicle-fuel incompatibility issues. For example, many existing gasoline vehicles will give a check engine light for gasoline with ethanol content above 10 percent. Other equipment regulated by ARB such as non-road and marine equipment may also have incompatibility issues.

Production Issues:
Addresses issues with the current technology refining process and limitations, if any.

Fueling Issues:
Addresses any issues with the current fueling and delivery system for the fuels. Fueling means the infrastructure required to bring the fuel to vehicle fuel tanks. Delivery means reliable mass delivery to consumers.

CDFA, Division of Measurement Standards Terms & Descriptions:

ASTM/SAE:
The consensus standard development organization ASTM International or SAE International standard specification for the fuel if one exists. Both ASTM and SAE enact specifications based on a consensus ruling of working groups consisting of fuel producers, fuel users and general interest organizations including state and federal governmental agencies.

CDFA is required under the Business and Profession Code division 5, chapter 14, sections 13440 and 13450, to adopt by reference either ASTM or SAE standards for spark-ingnition and compression- ignition fuels once ASTM or SAE has published their standards. If such a standard does not exist for a fuel, CDFA may establish an intern standard until such time that ASTM or SAE develops a standard for that fuel.

Authority to Regulate:
CDFA has the authority under division 5 of the Business and Professions Code to regulate the sale of fuel, including but not limited to the enforcement of quality and quantity standards, method of sale, and advertising and labeling requirements.

Regulations:
CDFA has established regulations in title 4, division 9 of the California Code of Regulations to enforce fuel quality and quantity standards, method of sale, and advertising and labeling requirements.

Quality Standard for Fuel Use:
ASTM or SAE has a recognized quality standard for the fuel. State law requires that if a consensus standard development organization approved by the American National Standards Institute (ANSI) develops a fuel standard, CDFA must adopt the standard.

Quality Test Methods:
ASTM or SAE, or State test methods exist for fuel quality analyses.

Quality Test Equipment:
CDFA has adequate equipment and instrumentation to perform fuel quality analyses.

Metering Systems:
Prototype fuel dispensing systems have successfully passed type evaluation testing and commercial fuel dispensing systems are available for use in the sale of the fuel.

Quantity Test Methods:
National Type Evaluation Program or California Type Evaluation Program test methods have been established to conduct type evaluation tests. National Institute of Standards and Technology or CDFA test methods have been established to conduct field accuracy tests.

Quantity Test Equipment:
National Type Evaluation Program or California Type Evaluation Program reference standards have been established and CDFA possesses adequate test equipment to conduct type evaluation tests. In addition, CDFA and/or county sealers of weights and measures possess field standards and test equipment certified by the CDFA Metrology Laboratory to conduct field accuracy tests.

Method of Sale:
Fuels shall be sold by weight, volume, or energy content. The method of sale shall contain accurate and adequate information so that purchasers can make price and quantity comparisons.

Labeling:
Dispensers and storage tanks (as applicable) shall be labeled with product identity and other legally required information, e.g. brand and grade. Containers and consumer packages shall contain a declaration of identity, net quantity, and statement of responsibility.

Advertising:
Every person offering a fuel for sale to the public must display a clearly visible sign advertising the product name, price, brand, grade of fuel and other legally required information.

CAL FIRE - Office of the State Fire Marshal Terms & Descriptions:

The following terms are from the California Code of Regulations title 19, division 1, the California Fire Code (California Code of Regulations title 24, part 9), and/or the California Building Code (California Code of Regulations title 24, part 2):

Alcohol-Blended Fuels:
Flammable liquids consisting of 10-percent or greater, by volume, ethanol or other alcohols blended with gasoline. (2013 California Fire Code, ch. 2)

Alternate Means of Protection
The provisions of these regulations (California Code of Regulations title 19, div. 1) are not intended to prevent the use of any equipment, material, assembly of materials, method of construction, method of installation of equipment, or means of protection not specifically prescribed by these regulations. The enforcing agency may approve any such alternate provided the proposed design is satisfactory and complies with the intent of these regulations and that the material, assembly of materials, equipment, method of construction or method of installation of equipment, or means of protection offered is, for the purpose intended, at least equivalent to that prescribed in these regulations in quality, strength, effectiveness, fire resistance, durability and safety. (Cal. Code Regs., tit. 19, div. 1)

Approved:
Acceptable to the fire code official or authority having jurisdiction. (2013 California Fire Code, ch. 2)

California Fire Code:
Automotive motor fuel-dispensing facilities, marine motor fuel-dispensing facilities, fleet vehicle motor fuel-dispensing facilities, aircraft motor-vehicle fuel-dispensing facilities and repair garages shall be in accordance with this chapter and the *California Building Code, California Plumbing Code* and *California Mechanical Code*. Such operations shall include both those that are accessible to the public and private operations.
(2013 California Fire Code, ch. 23)

Dispensing Device:
A unit assembly approved for installation consisting of a power-operated pumping unit, strainers, metering devices, valves, dispensing outlet(s) for hoses and dispensing nozzles designed to stop the discharge of liquid automatically when the control level of the dispensing nozzle is released. (Cal. Code Regs., tit. 19, §1918.11(a))

Dispensing devices incorporating provisions for vapor recovery shall be listed and labeled. (2013 California Fire Code, ch. 23)

Dispensing Nozzle:
A regulating mechanism with spout approved for installation in conjunction with a ”dispensing device“ which controls the flow of gasoline into fuel tanks, and returns vapors to an underground tank. (Cal. Code Regs., tit. 19, §1918.11(b))

Emergency Shutoff Valve:
A valve designed to shut off the flow of gases or liquids. (2013 California Fire Code, ch. 2)

Fire Code Official:
The fire chief or other designated authority charged with the administration and enforcement of the code, or a duly authorized representative. (2013 California Fire Code, ch. 2)

Labeled:
Labeled shall mean [vapor recovery] systems or components bearing the label, symbol, or other identifying mark of a testing laboratory approved by the State Fire Marshal, or the label of the State Fire Marshal. (Cal. Code Regs., tit. 19, div. 1, §1918.15)

Listed:
Equipment, materials, products or services included in a list published by an organization acceptable to the fire code official and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product, or service meets identified standards and has been tested or evaluated and found suitable for a specified purpose. (2013 California Fire Code, ch. 2)

Listed shall also mean equipment or materials accepted by the State Fire Marshal as conforming to the provisions of the State Fire Marshal's regulations and which are included in a list published by the State Fire Marshal. (2013 California Fire Code, ch. 2)

Listed Equipment:
Electrical equipment, dispensers, hose, hose connections, vehicle fuel connections, nozzles, and pumps used in flammable and combustible liquid fuel dispensing systems shall be listed by an approved and recognized organization such as UL.
(2013 California Fire Code, ch. 23, §2306)

Breakaway fittings, swivels, flexible connectors, or dispenser emergency shutoff valves, vapor recovery systems, leak detection devices, and pumps used in alcohol-blended fuel dispensing systems shall be listed or approved for the specific purpose.
(2013 California Fire Code, ch. 23, §2306)

Hydrogen motor-fueling connections shall be listed and labeled or approved for use with hydrogen. (2013 California Fire Code, ch. 23, §2309)

Request for Alternate Means of Protection

Requests for approval to use an alternative material, assembly or materials, equipment, method of construction, method of installation of equipment, or means of protection shall be made in writing to the enforcing agency by the owner or the owner's authorized representative and shall be accompanied by a full statement of the conditions. Sufficient evidence or proof shall be submitted to substantiate any claim that may be made regarding its conformance. The enforcing agency may require tests and the submission of a test report from an approved testing organization as set forth in California Code of Regulations title 19, chapter 1.5, section 213, to substantiate the equivalency of the proposed alternative means of protection. (2013 California Fire Code, ch. 1, div. 1 and Cal. Code Regs., tit. 19, div. 1, ch. 1)

When a request for alternate means of protection involves hazardous materials, the authority having jurisdiction may consider implementation of the findings and recommendations identified in a Risk Management Plan (RMP) developed in accordance with California Code of Regulations title 19, div. 2, chapter 4.5, article 3. (2013 California Fire Code, ch. 1, div. 1)

Approval of a request for use of an alternative material, assembly of materials, equipment, method of construction, method of installation of equipment, or means of protection made pursuant to these provisions shall be limited to the particular case covered by request and shall not be construed as establishing any precedent for any future request. (2013 California Fire Code, ch. 1, div. 1 and Cal. Code Regs., tit. 19, div. 1, ch. 1)

Vapor Recovery Labels:

Every gasoline vapor recovery system or component which is certified by the State Fire Marshal, shall bear a label conforming to the provisions of this section. Labels shall be placed in a conspicuous location and shall be attached by the manufacture during production or fabrication. (Cal. Code Regs., tit 19, div. 1, §1918.22(a))

Vapor Recovery System:

A vapor recovery system consists of a vapor gathering system capable of collecting the hydrocarbon vapors and gases discharged and a vapor disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission into the atmosphere, with all tank gauging and sampling devices gastight except when gauging or sampling is taking place. (Health & Saf. Code, div. 26, §41952)

The following terms are taken from the Aboveground Petroleum Storage Act (APSA) in Health and Safety Code division 20, chapter 6.67:

Aboveground Storage Tank (AST):
Under the Aboveground Petroleum Storage Act, AST means a tank that has the capacity to store 55 gallons or more of petroleum and that is substantially or totally above the surface of the ground, except that, for purposes of this chapter, "aboveground storage tank" or "storage tank" includes a tank in an underground area. "Aboveground storage tank" does not include any of the following:

(1) A pressure vessel or boiler that is subject to part 6 (commencing with section 7620) of division 5 of the Labor Code.

(2) A tank containing hazardous waste, as described in subdivision (g) of section 25316, if the Department of Toxic Substances Control has issued the person owning or operating the tank a hazardous waste facilities permit for the storage tank.

(3) An aboveground oil production tank that is subject to section 3106 of the Public Resources Code.

(4) Oil-filled electrical equipment, including, but not limited to, transformers, circuit breakers, or capacitors, if the oil-filled electrical equipment meets either of the following conditions:

(A) The equipment contains less than 10,000 gallons of dielectric fluid.

(B) The equipment contains 10,000 gallons or more of dielectric fluid with PCB levels less than 50 parts per million, appropriate containment or diversionary structures or equipment are employed to prevent discharged oil from reaching a navigable water course, and the electrical equipment is visually inspected in accordance with the usual routine maintenance procedures of the owner or operator.

(5) A tank regulated as an underground storage tank under chapter 6.7 (commencing with section 25280) of this division and chapter 16 (commencing with section 2610) of division 3 of title 23 of the California Code of Regulations and that does not meet the definition of a tank in an underground area.

(6) A transportation-related tank facility, subject to the authority and control of the United States Department of Transportation, as defined in the Memorandum of Understanding between the Secretary of Transportation and the Administrator of the United States Environmental Protection Agency, dated November 24, 1971, set forth in appendix A to part 112 (commencing with Section 112.1) of subchapter D of chapter I of title 40 of the Code of Federal Regulations. (Health & Saf. Code, §25270.2)

Petroleum:
Crude oil, or a fraction thereof, that is liquid at 60 degrees Fahrenheit temperature and 14.7 pounds per square inch absolute pressure. (Health & Saf. Code, §25270.2)

Spill Prevention, Control, and Countermeasure Plan:
Each owner or operator of a tank facility shall prepare and implement an Spill Prevention, Control, and Countermeasure Plan in accordance with the Code of Federal Regulations title 40, part 112. (Health & Saf. Code, §25270.4.5)

Tank Facility:
A tank facility is subject to APSA if the tank facility is subject to the oil pollution prevention regulations specified in the Code of Federal Regulations title 40, part 112 or the tank facility has a storage capacity of 1,320 gallons or more of petroleum. (Health & Saf. Code, §25270.3)

State Water Resources Control Board Terms & Descriptions:

Underground Storage Tank:
UST means any one or combination of tanks, including pipes connected thereto, that is used for the storage of hazardous substances and that is substantially or totally beneath the surface of the ground. (Health & Saf. Code, ch. 6.7, §25281(y)(1))

Hazardous Substance:
Hazardous substance means either of the following:
(1) All of the following liquid and solid substances, unless the department, in consultation with the board, determines that the substance could not adversely affect the quality of the waters of the state:

(A) Substances on the list prepared by the Director of Industrial Relations pursuant to section 6382 of the Labor Code.
(B) Hazardous substances, as defined in section 25316.
(C) Any substance or material that is classified by the National Fire Protection Association (NFPA) as a flammable liquid, a class II combustible liquid, or a class III-A combustible liquid.

(2) Any regulated substance, as defined in subsection (2) of section 6991 of Title 42 of the United States Code, as that section reads on January 1,1989, or as it may subsequently be amended or supplemented. (Health & Saf. Code, ch. 6.7, §25281(h))

Leak Detection Functional Testing:
A third party laboratory shall evaluate and approve all leak detection methods. A third party testing laboratory includes testing organizations, consulting firms, test laboratories, not-for-profit research organizations, and educational institutions with no financial interest in the matters under consideration. The term includes only those organizations which are not owned or controlled by any client, industrial organization, or any other institution with a financial interest in the matter under consideration. (Cal. Code Regs., tit. 23, §2643(f))

Testing Organization Approval:
An independent testing organization approval is required for tanks, piping, and other components used to construct the primary containment including any integral secondary containment system. Independent testing organization approval means an approval issued by an independent testing organization which tests products or systems for compliance with industry codes, voluntary consensus standards, or engineering standards (e.g. UL). To be acceptable as an independent testing organization, the organization shall not be owned or controlled by any client, industrial organization, or any other person or institution with a financial interest in the product or system being tested. For an organization to certify, list, or label products or systems in compliance with industry codes, voluntary consensus standards, or engineering standards, it shall maintain formal periodic inspections of production of products or systems to ensure that a certified, listed, or labeled product or system continues to meet the appropriate standards. (Cal. Code Regs., tit. 23, §2631(b))

Manufacturer Affirmative Statement of Compatibility:
A manufacturer affirmative statement of compatibility is required if the independent testing organization approval for the UST containment or components does not include the compatibility of the specific hazardous substance to be stored. Manufacturer affirmative statement of compatibility means a written, affirmative statement of compatibility, from the manufacturer(s) of the UST containment or components, for the specific hazardous substance to be stored. Written manufacturer affirmative statements of compatibility, along with the independent testing approval, allow UST owners/operators, who operate fully double-walled UST systems, an alternate mechanism to demonstrate compliance with the performance standards of compatibility. (Cal. Code Regs., tit. 23, §2631(j))

Industry Code and Engineering Standards:
Non integral secondary containment shall be designed and constructed according to an engineering specification approved by a state registered professional engineer or according to a nationally recognized industry code or engineering standard. (Cal. Code Regs., tit. 23, §2631(d))

IV. Specific Requirements for Fuels in California

This chapter covers the technical or regulatory requirements of each participating agency that remains to be addressed, organized by each individual fuel.

Gasoline w/ E10 Requirements:

ARB:

Compatible with petroleum pipelines: California's Reformulated Gasoline3 (CaRFG3) is comprised of approximately 90 percent California Reformulated Gasoline Blendstock for Oxygenate Blending (CARBOB) and 10 percent ethanol. CARBOB is compatible with petroleum pipelines, but ethanol and CaRFG3 are not. Ethanol has an increased tendency to corrode petroleum pipelines and introduce water impurities. In addition, E10 is not compatible with petroleum pipelines due to its incompatibility with jet fuel. It will remain so unless a new pipeline is built specifically for fuels containing ethanol.
ARB Specifications: Gasoline with up to 10 percent ethanol must comply with the specifications in California Code of Regulations title 13, sections 2250-2273.5.

CDFA:

There are no outstanding requirements for gasoline with up to 10 percent ethanol.

CAL FIRE - OSFM:

California Fire Code (2013 edition): Storage of this fuel product shall comply with the California Fire Code Chapter 50 (Hazardous Materials-General Provisions) and Chapter 57 (Flammable and Combustible Liquids). Motor fuel dispensing facilities shall also comply with California Fire Code Chapter 23 (Motor-Fuel Dispensing Facilities and Repair Garages). Dispensers shall be listed by an approved and recognized organization such as Underwriters Laboratories. Electrical equipment, hose, nozzles and submersible or subsurface pumps used in fuel dispensing systems shall also be listed. Breakaway fittings, swivels, flexible connectors or dispenser emergency shutoff valves, vapor recovery systems, leak detection devices and pumps used in alcohol-blended fuel dispensing systems shall be listed or approved for the specific purpose. Facilities dispensing alcohol-blended fuels shall be identified by an approved means. Dispensers shall be marked in an approved manner to identify the types of alcohol-blended fuels to be dispensed.
National Fire Protection Association (NFPA): This fuel product shall comply with applicable requirements in NFPA Standards 30 (Flammable and Combustible Liquids Code, 2012 edition) and 30A (Code for Motor Fuel Dispensing Facilities and Repair Garages, 2012 edition).

This product shall also comply with all other applicable and current adopted regulation requirements found in California Code of Regulations title 24, parts 1 through 9,

California Code of Regulations title 19, division 1, NFPA standards, and the APSA in Health and Safety Code division 20, chapter 6.67.

State Water Board:
There are no outstanding requirements for gasoline with up to 10 percent ethanol.

Gasoline w/ E15 Requirements:

ARB:

Multimedia: Ethanol up to 10 percent is the only oxygenate currently allowed in gasoline used in California. In order to increase the amount of ethanol allowed in gasoline a multimedia evaluation must be approved in accordance with Health and Safety Code section 43830.8.

Compatible with petroleum pipelines: E15 is not compatible with petroleum pipelines primarily due to its incompatibility with jet fuel. It will remain so unless a new pipeline is built specifically for fuels containing ethanol. Additionally, ethanol containing fuels have a high tendency to corrode pipelines and introduce water impurities, which contribute to their incompatibility with petroleum pipelines.

Vapor Recovery: Vapor recovery devices have not been approved for E15. If E15 were to be approved as an oxygenate in California, UL would have to approve vapor recovery devices for use with E15.

ARB Specifications: ARB has not set specifications for this fuel.

Vehicle Issues: The EPA approved E15 use for 2001 and newer cars, light-duty trucks, medium-duty passenger vehicles, and all flex-fuel vehicles (FFVs). Not all vehicles designed to run on gasoline may be compatible with E15 fuel due to possible corrosion of fuel systems and negative interaction with emission control devices.

Fueling Issues: Fueling hardware compatible with E15 would need to be approved by Underwriters Laboratories (UL) if E15 were to be approved as an oxygenate in California.

CDFA:

ASTM/SAE: ASTM D4814 is undergoing modification to include E15 performance requirements for vehicles used within the US.

Regulations: Current regulation need to be modified to include E15 fuel.

Labeling: Labeling requirements need to be modified to incorporating US EPA E15 labeling requirements.

CAL FIRE - OSFM:

California Fire Code (2013 edition): Storage of this fuel product shall comply with the California Fire Code chapter 50 (Hazardous Materials-General Provisions) and chapter 57 (Flammable and Combustible Liquids). Motor fuel dispensing facilities shall also comply with California Fire Code chapter 23 (Motor-Fuel Dispensing Facilities and Repair Garages). Dispensers shall be listed by an approved and recognized organization such as Underwriters Laboratories. Electrical equipment, hose, nozzles and submersible or subsurface pumps used in fuel dispensing systems shall also be listed. Breakaway fittings, swivels, flexible connectors or dispenser emergency shutoff valves, vapor recovery systems, leak detection devices and pumps used in alcohol-blended fuel dispensing systems shall be listed or approved for the specific purpose. Facilities dispensing alcohol-blended fuels shall be identified by an approved means. Dispensers shall be marked in an approved manner to identify the types of alcohol-

blended fuels to be dispensed. Various products commonly used in existing motor fuel dispensing systems are incompatible with this fuel product. Thus, there is limited fuel dispensing equipment/components that are listed for use with this fuel product. In instances where a provision of the fire code cannot be met, a request for alternate means of protection may be utilized with the approval of the local enforcing agency.
NFPA: This fuel product shall comply with applicable requirements in NFPA Standards 30 (Flammable and Combustible Liquids Code, 2012 edition) and 30A (Code for Motor Fuel Dispensing Facilities and Repair Garages, 2012 edition).
Vapor Recovery: This fuel product shall comply with applicable vapor recovery requirements in California Code of Regulations title 19, division 1, chapter 11.5 and 2013 California Fire Code chapters 23 and 57. Refer to ARB on issues or concerns regarding vapor recovery for this fuel product.

This product shall also comply with all other applicable and current adopted regulation requirements found in California Code of Regulations title 24, parts 1 through 9, California Code of Regulations title 19, division 1, NFPA standards, and APSA.

State Water Board:
Leak Detection Functional Testing: Industry has not yet developed third-party functional test methods, conducted testing, or obtained approval for E15.

Ethanol Fuel for Flex Fuel Vehicles (E85) Requirements:

ARB:

Multimedia: In order to approve ethanol fuel blends for flex fuel vehicles, a multimedia evaluation must be approved in accordance with Health and Safety Code section 43830.8.

Compatible with petroleum pipelines: Ethanol fuel for flex fuel vehicles, commonly referred to as E85, is comprised of between 51 and 83 percent ethanol and between 17 and 49 percent CARBOB. CARBOB is compatible with petroleum pipelines, but ethanol and E85 are not. Ethanol has an increased tendency to corrode pipelines and introduce water impurities. Incompatibility with jet fuel is also an issue.

Vapor Recovery: Vapor recovery devices have not been approved for E85, however ARB has issued variances to the CaRFG3 vapor recovery requirements for current E85 stations.

Vehicle Issues: E85 can only be used in flex fuel vehicles specifically designed to run on E85 or gasoline.

ARB Specifications: In lieu of the E85 specifications in California Code of Regulations title 13, section 2292.4, ARB issued test program exemptions to fuel producers, which waive the minimum vapor pressure specifications and specify instead the ASTM active standard for ethanol fuel blends along with a more stringent sulfur specification.

Fueling: E85 dispensing devices have been approved for use by UL.

CDFA:

There are no outstanding requirements for Ethanol Fuel for Flex Fuel vehicles.

CAL FIRE - OSFM:

California Fire Code (2013 edition): Storage of this fuel product shall comply with the California Fire Code chapter 50 (Hazardous Materials-General Provisions) and chapter 57 (Flammable and Combustible Liquids). Motor fuel dispensing facilities shall also comply with California Fire Code chapter 23 (Motor-Fuel Dispensing Facilities and Repair Garages). Dispensers shall be listed by an approved and recognized organization such as Underwriters Laboratories. Electrical equipment, hose, nozzles and submersible or subsurface pumps used in fuel dispensing systems shall also be listed. Breakaway fittings, swivels, flexible connectors or dispenser emergency shutoff valves, vapor recovery systems, leak detection devices and pumps used in alcohol-blended fuel dispensing systems shall be listed or approved for the specific purpose. Facilities dispensing alcohol-blended fuels shall be identified by an approved means. Dispensers shall be marked in an approved manner to identify the types of alcohol-blended fuels to be dispensed. Various products commonly used in existing motor fuel dispensing systems are incompatible with this fuel product. Thus, there is limited fuel dispensing equipment/components that are listed for use with this fuel product. In instances where a provision of the fire code cannot be met, a request for alternate means of protection may be utilized with the approval of the local enforcing agency.

NFPA: This fuel product shall comply with applicable requirements in NFPA Standards 30 (Flammable and Combustible Liquids Code, 2012 edition) and 30A (Code for Motor Fuel Dispensing Facilities and Repair Garages, 2012 edition).
Vapor Recovery: This fuel product shall comply with applicable vapor recovery requirements in California Code of Regulations title 19, division 1, chapters 11.5 and 2013 California Fire Code chapters 23 and 57. Refer to ARB on issues or concerns regarding vapor recovery for this fuel product.

This product shall also comply with all other applicable and current adopted regulation requirements found in California Code of Regulations title 24, parts 1 through 9, California Code of Regulations title 19, division 1, NFPA standards, and APSA.

State Water Board:
Leak Detection Functional Testing: Various manufacturers have either opted to not obtain approval for cost prohibitive reasons, or cannot obtain approval because components as originally manufactured are not compatible with high blends of ethanol. Therefore E85 equipment availability is limited.

Gasoline w/Butanol 16 Percent Requirements:

ARB:

ASTM: The applicable ASTM standard for gasoline with 16 percent butanol is ASTM D4814. ASTM has not established a standard for butanol blendstocks.
Multimedia: Ethanol up to 10 percent is the only oxygenate currently allowed in gasoline used in California. In order to approve butanol as an oxygenate in gasoline, a multimedia evaluation must be approved in accordance with Health and Safety Code section 43830.8.
Vapor Recovery: Vapor recovery devices have not been approved for butanol. If butanol were to be approved as an oxygenate in California, UL would have to approve vapor recovery devices for use with butanol.
Vehicle Issues: Current vehicles designed to run on gasoline may be incompatible with butanol due to possible corrosion of fuel systems and negative interaction with emission control devices.
Production Issues: Gasoline with 16 percent butanol is commercially available in small scale in the United States.
Fueling: Fueling hardware compatible with butanol would need to be approved by UL if butanol were to be approved as an oxygenate in California. In 2013, UL announced that gasoline fuel storage and dispensing equipment meeting the latest UL standards can be used to handle butanol blends of up to 16 percent.

CDFA:

There are no outstanding issues for gasoline containing butanol up to 16 percent.

CAL FIRE - OSFM:

California Fire Code (2013 edition): Storage of this fuel product shall comply with the California Fire Code chapter 50 (Hazardous Materials-General Provisions) and chapter 57 (Flammable and Combustible Liquids). Motor fuel dispensing facilities shall also comply with California Fire Code chapter 23 (Motor-Fuel Dispensing Facilities and Repair Garages). Dispensers shall be listed by an approved and recognized organization such as Underwriters Laboratories. Electrical equipment, hose, nozzles and submersible or subsurface pumps used in fuel dispensing systems shall also be listed. Breakaway fittings, swivels, flexible connectors or dispenser emergency shutoff valves, vapor recovery systems, leak detection devices and pumps used in alcohol-blended fuel dispensing systems shall be listed or approved for the specific purpose. Facilities dispensing alcohol-blended fuels shall be identified by an approved means. Dispensers shall be marked in an approved manner to identify the types of alcohol-blended fuels to be dispensed. No information is available on material compatibility with this fuel product. No information is available on fuel dispensing equipment/components that are listed for use with this fuel product. In instances where a provision of the fire code cannot be met, a request for alternate means of protection may be utilized with the approval of the local enforcing agency.

NFPA: This fuel product shall comply with applicable requirements in NFPA Standards 30 (Flammable and Combustible Liquids Code, 2012 edition) and 30A (Code for Motor Fuel Dispensing Facilities and Repair Garages, 2012 edition).
Vapor Recovery: This fuel product shall comply with applicable vapor recovery requirements in California Code of Regulations title 19, division 1, chapter 11.5 and 2013 California Fire Code chapters 23 and 57. Refer to ARB on issues or concerns regarding vapor recovery for this fuel product.

This product shall also comply with all other applicable and current adopted regulation requirements found in California Code of Regulations title 24, parts 1 through 9, California Code of Regulations title 19, division 1, NFPA standards, and APSA.

State Water Board:
Leak Detection Functional Testing: Industry has not yet developed third-party functional test methods, completed testing, or obtained approval for gasoline with 16 percent butanol.
Testing Organization Approval: Independent testing organization approval for UST containment or components includes the compatibility of gasoline with 16 percent butanol if the UST containment or component has a UL approval for standards that require testing with 25 percent or higher ethanol blends.
Industry Code and Engineering Standards: There are no known engineering specifications approved by a state registered professional engineer, nationally recognized industry code, or engineering standard for gasoline with 16 percent butanol.

Gasoline w/Ethanol Blends E16-E50 Requirements:

ARB:

Multimedia: In order to approve ethanol fuel blends E16-E50, a multimedia evaluation must be approved in accordance with Health and Safety Code section 43830.8.
Compatible with petroleum pipelines: E16-E50 is not compatible with petroleum pipelines primarily due to its incompatibility with jet fuel. It will remain so unless a new pipeline is built specifically for fuels containing ethanol. Additionally, ethanol containing fuels have a high tendency to corrode pipelines and introduce water impurities, which contribute to their incompatibility with petroleum pipelines.
Vehicle Issues: Current vehicles designed to run on gasoline may be incompatible with ethanol due to possible corrosion of fuel systems and negative interaction with emission control devices.
Fueling Issues: Fueling hardware compatible withE16-E50 would need to be approved by UL.

CDFA:

ASTM/SAE: ASTM D4814 needs to be modified to include performance requirement for vehicles used within the US.
Regulations: Current regulation need to be modified to include E16 to E50 fuel.
Labeling: Labeling requirements need to be modified to incorporating E16 to E50.

CAL FIRE - OSFM:

California Fire Code (2013 edition): Storage of this fuel product shall comply with the California Fire Code chapter 50 (Hazardous Materials-General Provisions) and chapter 57 (Flammable and Combustible Liquids). Motor fuel dispensing facilities shall also comply with California Fire Code chapter 23 (Motor-Fuel Dispensing Facilities and Repair Garages). Dispensers shall be listed by an approved and recognized organization such as Underwriters Laboratories. Electrical equipment, hose, nozzles and submersible or subsurface pumps used in fuel dispensing systems shall also be listed. Breakaway fittings, swivels, flexible connectors or dispenser emergency shutoff valves, vapor recovery systems, leak detection devices and pumps used in alcohol-blended fuel dispensing systems shall be listed or approved for the specific purpose. Facilities dispensing alcohol-blended fuels shall be identified by an approved means. Dispensers shall be marked in an approved manner to identify the types of alcohol-blended fuels to be dispensed. Various products commonly used in existing motor fuel dispensing systems are incompatible with this fuel product. Thus, there is limited fuel dispensing equipment/components that are listed for use with this fuel product. In instances where a provision of the fire code cannot be met, a request for alternate means of protection may be utilized with the approval of the local enforcing agency.
NFPA: This fuel product shall comply with applicable requirements in NFPA Standards 30 (Flammable and Combustible Liquids Code, 2012 edition) and 30A (Code for Motor Fuel Dispensing Facilities and Repair Garages, 2012 edition).

Vapor Recovery: This fuel product shall comply with applicable vapor recovery requirements in California Code of Regulations title 19, division 1, chapter 11.5 and 2013 California Fire Code chapters 23 and 57. Refer to ARB on issues or concerns regarding vapor recovery for this fuel product.

This product shall also comply with all other applicable and current adopted regulation requirements found in California Code of Regulations title 24, parts 1 through 9, California Code of Regulations title 19, division 1, NFPA standards, and APSA.

State Water Board:

Leak Detection Functional Testing: Industry has not yet developed third-party functional test methods, conducted testing, or obtained approval for E16-E50.

Diesel Fuel Oil Requirements:

ARB:

ARB Specifications: Diesel fuel must comply with the specifications in California Code of Regulations title 13, sections 2281-2285.

CDFA:

There are no outstanding requirements for diesel fuel with up to 5 percent Biodiesel.

CAL FIRE - OSFM:

California Fire Code (2013 edition): Storage of this fuel product shall comply with the California Fire Code chapter 50 (Hazardous Materials-General Provisions) and chapter 57 (Flammable and Combustible Liquids). Motor fuel dispensing facilities shall also comply with California Fire Code chapter 23 (Motor-Fuel Dispensing Facilities and Repair Garages). Dispensers shall be listed by an approved and recognized organization such as Underwriters Laboratories. Electrical equipment, hose, nozzles and submersible or subsurface pumps used in fuel-dispensing systems shall be listed.
NFPA: This fuel product shall comply with applicable requirements in NFPA Standards 30 (Flammable and Combustible Liquids Code, 2012 edition) and 30A (Code for Motor Fuel Dispensing Facilities and Repair Garages, 2012 edition).

This product shall also comply with all other applicable and current adopted regulation requirements found in California Code of Regulations title 24, parts 1 through 9, California Code of Regulations title 19, division 1, NFPA standards, and APSA.

State Water Board:

There are no outstanding requirements for diesel fuel oil.

Biodiesel Blends B6-B20 Requirements:

ARB:

Multimedia: Multimedia evaluation was approved for B6-B20 in accordance with Health and Safety Code section 43830.8.

Compatible with petroleum pipelines: B6 to B20 is not compatible with petroleum pipelines primarily due to its incompatibility with jet fuel. It will remain so unless a new pipeline is built specifically for fuels containing biodiesel.

ARB specifications: B6 to B20 must comply with the biodiesel blends specifications in California Code of Regulations title 13, section 2290-2295 that are expected to be effective January of 2016.

Vehicle Issues: Current vehicles designed to run on diesel may be incompatible with B6 to B20 fuel due to possible plugging of fuel systems and possible cold temperature operability issues. However, widespread adherence to ASTM standards for biodiesel may alleviate or eliminate these possible vehicle issues.

CDFA:

There are no outstanding issues for biodiesel blends B6 – B20.

CAL FIRE - OSFM:

California Fire Code (2013 edition): Storage of this fuel product shall comply with the California Fire Code chapter 50 (Hazardous Materials-General Provisions) and chapter 57 (Flammable and Combustible Liquids). Motor fuel dispensing facilities shall also comply with California Fire Code chapter 23 (Motor-Fuel Dispensing Facilities and Repair Garages). Dispensers shall be listed by an approved and recognized organization such as Underwriters Laboratories. Electrical equipment, hose, nozzles and submersible or subsurface pumps used in fuel dispensing systems shall also be listed.

NFPA: This fuel product shall comply with applicable requirements in NFPA Standards 30 (Flammable and Combustible Liquids Code, 2012 edition) and 30A (Code for Motor Fuel Dispensing Facilities and Repair Garages, 2012 edition).

This product shall also comply with all other applicable and current adopted regulation requirements found in California Code of Regulations title 24, parts 1 through 9, California Code of Regulations title 19, division 1, NFPA standards, and APSA.

State Water Board:

Testing Organization Approvals: Independent testing organization approval (e.g. UL) for UST containment or components does not include B6-B20. Written manufacturer affirmative statements of compatibility, along with the independent testing organization approval, is required to store B6-B20. Manufacturer affirmative statements of compatibility are available for B6-B20; however, various manufacturers have either opted to not submit such a statement or cannot make the necessary statement because

the UST containment or components as originally manufactured are not compatible with B6-B20. Therefore B6-B20 containment component availability is limited.

Industry Code and Engineering Standards: Engineering statements for secondary containment components that have been designed and constructed according to an engineering specification, nationally recognized industry code, or engineering standard for B6-B20 are available; however, various secondary containment components either do not have such a statement or cannot make the necessary statement because the secondary containment components as originally manufactured are not compatible with B6-B20. Therefore B6-B20 secondary containment component availability is limited.

Renewable Diesel Fuel Blends R6-R100 Requirements:

ARB:

Multimedia: Multimedia evaluation was approved for R6-R100 in accordance with Health and Safety Code section 43830.8.

ARB specifications: Renewable diesel consists solely of hydrocarbons and meets ARB motor vehicle fuel specifications under California Code of Regulations title 13, section 2281 et seq. In fact, renewable diesel meets specified aromatic, sulfur, and lubricity standards, as well as ASTM International standard specification, ASTM D975.

Regulations: R6-R100 must comply with the requirements set forth in the Low Carbon Fuel Standard (Cal. Code Regs., tit. 17, §§ 95480-95490), including a requirement that all biomass-based diesel, such as R6-R100, sold under the LCFS meet ASTM D975.

Production Issues: There are at least two commercial scale plants in the United States producing R6 to R100.

CDFA:

Labeling: Fuel providers have concerns about how to meet FTC labeling requirements for mixtures containing renewable diesel.

CAL FIRE - OSFM:

California Fire Code (2013 edition): Storage of this fuel product shall comply with the California Fire Code chapter 50 (Hazardous Materials-General Provisions) and chapter 57 (Flammable and Combustible Liquids). Motor fuel dispensing facilities shall also comply with California Fire Code chapter 23 (Motor-Fuel Dispensing Facilities and Repair Garages). Dispensers shall be listed by an approved and recognized organization such as Underwriters Laboratories. Electrical equipment, hose, nozzles and submersible or subsurface pumps used in fuel dispensing systems shall also be listed. Little information is available on pure renewable diesel materials compatibility. In instances where a provision of the fire code cannot be met, the “Alternate Means of Protection” may be utilized with the approval of the local enforcing agency.

APSA: Pure renewable diesel (R100) is not regulated under the state APSA, but the product may still be subject to federal spill prevention, control, and countermeasure requirements under the Code of Federal Regulations title 40, part 112.

This product shall also comply with all other applicable and current adopted regulation requirements found in California Code of Regulations title 24, parts 1 through 9, California Code of Regulations title 19, division 1, NFPA standards, and APSA.

State Water Board:

There are no outstanding requirements for R6 – R100.

Biodiesel Blends B21-B100 Requirements:

ARB:

ASTM: ASTM has not adopted specifications for B21 to B100 fuel. However ASTM D6751 was adopted as a specification for B100 biodiesel as a blending component.
Multimedia: In order for ARB to set a specification for B21 to B100 fuel in California a multimedia evaluation must be approved in accordance with Health and Safety Code section 43830.8.
Compatible with petroleum pipelines: B21 to B100 fuel is not compatible with petroleum pipelines primarily due to its incompatibility with jet fuel. It will remain so unless a new pipeline is built specifically for fuels containing biodiesel.
ARB specifications: ARB has not set specifications for B21 to B100 fuel.
Vehicle Issues: Current vehicles designed to run on diesel may be incompatible with B21 to B100 fuel due to possible plugging of fuel systems and possible cold temperature operability issues.
Production Issues: There is no ASTM specification for B21 to B100 fuel so there is no standard for producers to ensure quality product.

CDFA:

ASTM/SAE: Either a new ASTM or SAE fuel quality specification must be developed for biodiesel blends B21-100, or CDFA must establish an interim fuel quality specification by regulation to allow the retail sale of B21-100 blends.
Regulations: CDFA must adopt a fuel quality specification for B21 – 100 via rulemaking.
Labeling: Current Federal Trade Commission (FTC) regulations for B21 – 100 do not exist. CDFA cannot adopt labeling requirements which are in conflict with those required by the FTC.

CAL FIRE - OSFM:

California Fire Code (2013 edition): Storage of this fuel product shall comply with the California Fire Code chapter 50 (Hazardous Materials-General Provisions) and chapter 57 (Flammable and Combustible Liquids). Motor fuel dispensing facilities shall also comply with California Fire Code chapter 23 (Motor-Fuel Dispensing Facilities and Repair Garages). Dispensers shall be listed by an approved and recognized organization such as Underwriters Laboratories. Electrical equipment, hose, nozzles and submersible or subsurface pumps used in fuel dispensing systems shall also be listed. Various products commonly used in existing motor fuel dispensing systems are incompatible with this fuel product. Thus, there is limited fuel dispensing equipment/components that are listed for use with this fuel product. In instances where a provision of the fire code cannot be met, a request for alternate means of protection may be utilized with the approval of the local enforcing agency.
NFPA: This fuel product shall comply with applicable requirements in NFPA Standards 30 (Flammable and Combustible Liquids Code, 2012 edition) and 30A (Code for Motor Fuel Dispensing Facilities and Repair Garages, 2012 edition).

APSA: Pure biodiesel (B100) is not regulated under the state APSA, but the product may still be subject to federal spill prevention, control, and countermeasure requirements under the Code of Federal Regulations title 40, part 112.

This product shall also comply with all other applicable and current adopted regulation requirements found in California Code of Regulations title 24, parts 1 through 9, California Code of Regulations title 19, division 1, NFPA standards, and APSA.

State Water Board:

ASTM: B100 blendstock meets ASTM D6751.

Leak Detection Functional Testing: Industry has not yet developed third-party leak detection functional test methods, conducted testing, or obtained approval for B21-B99. Limited B100 leak detection equipment is available.

Testing Organization Approvals: Independent testing organization approval (e.g. UL) for UST containment or components does not include B21-B100. Written manufacturer affirmative statements of compatibility, along with the independent testing organization approval, is required to store B21-B100. Manufacturer affirmative statements of compatibility are available for B21-B100; however, various manufacturers have either opted to not submit such a statement or cannot make the necessary statement because components as originally manufactured are not compatible with B21-B100. Therefore B21-B100 containment component availability is limited.

Industry Code and Engineering Standards: Engineering statements for secondary containment that has been designed and constructed according to an engineering specification, nationally recognized industry code, or engineering standard for B21-B100 are available; however, various secondary containment components either do not have such a statement or cannot make the necessary statement because components as originally manufactured are not compatible with B21-B100. Therefore B21-B100 secondary containment component availability is limited.

Compressed Natural Gas Requirements:

ARB:

ARB Specifications: CNG must comply with the specifications in California Code of Regulations title 13, sections 2290-2293.5.
Vehicle Issues: CNG can only be used in vehicles that were specifically designed for CNG or retrofit to accommodate the specific equipment required by CNG vehicles. For example CNG vehicles require a different fueling system than vehicles not designed for use with CNG.

CDFA:

ASTM/SAE: A new ASTM or SAE fuel quality specification must be developed or CDFA must establish an interim fuel quality specification to allow sale of CNG and LNG. CDFA is working with ASTM and SAE to develop a fuel quality specification.
Regulations: CDFA must adopt fuel quality specifications for CNG and LNG via rulemaking.
Labeling: CDFA cannot adopt labeling requirements which are in conflict with those required by the FTC.
Advertising: CDFA cannot adopt advertising requirements until ASTM, SAE, or CDFA standards are adopted.

CAL FIRE - OSFM:

California Fire Code (2013 edition): Storage of this product shall comply with California Fire Code chapter 53 (Compressed Gases). Motor fuel dispensing facilities for CNG fuel shall also comply with California Fire Code chapter 23 (Motor-Fuel Dispensing Facilities and Repair Garages), section 2308. Hoses, hose connections, dispensers, gas detection systems and electrical equipment used for CNG shall be listed. Vehicle-fueling connections shall be listed and labeled. Containers, compressors, pressure relief devices (including pressure relief valves), and pressure regulators and piping used for CNG shall be approved.
NFPA: CNG for use as vehicular fuel shall comply with NFPA Standard 52 (Vehicular Gaseous Fuel Systems Code, 2013 edition).

This product shall also comply with all other applicable and current adopted regulation requirements found in California Code of Regulations title 24, parts 1 through 9, California Code of Regulations title 19, division 1, NFPA standards, and APSA.

State Water Board:

Regulated by CA Health and Safety Code: The underground storage of CNG is subject to the requirements of Health and Safety Code chapter 6.7 and California Code of Regulations title 23. CNG however, when mixed with LPG is exempt from UST statutes and regulations if the LPG in the mixture is greater than 50 percent.
Leak Detection Functional Testing: Industry has not yet developed third-party leak detection functional test methods, conducted testing, or obtained approval for CNG.

Testing Organization Approval: Industry has not yet developed industry codes, voluntary consensus standards, engineering standards, or obtained approval for CNG.
Industry Code and Engineering Standards: There are no known engineering specifications approved by a state registered professional engineer, nationally recognized industry code, or engineering standard for CNG.

The State Water Board staff is not aware, nor anticipates the storage of CNG in USTs.

Liquefied Natural Gas Requirements:

ARB:

ARB Specifications: Must comply with specifications in California Code of Regulations title 13, sections 2290-2293.5.
Vehicle Issues: LNG can only be used in vehicles that were specifically designed for LNG or retrofit to accommodate the specific equipment required by LNG vehicles. For example LNG vehicles require a different fueling system than vehicles not designed for use with LNG.

CDFA:

ASTM/SAE: A new ASTM or SAE fuel quality specification must be developed or CDFA must establish an interim fuel quality specification to allow sale of LNG. CDFA is working with ASTM and SAE to develop a fuel quality specification.
Regulations: CDFA must adopt fuel quality specifications for LNG via rulemaking.
Labeling: CDFA cannot adopt labeling requirements which are in conflict with those required by the FTC.
Advertising: CDFA cannot adopt advertising requirements until ASTM, SAE, or CDFA standards are adopted.

CAL FIRE - OSFM:

California Fire Code (2013 edition): Storage of this product shall comply with California Fire Code chapter 53 (Compressed Gases) and chapter 55 (Cryogenic Fluids).
NFPA: LNG fuel shall comply with NFPA Standards 52 (Vehicular Gaseous Fuel Systems Code, 2013 edition) and 59A (Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG), 2013 edition).

This product shall also comply with all other applicable and current adopted regulation requirements found in California Code of Regulations title 24, parts 1 through 9, California Code of Regulations title 19, division 1, NFPA standards, and APSA.

State Water Board:

Regulated by CA Health and Safety Code: The underground storage of LNG is subject to the requirements of Health and Safety Code chapter 6.7 and California Code of Regulations title 23. LNG however, when mixed with LPG is exempt from UST statutes and regulations if the LPG in the mixture is greater than 50 percent.
Leak Detection Functional Testing: Industry has not yet developed third-party leak detection functional test methods, conducted testing, or obtained approval for LNG.
Testing Organization Approval: Industry has not yet developed industry codes, voluntary consensus standards, engineering standards, or obtained approval for LNG.
Industry Code and Engineering Standards: There are no known engineering specifications approved by a state registered professional engineer, nationally recognized industry code, or engineering standard for LNG.
The State Water Board staff is not aware, nor anticipates the storage of LNG in USTs.

Liquefied Petroleum Gas Requirements:

ARB:
ARB Specifications: LPG must comply with the specifications in California Code of Regulations title 13, sections 2290-2293.5.
Vehicle Issues: LPG can only be used in vehicles that were specifically designed for LPG or retrofit to accommodate the specific equipment required by LPG vehicles. For example LPG vehicles require a different fueling system than vehicles not designed for use with LPG.

CDFA:
No outstanding issues.

CAL FIRE - OSFM:
California Fire Code (2013 edition): LPG shall comply with California Fire Code chapter 53 (Compressed Gases) and chapter 61 (Liquefied Petroleum Gases). LPG fuel dispensing facilities shall also comply with California Fire Code chapter 23 (Motor Fuel-Dispensing Facilities and Repair Garages), section 2307. Hoses, hose connections, vehicle fuel connections, dispensers, LP-gas pumps and electrical equipment used for LP-gas shall be listed. Containers, pressure relief devices (including pressure relief valves), pressure regulators and piping for LP-gas shall be approved.
NFPA: LPG fuel shall also comply with NFPA Standard 58 (Liquefied Petroleum Gas Code, 2011 edition).

This product shall also comply with all other applicable and current adopted regulation requirements found in California Code of Regulations title 24, parts 1 through 9, California Code of Regulations title 19, division 1, NFPA standards, and APSA.

State Water Board:
Regulated by CA Health and Safety Code: LPG tanks are excluded from the term "underground storage tank" and are exempted from meeting UST statutes and regulations. LPG tanks contain LPG or a mixture composed of greater than 50 percent LPG. (Health & Saf. Code, ch. 6.7, §25299.3 and Cal. Code Regs., tit. 23, §§2611 & 2621(a)(4))

Dimethyl Ether Requirements:

ARB:

Multimedia: In order for ARB to set a specification for DME fuel in California, a multimedia evaluation must be approved in accordance with Health and Safety Code section 43830.8.
Vehicle Issues: DME can only be used in vehicles that were specifically designed for DME or retrofit to accommodate the specific equipment required by DME vehicles. For example, DME vehicles require a different fueling system than vehicles not designed for use with DME.
Production Issues: There is one company producing DME in California currently.
Fueling Issues: With regards to fueling infrastructure, DME handles like propane. DME can be transported and dispensed using slightly modified propane tanks and dispensers.

CDFA:

Quality Test methods: ASTM test methods for DME fuel are being modified and developed by CDFA.

CAL FIRE - OSFM:

California Fire Code (2013 edition): Storage of this fuel product shall comply with the California Fire Code chapter 50 (Hazardous Materials-General Provisions), chapter 53 (Compressed Gases), and chapter 58 (Flammable Gases and Flammable Cryogenic Fluids). The California Fire Code does not address requirements for facilities dispensing DME as a motor vehicle fuel. Various products commonly used in existing motor fuel dispensing systems are incompatible with this fuel product. Thus, there is limited fuel dispensing equipment/components that are listed for use with this fuel product. In instances where a provision of the fire code cannot be met, a request for alternate means of protection may be utilized with the approval of the local enforcing agency.
NFPA: There is no NFPA standard that addresses requirements for facilities dispensing DME as a motor vehicle fuel.

This product shall also comply with all other applicable and current adopted regulation requirements found in California Code of Regulations title 24, parts 1 through 9, California Code of Regulations title 19, division 1, NFPA standards, and APSA.

State Water Board:

Regulated by CA Health and Safety Code: The underground storage of DME is subject to the requirements of Health and Safety Code chapter 6.7 and California Code of Regulations title 23. DME however, when mixed with LPG is exempt from UST statutes and regulations if the LPG in the mixture is greater than 50 percent.
Leak Detection Functional Testing: Industry has not yet developed third-party leak detection functional test methods, conducted testing, or obtained approval for DME.

Testing Organization Approval: Industry has not yet developed industry codes, voluntary consensus standards, engineering standards, or obtained approval for DME.
Industry Code and Engineering Standards: There are no known engineering specifications approved by a state registered professional engineer, nationally recognized industry code, or engineering standard for DME.

The State Water Board staff is not aware, nor anticipates the storage of DME in USTs.

Hydrogen Requirements:

ARB:

ASTM: ASTM has not adopted specifications for hydrogen. While no ASTM standard has been adopted, a variety of hydrogen related SAE standards have been developed and adopted in California. The fuel quality/purity standard is SAE J2719.

Compatible with petroleum pipelines: Hydrogen can be piped using a separate pipeline designed for transporting hydrogen. Some petroleum or CNG pipelines can be converted to move hydrogen by installing new pumps and seals designed for hydrogen.

Vehicle Issues: Hydrogen fuel can be utilized by both internal combustion engines and fuel cell vehicles utilizing an electric motor. Conventional liquid fuel vehicles, such as gasoline and diesel fuel vehicles, are not compatible with hydrogen. The fueling nozzle design will not allow these vehicles to be filled with hydrogen. Vehicle deployment is occurring in clusters to ensure that proper service and maintenance can be addressed in an economical manner.

ARB Specifications: Hydrogen fuel must comply with the specifications pursuant to California Code of Regulations title 13, section 2290 et seq. This specification is specifically for hydrogen for use in combustion engines.

Production Issues: Currently, hydrogen is economically produced and sold in California for refining and petrochemical industry. It can be economical for transportation use if produced at centralized plants close to the vehicle refueling facility. While small scale on-site production of hydrogen is not yet economical a small number of on-site electrolysis and steam methane reformation stations are being deployed. Most hydrogen stations currently being deployed use centralized production with compressed gas delivery with a smaller number using liquid hydrogen delivery.

Fueling Issues: Fueling stations and vehicles are being deployed in clusters to maximize fuel throughput at the stations. California has ten (10) publicly accessible stations, fifty-one (51) stations are projected to be operational by the end of 2016. Assembly Bill 8, (Perea, Chapter 401, Statutes pf 2013) provides up to $20 million annually until at least 100 publicly available hydrogen stations are in operation.

Technology Issues: Dispensing protocol is SAE J2601, protocol sets standard for a safe, fast fueling of Fuel Cell Electric Vehicles (FCEVs). Dispenser accuracy is in NIST Handbook 44 and method of sale is described in NIST Handbook 130. California Department of Food and Agriculture Division of Measurement Standards did develop and adopt additional accuracy classes that were more lenient than the NIST specification.

For and overview on FCEVs and hydrogen stations please use the direct link to the report titled, *2015 Annual Evaluation of Fuel Cell Electric Vehicle Deployment and Hydrogen Fuel Station Network Development* at:
http://www.arb.ca.gov/msprog/zevprog/ab8/ab8_report_2015.pdf

CDFA:

ASTM/SAE: ASTM test methods for hydrogen have been developed and are being validated by CDFA.

Metering Systems: Two hydrogen fuel dispenser design types have been evaluated and approved by CDFA. As other dispenser makes/models are developed, they too must successfully pass type approval before they may be placed in retail service.

This product shall also comply with all applicable and current adopted requirements found in California Code of Regulations title 24, parts 1 through 9, California Code of Regulations title 19, division 1, and NFPA standards.

CAL FIRE - OSFM:

California Fire Code (2013 edition): The storage and use of hydrogen shall comply with California Fire Code chapter 53 (Compressed Gases), chapter 55 (Cryogenic Fluids) and chapter 58 (Flammable Gases and Flammable Cryogenic Fluids). Hydrogen motor fuel dispensing stations, generation facilities, and their associated aboveground hydrogen storage systems shall also comply with California Fire Code Chapter 23 (Motor-Fuel Dispensing Facilities and Repair Garages). Hoses, hose connections, compressors, hydrogen generators, dispensers, detection systems and electrical equipment used for hydrogen shall be listed or approved for use with hydrogen. Hydrogen motor-fueling connections shall be listed and labeled or approved for use with hydrogen.

California Electrical Code (2013 edition): Electrical installations shall be in accordance with the California Electrical Code.

NFPA: The storage and use of hydrogen shall comply with NFPA 55 (Compressed Gases and Cryogenic Fluids Code, 2013 edition). Hydrogen motor fuel dispensing stations and their associated aboveground hydrogen storage systems shall also comply with NFPA 2 (Hydrogen Technologies Code, 2011 edition).

This product shall also comply with all other applicable and current adopted regulation requirements found in California Code of Regulations title 24, parts 1 through 9, California Code of Regulations title 19, division 1, NFPA standards, and APSA.

State Water Board:

Regulated by CA Health and Safety Code: The underground storage of hydrogen is subject to the requirements of Health and Safety Code chapter 6.7 and California Code of Regulations title 23. However hydrogen, when mixed with LPG, is exempt from UST statutes and regulations if the LPG in the mixture is greater than 50 percent.

Leak Detection Functional Testing: Industry has not yet developed third-party leak detection functional test methods, conducted testing, or obtained approval for hydrogen.

Testing Organization Approval: Industry has not yet developed industry codes, voluntary consensus standards, engineering standards, or obtained approval for hydrogen.

Industry Code and Engineering Standards: There are no known engineering specifications approved by a state registered professional engineer, nationally recognized industry code, or engineering standard for hydrogen.

The State Water Board staff is not aware, nor anticipates the storage of hydrogen in USTs.

Electricity Requirements:

ARB:

Compatible with petroleum pipelines: Electricity is not a liquid fuel and cannot be pipelined. However, electrical transmission wires are currently in place and can transport electricity.

Fueling Issues: In California, there are about 2232 public and 382 private charging stations available to Plug-in Electric Vehicles (PEV). Every station has at least one or more connectors. Every new PEV comes with an on-board charger and a Level 1 (120-Volt) portable Electric Vehicle Supply Equipment (EVSE) (AKA a "convenience cord"). A Level 1 convenience cord requires access to a standard household outlet with available capacity. For faster charging, a PEV driver may opt to purchase an optional Level 2 (240-Volt) EVSE. A Level 2 EVSE would require a 240 Volt outlet on a dedicated 40 AMP circuit that may need to be installed by a professional electrician for faster charging.

CDFA:

ASTM/SAE: Not applicable as neither organization has jurisdiction over electricity as a motor vehicle fuel.

Regulations: Public Utilities Code division 1, part 1, chapter 1, section 216 (i) provides CDFA the authority to regulate electricity sold publically as a motor vehicle fuel when charging light duty vehicles. This includes type evaluation of new design types, testing and sealing commercial charging stations. CDFA has yet not promulgated regulations for the advertising and labeling requirements for electric vehicle charging stations.

CAL FIRE - OSFM:

This product shall also comply with all other applicable and current adopted regulation requirements found in California Code of Regulations title 24, parts 1 through 9, California Code of Regulations title 19, division 1, NFPA standards, and APSA.

There are no other additional requirements for electricity as fuel.

State Water Board:

Regulated by CA Health and Safety Code: Electricity does not meet the definition of a hazardous substance as defined in Health and Safety Code chapter 6.7, section 25281(h) and therefore is not subject to the requirements of Health and Safety Code chapter 6.7.