

4.7 HAZARDS, HAZARDOUS MATERIALS, AND RISK OF UPSET

4.7.1 METHODOLOGY

This section analyzes the potential impacts related to hazards and hazardous materials that could result from Project implementation. The *Risk of Upset Analysis* prepared by Kleinfelder, Inc. dated March 2017 includes an analysis of the risks of upset, safety and hazardous material handling associated with the proposed expansion of oil and gas operations at the Project Site in accordance with the Drilling Regulations of the Specific Plan. The *Risk of Upset Analysis* is provided in Appendix F of this Draft EIR. Direct, indirect, and cumulative impacts are addressed for each threshold criteria below, and growth-inducing impacts are described in Sections 6.0, CEQA-Mandated Analyses, of this Draft EIR.

Throughout this Draft EIR, the City's portion of the Inglewood Oil Field (77.8-acres) is referred to as the "Project Site" or the "City IOF." The surface boundary limits¹ of the Inglewood Oil Field, including lands within both the City and County, is referred to as the "Inglewood Oil Field." The portion of the Inglewood Oil Field that is only within the jurisdiction of the County of Los Angeles is referred to as the "County IOF."

The Drilling Regulations contain guidance on an extensive list of provisions to help reduce hazards and hazardous materials. These generally include requirements for a Stormwater Pollution Prevention Plan (SWPPP); Spill Prevention, Control, and Countermeasure Plan (SPCCP); Groundwater Monitoring Program; Water Management Plan; remediation of any hazardous substance that is discharged, dispersed, released or that escapes into soils, water or groundwater; vapor recovery systems for produced water tanks; closed systems for produced oil and water; requirements for water injection processing operations; and compliance with California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) and other applicable local, State and federal regulations.

4.7.2 ENVIRONMENTAL SETTING

In Section 2.0, Environmental Setting, the Project Site, as well as existing site operations and conditions are summarized. Information concerning on-site wells, tanks, pipelines, hazardous materials used at the Project Site, and hazardous wastes generated are discussed in Section 2.4, Existing Site Operations and Baseline Conditions, of this Draft EIR.

Characteristics of the City IOF and Surrounding Land Uses

At the time of the issuance of the Notice of Preparation (NOP), and based on DOGGR data, there were 69 wells having top-hole locations within the Project Site boundary, of which 41 are active/potentially active, including 26 production and 10 injection wells and 5 idle wells. Additionally, there are 28 abandoned wells. A tank farm, known as the T-Vickers Tank Farm, is located on a pad near the center of the Project Site. This tank farm contains the following equipment: three 5,000-barrel tanks, one 3,000-barrel tank, one 1,000-barrel tank, and one 100-horsepower pump (FM O&G 2016).

At the tank farm, oil and water are separated in large gravity settling tanks. The oil is continuously skimmed off the tanks and routed to holding tanks. From the storage tanks, the produced water and the oil are pumped to the central oil sales facility located outside the Project Site, in the

¹ Surface boundary limit refers to the physical extent of the ground surface for which the Oil Field Operator has access and land owner permission to establish and conduct oil drilling activity. Subsurface and mineral right limits may have different boundaries than the surface boundary.

northeastern portion of the Inglewood Oil Field. The tank farm is surrounded by a dike, with an area of 30,456 square feet and an effective depth of 2 feet (60,912 cubic feet), which provides secondary containment for the rupture of one of the larger tanks full of oil (Kleinfelder 2017).

Water from the T-Vickers production tank is processed separately at the T-Vickers water plant, which consists of a single raw water tank, clarifier, and filtered water tank. The produced water is piped from the storage tanks to the central water plant or the small water plant at T-Vickers lease where it is treated and piped to injection wells for injection into the subsurface. Neither water plant is located in the Project Site; therefore failures at these plants are outside the scope of the Risk of Upset Analysis (Kleinfelder 2017).

The six surface water retention basins are located along primary drainages to retain surface runoff from the Inglewood Oil Field. There is one retention basin located within the Project Site. It is the Dabney Lloyd Basin (Basin 002) and is located on the east side of the Project Site. Basin 002 receives runoff from the northwest portion of the Inglewood Oil Field including drainage from the City IOF, Packard Basin, and R.J. Basin. The basin also receives runoff from the Kenneth Hahn State Recreation Area. The maximum capacity of Basin 002 is approximately 294,000 gallons. The maximum flow is 3.06 mgd. The drainage area is 139 acres (FM O&G 2016).

These basins ultimately drain to Ballona Creek, a concrete-lined creek located approximately 1,600 feet from the City IOF. Ballona Creek is considered an impaired water body (pursuant to the Clean Water Act) and several programs monitor general surface water parameters as well as the constituents that cause the impairment (e.g., Ballona Wetlands Foundation, Friends of Ballona Wetlands Education/Ecology Center, Santa Monica Bay Restoration Project, Los Angeles Regional Water Quality Control Board Trash Total Maximum Daily Load for Ballona Creek and Wetland). Ballona Creek is listed as impaired for cadmium, coliform bacteria, dissolved copper, cyanide, lead, selenium, shellfish harvesting advisory, toxicity, trash, viruses, and zinc (Los Angeles RWQCB 2015).

The Ballona Creek Flood Control Channel is jointly owned and operated by the Los Angeles County Flood Control District (LACFCD) and the U.S. Army Corps of Engineers (USACE). The channel's primary function is to protect the public from flood hazards. Its secondary purpose, consistent with USACE policy is to provide outdoor recreation opportunities, and the Ballona Creek Channel includes a 12-foot wide Class I bike path from near Jacob Street to the beach.

As shown on Exhibit 2-3, Specific Plan Boundary and Adjacent Land Uses in Section 2.0, Environmental Setting of this Draft EIR, the Project Site is surrounded by residential and recreational land uses to the north and east, including residential properties in the Blair Hills neighborhood, the Stoneview Nature Center and Culver City Park. In addition, the Park to Playa Trail is a planned 13-mile multi-modal regional trail that will connect the Baldwin Hills parklands to the Pacific Ocean. The eastern portion of the Park to Playa Trail is an approximate 7.0-mile system of walking, hiking, and bicycle trails running east-southeasterly through parks and open space areas in the Baldwin Hills (including existing trails in Culver City Park, the Baldwin Hills Scenic Overlook, the Kenneth Hahn State Recreation Area, and along the Stocker Street Corridor). The proposed Segment C of the Park to Playa Trail will consist of a pedestrian bridge over La Cienega Boulevard and an at-grade trail that will connect the KHSRA to the Baldwin Hills Scenic Overlook, passing through the northeastern edge of the Project Site and immediately north of the central and western sections of the Project Site.

Oil, Natural Gas, and Odorant

As it emerges from the wellhead, crude oil is a mixture of solids, liquids, and gases, including sediments, water and water vapor, salts, acid gases (e.g., carbon dioxide and, sometimes, hydrogen sulfide), and flammable vapors (e.g., methane, propane, butane, and pentane) (Kleinfelder 2017).

Crude oil comes in many forms. Low viscosity and volatile oils are called "light", whereas viscous and low- or non-volatile oils are called "heavy". Light oils have an API gravity of 30 to 40 degrees, which means that the density is much less than 1.0 gram per cubic centimeter (g/cc) (the density of water). These oils float easily on water. By contrast, some heavy oils have an API gravity of less than 12 degrees and are so dense that they sink, rather than float, in water. Oil that has the same density of water has an API gravity of 10 degrees. Hydrocarbons compose the majority of most crude oils and there are four main hydrocarbon groups:

- Saturates – hydrocarbons consisting of straight chains of carbon atoms.
- Aromatics – hydrocarbons consisting of rings of carbon.
- Asphaltenes – complex polycyclic hydrocarbons that contain many complicated carbon rings.
- Nitrogen-, sulfur- and oxygen-containing compounds.

In most oils, the saturate fraction is the largest, and is made up of two subgroups called paraffins and isoprenoids. Paraffins are simple, straight-chain hydrocarbons, whereas isoprenoids are hydrocarbon chains with branches. Waxes are long-chain paraffins that are solid at surface temperatures and may contain as many as 50 carbon atoms. Waxy oils tend to be thick and viscous, whereas aromatic oils tend to be light and volatile (Kleinfelder 2017).

The major hydrocarbon constituents include:

- Alkanes (paraffins) – straight-chain normal alkanes and branched iso-alkanes with the general formula C_nH_{2n+2} . The major paraffinic components of most crude oils are in the C1 to C35 range.
- Cycloalkanes (naphthenes) – saturated hydrocarbons containing structures with carbon atoms linked in a ring. The cycloalkane composition in crude oil worldwide typically varies from 30 to 60 percent.
- Aromatic Hydrocarbons – most commonly benzene, benzene derivatives, and fused benzene ring compounds. The concentration of benzene in crude oil ranges between 0.01 percent and 1 percent.

Sulfur is a component of many natural compounds found in crude oil, including hydrogen sulfide. Total sulfur ranges from approximately 1 percent to 4 percent by weight in crude oils, and hydrogen sulfide concentrations can reach 100 parts per million (ppm) in "sour" crudes. Hydrogen sulfide is a toxic gas that can cause injuries or fatalities if released to the atmosphere and inhaled. It has a strong, pungent odor detectable by humans at concentrations substantially below those which cause health effects; however, it also causes paralysis of the olfactory functions at concentrations below health effects (Kleinfelder 2017).

In contrast, the crude oil currently produced at the Inglewood Oil Field is "sweet" crude oil, meaning it does not contain appreciable quantities of hydrogen sulfide. Other constituents of

crude oil include nitrogen and oxygen compounds, and water- and metal-containing compounds, such as iron, vanadium, and nickel (Kleinfelder 2017).

Hydrocarbon gas is also recovered from subsurface geological formations and processed at the Inglewood Oil Field gas plant in the County IOF. The processed gas must conform to requirements established by Southern California Gas Company for use in their distribution system. The majority of the gas is methane with historical levels (between 2005 and 2007) of between 78–86 percent, with some smaller amounts of ethane (5 percent), propane (3 percent), butane (2 percent), pentane (1 percent), hexane+ (1–2 percent) and inert compounds (such as carbon dioxide up to 3 percent). Natural gas may present a hazard due to its flammability in the form of vapor cloud fires and explosions, and thermal radiation impacts due to flame jet fires emanating from a gas leak or rupture. Produced gas as it emerges from the wellheads at the field has historically contained some hydrogen sulfide in levels ranging from 0 to 10 ppm, which may be of health concern for humans if exposure to this concentration lasts for 10 minutes or more (Kleinfelder 2017).

Because natural gas is essentially odorless, an odorant is added to provide warning in case of a natural gas leak. The odorant used at the Inglewood Oil Field odorant station, which is located in the County IOF, is 100 percent tetrahydrothiophene (C₄H₈S). It is a liquid at standard conditions (68°F and atmospheric pressure) and has a boiling point of approximately 247°F. It can produce a flammable vapor with explosion limits of 1.1 percent to 12.3 percent. It has a low flash point of approximately 54°F; meaning that, above this temperature, sufficient volatile vapors are produced to create a flash if brought in contact with an ignition source. If spilled, or opened to the atmosphere, the odorant produces a vapor that is approximately three times heavier than air. It is defined as a colorless liquid with a stench, and is insoluble in water. Because the odorant's molecular structure contains sulfur atoms, if exposed to flames or high temperatures, it can produce toxic sulfur oxides (Kleinfelder 2017).

Hazardous Wastes and Material Releases

As discussed in Section 2.0, Environmental Setting of this Draft EIR, Table 2-3 provides the estimated volume of chemical storage within the Inglewood Oil Field for well drilling and production activities. Table 2-4 provides approximate hazardous waste generation from the Project Site based on the operation of the maximum number of injection and production wells allowed by the Specific Plan (30 new wells plus the 37 existing wells already located within the City portion of the Oil Field for a total of 67 active wells).

Based on Phase I and Phase II Environmental Site Assessments conducted in 1990 and 1991, chemical contamination was reported in several locations within the Inglewood Oil Field. The majority of the soil contamination was found to contain non-hazardous hydrocarbons (non-hazardous hydrocarbon-impacted soils) and low levels of heavy metals and other contaminants, below the action levels prescribed by the pertinent agencies (Kleinfelder 2017).

In Section 4.8, Hydrology and Water Quality, Table 4.8-2, Inglewood Oil Field Reported Petroleum or Chemical/Hazardous Material Releases, provides a summary for the past five years of reported petroleum or chemical/hazardous material releases for the County IOF. There has been one reportable release in Culver City in the last five years. On November 24, 2013, an inter-facility pipeline between the FM O&G "Packard" facility in the City of Los Angeles and the Inglewood Oil Field, which leaked seven barrels of produced water that drained onto the street and then into the storm drain near Blackwelder Street (near the intersection of La Cienega Boulevard and Fairfax Avenue). The produced water did not reach Ballona Creek (Kleinfelder 2017).

As described in Section 4.12, Public Services, the Culver City Fire Department (Department) has three fire stations, which are equipped to respond to emergencies at the Inglewood Oil Field. The Fire Suppression Division includes both Hazardous Materials Response and Heavy Rescue Teams. The Department is supported by a mutual aid system with surrounding communities and agencies. The City inspects oil wells and facilities at the field and issues operating permits for the equipment. During drilling activities, the DOGGR issues the permits, oversees the drilling operations and inspects tanks. Once drilling is completed, the Department issues permits for the operations.

4.7.3 REGULATORY SETTING

Numerous laws have been enacted to regulate hazardous materials and wastes, including regulations specific to the oil and gas industry. California has the most stringent regulation and oversight of oil and gas operations in the U.S.; with the primary oversight agency being the DOGGR. Pertinent regulations that reduce routine hazards, reduce the potential for risks of upset (accidents), and enhance emergency response in the event of an upset or cleanup during oil and gas production and transport activities are summarized in Section 2.0, Environmental Setting, of this Draft EIR. Please refer to Section 2.5, Regulatory Overview, for a description of applicable regulations and oversight agencies related to oil and gas production and transport in Culver City. Additional hazardous materials regulations applicable to the Project are described below.

Hazardous Material Definitions

The definition, or list, of what is considered a hazardous material varies depending on the regulatory program(s) with jurisdiction over the material or the operation. Additionally, the criteria for hazardous materials within each regulatory program can be complex. There are several categories of hazardous materials defined in the statutes of various agencies or programs, including:

- Substances covered under the Hazard Communication Standard (29 CFR 1910.1200);
- "Hazardous materials" as defined under U.S. Department of Transportation (USDOT) regulations at 49 CFR Parts 170-177;
- "Hazardous wastes" as defined in the Resource Conservation and Recovery Act (RCRA). Procedures in 40 CFR 262 are used to determine whether waste is considered hazardous waste;
- "Hazardous substances" as defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and listed in 40 CFR Table 302.4;
- Any "hazardous substances" or "extremely hazardous substances," as well as petroleum products such as gasoline, diesel, or propane (i.e., refined petroleum products), that are subject to reporting requirements (Threshold Planning Quantities) under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act (SARA); and/or
- Petroleum products defined as "oil" in the Oil Pollution Act of 1990; which includes fuels, lubricants, hydraulic oil, and transmission fluids.

Crude oil is defined as a hazardous material under some statutes, and not under others, as discussed further below. Also, as discussed in Section 3.0, Project Description, construction and operation of the Project would involve other (i.e., non-petroleum) materials and/or wastes that are defined as hazardous materials.

Exploration and Production Exemption from RCRA

In 1978, the USEPA proposed hazardous waste management standards that reduced requirements for several types of large volume wastes that the USEPA believed were lower in toxicity than other wastes being regulated as hazardous waste under RCRA. In 1980, legislative amendments to RCRA included “drilling fluids, produced water, and other wastes associated with the exploration, development, or production of crude oil or natural gas ...” The term “other wastes associated” specifically includes waste materials derived from primary field operations associated with the exploration, development, or production of crude oil and natural gas (USEPA 2002).

Primary field operations is intended to cover exploration, development, and production operations and not transportation and manufacturing operations. In 1988, the USEPA issued a regulatory determination that control of exploration and production (E&P) wastes was not warranted under RCRA Subtitle C. E&P wastes have since remained exempt from Subtitle C regulations. The exemption only applies to wastes generated from the exploration, development, and production of oil and gas associated with primary field operations. Primary field operations include exploration, development, and the primary, secondary, and tertiary production of oil or gas (USEPA 2002). With respect to crude oil, primary field operations include activities occurring at or near the wellhead and before the point where the oil is transferred from an individual field facility. With respect to natural gas, primary field operations are those activities occurring at or near the wellhead or at the gas plant, but before the point where the gas is transferred from an individual field facility to a carrier for transport (trucks, interstate pipelines and some intrastate pipelines) to market. (USEPA 2002).

Many of the wastes generated during oil and gas-related activities are exempt from RCRA, but some are not. The RCRA Subtitle C exemption did not preclude wastes from control under State regulations, under the less stringent RCRA Subtitle D solid waste regulations, or under other federal regulations. Currently, E&P wastes are managed as non-hazardous solid wastes under federal law, pursuant to the E&P exemption codified in Title 40 Code of Federal Regulations (40 CFR), Section 261.4.(b)(5), and included with limitations, in Title 22 of the California Code of Regulations (22 CCR) Sections 6621.4(b)(2) and 66261.24(a)(1). The exemption applies in California based solely on the Toxicity Characteristic Leaching Procedure (TCLP), as provided under 22 CCR, Section 66261.24 (CalEPA 2002).

The California DTSC conducted a study of E&P wastes including produced water, drilling waste, oily sludge, and foam treatment waste to determine whether the wastes are being properly managed in California and whether these wastes could have hazardous waste characteristics that are not covered by the exemption. The data indicated that oily sludge may exhibit hazardous waste characteristics not covered by the exemption. The DTSC report concluded that depending on formation characteristics or facility operations, certain E&P wastes, such as oily sludge, may be regulated by the State as hazardous wastes even if they are exempted from hazardous waste regulation under federal law. It is the generator’s responsibility to determine which waste streams are hazardous in California and to manage them accordingly (CalEPA 2002).

Federal Regulations

Hazardous Liquid Pipeline Safety Act

The Hazardous Liquid Pipeline Safety Act (49 United States Code Section 60101-60133) contains federal pipeline safety regulations for the design, installation, inspection, testing, construction, extension, operation, replacement, and maintenance of pipeline facilities and pipeline transportation, including the qualifications of pipeline operators and emergency plans and

procedures. These regulations apply to pipelines that are not regulated by the State, such as intrastate pipelines, unless otherwise subject to an agreement between the US Secretary of Transportation and the State.

Hazardous Materials Transportation Act

The Hazardous Materials Transportation Act, 49 CFR 171-177, was enacted in 1975 as the principal federal law in the United States regulating the transportation of hazardous materials. This Act contain requirements for hazardous materials classification, hazard communication, packaging requirements, operational rules, training and security, and registration.

Transportation of Hazardous Liquids by Pipeline, 49 CFR 195, describes a range of safety and environmental requirements for liquids pipelines. Part 195.30 incorporates applicable safety standards of the American Petroleum Institute, American Society of Mechanical Engineers, American National Standards Institute and the American Society for Testing and Materials. Relevant portions include:

- Part 195.50, Reporting Accidents.
- Subpart C, Design Requirements, Parts 195.100 through 195.200.
- Subpart D, Construction Parts, 195.200 through 195.266.
- Subpart E, Pressure Testing Parts, 195.300 through 195.310.
- Subpart F, Operation and Maintenance, Parts 195.400 through 195.466.

Other applicable requirements related to the need for Oil Spill Prevention and Countermeasure Plans are in 40 CFR:

- Part 109, which provides minimum criteria for developing oil removal contingency plans.
- Part 110, which prohibits the discharge of oil that would violate applicable water quality criteria or cause a film or sheen in or on the water.
- Part 112, which addresses oil spill prevention and preparation.
- Part 113, which addresses liability limits for small onshore storage facilities.
- Part 114, which provides civil penalties for violations.

Gas transmission operators are required to follow the regulations in 49 CFR 192, which address:

- Pipeline classification.
- Pipe types and markings.
- Pipeline materials and design issues.
- Pipeline fittings and connections.
- Pipeline inspection.
- Compressor stations and vaults.
- Pipeline installation.
- Emergency plans.

Risk-based anti-terrorism performance standards for chemical facilities are described in 6 CFR 27.

The generation, transportation, treatment, storage, and disposal of hazardous waste is regulated under 40 CFR 260. USEPA, which administers these regulations, has approved California's program to implement this program.

Emergency planning and community-right-to-know requirements are described in 40 CFR 350-372. Major requirements include:

- Local agencies must regulate the storage and handling of hazardous materials and develop plans to mitigate any releases.
- Businesses that handle specified hazardous materials must submit to the local government agency an inventory of hazardous materials, an emergency response plan, and an employee training program.

Under 40 CFR 68, facilities that handle listed regulated substances must develop Risk Management Programs, which include a hazard assessment that addresses off-site consequences, a five-year accident history, a prevention program, and an emergency response program.

An asbestos containing materials survey must be performed prior to renovation or demolition under 40 CFR 61 Subpart M. The lead agency must be notified 14 days in advance to the start of work that disturbs these materials. Worker protection measures are described in 40 CFR 763, Subpart G, and 29 CFR 1910.1001.

Hazardous materials transportation carriers are required to report accidental releases, deaths, injuries requiring hospitalization, and property damage that exceeds \$50,000 to the U.S. Department of Transportation at the earliest practical time under 49 CFR 171, Subpart C.

The Occupational Safety and Health Administration had adopted many worker safety and health regulations (29 CFR), including:

- Part 1910.1000, Air Contaminants, which requires limits of exposure of an employee to substances listed.
- Part 1910.1200, Hazard Communications, which requires hazards to be evaluated and communicated to employers and employees.
- Part 1910.119, Process Safety Management, which requires a number of components to prevent a catastrophic release of chemicals, safety train workers, develop safety equipment inventories, provide hazardous substance exposure warnings, prepare illness prevention programs, prepare fire prevention plan, and prepare emergency response plans.
- Part 1910.134, Respiratory Protection, which requires personal protective equipment for employees working under specific conditions.

National Codes and Standards and Other Applicable Guidelines

Safety and Corrosion Prevention Requirements – American Society of Mechanical Engineers (ASME), National Association of Corrosion Engineers (NACE), American National Standards Institute (ANSI), American Petroleum Institute (API)

- ASME & ANSI B16.1 Cast Iron Pipe Flanges and Flanged Fittings.
- ASME & ANSI B16.9, Factory-Made Wrought Steel Butt Welding Fittings.
- ASME & ANSI B31.1a, Power Piping.

- ASME & ANSI B31.4a, addenda to ASME B31.4a, Liquid Transportation Systems for Hydrocarbons, Liquid Petroleum Gas, Anhydrous Ammonia, and Alcohols.
- NACE Standard RP0190, Item No. 53071. Standard Recommended Practice External Protective Coatings for Joints, Fittings, and Valves on Metallic Underground or Submerged Pipelines and Piping Systems.
- NACE Standard RP0169, Item No. 53002. Standard Recommended Practice Control of External Corrosion on Underground or Submerged Metallic Piping Systems.
- API 49, Recommended Practice for Drilling and Well Service Operations Involving Hydrogen Sulfide.
- API 54, Recommended Practice for Occupational Safety for Oil and Gas Well Drilling and Servicing Operations
- API 55 Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide.
- API 68 Well Servicing and Workover Operations Involving Hydrogen Sulfide.
- API 510, Pressure Vessel inspection Code.
- API 570, Piping Inspection Code, applies to in-service metallic piping systems used for the transport of petroleum products.
- API 572, Inspection of Pressure Vessels.
- API 574, Inspection Practices for Pipe System Components.
- API 575, API Guidelines and Methods for Inspection of Existing Atmospheric and Low-pressure Storage Tanks.
- API 576, Inspection of Pressure Relieving Devices.
- API 650, Welded Steel Tanks for Oil Storage.
- API 651, Cathodic Protection of Aboveground Storage Tanks.
- API 653, Tank Inspection, Repair, Alteration, and Reconstruction.
- API 2610, Design, Construction, Operation, Maintenance, and Inspection of Terminal & Tank Facilities.
- API Spec 12B - Bolted Tanks for Storage of Production Liquids.
- IADC H2S Safety Handbook.
- IADC H2S Safety for Oil, Gas & Petrochemical Industry.
- IADC H2S Safety in Drilling and Production.
- IADC Oilfield H2S Safety Training.

API 653, Atmospheric Tank Inspection and Repair, addresses:

- Tank suitability for service;
- Brittle fracture considerations;
- Inspections;
- Materials;
- Design considerations;
- Tank repair and alteration;
- Dismantling and reconstruction;
- Welding;

- Examination and testing; and
- Marking and recordkeeping.

Requirements for tank inspections in API 653 include:

- External inspections by an authorized inspector every 5 years.
- Ultrasonic inspections of shell thickness every 5 years, if corrosion rate is not known.
- Internal bottom inspection every 10 years, if corrosion rate is not known.
- Appendix C – detailed checklists for in-service and out-of-service inspections.

Fire and Explosion Prevention and Control, National Fire Protection Agency (NFPA) Standards

- NFPA 30, Flammable and Combustible Liquids Code and Handbook.
- NFPA 11, Foam Extinguishing Systems.
- NFPA 12, A&B Halogenated Extinguishing Agent Systems.
- NFPA 15, Water Spray Fixed Systems.
- NFPA 20, Centrifugal Fire Pumps.
- NFPA 70, National Electrical Code.

California Regulations

California Health and Safety Code

- Division 20, Chapter 6.5, §25100-25249, Hazardous Waste Control.
- Division 20, Chapter 6.95, §255500, et seq. Hazardous Materials Management Plan and Community Right-to-Know and Hazardous Materials Release Response Plans and Inventory (Business Plan Program).
- Proposition 65 Compliance, H&SC §25249.5 et seq.
- H&SC §§25340-25392, Carpenter-Presley-Tanner Hazardous Substance Account Act.
- H&SC §§25531-255413, California Accidental release Prevention Program.

California Water Code

- Division 7, Water Quality (Porter-Cologne Water Quality Control Act).

California Code of Regulations (CCR)

- Title 8, §1529, Asbestos Construction Standard.
- Title 8, §1532.1, Lead Construction Standard.
- Title 8, §5189, Accidental Release Plan.
- Title 8, §5192, Accidental Release Plan.
- Title 14, Division 2, Department of Conservation.
- Title 19, §2729, Employee Training Program.
- Title 22, Division 4, Chapter 30, Hazardous Wastes.
- Title 22, Division 4.5, §§66260-67786, Hazardous Waste Requirements.
- Title 22, §66265.50-.56, Contingency/Emergency Response Plan.

California Civil Code

- Oil Pipeline Environmental Responsibility Act (Section 3333.4)

California Pipeline Safety Regulations

Parts 51010 through 51018 of the California Government Code provide specific safety requirements that are more stringent than the federal rules. These include:

- Periodic hydrostatic testing of pipelines, with specific accuracy requirements on leak rate determination.
- Hydrostatic testing by state-certified independent pipeline testing firms.
- Pipeline leak detection.
- Reporting of all leaks required.

Recent amendments require pipelines to include means of leak prevention and cathodic protection, with acceptability to be determined by the State Fire Marshal. All new pipelines must also be designed to accommodate passage of instrumented inspection devices (smart pigs) through the pipeline.

California Public Resources Code Sections 30260, 30262 and 30265

The California Public Resources Code (PRC) requires adverse environmental effects to be mitigated to the maximum extent feasible, that new and expanded oil and gas facilities be consolidated, and that platforms not be sited where a substantial hazard to vessel traffic might result from the facility or related operations.

Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR) Regulations

The DOGGR was formed in 1915 to regulate oil and gas activities with uniform laws and regulations. The Division supervises the drilling, operation, maintenance, and plugging and abandonment of onshore and offshore oil, gas, and geothermal wells, preventing damage to: (1) life, health, property, and natural resources; (2) underground and surface waters suitable for irrigation or domestic use; and (3) oil, gas, and geothermal reservoirs.

DOGGR responsibilities are detailed in Section 3000 of the California PRC and Title 14, Chapter 4 of the California Code of Regulations. These regulations address well spacing, blow-out prevention devices, casing requirements, plugging and abandonment of wells, maintenance of facilities and safety systems, inspection frequency and reporting requirements. In addition, DOGGR publishes a number of instruction manuals related to testing of oil and gas wells (M06), blowout prevention requirements (M07) and drilling wells in an H₂S environment (M10).

DOGGR is also mandated by Section 3106 of the PRC to supervise the drilling, operation, maintenance, and abandonment of oil wells for the purpose of preventing: damage to life, health, property, and natural resources; damage to underground and surface waters suitable for irrigation or domestic use; loss of oil, gas, or reservoir energy; and damage to oil and gas deposits by infiltrating water and other causes.

Section 1774 of Title 14 CCR Division 2, Chapter 4 specifies oilfield maintenance practices related to oil field facilities.

California Pipeline Safety Act

The California Pipeline Safety Act of 1981 gives regulatory jurisdiction to the State Fire Marshal for the safety of all intrastate hazardous liquid pipelines and all interstate pipelines used for the transportation of hazardous or highly volatile liquid substances. The law establishes the governing rules for interstate pipelines to be the Federal Hazardous Liquid Pipeline Safety Act and Federal pipeline safety regulations.

Oil Pipeline Environmental Responsibility Act (Assembly Bill [AB] 1868)

AB 1868 applies to public utility pipelines for which construction would be completed after January 1, 1996, or that are part of an existing utility pipeline that is being relocated after the above date and is more than three miles in length. AB 1868 was signed into law in October 1995 and mandates that:

- Each pipeline corporation that qualifies as a public utility that transports crude oil in a public utility oil pipeline system shall be absolutely liable, without regard to fault, for any damages incurred by any injured party that arise out of, or are caused by, the discharge or leaking of crude oil.
- Damages for which a pipeline corporation is liable under this law are: all costs of response, containment, cleanup, removal, and treatment, including monitoring and administration cost; injury or economic losses resulting from destruction of, or injury to, real or personal property; injury to, destruction of, or loss of natural resources, including but not limited to, the reasonable cost of rehabilitating wildlife habitat, and other resources and the reasonable cost of assessing that injury, destruction, or loss, in any action brought by the State, county, city, or district; loss of taxes, royalties, rents, use, or profit shares caused by the injury, destruction, loss, or impairment of use of real property, personal property, or natural resources; and loss of use and enjoyment of natural resources and other public resources or facilities in any action brought by the state, county, city, or district.
- A pipeline corporation shall immediately clean up all crude oil that leaks or is discharged from a pipeline.
- No pipeline system subject to this law shall be permitted to operate unless the State Fire Marshal certifies that the pipeline corporation demonstrates sufficient financial responsibility to respond to the liability imposed by this section. The minimum financial responsibility required by the State Fire Marshal shall be seven hundred fifty dollars (\$750) times the maximum capacity of the pipeline in the number of barrels per day up to a maximum of one hundred million dollars (\$100,000,000) per pipeline system, or a maximum of two hundred million dollars (\$200,000,000) per multiple pipeline system.
- Financial responsibility shall be demonstrated by evidence that is substantially equivalent to that required by regulations issued under section 8670.37.54 of the Government Code, including insurance, surety bond, letter of credit, guaranty, qualification as a self-insurer, or combination thereof or any other evidence of financial responsibility. The State Fire Marshal shall require that the documentation evidencing financial responsibility be placed on file with that office.
- The State Fire Marshal shall require evidence of financial responsibility to fund post-closure cleanup spots. The evidence of financial responsibility shall be 15 percent of the amount of financial responsibility stated above.

California Accident Release Prevention

The California Accident Release Prevention program mirrors the Federal Risk Management program, except that it adds external events and seismic analysis to the requirements and includes facilities with lower inventories of materials. A California Accident Release Prevention or Risk Management Plan is a document prepared by the owner or operator of a stationary source containing detailed information including:

- Regulated substances held onsite at the stationary source.
- Offsite consequences of an accidental release of a regulated substance.
- The accident history at the stationary source.
- The emergency response program for the stationary source.
- Coordination with local emergency responders.
- Hazard review or process hazard analysis.
- Operating procedures at the stationary source.
- Training of the stationary source's personnel.
- Maintenance and mechanical integrity of the stationary source's physical plant.
- Incident investigation.

Oil and Gas: Well Stimulation (SB4)

Well stimulation is regulated by DOGGR under SB4. The Oil Field Operator's application for using well stimulation treatments must include:

- Composition of fluid to be used.
- Chemicals to be used and their concentrations.
- Disposal method of recovered water.
- Anticipated procedure to comply with the Hazardous Waste Control Law.
- Estimate of generated waste volume and disposal method.

Fluids must be stored in compliance with all applicable requirements. The Oil Field Operator must have a Spill Contingency Plan. Operators must continuously monitor and record specified parameters during well stimulation procedures, and terminate stimulation and immediately report to DOGGR if critical pressure thresholds are reached or if there is a potential breach of the well casing.

Hazardous Materials and Hazardous Waste

Hazardous Waste Control in California

The Hazardous Waste Control Law is administered by the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) pursuant to Chapter 6.5 "Hazard Waste Control" of the California Health and Safety Code. The DTSC has adopted extensive regulations governing the generation, transportation, and disposal of hazardous wastes. These regulations impose cradle-to-grave requirements for handling hazardous wastes in a manner that protects human health and the environment. The Hazardous Waste Control Law regulations establish requirements for identifying, packaging, and labeling hazardous wastes. They prescribe management practices for hazardous wastes; establish permit requirements for hazardous waste

treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills. Hazardous waste is tracked from the point of generation to the point of disposal or treatment using hazardous waste manifests. The manifests list a description of the waste, its intended destination, and regulatory information about the waste.

Hazardous Materials Management Planning

The Office of Emergency Services, in support of local government, coordinates overall state agency response to major disasters. The office is responsible for assuring the State's readiness to respond to and recover from natural, manmade, and war-caused emergencies, and for assisting local governments in their emergency preparedness, response, and recovery efforts. During major emergencies, Office of Emergency Services may call upon all State agencies to help provide support. Due to their expertise, the California National Guard, California Highway Patrol (CHP), Department of Forestry and Fire Protection, Conservation Corps, Department of Social Services, and California Department of Transportation (Caltrans) are the agencies most often asked to respond and assist in emergency response activities.

Hazardous Materials Transportation in California

California regulates the transportation of hazardous waste originating or passing through the State in Title 13 of the California Code of Regulations. The CHP and Caltrans have primary responsibility for enforcing Federal and State regulations and responding to hazardous materials transportation emergencies. The CHP enforces materials and hazardous waste labeling and packing regulations that prevent leakage and spills of material in transit and provide detailed information to cleanup crews in the event of an incident. Vehicle and equipment inspection, shipment preparation, container identification, and shipping documentation are all part of the responsibility of the CHP. The CHP conducts regular inspections of licensed transporters to ensure regulatory compliance. Caltrans has emergency chemical spill identification teams at locations throughout the State.

Hazardous waste must be regularly removed from generating sites by licensed hazardous waste transporters. Transported materials must be accompanied by hazardous waste manifests.

Hazardous Material Worker Safety, California Occupational Safety and Health Act

The California Occupational Safety and Health Administration (Cal/OSHA) is responsible for assuring worker safety in the handling and use of chemicals in the workplace. Cal/OSHA assumes primary responsibility for developing and enforcing workplace safety regulations in Title 8 CCR. Cal/OSHA hazardous materials regulations include requirements for safety training, availability of safety equipment, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation.

Cal/OSHA also enforces hazard communication program regulations, which contain training and information requirements, including procedures for identifying and labeling hazardous substances. The hazard communication program also requires that Material Safety Data Sheets be available to employees and that employee information and training programs be documented.

There are several OSHA Publications and other resources related to protection of employees during temperature extremes. A few examples include Publication 3154, Protecting Workers from Heat Stress, and Publication 3438, Protecting Workers from Heat Illness.

California SB 861

Under this law the Office of Spill Prevention and Response (OSPR) has the authority to implement spill preparedness and response requirements for inland oil spills. This bill went into effect in June 2014. This bill applies to areas where there is a threat to State surface waters and includes pipelines, oil wells, railroads, and ships.

California Fire Plan

The California Fire Plan (Fire Plan) is the State's plan for reducing the risk of wildfire through a cooperative effort between the State Board of Forestry and Fire Protection and the California Department of Forestry and Fire Protection (CAL FIRE). By placing the emphasis on prevention, the Fire Plan looks to reduce firefighting costs and property losses; to increase firefighter safety; and to contribute to ecosystem health (CAL FIRE 2010). The Fire Plan sets up the structure of County-level plans. However, the Fire Plan is structured so that individual Fire Departments can establish plans and policies for land within their respective jurisdictions. Therefore, the State does not specify fire prevention plans or policies.

Sections 51175–51189 of the *California Government Code* define responsibilities for CAL FIRE and for local agencies. In summary, Sections 51178 and 51181 define the CAL FIRE Director's responsibility to (1) identify very high fire hazard severity zones; (2) transmit this information to local agencies; and (3) periodically review the recommendations relative to identification of very high fire hazard severity zones. Section 51176 identifies that land is classified in the State "in accordance with whether a very high fire hazard is present so that public officials are able to identify measures that will retard the rate of spread, and reduce the potential intensity, of uncontrolled fires that threaten to destroy resources, life, or property, and to require that those measures be taken". Sections 51175–51189 direct CAL FIRE to designate and map areas of very high fire hazard within Local Responsibility Areas (LRAs) and State Responsibility Areas (SRAs). Wildland fire protection in California is the responsibility of the State, local, or the federal government. LRAs include incorporated cities, cultivated agricultural lands, and portions of the desert with service typically provided by municipal fire departments, fire protection districts, counties, and by CAL FIRE under contract to local government. SRAs include areas of the State where the financial responsibility of preventing and suppressing fires has been determined to be primarily the responsibility of the State.

Mapping of the areas, referred to as Very High Fire Hazard Severity Zones (VHFHSZ), is based on relevant factors such as fuels, terrain, and weather. VHFHSZ maps were initially developed in the mid-1990s but are now being updated based on improved science, mapping techniques, and data. Mapping was prepared by CALFIRE's Fire and Resource Assessment Program using data and models describing development patterns, potential fuels over a 30–50 year time horizon, expected fire behavior, and expected burn probabilities to quantify the likelihood and nature of vegetation fire exposure to new construction. Based on the State "Fire Hazard Severity Zones in LRA" for the City of Culver City, the Project Site is not a designated VHFHSZ (CAL FIRE 2011). However, there are VHFHSZ immediately east and south of the Project Site (CCFD 2012).

Local Regulations

Los Angeles County Certified Unified Program Agency

The Certified Unified Program Agency (CUPA) is designed to consolidate, coordinate, and consistently administer permits, inspection activities, and enforcement activities throughout the County. The Los Angeles County Fire Department is the CUPA for the entire County except in

the cities of El Segundo, Glendale, Long Beach, Los Angeles, Santa Fe Springs, Santa Monica, and Vernon; these cities are CUPAs within their own jurisdictions. Ten cities and two County agencies entered into agreements and/or Memorandum of Understanding with the Los Angeles County Fire Department to administer one or more of the Program Elements as Participating Agencies (PAs) to the LA County CUPA. The ten City agencies include the Fire Departments of Alhambra, Burbank, Compton, Culver City, Downey, Monrovia, Pasadena, Redondo Beach, South Pasadena, and Torrance. The Program Elements consolidated under the Unified Program are:

- Hazardous Waste Generator and Onsite Hazardous Waste Treatment Programs (a.k.a. Tiered Permitting);
- Aboveground Petroleum Storage Tank Spill Prevention Control and Countermeasure Plan (SPCC);
- Hazardous Materials Release Response Plans and Inventory Program (a.k.a. Hazardous Materials Disclosure or "Community-Right-To-Know");
- California Accidental Release Prevention Program (Cal ARP);
- Underground Storage Tank Program (UST); and,
- Uniform Fire Code Plans and Inventory Requirements.

Culver City General Plan

The Culver City General Plan lists the goals and policies of the City as they relate to land uses and development. The City of Culver City General Plan's Public Safety Element contains policies that address fire and geologic hazards. These include:

Public Safety Element Policy 1. Establish and enforce standards and criteria to reduce unacceptable levels of fire and geologic risk.

Public Safety Element Policy 5. Develop stringent site criteria for construction in areas with fire and/or geologic problems and prohibit construction if these criteria are not met.

Public Safety Element Policy 7. Strengthen existing codes and ordinances pertaining to fire and geologic hazards.

Public Safety Element Policy 9. Require all new development and selected existing development to comply with established fire and geologic safety standards.

Culver City Municipal Code

Chapter 9.03 of the Culver City Municipal Code addresses Health, Sanitation, and Hazardous Materials. Section 9.03.110.A, Business Plans, of the Municipal Code requires that every business within the City must complete the Departments reporting form(s), declaring whether that business handles any hazardous or extremely hazardous materials at any time within the calendar year. All businesses handling hazardous or extremely hazardous materials shall be required to prepare and submit a business plan to the Department. Business plans shall include, but not be limited to, the inventory of hazardous materials, as described in Section 9.03.115, procedures for emergency notification to the Department and the State Office of Emergency Services, procedures for mitigation of a release or threatened release of hazardous materials, evacuation plans and employee training, as required by Resolution by the City Council.

Section 9.03.115.A, Inventory Reports, of the Municipal Code requires every business within the City which handles hazardous or extremely hazardous materials shall prepare an inventory of all hazardous materials it handles within a single calendar year. The inventory shall be considered part of the business plan, required pursuant to Section 9.03.110 of this Subchapter, and shall be submitted to the Department annually, according to the dates established in the Inventory Reporting Schedule. The Inventory Reporting Schedule and specific information required thereunder shall be established by Resolution by the City Council.

Section 9.03.120, Risk Management and Prevention Program, of the Municipal Code requires:

- A. *General requirements; timetable.*
 - 1. Any business which handles any acutely hazardous material at any time within the calendar year, shall be required to file an acutely hazardous material registration form, pursuant to Cal. Health & Safety Code § 25533. Within ninety (90) days after the Department receives the form, said business may be required, at the discretion of the Fire Chief, to prepare a Risk Management and Prevention Program (RMPP) for that business. The RMPP shall be prepared within twelve (12) months following the Fire Chief's request for preparation.
 - 2. The RMPP shall be required for any new or modified facility which will be used for the handling of acutely hazardous materials and which will commence or have commenced new or modified operations on or after January 1, 1988. The new or modified operations dealing with acutely hazardous materials shall not commence until the RMPP has been prepared and certified, pursuant to Subsection D. The RMPP shall be prepared in addition to the business plan required in § 9.03.115 of this Subchapter. A separate plan shall be prepared for each site, branch, or facility of the business located within Culver City, unless the Fire Chief agrees to a consolidated plan.
- B. *Plan contents.* The RMPP shall include all the information required by Cal. Health & Safety Code § 25534.
- C. *Review and update of RMPP.* The handler shall review the RMPP, and shall make necessary revisions to the RMPP at least every three (3) years, but, in any event, within sixty (60) days following a modification which would materially affect the handling of an acutely hazardous material.
- D. *Certification; copy of RMPP.* The RMPP, including any revisions required by the Department, shall be certified as complete by a qualified professional and the facility operator. If requested, a copy shall be provided to the Department.
- E. *Notification of completion; implementation of the RMPP.* The handler shall notify the Department in writing when the RMPP has been completed and certified. The handler shall implement the programs and activities specified in the RMPP. The handler shall again notify the Department in writing when the RMPP has been implemented, and shall summarize the steps taken in the preparation and implementation of the RMPP. The handler shall continue to carry out the programs and activities specified in the RMPP after notification of implementation is sent to the Department.

Section 9.03.135, Reporting Release or Threatened Release of Hazardous Materials, of the Municipal Code requires:

A. Immediate verbal notice required.

1. A person shall provide an immediate, verbal report of any release or threatened release of a hazardous material to the Department and the State Office of Emergency Services, as soon as:
 - a. He or she has knowledge of the release or threatened release;
 - b. Notification can be provided without impeding immediate control of the release or threatened release; and
 - c. Notification can be provided without impeding immediate emergency medical measures.
2. The immediate reporting required hereunder shall include all the information described in the Resolution adopted pursuant to this Subchapter. An immediate report shall not be required if there is a reasonable belief that the release or threatened release poses no significant present or potential hazard to human health and safety, property, or the environment. Each handler shall allow fire, public health and safety personnel to have access to the facility.

B. Written report required. In addition to the immediate verbal notification required in Subsection A., any business with ten (10) or more employees and which handles more than ten thousand (10,000) pounds of hazardous materials in a single calendar year shall submit a copy to the Department of any report on any release or threatened release of a hazardous material prepared in writing, pursuant to Title III, being 42 USC 11001 et seq., as submitted to the Administrator of the U.S. Environmental Protection Agency, within ten (10) days of the date of the release.

Chapter 11.12 of the Municipal Code address Oil, Gas and Hydrocarbons and outlines the City's permit and operational requirements for oil, gas or hydrocarbon wells operating in the City. These regulations include well operating standards, required fire equipment, prohibited facilities, and other safety requirements.

Primary Oversight Agencies

Primary oversight of the petroleum industry is provided by DOGGR, (PRC Section 3000 and 14 CCR Chapter 4), including the administration of Senate Bill (SB) 4 (Pavley, Chapter 313, Stats of 2013).

In addition to DOGGR, the Certified Unified Program Agency (CUPA) is designed to consolidate, coordinate, and consistently administer permits, inspection activities, and enforcement activities through a county. The Los Angeles County Fire Department (LACFD) is the CUPA for the majority of the County of Los Angeles, including the City of Culver City.

Table 4.7-1, Oil and Gas Industry Regulatory Oversight Responsibilities, summarizes the general categories of oversight and the agencies with primary responsibility for oversight of various regulations. This matrix is not intended to be all encompassing, but to provide a general explanation of the numerous agencies and their areas of oversight, often overlapping, involved in the regulation of an oil and gas facility and associated product transport in California.

**TABLE 4.7-1
 OIL AND GAS INDUSTRY REGULATORY OVERSIGHT RESPONSIBILITIES**

Area of Oversight	USEPA	USDOT	OSHA/CalOSHA	DOGGR	RWQCB or DTSC	OES	Caltrans	State Fire Marshall	CUPA (LACFD)	County and/or Local Fire Department	SCAQMD	Local Jurisdiction/City
Spill Cleanup	•				•	•			•			•
Permit Conditions and Local Code Compliance									•	•		•
Preparation of Emergency Response and Hazardous Materials Plans						•			•	•		•
Toxic and Hazardous Materials Emissions	•										•	•
Inspections of Facilities for Code Compliance	•		•	•					•	•		•
Emergency Response, Conducting Drills, Etc.								•	•	•		•
Site Contamination	•				•				•			•
Hazardous Materials Spills	•				•				•	•		•
Storm Water Discharges					•							•
Pipeline Transport of Hazardous Materials								•				•
Truck Transport of Hazardous Materials		•					•					•
Worker Safety/Workplace Conditions			•									•
USEPA: U.S. Environmental Protection Agency; USDOT: U.S. Department of Transportation; OSHA: Occupational Safety and Health Administration; CalOSHA: California Occupational Safety and Health Administration; DOGGR: Division of Oil, Gas, and Geothermal Resources; OES: Office of Emergency Services; Caltrans: California Department of Transportation; CUPA: Certified Unified Program Agency; LACFD: Los Angeles County Fire Department; SCAQMD: South Coast Air Quality Management District. Sources used: Culver City 2017; Hermosa Beach 2014.												

4.7.4 SPECIFIC PLAN AND REGULATORY REQUIREMENTS

Specific Plan Drilling Regulations

Section 12. Fire Operating Permit, Protection and Emergency Response

C. Fire Training and Equipment. The Operator shall be responsible for costs and expenses incurred by the City, up to \$25,000 annually (to be adjusted annually each July 1st to reflect the increase in the Consumer Price Index for all Urban Consumers, Los Angeles/Riverside/Orange County Area, as established by the U.S. Department of Labor for the period from March of the preceding year through March of the current year), for training and equipment, including hazardous materials training, oil well fire suppression and spill containment training, and other related specialized training and equipment as requested by the Fire Department. In accordance with the provisions of Section 9.A, the Draw-Down Account shall be used to fund such training and equipment when requested by the Fire Chief and approved by the City's Chief Financial Officer.

F. Spill Containment Response Personnel, Training and Equipment.

1. The Operator shall conduct within the Inglewood Oil Field annual spill containment response training and shall at all times have available sufficiently trained personnel with an adequate amount of properly maintained equipment and/or facilities so that a spill of the entire contents from the largest oil tank on the Oil Field can be responded to and contained immediately to reduce the likelihood that the spill reaches a catch basin. The content of the spill containment response training shall, at a minimum, include training for the recording of spill events (e.g. date and location of spill, estimated size of spill, all substances involved, resources deployed to respond, and containment timeframe). The spill containment equipment shall comply with the requirements of the Local California Unified Program Agency and the EPA and be inspected by the Fire Chief to ensure that it will be effective in the event of a spill.

G. Emergency Response Plan (ERP).

1. Within 180 days of the date of approval of the Comprehensive Drilling Plan, the Operator shall submit an ERP to the Fire Chief. The ERP shall include measures to protect biological species and to revegetate any areas disturbed during an oil spill or clean-up activities (see Section 29, Biological Resources). The Operator shall also ensure that the ERP satisfies all rules and regulations of the EPA, California Code of Regulations, SPCCP, the California Office of Spill Prevention and Response, and the US Department of Transportation relating to onshore pipeline spills. Any modifications to the ERP shall be submitted to the Fire Chief. Operator shall fully implement and comply with all provisions of the ERP within 30 days following submittal of the ERP or at such later date as may be approved by the Fire Chief, for good cause shown. The Operator shall review and update the plan at least every two years to ensure the ERP is in compliance with this Section.

H. Community Alert Notification System.

1. The Operator shall establish, maintain and test on an annual basis, a proposed Community Alert Notification System for automatic notification of area residents and businesses in the event of an emergency associated with Oil Operations that could require residents or inhabitants to take shelter, evacuate, or take other protective measures. The proposed Community Alert Notification System shall be reviewed and approved by the City's Fire and Police Chiefs.

- I. Annual Emergency Response Drills.** Annual Emergency Response Drills shall include the Culver City and Los Angeles County Fire Department. The Operator shall demonstrate the effectiveness of the Emergency Response Plan (ERP) by responding to one planned emergency response drill per year which shall be conducted in conjunction with the Culver City and Los Angeles County Fire Department. Emergency response drills required by other agencies that involve Culver City and Los Angeles County Fire Departments can be used to satisfy this provision. In addition, the Operator shall demonstrate the effectiveness of the ERP by responding to not more than two unannounced drills each year, which may be called by the Fire

Chief at the Inglewood Oil Field in coordination with Los Angeles County Fire Department, such that no more than two announced drills are conducted between both jurisdictions. If critical operations are then underway at the Oil Field, the Operator need not respond to an unannounced drill to the extent such a response would, as a result of such critical operations, create an undue risk of personal injury or property damage, but in such case, the Operator must promptly explain the nature of the critical operations, why response is not possible, and when the critical operations will be completed.

- J. Site Assessment.** In the event of a spill, leak or discharge from a tank system, pipelines or any other facility, the Fire Chief and Community Development Director shall be immediately notified. A site assessment shall be completed to determine the nature and extent of the release and provided to the Community Development Director and the Fire Chief. If the Fire Chief determines that a potential fire or explosion hazard exists, the Site Assessment will be and submitted to the Fire Chief within 60 days of the spill leak or discharge, in accordance with the requirements of the California Fire Code. If the spill, leak or discharge presents a potential threat to the environment, including groundwater, or human health, then the Operator shall promptly notify all appropriate local, state and federal agencies.

Section 13. Sumps. It shall be unlawful for any person, firm or corporation to construct or cause to be constructed, to use or cause to be used, or to maintain or cause to be maintained, any permanent sump hereafter constructed or erected, for the purpose of storing petroleum or flammable liquids or well stimulation flowback liquids.

Section 14. Major Facilities Prohibited. No Major Facilities shall be constructed within the City of Culver City. Construction activities shall be limited to those necessary for new production and injection wells and associated equipment (tanks, pipes, piping components, etc.) that are needed to support access to such wells and equipment, or as needed for emergency construction activities, such as repairs after earthquakes, floods, or landslides or other catastrophic events.

Section 15. Tanks.

D. Vapor Recovery. Oil, wash, and produced water tanks shall be vapor tight and shall be equipped with a vapor recovery system.

E. Tank Piping, Valves, Fittings, and Connections. All new tank piping, valves, fittings, and connections including normal and emergency relief venting, shall be installed and maintained in accordance with current API standards to the satisfaction of SCAQMD and DOGGR.

F. Leak Detection and Control Plan. Within 180 days of the date of approval of Comprehensive Drilling Plan, or at such later date as may be approved by the City's Fire Chief, for good cause shown, the Operator shall design, implement, and comply with a Leak Detection and Control Plan, to be submitted to and approved by the Fire Chief, for controlling and detecting tank bottom leaks on all existing and new tanks. The Operator may use a

combination of methods including but not limited to diversion walls, dikes, tank foundations of concrete or gravel, and a tank bottom leak detection system in compliance with Title 14 of the California Code of Regulations Section 1773, or subsequently enacted state regulations regarding tank bottom leaks. The Operator shall document its approach for identifying, monitoring, and correcting tank leaks and submit this information to the Community Development Director and Fire Chief as specified in the Drilling Use Permit.

G. Dikes and Walls Surrounding Storage Tanks. The Operator, shall construct and maintain dikes or walls around all storage tanks, clarifying tanks, or tanks used in connection with the production of oil. Dikes and walls shall be constructed and maintained to meet the standards of the NFPA and current DOGGR requirements. (See also Section 18, Dikes and Retaining Walls, and Section 20, Safety and Risk of Upset).

Section 16. Location of Tanks

B. No activity that creates an open flame shall be conducted within 100 feet of a storage tank containing flammable liquids, except hot work permitted by the Fire Chief under a hot work permit as defined in the California Fire Code. Where the area under ownership or control of the person, firm or corporation proposing to install or maintain any such tank does not permit the 100 foot spacing, as specified above, the location of any such tank shall be designated by the Building Official and Fire Chief except that in no case shall the distance between any tank containing petroleum or any products, or any flammable liquids and a steam boiler or open flame be less than 25 feet.

Section 17. Piping and Electrical Equipment.

- A.** The Operator shall maintain and implement a Pipeline Management Plan that complies with the California Fire Code and DOGGR regulations. A copy of the Plan shall be submitted to the Fire Chief.
- B.** All pipe and pipe fittings, including valves, gauge glass fittings, and other similar appurtenances shall be designed, installed and maintained to safely withstand the pressure to which they may be subjected.
1. All valves directly controlling the flow of flammable liquids from tanks shall be of the self-indicating type, or other type commonly used in Oil Operations, which is equally adequate or efficient. This provision shall not apply to valves less than two inches in diameter.
 2. Gauge glass fittings for tanks and for containers, sample cocks and other similar fittings intended or used for the purpose of drawing off flammable liquids from tanks and/or containers, in any quantity shall be constructed of some metal having a melting point equal to steel or higher. Brass fittings shall not be used.
 3. Gauge glass fittings shall be equipped with automatic ball checks.

- C. Any system of piping connected to a positive displacement pump shall be equipped with an automatic pressure relief valve or suitable means to relieve the pressure of any such system and prohibit such pressure from exceeding 125 percent of the normal safe working pressure of the piping system or pump, whichever is the lower pressure.

Section 18. Dikes and Retaining Walls

- A. It shall be unlawful for any person to use or cause to be used, or to maintain or cause to be maintained, any surface storage tank or containers located outside of any building, and in which flammable liquids, petroleum or its liquid byproducts, or liquefied petroleum gases are, or may be, placed or stored, unless such surface storage tank or container is surrounded by impervious, lined or coated masonry or reinforced concrete walls, or dikes, so designed, constructed and maintained as to confine at least 110 percent capacity of the largest tank or container within such masonry or reinforced concrete walls or dikes consistent with NFPA 30 requirements.
 - 1. Such walls or dikes shall be increased for each additional tank or container of smaller capacity located within the same vicinity by 10 percent of the capacity of such additional tank or container.
 - 2. Such walls or dikes shall not be required for tanks of less than 2,000 gallons capacity, except where in the opinion of the Fire Chief and Public Works Director/City Engineer a hazardous condition exists.
- B. Any surface storage tank or container located inside of any building and in which flammable liquids are, or may be, placed or stored shall be surrounded by masonry or reinforced concrete walls or dikes so designed, constructed, and maintained as to confine the total capacity of all such tanks or containers within such masonry or reinforced concrete walls or dikes.

Section 20.

Safety and Risk of Upset. The Operator shall at all times conduct Oil Operations in a manner that minimizes risk of accidents and the release of hazardous materials in accordance with the best available technology and safety devices for the prevention of accidents. Operator shall give written notice to the Fire Chief and Community Development Director, as well as all other required authorities, of any and all reportable accidents occurring as a result of Oil Operations or on the Oil Field site, within two working days of the accident. Failure to provide the required notice may result in revocation of the Drilling Use Permit in accordance with the provisions of Section 8 of the Specific Plan.

- A. **Blowout Preventer.** Operator shall not drill a well without equipping such well with a blowout preventer, installed and maintained as required by DOGGR and with all safety orders of the State Division of Industrial Safety for drilling and production. Upon cementing of the surface string of casing and prior to drilling out the shoe of said string, a blowout preventer, tested and approved by DOGGR, shall be installed in accordance with the most current DOGGR requirements. Such equipment shall be capable of being operated from the driller's station and from another remote station. Redrilling, reworking and maintenance operations shall be equipped with

blowout preventer equipment at the onset of operations in accordance with the most recent requirements of DOGGR. Blowout preventers shall be maintained in good condition and shall be required to be tested at intervals as requested by DOGGR. Blowout preventer flanges and kill valves at the casing head shall be kept free of fluids to allow for routine inspection at any time.

B. Well Casings. Operator shall equip the well with casings of sufficient strength and with safety devices in accordance with DOGGR requirements.

C. Safety Precautions. The Operator shall comply with all of the current safety precautions required by any State agency or the City.

D. Belt Guards. Belt guards shall be required over all drive belts on drilling, redrilling and reworking equipment. Guarding shall be in compliance with Title 8 of the California Code of Regulations, Section 6622, or as may be subsequently amended.

E. Secondary Containment for Oil.

1. The Operator shall ensure that all existing oil tanks and all new tanks have secondary containment (berms and/or walls) that can contain at least 110 percent of the largest oil tank volume for as long as necessary to respond and clean up a tank spill, in order to reduce the likelihood of oil spills entering the retention basins. In the event the Public Works Director/City Engineer determines that it would be infeasible to provide 110 percent containment for a particular existing oil tank, the Operator shall provide containment at a level determined by the Public Works Director/City Engineer to be feasible and adequate for containment.

2. Except as provided in Section 34.E.1, all above ground piping in the Oil Field that contains or could contain oil shall be protected by basins or secondary containment measures (berms and/or walls). All new piping shall be above ground and shall have alarm sensors or another comparable system for immediately detecting leaks. All above ground piping shall be visually inspected for leaks on a daily basis. All existing underground piping shall be tested for leaks on an annual basis. Any pipes found to be leaking shall be promptly replaced with new piping meeting the requirements of this Specific Plan.

F. Retention Basins. All retention basins used in Oil Operations shall be adequately sized, sited, inspected, maintained and operated to handle a 100-year storm event to the satisfaction of the Public Works Director/City Engineer.

Section 21.

Air Quality, Public Health and Climate Change. The Operator shall at all times conduct Oil Operations in accordance with the best available technology, safety devices and measures for the prevention of the release, escape, or emission of dangerous, hazardous, harmful and/or noxious gases, vapors, odors, substances or greenhouse gases.

C. Air Monitoring.

1. **Air Monitoring Plan.** Operator shall submit an Air Monitoring Plan to be reviewed and approved or conditionally approved by the Community Development Director. At a minimum, the Air Monitoring Plan shall address related air pollutant emissions monitoring and tracking requirements as required by SCAQMD and the MMP, and shall include any measure requested by the Community Development Director. The Air Monitoring Plan shall be designed to ensure the public health, safety and welfare, and the environment through the reduction in air toxics and odorous emissions and reduce greenhouse gas emissions from Oil Operations. The Air Monitoring Plan shall also specify the number, type and location of monitors that will be used, and provide detailed information concerning the reliability of the instrumentation, frequency of calibration and other similar information. The Air Monitoring Plan shall also be designed to assess the risk of both acute and chronic exposure to air contaminants from Oil Operations within the Oil Field, and endeavor to determine and distinguish the source of emissions, to the extent feasible, using available and affordable monitoring technology. Additionally, air monitoring may also be required, as requested by the Community Development Director, along the Outer Boundary of the Oil Field to assess the risk of both acute and chronic exposure to air contaminants from Oil Operations in the portion of the Inglewood Oil Field under the jurisdiction of Los Angeles County. During drilling, redrilling, or reworking operations, the Operator shall monitor for hydrogen sulfide and total hydrocarbon vapors as specified in the approved Air Monitoring Plan. Hydrogen sulfide shall also be monitored using mobile monitoring equipment in response to odor complaints or when onsite odors are encountered by operating personnel. Total hydrocarbon vapors shall be monitored, so as to comply with the requirements of SCAQMD Rule 1173, using mobile monitoring equipment at locations surrounding the wells, tanks, piping, piping components, etc. at the locations and frequencies, no less frequent than quarterly, that shall be specified in the approved Air Monitoring Plan. The approved monitors shall provide automatic alarms that are triggered by the detection of hydrogen sulfide or total hydrocarbon vapors at levels designated in the approved Air Monitoring Plan. For drilling, redrilling or reworking monitors, the alarms shall be audible and/or visible to the person operating the drilling, redrilling or reworking equipment. When specified alarm levels are reached, the following actions shall be taken:

- a. At a hydrogen sulfide concentration of equal to or greater than one part per million but less than 10 parts per million, the Operator shall, immediately, and not later than 30 minutes after the alarm, investigate the source of the hydrogen sulfide emissions and take immediate corrective action to eliminate the source. The corrective action taken shall be documented in the drilling, redrilling and reworking log, or applicable inspection and maintenance logs. If the concentration is not reduced to less than one part per million within 30 minutes of the first occurrence of such concentration, the Operator shall shut down the drilling, redrilling, reworking or

operations or other source in a safe and controlled manner, until the source of the hydrogen sulfide emissions has been eliminated, unless shutdown creates a health and safety hazard.

- b.** At a hydrogen sulfide concentration equal to or greater than 10 parts per million, the Operator shall promptly commence the shutdown of the drilling, redrilling, or reworking operations or other source in a safe and controlled manner until the source of the hydrogen sulfide emissions has been eliminated, unless shutdown creates a health and safety hazard. The corrective action taken shall be documented in the drilling, redrilling, or reworking log, or applicable inspection and maintenance logs. When an alarm is received, the Operator shall immediately notify, and provide access and the right to investigate the event as necessary to all agencies with jurisdiction over the Oil Field, including, but not limited to, the Culver City Fire Department, the Los Angeles County Fire Department - Health Hazardous Materials Division, DOGGR, and SCAQMD.
- c.** At a total hydrocarbon concentration equal to or greater than 500 parts per million but less than 1,000 parts per million, the Operator shall immediately investigate the source of the hydrocarbon emissions and take immediate corrective action to eliminate the source. The corrective action taken shall be documented in the drilling, redrilling, reworking or maintenance log, or applicable inspection and maintenance logs. If the concentration is not reduced to less than 500 parts per million within 30 minutes of the first occurrence of such concentration, the Operator shall shut down the drilling, redrilling or reworking in a safe and controlled manner, until the source of the hydrocarbon emissions has been eliminated, unless shutdown creates a health and safety hazard.
- d.** At a total hydrocarbon concentration equal to or greater than 1,000 parts per million, the Operator shall promptly commence the shutdown of the drilling, redrilling or reworking operations, or other source, in a safe and controlled manner, until the source of the hydrocarbon emissions has been eliminated, unless shutdown creates a health and safety hazard. The corrective action taken shall be documented in the drilling, redrilling, reworking or maintenance log, or applicable inspection and maintenance logs. When an alarm is received, the Operator shall immediately notify and provide access and the right to investigate the event as necessary to all agencies with jurisdiction over the Oil Field, including the Culver City Fire Department, the Los Angeles County Fire Department - Health Hazardous Materials Division, DOGGR, and SCAQMD.
- e.** The Operator shall keep a record of the levels of total hydrocarbons and hydrogen sulfide detected at each of the monitors, which shall be retained for at least five years. The Operator shall notify the Fire Chief within 48 hours in the event of the occurrence of any hydrogen sulfide concentration of one part per million or more, or any total hydrocarbon concentration of 500 parts per million or more. At the

request of the Fire Chief, the Operator shall make available the retained records from the monitoring equipment.

2. City Testing. In the event of a gas release in the Oil Field or in response to complaints received regarding odors in the Oil Field, substantiated by City personnel called to the location of the odor, the City may take grab samples of the air outside the Oil Field boundary to test for airborne toxins including hydrogen sulfide. The Operator shall be required to pay for all of the City's cost to sample the air including, without limitation, the costs to obtain vacuum canisters and teflar bags for air sampling, the costs to contract with a local laboratory to pick up the canisters and teflar bags immediately after sampling takes place and transport the samples to a laboratory for immediate analysis as required to obtain a valid and accurate test of the air and report for the presence and concentration of airborne toxins. The Operator shall also be responsible for the costs for City personnel to be trained in the proper techniques for conducting the air sampling.

D. Portable Flare for Drilling. To reduce air toxics emissions, odorous substances emissions, and greenhouse gas emissions, the Operator shall have a gas buster and a portable flare, approved by SCAQMD, at the Oil Field and available for immediate use to remove any gas encountered during drilling operations from drilling muds prior to the muds being sent to the shaker table, and to direct such gas to the portable flare for combustion. The portable flare shall record the volume of gas that is burned in the flare. The volume of gas burned in the flare shall be documented in the drilling log. The Operator shall notify the Fire Chief and SCAQMD within 48 hours in the event gas is burned by the flare, and shall specify the volume of gas that was burned in the flare. No drilling or re-drilling shall be conducted in areas that are known to penetrate the Nodular Shale zone, or where pressurized methane is known or reasonably suspected to exist, unless a fully operational and properly maintained gas buster and portable flare are installed on the rig. All other drilling and re-drilling operations shall be conducted so that any measurable gas that is encountered can, and will, be retained in the well bore until the gas buster and portable flare are installed on the rig, after which the gas will be run through the system. The Operator shall immediately notify the Fire Chief and SCAQMD in the event any gas from drilling or re-drilling operations is released into the atmosphere without being directed to and burned in the flare.

E. Oil Tank Pressure Monitoring and Venting. All oil tanks that contain or could contain oil shall have a fully operational pressure monitoring system, of a type and design approved by the Fire Chief that continuously measures and digitally records the pressure in the vapor space of each tank. The detection system shall notify the Operator via an alarm when the pressure in the tank reaches within 10 percent of the tank relief pressure. In the event of an alarm, the Operator shall immediately take corrective action to reduce the tank pressure. The corrective action shall be documented in the applicable inspection and maintenance log. The Operator shall notify the Fire Chief and SCAQMD within 24 hours if the pressure in any tank covered by this Subsection ever exceeds such tank's relief pressure or if the hatches on the tank(s) have lifted and allowed gas to vent to atmosphere.

Within seven calendar days after any tank vapor release, the Operator shall submit a report of the incident to SCAQMD as a breakdown event pursuant to Rule 430, and shall provide the Fire Chief with a written report of the event and the corrective measures undertaken and to be undertaken to avoid future oil tank vapor releases. The Operator shall make any changes to such report that may be required to obtain approval from the Fire Chief and SCAQMD, shall promptly institute all corrective measures called for by the report, and shall report the completion of the corrective measures to the Fire Chief and the Community Development Director within one week of their completion.

Section 28. Storage of Hazardous Materials and Oil Field Waste Removal.

A. Storage of Hazardous Materials. The Operator shall comply with all provisions of Subchapter 9.03.100, et seq. of the CCMC relating to Hazardous Materials Disclosure Requirements, Business Plans, and Inspections.

B. Waste Discharge and Collection.

1. No drilling, redrilling, reworking or maintenance waste ("Drilling Waste") shall be discharged into any sewer, storm drain, irrigation systems, stream, creek, street, highway or drainage canal.
2. No Drilling Waste shall be discharged on the ground, except for the proper use of active drilling sumps and mud pits.
3. Drilling Waste shall be discharged into portable steel tanks compliant with API standards and collected in portable steel bins compliant with US Department of Transportation standards.
4. All Drilling Waste shall be disposed of in compliance with all applicable City, regional, State, and Federal rules and regulations.
5. Drilling Waste materials, that are not intended to be injected into a Class II Well as permitted by DOGGR, shall be removed from the Oil Field no later than 30 days following the completion of the drilling operation that generated the waste.

C. Recycling and Removal Plan. Within 180 days of the date of approval of the Comprehensive Drilling Plan or at such later date as may be approved by the Public Works Director/City Engineer, for good cause shown, the Operator shall prepare a Recycling Plan, to be reviewed and approved by the Public Works Director/City Engineer:

1. The Recycling and Removal Plan shall include, but not be limited to, the following:
 - a. Identification of how recycling will be incorporated into Oil Operations, including debris generated during construction, drilling and other Oil Operations;
 - b. Use of mulching, composting, and grass-cycling on landscaped areas;
 - c. Design and allocation of recycling collection and storage space;

- d. An employee participation recycling program;
 - e. Employee education through a series of brief educational sessions to demonstrate how employees can further contribute to recycling and conservation; and
 - f. Identification of methods of loading, transport, and receiving locations for all waste from the Oil Field.
2. This requirement may be satisfied if the Operator can demonstrate, to the satisfaction of the Public Works Director/City Engineer, that a Recycling and Removal Plan is being implemented and has been approved for other parts of the Oil Field and can conclusively show that the Recycling and Removal Plan applies to the Oil Field within the jurisdiction of the City. Additional information may be required by the Public Works Director/City Engineer to demonstrate compliance with this Section.

Section 32. Well Stimulation Treatments.

(NOTE: The EIR for the Proposed Inglewood Oil Field Specific Plan Project ("Specific Plan EIR") will evaluate the potential environmental impacts of conducting Well Stimulation Treatments, within the Oil Field, performed in a manner consistent with DOGGR's Senate Bill 4 regulations as of July 1, 2015, and the site-specific requirements set forth in this draft Specific Plan. In taking action on the Specific Plan, the City Council will consider the available information, including the Specific Plan EIR, in making a determination as to whether and upon what terms the adopted Specific Plan would allow Well Stimulation Treatments to be conducted within the Oil Field.)

Section 34. D Removal by Pipeline Only. All oil, gas, and other hydrocarbon substances, except propane and other related natural gas liquids, produced from any well within the Oil Field shall be shipped and transported through pipelines, except in case of an emergency or when access to a pipeline becomes unavailable. If the Operator provides documentation satisfactory to the Fire Chief that any pipeline through which oil or gas is currently transported is unavailable for the safe transportation of said products due to maintenance problems with the pipeline, or lack of sufficient capacity within the pipeline to handle the volume of oil and gas needing transportation, or because the owner or operator of such pipeline elects to discontinue transporting oil or gas through such pipeline, then the Operator shall, within 180 days of the date the existing pipeline becomes unavailable, seek to acquire a private right of way or easement, or shall file an application for a right of way, easement, encroachment permit, or franchise for the construction of a replacement pipeline and shall diligently prosecute such application until such pipeline is completed. During any emergency situation, or during such time as any existing pipeline becomes unsafe or unavailable, oil and gas may be transported by truck for up to 180 days, unless extended by the Fire Chief for good cause shown, until the emergency situation is resolved or until a replacement pipeline is permitted and constructed in compliance with all applicable laws and regulations. In addition, the Operator shall coordinate with emergency

service providers to alert them regarding the emergency and provide an oversight mechanism to ensure prompt resolution.

Section 48. Abandoned Well Testing. The Operator shall conduct quarterly testing of abandoned wells for hydrocarbon vapor and any liquid leaks. The first quarterly testing shall be completed within 120 days of the date of approval of the Comprehensive Drilling Plan. The procedures and equipment for such testing shall be reviewed and approved by the Public Works Director/City Engineer. Abandoned wells that are found to be leaking hydrocarbons shall be reported to the Public Works Director/City Engineer and DOGGR within 12 hours of the abandoned well testing. DOGGR shall determine if the well needs to be re-abandoned. If directed by DOGGR, the Operator shall re-abandon the well in accordance with DOGGR rules and regulations. Any abandoned well that is not found to be leaking hydrocarbon vapors or any liquid for eight consecutive quarters (after a hydrocarbon leak is found), shall thereafter be tested on annual basis and such test results shall be submitted to the Public Works Director/City Engineer.

Section 52. Safety Inspection, Maintenance, and Quality Assurance Program (SIMQAP). Within 180 days of the date of approval of the Comprehensive Drilling Plan, Operator shall submit to the Community Development Director and Fire Chief for review and approval, a detailed SIMQAP that covers all existing and proposed Oil Operations. This requirement may be satisfied if the Operator can demonstrate, to the satisfaction of the Community Development Director and Fire Chief, that a SIMQAP is being implemented and has been approved for other parts of the Oil Field and can conclusively show that the SIMQAP applies to the Oil Field within the jurisdiction of the City. Additional information may be required by the Community Development Director and Fire Chief to demonstrate compliance with this Section. The following provisions relate to the SIMQAP:

A. SIMQAP Review and Revisions. The Operator shall periodically review and update the plan to incorporate changes in procedures, and new safety and maintenance technologies. The Operator shall review and revise the plan at least every five years or more frequently if the Operator determines changes are necessary, or if requested by the Community Development Director or the Fire Chief. Revisions to the SIMQAP shall be submitted to the Community Development Director and the Fire Chief for their review and approval. The Operator shall respond to any request for additional information within 30 days of receiving such request, unless extended by the City.

B. SIMQAP Requirements. The SIMQAP shall include but not be limited to the following:

1. Inspection of construction techniques;
2. Regular maintenance and safety inspections;
3. Periodic safety audits;
4. Corrosion monitoring and leak detection; and

5. Inspections of all trucks carrying hazardous and/or flammable material prior to loading.

C. Worker Notification. The Operator shall ensure that all personnel comply with all provisions of the currently approved SIMQAP.

D. Inspections. The SIMQAP shall provide for participation of City staff and the City's On-Site Monitor, at the discretion of the City, in all inspections required by this section.

Section 53.

Compliance and Safety Audits. At the discretion of the Community Development Director, the Operator may be required to fund a comprehensive third-party Compliance and Safety Audit of all or a portion of the Oil Operations within the jurisdiction of the City. The audit will ensure the safety of Oil Operations and compliance with all federal, state, regional and local laws, rules and regulations. The third-party auditor shall be approved by the Community Development Director and the Fire Chief. In addition to auditing compliance with agency rules and regulations, there shall also be a Comprehensive Facilities Safety Audit for Oil Operations, including all wells and facilities. In addition to the physical condition of the site, operations and procedures manuals for employees and equipment shall be reviewed, as well as manuals addressing emergency planning and procedures. The results of the Compliance and Safety Audits, together with correction action plans for any non-compliance items or unsafe conditions found in the audit, shall be submitted to the Community Development Director and Fire Chief. The corrective action plan shall identify the non-compliance and unsafe items, describe the corrective action to be taken, and provide the timeline for each element of the corrective action. The Operator shall be in violation of the provisions of this section if the Operator fail to complete any corrective action called for by the corrective action plan within the approved time limits specified in the plan, and be subject to penalties as set forth in Section 9.F. The Operator shall submit to the Community Development Director monthly updates on the corrective action plan until such time as all corrective actions have been completed.

Regulatory Requirements

RR HAZ-1 Oilfield operations at the Project Site must be constructed, maintained, monitored, operated, and decommissioned in compliance with all applicable federal, state, and local regulations, including but not limited to the Hazardous Liquid Pipeline Safety Act, Hazardous Materials Transportation Act, Hazardous Waste Control Law, California Pipeline Safety Act, Oil Pipeline Environmental Responsibility Act, and other pertinent regulations of the USEPA/CalEPA, USDOT/Caltrans, OSHA/CalOSHA, DTSC, DOGGR, SWRCB/RWQCB, SCAQMD, CalOES, State Fire Marshall, Los Angeles County Fire Department as CUPA, Culver City Fire Department, and other Culver City Municipal Code requirements.

DOGGR determined that several of the mitigation measures developed in the SB4 EIR should be converted into formal regulations, including SB4 HAZ-1a (Ensure that Spill Contingency Plan Provides Adequate Protection Against Leaks or Discharges of Dangerous Fluids and Other Potentially Dangerous Materials). These measures are intended to be applied without change throughout the State because (1) they address the direct environmental effects of well stimulation

treatment; (2) they relate to activities that occur physically very close to the oil and gas wells; and (3) they already reflect the lessons of a considerable amount of scientific input and empirical experience. SB4 HAZ-1a is temporarily included within the DOGGR Draft Mitigation Policy Manual (see Appendix B-2 of this Draft EIR) until such time as formal regulations are duly adopted and in place (DOC 2015b). An interim MM HAZ-14, which corresponds to SB4 HAZ-1a, will be implemented and enforced by the City until such time as DOGGR adopts the measure as a formal regulation.

SB4 HAZ-1a Ensure that Spill Contingency Plan Provides Adequate Protection Against Leaks or Discharges of Dangerous Fluids and Other Potentially Dangerous Materials. In approving a well stimulation treatment permit, DOGGR shall require as a condition of permit approval that the applicant demonstrate to DOGGR's satisfaction that the spill contingency plan required by Section 1722.9 of Title 14 of the California Code of Regulations is sufficient to prevent any leaks, spills or other discharges of well stimulation fluids, flowback fluids, produced water, hazardous chemicals, contaminated surface water runoff, oil, or other potentially dangerous materials that might occur before, during, and after the well stimulation process from reaching the soil at all site pads. Potentially viable options for achieving such a result, which shall be considered on a case by case basis, may be the installation of a physical barrier between the pad and the ground or the use of plastic sheets under equipment with the potential to leak or discharge pollutants. The use of barriers or other control devices shall not interfere with safety protocols during well stimulation operations.

4.7.5 THRESHOLDS OF SIGNIFICANCE

Thresholds Addressed in the Initial Study

The Initial Study prepared for the Project (included in Appendix A-1) concludes that the Project would have no impact on the following threshold, and further analysis of this threshold is not required in the Draft EIR:

- Would the Project result in a safety hazard or people residing or working in the Project area for a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport?
- Would the Project result in a safety hazard for people residing or working in the Project area for a Project within the vicinity of a private airstrip?

Thresholds Addressed in this Environmental Impact Report

The Initial Study for the Project concludes that additional project-level analysis of the following thresholds of significance is required in this Draft EIR. These thresholds are mostly based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines along with an additional threshold determined to be relevant to the Project. A project would have a significant adverse environmental impact on hazards, hazardous materials, and risk of upset if it would:

Threshold 7-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Threshold 7-2: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

- Threshold 7-3:** Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter-mile of an existing or proposed school?
- Threshold 7-4:** Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?
- Threshold 7-5:** Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?
- Threshold 7-6:** Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?
- Threshold 7-7:** Cause deterioration of components of oil field infrastructure due to corrosion, weathering, fatigue, or erosion that could reduce structural stability?

4.7.6 IMPACT ANALYSIS

- Threshold 7-1: Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?**

Hazardous Materials Use

According to the U.S. OSHA, potential chemical and other health hazards associated with oil and gas extraction activities include potential exposure to diesel particulate matter (addressed in Section 4.2, Air Quality, of this Draft EIR); hazardous chemicals; hydrogen sulfide; silica (see Threshold 7-2 below); and naturally occurring radioactive material (NORM) (OSHA 2017).

Hazardous Materials and Chemicals

Several activities that would be allowed under the Specific Plan could result in hazards to the public or the environment through the routine use of hazardous materials at the Project Site. These activities include, but are not limited to, drilling, well completion, production of oil and gas, use of injection wells, maintenance and testing of wells and other production supporting equipment, and the transfer of oil and produced water to processing facilities located in the County IOF. Earthmoving and site preparation activities include well pad preparation, access road construction, fencing, tanks, and installation of other oil and gas production support equipment, such as pipelines, which can also result in potential hazards to the public or the environment through the routine use of hazardous materials. Additionally, there are several avenues that could result in leaks or releases that could potentially contaminate soil or surface water, including improper storage, disposal, or handling of hazardous chemicals and materials and improper maintenance.

Current operations on the Project Site are likely to involve the use of a number of chemicals and other materials associated with well drilling and production. Since no crude oil or gas processing or treatment facilities are located on the Project Site, chemicals specifically associated with processing and treatment are not expected to be used or stored on the Project Site, but would be used in the adjacent County IOF. Table 4.7-2 lists the estimated storage quantities of chemicals and other materials associated with well drilling and production activities that are likely to be stored

and/or used on the Project Site. These values were based on the maximum storage quantities for the entire Inglewood Oil Field at the time of the Baldwin Hills CSD EIR, which included 643 active injection and production wells. Those maximum quantities were proportionally scaled down to correspond to the number of injection and production wells allowed by the Specific Plan (30 in total) plus the existing wells already located within the City IOF (36) for a total of 66 wells. Therefore, this table represents an estimated volume of chemical storage and/or use at full buildout. Usage of chemicals in gallons per day were not specified (LACDRP 2008).

**TABLE 4.7-2
ESTIMATED VOLUME OF CHEMICALS AND OTHER MATERIALS STORED ONSITE
FOR WELL DRILLING AND PRODUCTION ACTIVITIES AT FULL BUILDOUT**

Type	Description	Estimated Amount*
Anti-foulant	Inhibits corrosion and fouling	7 gallons
Binary Corrosion Inhibitor	Prohibits corrosion of pipes and vessels and helps with pipeline integrity	578 gallons
Corrosion Inhibitor	Prohibits corrosion of pipes and vessels and helps with pipeline integrity	351 gallons
Degreaser	Cuts grease	20 gallons
Oxygen Scavenger	Liquid blend of sulfite formulated to prevent oxygen pitting and general corrosion in pipes and water treatment systems	20 gallons
Scale Inhibitor	A chemical treatment used to control or prevent scale deposition in the extraction process	273 gallons
<p>* Based on the total use of 643 active wells (injection and production wells) at the Inglewood Oil Field and the proportionate use of 66 active wells (injection and production wells) in the City IOF. Source: LACDRP 2008</p>		

The most commonly generated wastes during drilling are drilling fluids, drilling cuttings, and produced water. In general, wastes generated during exploration and production activities are not classified as RCRA hazardous, but may be considered California hazardous wastes. Examples of oil and gas exploration and production (E&P) wastes that are exempt from regulation under Subtitle C of RCRA include, but are not limited to: produced water; drilling fluids and cuttings; well completion, treatment, and stimulation fluids; workover wastes; produced sand; packing fluids; hydrocarbon-bearing soil; and constituents removed from produced water before it is injected or disposed (USEPA 2002). Examples of non-exempt wastes include, but are not limited to: unused fracturing fluids or acids; waste solvents; used lubricating oils and hydraulic fluids; caustic or acid cleaners; and radioactive tracer wastes. Importantly, exempt wastes are not necessarily harmless to human health and the environment and can be regulated via other State regulations and NPDES requirements.

As discussed above, oil and gas operations are highly regulated by numerous federal, state, and local agencies. Compliance with existing regulations (RR HAZ-1) would reduce public health and safety hazards. However, spills and leaks have occurred in recent years in the County IOF. As discussed in Section 4.8, Hydrology and Water Quality, Table 4.8-2, Inglewood Oil Field Reported Petroleum or Chemical/Hazardous Material Releases, provides a summary for the past five years of reported petroleum or chemical/hazardous material releases for the County IOF. As shown, there were 16 reported incidents between 2010 and 2015, for an average of approximately 3 incidents per year. Also, one release occurred in the City in 2013. As such, even with existing federal, State, and local agency regulations, routine oil and gas operations can result in hazards to the public and the environment.

The Drilling Regulations contain numerous restrictions and requirements to minimize the potential for the release of hazardous chemicals and materials into the environment. Drilling Regulations Section 12 requires spill containment, emergency response plan, community alert, annual emergency drills; Drilling Regulations Section 13 sets forth restrictions on sumps; Section 14 restricts major facilities within the City IOF; Drilling Regulations Sections 15 and 16 include restrictions on tanks; Drilling Regulations Section 17 sets forth requirements for pipeline construction and maintenance; Drilling Regulations Section 18 has mandates for dikes and retaining walls; Drilling Regulations Section 20 addresses safety and risk of upset prevention; Drilling Regulations Section 21 requires air monitoring; Drilling Regulations Section 28 regulates the storage of hazardous materials and oil field waste removal; Section 49 addresses the abandonment of wells; Drilling Regulations Section 53 requires SIMQAP; and Drilling Regulations Section 54 requires safety audits. The Drilling Regulations also include monitoring and reporting requirements to reduce the adverse effects of spills within the City IOF, and compliance with RR HAZ-1 and the Drilling Regulations would ensure that the routine use of hazardous materials at the site would not result in a significant hazard to the public or the environment.

Hydrogen Sulfide

As discussed above, crude oil emerges from the wellhead, it is a mixture of soils, liquids and gases, including hydrogen sulfide. The crude oil currently produced at the Inglewood Oil Field is “sweet” crude oil, meaning it does not contain appreciable quantities of hydrogen sulfide (Kleinfelder 2017). Table 4.7-3 summarizes the physical properties of the crude oil that has historically been produced at the Inglewood Oil Field, including the City IOF.

**TABLE 4.7-3
 INGLEWOOD OIL FIELD CRUDE OIL PROPERTIES**

Property	Value
API Gravity at 60° F	18.6-21.5 ^a
REID Vapor Pressure (pounds per square inch)	0.65-0.88 ^b
Sulfur Content (percent weight) (not the same as hydrogen sulfide)	< 1 percent
Hydrogen Sulfide	Trace
^a API Gravity is a measure of the quality of the crude. The lower the number the heavier the crude oil. Crude oil with API Gravity in the range of 18.6-21.5 would be considered moderately heavy crude. ^b REID vapor pressure is a measure of the volatility of the material. The crude oil has a fairly low level of volatility compared with other crude oils. API: American Petroleum Institute Source: Kleinfelder 2017.	

The health effects of hydrogen sulfide are contingent upon the amount and duration of exposure and may include nausea, headaches, delirium, disturbed equilibrium, tremors, convulsions, and skin and eye irritation and inhalation of high concentrations causing extremely rapid unconsciousness and death. The reference exposure level (i.e., the level that is protective against mild adverse effects) for one hour of exposure to hydrogen sulfide is 0.03 ppm (OEHHA 2008). Recommended regulations from the Occupational Safety and Health Administration (OSHA) set an acceptable ceiling limit of 20 ppm for workplace air, which is a 15-minute-time-weighted average limit that must not be exceeded. The National Institute for Occupational Safety and Health (NIOSH) recommends a ceiling level of 10 ppm for 10 minutes. Additionally, NIOSH has determined that exposure to 100 ppm is immediately dangerous to the health and life of workers. Exposure that exceeds these limits is considered dangerous to human health (ATSDR 2016).

While hydrogen sulfide gases are released during operations at the City IOF, as shown in Table 4.7-3, the hydrogen sulfide concentrations in the crude historically generated at the Inglewood Oil Field has trace amounts of H₂S. The 2012 Environmental Quality Assurance Program (EQAP) Audit Report, which assesses the implementation status of the CSD requirements, states that no monitoring instrumentation recorded an exceedance of H₂S in that year (MRS 2013). Subsequent EQAP Reporting in 2015 similarly stated that there were no notifications to the County, the City of Culver City Fire Department, or the AQMD due to exceedances of H₂S monitoring data (Sentinel Peak Resources 2017). Notifications would be required if H₂S levels were to be equal to or greater than 10 ppm. In summary, the crude oil generated at the Inglewood Oil Field can be characterized as “sweet”, which has a lower H₂S concentration than “sour” crudes, and recent monitoring efforts conducted in the County IOF have not revealed any exceedances of limits set forth in the CSD.

In 2006, a Notice of Violation was issued by the SCAQMD to PXP (former Oil Field Operator) for a “discharge from oil well drilling operation that caused nuisance to a considerable number of people” (SCAQMD 2017). This event was due to odors emanating from the releases of gases from the drilling rig from hitting a pocket of gas while drilling in the Nodular Shale zone (LACDRP 2008). Due to the odor complaints, the gas presumably contained H₂S, which has a strong, pungent odor detectable by humans at concentrations substantially below those that can cause health effects. Releases such as these have the potential to impact nearby receptors; however, such events are anticipated to be infrequent and would be detected early through the requirements set forth in the Specific Plan.

The Drilling Regulations have requirements that address potential hydrogen sulfide releases. Drilling Regulations Section 21 sets air monitoring requirements, as outlined in subsection C, Air Monitoring. Under Drilling Regulations Section 21.C, hydrogen sulfide must be monitored during drilling, redrilling, and reworking operations. Hydrogen sulfide monitoring, using mobile monitoring equipment, is also required in response to odor complaints or when onsite odors are encountered by operating personnel. Drilling Regulations Section 21.C outlines requirements for detection of 1 to less than 10 ppm and has separate requirements for detection of 10 or greater ppm. These requirements include, but are not limited to, shutdown of drilling, redrilling or reworking operations until corrective actions have been taken. By complying with the requirements of Drilling Regulations Section 21 and by following industry standards as outlined in the Regulatory Setting (Section 4.7.3 above) and RR HAZ-1, typical oil production operations at the City IOF would not create a significant hazard to the public, the environment, or to workers due to the release or inhalation of hydrogen sulfide gas. Impacts would be less than significant and no mitigation is required.

Hydraulic Fracturing Chemicals

Table 4.7-4 lists chemicals used for hydraulic fracturing that was developed from disclosures in FracFocus. Although there are dozens to hundreds of chemicals which could be used as additives, there are a limited number which are routinely used in hydraulic fracturing. The following is a list of the chemicals used most often. The CAS number is listed to avoid the issue of multiple names for the same chemical (FracFocus 2015).

**TABLE 4.7-4
TYPICAL CHEMICALS USED FOR HYDRAULIC FRACTURING**

Typical Main Compound	CAS Number	Purpose	Additive Type
Hydrochloric Acid	007647-01-0	Helps dissolve minerals and initiate cracks in the rock	Acid
Glutaraldehyde	000111-30-8	Eliminates bacteria in the water that produces corrosive by-products	Biocide
Quaternary Ammonium Chloride	012125-02-9	Eliminates bacteria in the water that produces corrosive by-products	Biocide
Quaternary Ammonium Chloride	061789-71-1	Eliminates bacteria in the water that produces corrosive by-products	Biocide
Tetrakis Hydroxymethyl-Phosphonium Sulfate	055566-30-8	Eliminates bacteria in the water that produces corrosive by-products	Biocide
Ammonium Persulfate	007727-54-0	Allows a delayed break down of the gel	Breaker
Sodium Chloride	007647-14-5	Product Stabilizer	Breaker
Magnesium Peroxide	014452-57-4	Allows a delayed break down the gel	Breaker
Magnesium Oxide	001309-48-4	Allows a delayed break down the gel	Breaker
Calcium Chloride	010043-52-4	Product Stabilizer	Breaker
Choline Chloride	000067-48-1	Prevents clays from swelling or shifting	Clay Stabilizer
Tetramethyl ammonium chloride	000075-57-0	Prevents clays from swelling or shifting	Clay Stabilizer
Sodium Chloride	007647-14-5	Prevents clays from swelling or shifting	Clay Stabilizer
Isopropanol	000067-63-0	Product stabilizer and / or winterizing agent	Corrosion Inhibitor
Methanol	000067-56-1	Product stabilizer and / or winterizing agent	Corrosion Inhibitor
Formic Acid	000064-18-6	Prevents the corrosion of the pipe	Corrosion Inhibitor
Acetaldehyde	000075-07-0	Prevents the corrosion of the pipe	Corrosion Inhibitor
Petroleum Distillate	064741-85-1	Carrier fluid for borate or zirconate crosslinker	Crosslinker
Hydrotreated Light Petroleum Distillate	064742-47-8	Carrier fluid for borate or zirconate crosslinker	Crosslinker
Potassium Metaborate	013709-94-9	Maintains fluid viscosity as temperature increases	Crosslinker
Triethanolamine Zirconate	101033-44-7	Maintains fluid viscosity as temperature increases	Crosslinker
Sodium Tetraborate	001303-96-4	Maintains fluid viscosity as temperature increases	Crosslinker
Boric Acid	001333-73-9	Maintains fluid viscosity as temperature increases	Crosslinker
Zirconium Complex	113184-20-6	Maintains fluid viscosity as temperature increases	Crosslinker

**TABLE 4.7-4
TYPICAL CHEMICALS USED FOR HYDRAULIC FRACTURING**

Typical Main Compound	CAS Number	Purpose	Additive Type
Borate Salts	N/A	Maintains fluid viscosity as temperature increases	Crosslinker
Ethylene Glycol	000107-21-1	Product stabilizer and / or winterizing agent.	Crosslinker
Methanol	000067-56-1	Product stabilizer and / or winterizing agent.	Crosslinker
Polyacrylamide	009003-05-8	"Slicks" the water to minimize friction	Friction Reducer
Petroleum Distillate	064741-85-1	Carrier fluid for polyacrylamide friction reducer	Friction Reducer
Hydrotreated Light Petroleum Distillate	064742-47-8	Carrier fluid for polyacrylamide friction reducer	Friction Reducer
Methanol	000067-56-1	Product stabilizer and / or winterizing agent.	Friction Reducer
Ethylene Glycol	000107-21-1	Product stabilizer and / or winterizing agent.	Friction Reducer
Guar Gum	009000-30-0	Thickens the water in order to suspend the sand	Gelling Agent
Petroleum Distillate	064741-85-1	Carrier fluid for guar gum in liquid gels	Gelling Agent
Hydrotreated Light Petroleum Distillate	064742-47-8	Carrier fluid for guar gum in liquid gels	Gelling Agent
Methanol	000067-56-1	Product stabilizer and / or winterizing agent.	Gelling Agent
Polysaccharide Blend	068130-15-4	Thickens the water in order to suspend the sand	Gelling Agent
Ethylene Glycol	000107-21-1	Product stabilizer and / or winterizing agent.	Gelling Agent
Citric Acid	000077-92-9	Prevents precipitation of metal oxides	Iron Control
Acetic Acid	000064-19-7	Prevents precipitation of metal oxides	Iron Control
Thioglycolic Acid	000068-11-1	Prevents precipitation of metal oxides	Iron Control
Sodium Erythorbate	006381-77-7	Prevents precipitation of metal oxides	Iron Control
Lauryl Sulfate	000151-21-3	Used to prevent the formation of emulsions in the fracture fluid	Non-Emulsifier
Isopropanol	000067-63-0	Product stabilizer and / or winterizing agent.	Non-Emulsifier
Ethylene Glycol	000107-21-1	Product stabilizer and / or winterizing agent.	Non-Emulsifier
Sodium Hydroxide	001310-73-2	Adjusts the pH of fluid to maintains the effectiveness of other components, such as crosslinkers	pH Adjusting Agent

**TABLE 4.7-4
TYPICAL CHEMICALS USED FOR HYDRAULIC FRACTURING**

Typical Main Compound	CAS Number	Purpose	Additive Type
Potassium Hydroxide	001310-58-3	Adjusts the pH of fluid to maintains the effectiveness of other components, such as crosslinkers	pH Adjusting Agent
Acetic Acid	000064-19-7	Adjusts the pH of fluid to maintains the effectiveness of other components, such as crosslinkers	pH Adjusting Agent
Sodium Carbonate	000497-19-8	Adjusts the pH of fluid to maintains the effectiveness of other components, such as crosslinkers	pH Adjusting Agent
Potassium Carbonate	000584-08-7	Adjusts the pH of fluid to maintains the effectiveness of other components, such as crosslinkers	pH Adjusting Agent
Copolymer of Acrylamide and Sodium Acrylate	025987-30-8	Prevents scale deposits in the pipe	Scale Inhibitor
Sodium Polycarboxylate	N/A	Prevents scale deposits in the pipe	Scale Inhibitor
Phosphonic Acid Salt	N/A	Prevents scale deposits in the pipe	Scale Inhibitor
Lauryl Sulfate	000151-21-3	Used to increase the viscosity of the fracture fluid	Surfactant
Ethanol	000064-17-5	Product stabilizer and / or winterizing agent.	Surfactant
Naphthalene	000091-20-3	Carrier fluid for the active surfactant ingredients	Surfactant
Methanol	000067-56-1	Product stabilizer and / or winterizing agent.	Surfactant
Isopropyl Alcohol	000067-63-0	Product stabilizer and / or winterizing agent.	Surfactant
2-Butoxyethanol	000111-76-2	Product stabilizer	Surfactant
Source: FracFocus 2015.			

Of the chemicals reported for well stimulation treatments in California for which toxicity information is available (compiled from the voluntary industry database, FracFocus), most are considered to be of low toxicity or non-toxic. However, a few reported chemicals present concerns for acute toxicity. These include biocides (e.g., tetrakis [hydroxymethyl] phosphonium sulfate; 2,2-dibromo-3-nitrilopropionamide; and glutaraldehyde), corrosion inhibitors (e.g., propargyl alcohol), and mineral acids (e.g., hydrofluoric acid and hydrochloric acid). Potential risks posed by chronic exposure to most chemicals used in well stimulation treatments are unknown at this time (CCST 2015).

SB4 outlines hydraulic fracturing chemical regulations, as mentioned previously under California Regulations in Section 4.7.3, Regulatory Setting. The Oil Field Operator's application for using well stimulation techniques must include:

- Composition of fluid to be used.
- Chemicals to be used and their concentrations.
- Disposal method of recovered water.
- Anticipated procedure to comply with the Hazardous Waste Control Law.
- Estimate of generated waste volume and disposal method.

Fluids must be stored in compliance with all applicable requirements. The Oil Field Operator must have a Spill Contingency Plan and must continuously monitor and record specified parameters during well stimulation procedures, and terminate well stimulation activity and immediately report to DOGGR if critical pressure thresholds are reached or if there is a potential breach of the well casing.

In addition, there are mitigation measures in DOGGR's *Draft Mitigation Policy Manual for Well Stimulation Treatment Permits* prepared pursuant to the SB4 EIR, which is included in Appendix B-2 of this Draft EIR, and are applicable to this analysis. DOGGR encourages Lead Agencies to include mitigation measures in their CEQA documentation that are feasible and meet or are substantially consistent with the Draft Mitigation Policy Manual, where such measures are relevant and applicable (DOC 2015b).

Therefore, this Draft EIR includes corresponding MM HAZ-1 (see SB4 RSK-2a), MM HAZ-2 (see SB4 RSK-2b), MM HAZ-3 (see SB4 RSK-4a), MM HAZ-4 (see SB4 RSK-5a), MM HAZ-5 (see SB4 RSK 5b), and MM HAZ-6 (SB4 RSK-5c) to implement the requirements of applicable SB4 measures, revised to reflect site-specific conditions and impacts while being the same or substantially consistent with DOGGR's measures. These MMs address the needs of the City IOF in a manner that can be implemented by the City of Culver City and do not adhere to the exact wording set forth by DOGGR.

In addition to MM HAZ-1 through MM HAZ-5, DOGGR will be implementing SB4 HAZ-1a as State regulation (with interim implementation required through MM HAZ-14). This measure requires that the Oil Field Operator must demonstrate to the satisfaction of DOGGR that the Spill Contingency Plan required by Section 1722.9 of Title 14 of the California Code of Regulations is sufficient to prevent any leaks, spills or other discharges of well stimulation fluids, flowback fluids, produced water, hazardous chemicals, contaminated surface water runoff, oil, or other potentially dangerous materials that might occur before, during, and after the well stimulation process from reaching the soil at all site pads.

In addition, Drilling Regulations Section 32 prohibits well stimulation treatments from being conducted within the designated 400-foot setback area from Developed Areas. Through implementation of the Drilling Regulations, implementation of MM HAZ-1 through MM HAZ-6, compliance with RR HAZ-1, and compliance with SB4 HAZ-1a (interim MM HAZ-14) as required by DOGGR, the Project's Maximum Buildout Scenario would not create a significant hazard to the public or the environment through the routine transport of hazardous materials used for well stimulation activities.

Silica

Silica sand is often used as a proppant in most of the hydraulic fracturing operations. Workers could be exposed to silica dust as a result of hydraulic fracturing operations allowed under the Specific Plan. The National Institute for Occupational Safety and Health (NIOSH) identifies exposure to airborne silica as a potential health hazard to workers conducting hydraulic fracturing operations. Silicosis could occur as a result of breathing silica. Silicosis potentially leads to lung disease by causing inflammation and reducing the lungs' ability to absorb oxygen (DOC 2015a).

However, there are numerous OSHA standards including, but not limited to 29 CFR 1910.1000 for Air Contaminants, 29 CFR 1910.1200 for Hazard Communication and 29 CFR 1910.134 for Respiratory Protection to help protect workers for exposure to silica dust (DOC 2015a).

In addition, there are mitigation measures in DOGGR's *Draft Mitigation Policy Manual for Well Stimulation Treatment Permits* prepared pursuant to the SB4 EIR, which is included in Appendix B-2 of this Draft EIR, and are applicable to this analysis of silica. This Draft EIR includes corresponding MM HAZ-7 (see SB4 RSK-7a) and MM HAZ-8 (see SB4 RSK-7b) to implement the requirements of applicable SB4 measures, revised to reflect site-specific conditions and impacts while being the same or substantially consistent with DOGGR's measures. These MMs address the needs of the City IOF in a manner that can be implemented by the City of Culver City and do not adhere to the exact wording set forth by DOGGR.

In addition, Drilling Regulations Section 32 prohibits well stimulation treatments from being conducted within the designated 400-foot setback area from Developed Areas. By implementing the Drilling Regulations, following federal, State, and local regulations already in place (RR HAZ-1), and implementing MM HAZ-7 and MM HAZ-8, which are anticipated to be consistent with the forthcoming DOGGR "Mitigation Policy Manual", exposure to silica dust associated with hydraulic fracturing operations at the City IOF would not create a significant hazard to the public, the environment, or to workers through the routine use of silica. Impacts would be less than significant after mitigation.

NORM

Naturally occurring radioactive material (NORM) might be released during oil and gas production at the City IOF during activities allowed by the Specific Plan. Workers may be exposed to NORM through contact with pipes and equipment that might have been contaminated with NORM. Sludge and drilling mud often contain elevated levels of NORM. NORM could be moved from site to site as equipment and materials are reused. Finally, disposal, reuse, and recycling of NORM may increase worker exposures. Worker exposure to NORM at high levels and for prolonged periods could cause bone cancers and other bone abnormalities.

In 1996, the California Department of Health Services, Radiologic Health Branch and DOGGR released a publication entitled "A Study of NORM Associated with Oil and Gas Production Operations in California". This document included sample analyses and survey results for NORM throughout the State of California including the Inglewood Oil Field. The results of this study indicate that NORM is not a serious problem in California oil- and gas-producing operations.

Recommendations from the study were based on Texas and Louisiana standards in order to assess California's NORM levels. These recommendations included that sites/facilities with levels greater than 15 pCi/g should be evaluated to determine if protective safety measures are necessary to control the ingestion or inhalation of the NORM by workers (DOGGR 1996).

Samples of produced water that exceeded 5 pCi/l of radium were obtained from the Inglewood Oil Field. However, as the study stated, since the produced waters are not used as a source of public drinking water, this is not an area of concern for public health. The vast majority of produced water is returned to producing or similar zones for enhanced recovery or disposal purposes. Also, produced water is considered an exploration and production waste (E&P) and as such is considered to be a nonhazardous waste that is subject to RCRA Subtitle D (solid waste regulations), not the more stringent Subtitle C regulations.

Samples of soils from a tank bottom at the Inglewood Oil Field had between 5 pCi/g and 15 pCi/g of radium. This is below the level where the study stated that sites/facilities should be evaluated to determine if protective safety measures are necessary to control the ingestion or inhalation of NORM by workers. There currently are no existing federal regulations that specifically address the handling and disposal of oil-field NORM wastes. Also, California currently does not have regulations concerning NORM. At the same time, California typically has NORM readings that are at background or marginally detectable (USGS 1999).

While workers may be exposed to NORM at the City IOF during operations allowed by the Specific Plan, the DOGGR study results indicate that NORM levels at the Inglewood Oil Field are not high enough to be of immediate health concern. Therefore, worker exposure to NORM at the City IOF would not create a significant hazard to the public, the environment, or to workers. Impacts would be less than significant. No mitigation is required.

Hazardous Materials Transport

The potential exists for a significant hazard to the public or the environment through the routine transport of hazardous materials to and from the Project Site. There are two prominent methods of transporting hazardous materials for the Project: by truck and by pipeline.

Trucks

Trucks would be used to transport hazardous materials to the Project Site. Trucks would also be used to transport any hazardous wastes generated at the Project Site to commercial hazardous wastes facilities. The Project is assumed to result in an increase in oil and gas production. As such, it is anticipated that more truck trips transporting hazardous materials and waste would occur. The increase in the number of trucks and the amount of hazardous materials or wastes that are transported from the Project Site translates to an increase in the potential for an accidental release of hazardous materials or waste to occur during transport.

Trucks transporting hazardous materials would be required to comply with federal, State and local transport laws as described in Section 4.7.3 of this EIR. Transportation accidents involving hazardous materials and wastes can lead to fires, explosions, vapor and gas clouds, and/or spills onto land or into water. During routine operations, transportation-related accidents could occur. The potential impact would be determined by the amount and type of material released. In turn, a release could result in the exposure of the public to health and safety hazards and/or in soil or water contamination.

The Hazardous Materials Transportation Act (HMTA) is the primary foundation for the regulatory control of the transportation of hazardous materials and would apply to the transport of hazardous materials and wastes to and from the Project Site. The purpose of the HMTA is to “protect against the risks to life, property, and the environment that are inherent in the transportation of hazardous materials.” This act contain requirements for hazardous materials classification, hazard communication, packaging requirements, operational rules, training and security, and registration

(49 CFR Parts 171–177). All hazardous materials being transported must be handled, packaged, labeled, and transported in a manner that is consistent with the HMTA regulations set forth for each categorized hazardous material/waste. Compliance with the HMTA would limit the potential for hazardous materials or wastes to be released to the environment, including public exposure to hazardous materials.

Therefore, through compliance with the HMTA requirements (RR HAZ-1), the routine transport, use, and disposal of hazardous materials and wastes related to Project implementation would not create a significant hazard to the public or the environment. Impacts would be less than significant and no mitigation is required.

Pipelines

Currently, pipelines on the Project Site transport crude oil, produced water, natural gas, and waste gas off-site to processing facilities located within the County IOF, not on the Project Site. It is likely that over time, existing and aged pipelines for transporting crude oil, produced water, natural gas, and waste gas would be replaced or upsized onsite. If existing pipelines are corroded, aged, or otherwise have compromised integrity, then the routine transport of hazardous materials could result in significant impacts to the environment and nearby workers. An analysis of the risk of upset associated with pipeline ruptures is discussed below under Threshold 7-3.

Pipelines within the Project Site would be required to comply with federal, State and local transport laws as described above in Section 4.7.3. While there have been no petroleum or chemical/hazardous material releases at the Project Site in the last five years, 16 reportable releases did occur in the Los Angeles County portion of the Inglewood Oil Field (FM O&G 2016), as shown on Table 4.8-2 of Section 4.8 of this EIR, Hydrology/Water Quality. Thirteen of these releases occurred as a result of pipeline leaks. While several regulations are in place to reduce impacts from pipeline releases, existing regulations have not eliminated releases. As such, it is possible that a pipeline could leak or malfunction, even with existing regulations, and could result in soil, water and/or groundwater contamination.

California Code of Regulations Title 14, Section 1774.1 requires environmentally sensitive pipelines to have a pipeline management plan. The DOGGR has designated all pipelines in oil and gas fields within the Los Angeles Basin, including the Inglewood Oil Field, as environmentally sensitive and subject to Pipeline Management Plan requirements. A requirement of the Baldwin Hills CSD EIR was that a Pipeline Management Plan be submitted to DOGGR. The Plan was submitted in December 2009, as required. It has not been necessary to update the Plan to date (LACDRP 2015).

As required by 14 CCR Section 1774.2, Pipeline Management Plans, the Plan shall be updated within 90 days whenever pipelines are acquired, installed, altered, or at the request of DOGGR. Section 1774.1, Pipeline Inspection and Testing, of 14 CCR requires the operator to visually inspect all aboveground pipelines for leaks and corrosion at least once a year. A mechanical integrity test must be performed every two years on all active, environmentally sensitive pipelines. Mechanical testing, including ultrasonic or hydrostatic testing, is also required. Pipelines less than 10 years old are exempt from the two-year testing requirement. The Pipeline Management Plan for the Inglewood Oilfield has been developed in compliance with pertinent provisions of the CCR and would apply to the entire Inglewood Oil Field, including the Project Site.

The Oil Field Operator maintains an Integrated Contingency Plan with Spill Prevention Control and Countermeasures Plan. This Plan satisfies requirements of numerous federal, state, and local codes and regulations that address spill prevention and emergency response including oil spill

response plans for oil pipelines, emergency plans for gas pipelines, and requirements for production flow lines, along with others. The Oil Field Operator also maintains an Emergency Response Action Plan (FM O&G 2016).

The Drilling Regulations require an Emergency Response Plan that satisfies all rules and regulations of the USEPA, the California Code of Regulations, the Spill Prevention, Control, and Countermeasure Plan, the California Office of Spill Prevention and Response, and applicable regulations of the U.S. Department of Transportation relating to onshore pipeline spills be submitted by the Oil Field Operator within 180 days of the date of approval of the Comprehensive Drilling Plan.

In addition, there are mitigation measures in DOGGR's *Draft Mitigation Policy Manual for Well Stimulation Treatment Permits* prepared pursuant to the SB4 EIR, which is included in Appendix B-2 of this Draft EIR, and are applicable to this analysis of pipelines. This Draft EIR includes corresponding MM HAZ-9 (see SB4 HAZ-1b) and MM HAZ-10 (SB4 RSK-2c) to implement the requirements of applicable SB4 measures, revised to reflect site-specific conditions and impacts while being the same or substantially consistent with DOGGR's measures. These MMs address the needs of the City IOF in a manner that can be implemented by the City of Culver City and do not adhere to the exact wording set forth by DOGGR.

Additionally, Drilling Regulations Section 12 includes requirements for spill containment, emergency response plans, community alert notifications, and annual emergency response drills. Drilling Regulations Section 20 also includes various requirements to address potential leaks from tanks and pipelines, including the requirements for all new piping to be above ground to have alarm sensors or comparable systems for leak detection, and for annually testing existing underground piping for leaks. Drilling Regulations Section 53 requires a Safety Inspection, Maintenance, and Quality Assurance Program (SIMQAP) be submitted by the Oil Field Operator within 180 days of the date of approval of the Comprehensive Drilling Plan. Requirements of the SIMQAP include, but are not limited to, regular maintenance and safety inspections and corrosion monitoring and leak detection. In addition, the Oil Field Operator would need to comply with existing regulations (RR HAZ-1).

A liquid release outside of the Inglewood Oil Field could occur if a detention basin is drained when there is a release or that the valves controlling the release of material from the drainage basin are left open and a release occurs before the next inspection of the retention basin discovers the incorrect valve position. The Oil Field Operator has an established procedure for confirming that there are no sheens or oil on the surface of retention basins before drainage. The retention basins are also inspected on a regular basis.

Through implementation of the Pipeline Management Plan, the Integrated Contingency Plan with Spill Prevention Control and Countermeasures Plan, and the Emergency Response Action Plan and other Drilling Regulations, implementation of MM HAZ-9, MM HAZ-10, and compliance with RR HAZ-1, the Project would not create a significant hazard to the public or the environment through the routine transport of hazardous materials via pipelines.

Hazardous Waste Disposal

Hazardous wastes are expected to be generated by well drilling and production activities at the Project Site during routine operations and maintenance. The approximate amounts of hazardous waste generation from activities at the Project Site is estimated in Table 4.7-5. These values are based on the generation quantities for the entire Inglewood Oil Field at the time of the Baldwin Hills CSD EIR, which included 643 active injection and production wells. Those maximum

quantities were proportionally reduced to the maximum number of injection and production wells allowed by the Specific Plan (30 in total) plus the existing wells already located within the City IOF (36) for a total of 66 wells.

**TABLE 4.7-5
ESTIMATED HAZARDOUS WASTE GENERATION AT FULL BUILDOUT**

Type	Monthly Waste Volume*	Annual Waste Volume*
Absorbents used for chemical and hazardous material spills	1 pound	12 pounds
Empty 5-gallon containers used for chemicals and hazardous wastes	5 pounds	58 pounds
Off-spec paints	36 pounds	420 pounds
Waste aerosols	25 pounds	292 pounds
Non-hazardous oily debris	3,126 pounds	36,498 pounds
* Based on the total hazardous waste generation of 643 active wells (injection and production wells) at the Inglewood Oil Field and the proportionate generation by 66 active wells (injection and production wells) in the City IOF. Source: LACDRP 2008		

The potential exists for a significant hazard to the public or the environment through the routine disposal of hazardous materials and wastes from the Project Site. Impacts concerning disposal of hazardous materials and hazardous wastes would be similar to those described under Transport - Trucks. With a possible increase in oil and gas production, there may be an increase in hazardous material usage and hazardous wastes to be disposed. Any increase in transport of hazardous materials or waste would increase the potential for the accidental release.

It is the Oil Field Operator's responsibility to ensure that all wastes generated are classified and disposed of properly in accordance with applicable regulations. The annual estimated hazardous waste volume is expected to be approximately 804 pounds of absorbents used for chemical and hazardous material spills; empty 5-gallon containers used for chemicals and hazardous wastes; off-spec paints and waste aerosols at full buildout of the City IOF. If hazardous materials are not properly managed, workers or the public could be exposed to hazardous materials during operational activities.

Compliance with the HMTA requirements and other regulations (RR HAZ-1) would reduce potential hazards to the public or the environment. There would be a less than significant impact and no mitigation is required.

Threshold 7-2: Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

The Specific Plan would allow for various activities to be performed onsite simultaneously. Under the Maximum Buildout Scenario, one well pad would be developed; two wells may be drilled or redrilled per year for the first two years and up to three wells per year after that may be drilled or redrilled for a maximum of 30 new wells to be drilled or redrilled; one well could be hydraulically fractured at any one time; and no more than two rigs being used for rework, maintenance and/or well abandonment.

Potential environmental impacts and impacts to human from site operations can occur through accidental upsets (e.g., accidents, breaks) at oil or gas wells, pipelines, or tanks. Potential

physical hazards from these upsets include fire or explosions. Fires can result if flammable materials (e.g., oil and gas) are contacted by ignition sources (e.g., open flames, electrical sparks) in the presence of an oxidizer (e.g., oxygen in air). Different materials require different levels of ignition sources and oxidizers for a fire to result. Explosions may result if a gas concentration is between its lower and upper explosive limits, and the gas is exposed to an igniter (e.g., open flame) in the presence of an oxidizer (e.g., oxygen in air). Different gases have different lower and upper explosive limits. In the unlikely event of a fire or explosion, nearby human populations may be exposed to thermal radiation from a fire, which can result in burns, or the pressure wave from an explosion, which can cause external and internal physical damage. Public receptors may also be exposed to hazardous and/or toxic chemicals during an upset condition.

Additionally, well stimulation activities at other locations in California and the rest of the United States have resulted in unauthorized releases. Thus, well stimulation activities that would be allowed under the Project could result in a significant hazard to the public or the environment. During well stimulation activities, hazardous materials, such as hydraulic fracturing fluid components, hydraulic oil, and other fuel and motor oils used in hydraulic fracturing equipment and supporting equipment could result in leaks or releases that could potentially contaminate soil or surface water. Workers or the public could also be exposed to hazardous materials as a result of well stimulation activities. The potential effects would depend upon the location of the release in relation to sensitive receptors and the size of the release.

Residents, employees and visitors in the surrounding area may be affected by a fire or explosion at the site. The area immediately north of the Project Site includes the single-family residential neighborhood of Blair Hills in Culver City, a multi-family development, Blair Hills Park, Baldwin Hills Scenic Overlook, and the Overlook's retention basin. The adjacent Baldwin Hills Scenic Overlook has a visitor center and provides a hilltop vantage point of the surrounding communities and the Los Angeles Valley. West of the Project Site are some buildings off Jefferson Boulevard, and the Culver City Park, a 41.6-acre City park that is developed with a skate park (Culver City Skate Park), the Culver City Bone Yard Dog Park, playgrounds, recreation huts with restroom facilities and picnic areas, barbecues, softball diamonds, half basketball courts, walking trails, a ropes course, and soccer fields. The southern boundary is the remainder of Inglewood Oil Field. The eastern boundary of the Project Site is generally defined by La Cienega Boulevard, with a State park farther east.

Quantitative Risk Assessment

To better define the safety hazards to nearby properties and individuals, a *Risk of Upset Analysis* was conducted by Kleinfelder and is located in Appendix F of this Draft EIR. In the analysis, six primary upset scenarios were developed based on operations and infrastructure at the Project Site:

- A. Oil Pipeline Leak
- B. Gas Pipeline Leak or Rupture
- C. Wellhead Leak or Rupture
- D. Tank Rupture
- E. Gas in Field
- F. Well Stimulation

“Daisy-chain” upsets, where one upset causes one or more additional upsets to occur, are unlikely given the low (i.e., near ambient) pressure state of the environmental and industrial conditions at

the site. Failure in an oil field system that is not under pressure generally lacks the requisite energy to trigger failure in another oil field system. Consequently, scenarios were considered individually.

Scenario A: Oil Pipeline Leak. Under this scenario, it was assumed that a typical oil pipeline, which is under ambient pressure, develops a leak resulting in 100 barrels of oil being released, which is based on the largest oil leak reported in the Inglewood Oil Field between 2010 and 2015. The released oil is expected to develop a pool with an area of 2,466 square feet and a depth of 0.25 foot (3 inches), which ignites, causing a pool fire. The closest receptors would be residents in the Blair Hills neighborhood who would be located approximately 1,200 feet from the release site/pool fire under this scenario.

Scenario B: Gas Pipeline Leak or Rupture. Under the *leak scenario*, it was assumed that an 18-inch gas pipeline under 15 pounds per square inch gauge (psig) of pressure develops a one-inch hole, which results in a jet fire. The closest receptors for this Scenario would be residents in the Blair Hills neighborhood (650 feet from the nearest gas pipeline) and persons in the buildings along Jefferson Boulevard (50 feet from the nearest gas pipeline). It is assumed that persons would be located outside and adjacent to the buildings.

Under the *rupture scenario*, it is assumed that an 18 inch gas pipeline under 15 psig of pressure is completely severed and results in a jet fire. The closest receptors for this Scenario would also be residents in the Blair Hills neighborhood and persons in the buildings along Jefferson Boulevard.

Scenario C: Wellhead Leak or Rupture. The wellhead leak or rupture would have similar conditions and consequences as those discussed under Scenarios A and B. Thus, impacts for Scenario C are not separately calculated, but are addressed with Scenarios A and B. A leak of oil or gas lines at the wellhead could result in a pool fire or jet fire. A rupture of gas lines at the wellhead could result in a jet fire similar to the gas pipeline rupture. Except for some pressurized subsurface pockets, the oil and gas produced at the Project Site has not been under pressure; therefore, well blow-outs, or high pressure pipeline leaks or ruptures have been rare. This condition may change as drilling goes into deeper layers (e.g., Nodular shale and Sentours).

Scenario D: Tank Rupture. This scenario assumes a rupture in one of the aboveground storage tanks located at an oil tank farm with a secondary containment area of 30,456 square feet. It was assumed that oil pools to a depth of 0.5 foot and catches fire. The closest receptors for this Scenario would also be residents in the Blair Hills neighborhood. The Drilling Regulations require that all new tanks be built no closer than 500 feet of a developed area.

Scenario E: Gas in Field. This scenario assumes the near-surface gas is not under pressure. It may migrate, however, through the soil and enter a building, depending on the soil vapor pressure, migration pathways, and the characteristics of the building's foundation. This could lead to an explosion that would affect nearby buildings.

Scenario F: Well Stimulation. This scenario assumes that well stimulation activities will commence in the future. Well stimulation activities in the Project Site will introduce increased pore pressure on the existing faults of the Newport-Inglewood Fault Zone. The very nature of hydraulic fracturing is to fracture the bedrock, thus creating microseisms. Increased seismicity has been reported with well stimulation in other states. No study, however, has specifically addressed seismicity associated with well stimulation in California (Kleinfelder 2017).

Analysis Methods

Risk is a function of probability and consequence. In other words, the likelihood of an adverse event and the nature and magnitude of the consequence of that event define the significance of a given risk. The risks identified in Scenarios A through F are analyzed, and to the extent possible, quantified and then compared to levels of significance that have been used in infrastructure and industrial risk assessments, and the findings of this analysis are located in *The Risk of Upset Analysis* in Appendix F of this Draft EIR.

Potential thermal radiation burn injuries were estimated for fires that may occur under Scenarios A through D using the ALOHA version 5.4.5 software from the Office of Emergency Management, U.S. Environmental Protection Agency (USEPA), and Emergency Response Division, National Oceanic and Atmospheric Administration (NOAA). Atmospheric conditions for the model were set at the default California conditions.

Meteorological sensors are located on the Inglewood Oil Field meteorological station tower, which is 33 feet tall and located on the well pad of Well #129 on Vickers Lease. Data from 2010 through 2014 indicate that winds are principally from the southwest except there are also winds from the northeast during the winter (December through February). The receptors were set in ALOHA to be downwind of the incident for maximum exposure.

ALOHA does not have crude oil as one of its described chemicals; therefore, hexane was used as a substitute for crude oil to evaluate pool fires, with the exposure distances results then adjusted by a factor of 0.71 to account for the chemical substitution.

The U.S. Department of Housing and Urban Development (HUD) considers 450 Btu/ft²/hr (approximately equal to 1.4 kW/m² in metric units) as the maximum acceptable level of thermal radiation for people in open spaces where people congregate, such as parks and playgrounds. The British maximum allowable value is 1.5 kW/m² for areas with people without protective clothing. The two values are similar, and the analysis in the Risk of Upset Report uses 1.4 kW/m² for a thermal exposure safety criterion.

Scenario E was evaluated qualitatively because insufficient quantitative data were available for application to the Project Site with regard to explosion hazards, which may be associated with methane (e.g., near-surface methane concentrations, transport routes, and building conditions). The *Geology, Soils and Seismicity Technical Memorandum* included in Appendix E-1 of this Draft EIR and summarized in Section 4.5, Geology, Soils and Seismicity, does not provide quantitative information about the potential for seismic events from IOF well stimulation, so Scenario F was evaluated qualitatively.

Scenario Probabilities

The probabilities of Scenarios A to D are provided in Table 4.7-6, Scenario Probabilities. As shown, all probability estimates are considered low, with the highest probability being 5E-04 (0.0005) per year, or about once every 2,000 years. These probabilities do not state when a leak or rupture will occur, only a long-run average condition that a leak or rupture may occur within the specified distance to human receptors, as shown in Table 4.7-7, Scenario Conditions and Consequences.

**TABLE 4.7-6
 SCENARIO PROBABILITIES**

Oil Field Equipment	Scenario ID	Upset Type	Unit Release Probability	Units	Conditional Probability of Leak or Rupture Given Release	Conditional Probability of Ignition Given Leak or Rupture	Conditional Probability of Fire Given Ignition	Scenario Probability ^a (per yr)
Oil Pipeline	A	Leak of 100 bbl. ^b	0.0023 per mi-yr	0.32 mi ^b (1700 ft)	0.8	0.09	0.95	5E-05
Gas Pipeline	B-L	Leak	0.00021 per mi-yr	0.32 mi ^b (1700 ft)	0.8	0.3	0.99	2E-05
	B-R	Rupture	0.00021 per mi-yr	0.32 mi ^b (1700 ft)	0.2	0.45	0.99	6E-06
Wellhead (construction or operation)	C-L	Leak	NA ^c	NA	NA	NA	NA	NA
	C-R	Rupture	NA ^c	NA	NA	NA	NA	NA
Tank (T-Vickers Farm)	D	Rupture (oil fills diked area)	2E-04 ^c	5	1 ^c	0.5 ^c	0.95	5E-04
Gas in Field	E	Gas in subsurface	NA	NA	NA	NA	NA	NA
Well	F	Stimulation effect	NA	NA	NA	NA	NA	NA

All conditional probabilities values are from CDE (2007) unless otherwise indicated.

^a Scenario probability is the product of the factors in the columns to the left.

^b Pipeline length assumed to present a continuous level of receptor exposure.

^c Impacts for Scenario C are not separately calculated, but are addressed with Scenarios A and B.

ft: feet; mi: mile; yr: year
 NA - Quantitative data is not available for Scenarios E and F.
 Source: Kleinfelder 2016.

Table 4.7-7 summarizes Scenarios A through D and estimates the potential for thermal radiation. Considering both the current and Maximum Buildout Scenario conditions, there were three scenarios and conditions in which the thermal radiation exposure exceeded 1.4 kW/m²: Scenarios B-R (Gas Pipeline Rupture); C-R (Wellhead Rupture); and Scenario D (Tank Rupture).

**TABLE 4.7-7
SCENARIO CONDITIONS AND CONSEQUENCES**

Oil Field Equipment	Scenario ID	Upset Type	Conditions	Consequence Considered	Human Receptor	Distance	Impact (thermal radiation, kW/m ²)
Oil Pipeline	A	Leak of 100 bbl.	Ambient pressure; oil pool: 2,246 ft ² , 3 inches deep	Pool fire	Residences Developed Area	1,200 ft. 400 ft.	0.057 0.62
Gas Pipeline	B-L	Leak	18 inch pipe; 15 psig; 1 inch hole	Jet fire	Residences Developed Area Buildings on Jefferson	650 ft. 400 ft. 50 ft.	Too small for software to report 0.043
	B-R	Rupture	18 inch pipe; 15 psig; pipe severed	Jet fire	Residences Developed Area Buildings on Jefferson	650 ft. 400 ft. 50 ft.	0.31 0.85 18
Wellhead (construction or operation)	C-L	Leak	See results for Scenarios A and B-L.				
	C-R	Rupture	See results for Scenarios A and B-R .				
Tank (T-Vickers Farm)	D	Rupture (oil fills diked area)	Ambient pressure; oil pool: 30,456 ft ² , 6 inches deep	Pool fire	Residences Developed Area	1,200 ft. 500 ft.	0.77 4.9
Values in bold exceed the HUD acceptable level of thermal radiation of 1.4 kW/m ² (converted to metric units). kW: kilowatts; m ² : square meters; bbl: barrel; ft ² : square feet; ft: feet; psig: pounds per square inch gauge Source: Kleinfelder 2016.							

Scenarios B-R (Gas Pipeline Rupture) and C-R (Wellhead Rupture)

The buildings off Jefferson Boulevard are close to a gas pipeline under current and Maximum Buildout Scenario conditions. If people were outside when a pipeline ruptured and the contents caught fire, these people could quickly suffer severe burns, with possibly fatal consequences if they are unable to evacuate quickly. Buildings would offer temporary protection from a fire, reducing the impacts if the people were inside at the time of the rupture. The buildings may also catch fire from the flame. This scenario, however, is estimated to have an occurrence frequency of about 6E-06 (0.000006) per year, or once in about 200,000 years. Gas pipelines are regularly sited through residential neighborhoods to supply natural gas to homes and fires or explosions associated with these installations are exceedingly rare on a pipeline-mile/year basis. Regarding Scenario C, wellhead construction and operation may result in leaks that would have the same potential thermal radiation exposure as a gas pipeline rupture.

Gas pipeline rupture would cause thermal radiation that would affect nearby persons and buildings. But given the very low frequency occurrence (once in about 200,000 years) of a potential gas pipeline rupture or wellhead rupture, impacts are considered less than significant.

Additionally, as discussed under Threshold 7-1 above, through implementation of the Pipeline Management Plan, the Integrated Contingency Plan with Spill Prevention Control and Countermeasures Plan, and the Emergency Response Action Plan and other Drilling Regulations, as well as implementation of MM HAZ-3, MM HAZ-4, and MM HAZ-5 related to pipeline and infrastructure integrity, and compliance with RR HAZ-1, the Project would not create a significant hazard to the public or the environment through the through reasonably foreseeable upset or accident conditions involving the pipeline or wellhead rupture.

Scenario D (Tank Rupture), at the Maximum Buildout Scenario.

The Maximum Buildout Scenario conditions assumed a distance of 500 feet between a new tank and developed areas. At the estimated thermal exposure of 4.9 kW/m² for a person located outdoors, pain would be felt within about 13 seconds and second degree burns would occur after an exposure of about 40 seconds. Buildings would offer temporary protection from a fire, reducing the impacts if the people were inside at the time of the rupture. This scenario is estimated to have an occurrence frequency of 0.0005 per year, or once in about 2,000 years.

The thermal radiation exposure from a tank pool fire at a new tank located with 500-foot setback from developed areas would exceed the health criterion of 1.4 kW/m². With an occurrence frequency of about once in 2,000 years, this would result in a potentially significant impacts.

MM HAZ-12 would decrease the probability and/or potential impacts of tank rupture oil fires by increasing the required setback distance to human receptors and/or reducing the diked surface areas of tanks. MM HAZ-12 would decrease the probability and/or potential impacts of tank rupture oil fires by requiring future storage tanks to be located at least 907 feet from developed areas, or the size of the diked area could be reduced to 15,228 square feet to reduce the threat zone distance, resulting in a minimum of 655 feet of distance between the tank site and developed areas. Alternately, the Oil Field Operator may conduct a Facility Siting Study or Quantitative Risk Assessment using accepted industry standards, to select the best location future tanks and identify the proper features to confine and minimize any risks of surface spills that could result in oil fires. In order to be able to assess the risk, the Oil Field Operator shall have a risk matrix (which depicts likelihood and consequences) that reflects established risk assessment standards and sets forth tolerability criteria that are acceptable to the City of Culver City.

Additionally, the Drilling Regulations contain numerous restrictions and requirements to minimize the potential hazards associated with tank ruptures, including: Drilling Regulations Section 12 requires spill containment, emergency response plan, community alert, annual emergency drills; Drilling Regulations Sections 15 and 16 include restrictions on tanks; Drilling Regulations Section 18 has mandates for dikes and retaining walls; Drilling Regulations Section 20 addresses safety and risk of upset prevention; Drilling Regulations Section 28 regulates the storage of hazardous materials and oil field waste removal; Drilling Regulations Section 49 addresses the abandonment of wells; Drilling Regulations Section 53 requires SIMQAP; and Drilling Regulations Section 54 requires safety audits. The Drilling Regulations also include monitoring and reporting requirements to reduce the adverse effects of spills within the City IOF. Compliance with RR HAZ-1 and the Drilling Regulations, and implementation of MM HAZ-12, would ensure that the hazards through this reasonably foreseeable upset or accident condition would be less than significant after mitigation.

Scenario E: Gas in Field. While the subsurface gas of the Oil Field is not under pressure, the gas may migrate through soil and enter a building, depending on the soil vapor pressure, migration pathways, and the characteristics of the building's foundation. Under this scenario, soil methane is assumed to migrate by diffusion through the soil and enter a building. Methane concentrations cannot increase as it migrates through soil. Vapor concentrations decrease substantially going from soil to buildings. Only pressurized methane soil gas can achieve explosive concentrations in building spaces adjacent to subsurface sources of methane. Re-pressurization conditions, however, can result in a hazard with soil gas at concentrations equal to or greater than lower explosive limit. Rising groundwater, formation of perched water above the diluted gas, low permeability soil, or confining layers above the gas can lead to a pressure increase. Ultimately, for a hazard to occur, the methane volume divided by the building's volume must be greater than

methane's lower explosive limit, which is 50,000 parts per million by volume (ppmv) (Sepich 2006).

Over 90 soil gas samples were taken in the Inglewood Oil Field during the Baldwin Hills Community Standards District environmental impact review. A majority showed soil gas extremely low concentrations (less than 2 ppmv). Higher concentrations were found near leaking wells. There is very little free gas associated with the reservoirs and gas migration does not appear to be an issue at Inglewood Oil Field (LACDRP 2008).

The available information indicates that soil methane field conditions at the Project Site do not match the requirements for explosive impacts on buildings. Thus, an explosion resulting from methane migrating into adjacent buildings, is not likely. However, it is not possible to preclude future conditions that might pressurize the gas in particular areas, potentially leading to an explosion. Changes in Project Site conditions that may lead to a pressurization of the soil gas should be reviewed to determine whether restrictions are required. MM HAZ-13 requires periodic evaluation of soil gas conditions on the City IOF to monitor and confirm that soil gas does not approach the lower explosive limit.

With implementation of MM HAZ-13, methane gas explosions from oil field migration into adjacent buildings would be prevented and thus, would not be expected to create a significant hazard to the public or the environment through this reasonably foreseeable upset or accident condition.

Scenario F: Well Stimulation. No induced earthquakes due to well stimulation are known to have been reported in California. The consensus among most researchers is that the likelihood of a large and damaging earthquake induced by well stimulation appears to be remote. However, research documents indicate that a minor to light-size earthquake could happen, as discussed in the *Geology, Soils and Seismicity Technical Memorandum* included in Appendix E-1 of this EIR and summarized in Section 4.5, Geology, Soils and Seismicity.

This scenario analyzes the impacts of well stimulation activities inducing seismicity (resulting in an earthquake) that could expose people or structures to substantial geologic hazards. Currently, it is not known to what extent the induced seismicity, from one hydraulic fracturing event or numerous hydraulic fracturing events may alter, or affect, the tectonic regime of an active fault, like the Newport-Inglewood fault. This is especially true given that wells may undergo hydraulic fracturing, and possibly deep water injection, within a relatively small oil field area.

It is also unknown what the effects of the induced seismicity from new wells in close proximity to each other will have on the tectonic regime of the Newport-Inglewood fault. Therefore, induced seismicity could trigger a larger earthquake with accompanying strong ground shaking. This could expose people or structures in the area to substantial geologic hazards, which could contribute to the risk of loss, injury, or death. The residual risks associated with well stimulation may include groundwater pollution for well integrity issues, release of methane to groundwater or to atmosphere if a damaging earthquake occurs, and public concerns about hazards associated with living next to an oil field conducting well stimulation along an active fault. This is considered a potentially significant impact.

As shown in Exhibit 4.5-5, Liquefaction and Earthquake Induced Landslide Zones, in Section 4.5, Geology, Soils, Seismicity of this Draft EIR, the western and northwestern portion of the City IOF is located in an earthquake-induced landslide hazards zone. The Project Site is underlain by weak bedrock and unfavorable (out of slope) bedding angles that make the slopes extremely prone to failure during heavy rainfall and/or strong ground shaking. Landslides could result in damage to structures and facilities within the City IOF, including pump jacks, tanks, and pipelines. A more

detailed discussion of tectonic seismicity and induced seismicity and associated mitigation measures is provided in Section 4.5, Geology, Soils, Seismicity of this Draft EIR, including the potential for induced seismicity caused by hydraulic fracturing/deep water injection to trigger an earthquake along the Newport-Inglewood fault, with accompanying ground rupture.

The results of the Risk of Upset analysis do not depend on the cause of the upset type and conditions (e.g., whether caused by an induced earthquake, or a tectonic earthquake), the upset conditions are addressed through the mitigation measures. As discussed in Section 4.5, Geology, Soils, and Seismicity, MM GEO-1 requires the development of a “traffic light” system for screening of seismic activity in the City IOF. MM GEO-1 requires that RED would correspond to a M2.7 or greater earthquake (near the threshold of a felt earthquake), which would trigger the requirement to stop all pumping, injection, and hydraulic fracturing activity. This would be similar to the level of detected earthquake required in SB 4 and the Drilling Regulations. MM GEO-1 requires that YELLOW would correspond to a M2.0 to M2.6, which would trigger the requirement that any pumping, injection, and hydraulic fracturing proceed with caution at reduced flow rates until a study determines whether there is a correlation between oil field activities and the seismic event. even with implementation of DOGGR measures and MM GEO-1, given the unacceptable consequences of an induced seismic event (and including related ground rupture and strong seismic shaking associated with such an induced seismic event) in the heavily populated and urbanized vicinity of Culver City, potential impacts of induced seismicity due to hydraulic fracturing would result in significant and unavoidable direct impacts.

As discussed in Section 4.5, Geology, Soils, and Seismicity, MM GEO-2 would prohibit the practice of deep well injection for wastewater disposal within the City IOF until such time that it could be proven that a site-specific mitigation system (e.g., traffic light) is effective at avoiding large seismic events associated with deep well injection for wastewater disposal. Compliance with MM GEO-2 would ensure that there would be no impact associated with induced seismicity due to deep well injection for wastewater disposal.

In addition, Drilling Regulations Section 32 Drilling Regulations prohibits well stimulation treatments from being conducted within the designated 400-foot setback area from Developed Areas. By implementing the Drilling Regulations, following federal, State, and local regulations already in place (RR HAZ-1), and with implementation of mitigation measures, impacts related to significant hazards to the public or the environment through this reasonably foreseeable upset or accident condition would be less than significant, with the exception of potential impacts that could result from induced seismicity, which would remain significant and unavoidable.

Importantly, there are many sources of uncertainty that affect the risk results. These uncertainties include: release frequency; release size; population impacts, including likelihood of fatality/serious injury; behavior of the release (jet mixing versus passive dispersion); accuracy of the hazard model; and ignition sources and probabilities. The release frequencies and sizes are the most important contributors to overall uncertainty of risks. Changes in failure rates would directly influence the risk profile, and a doubling of the event frequencies would double the probability of injuries. However, the Drilling Regulations, RR HAZ-1, and MMs HAZ-1 through HAZ-13 would address these risks.

Threshold 7-3: Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter-mile of an existing or proposed school?

Hazardous materials, substances, and wastes would be handled on the Project Site under the Specific Plan. Schools within 0.25-mile of the Project Site include the following:

- Star Education (10117 Jefferson Boulevard) located approximately 400 feet southwest of the western edge of the Project Site
- West Los Angeles Community College (9000 Overland Avenue) located approximately 1,000 feet south of the western section of the Project Site.

It is noted that when considering the setbacks required by the Drilling Regulations, not all of these schools would be within one-quarter mile of oil field activities on the Project Site. Activities on the City IOF under the Specific Plan would involve deliveries of materials designated as hazardous, as well as export of hazardous waste generated on-site. Consistent with its location in a dense urban area, there are several schools along the freeways and the surface streets in vicinity of the Inglewood Oil Field that may be used by trucks. As discussed in Section 4.14, Transportation and Traffic, the main Project Site truck access (i.e., not employee or visitor traffic) would be the intersection of Stocker Street and Fairfax Avenue, which is within the County IOF (refer to Exhibit 4.14-3, Trip Distribution, in Section 4.14). From this entrance, the trucks would travel from the County IOF to the City IOF, and return the same route. As shown on Exhibit 4.14-3, a total of 85 percent of City IOF-related truck trips would travel to the site via the I-405, with the remaining 15 percent traveling via South La Cienega Boulevard.

As discussed above under Threshold 7-1, through compliance with applicable regulations and the Drilling Regulations and implementation of mitigation measures, there would be less than significant impacts associated with the routine transport, use, and disposal of hazardous materials and wastes related with Project implementation. This analysis considers all surrounding land uses, including along truck routes. As discussed above under Threshold 7-2, the quantitative risk assessment concludes there would be less than significant impacts due to upset and accident conditions occurring on the Project Site with compliance with regulations, the Drilling Regulations, and implementation of mitigation measures for all scenarios modeled, with the exception of Scenario F related to well stimulation as it relates to the potential for induced seismicity.

As there would be less than significant impacts with mitigation to land uses surrounding the Project Site, there would also be less than significant impacts with mitigation to nearby schools due to upset and accident conditions during hazardous materials delivery and waste disposal. As discussed under Threshold 7-1 and as presented in Table 4.8-2 in Section 4.8, Hydrology and Water Quality, accident events are possible within the City IOF that have the potential to affect nearby sensitive receptors and schools. However, with the exception of the potential for induced seismicity, these hazards would not be significant after mitigation. Another consideration in the analysis of hazards to schools is emissions of Toxic Air Contaminants (TACs). A quantitative health risk assessment (HRA) was prepared for the Project and is summarized in Section 4.2, Air Quality. As discussed under Threshold 2-4 in Section 4.2, there would be less than significant impacts with mitigation to exposure of on-site and off-site receptors to TACs. Thus, the Project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste that may have significant adverse effects on schools. There would be no impacts and no mitigation is required.

Threshold 7-4: Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Hazardous materials sites compiled pursuant to Government Code Section 65962.5 are included in the “Cortese” list, which includes the California Department of Toxic Substances Control (DTSC) Envirostor database, DTSC’s list of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the California Health and Safety Code, State Water Resources Control Board (SWRCB) GeoTracker database, SWRCB’s list of solid waste disposal sites with waste constituents above hazardous waste levels outside the waste management unit, and SWRCB’s list of active Cease and Desist Orders (CDO) and Cleanup and Abatement Orders (CAO). According to these data resources, the Inglewood Oil Field is not included in the “Cortese” list and as such is not a hazardous materials site pursuant to Government Code Section 65962.5 (DTSC 2017a, 2017b; SWRCB 2017a, 2017b, 2017c).

Although the Project Site is not located on the Cortese list, the potential to encounter hazardous materials in the soil during earthmoving and excavation activities is possible. Based on years of intermittent oil and gas operations on the Project Site, some of which predate hazardous materials handling, storage, and disposal regulations, there remains a potential to encounter unknown contamination during earthmoving and excavation activities required for Project implementation, such as related to former storage tanks and materials handling, as well as accidental unauthorized chemical releases. MM HAZ-3 describes the process if stained, discolored or odorous soils are found and, if necessary, remediation of any unanticipated soil contamination. Implementation of MM HAZ-3 would reduce the potential to create a significant hazard to the public or the environment. Impacts would be less than significant with implementation of MM HAZ-3.

Threshold 7-5: Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Under the Maximum Buildout Scenario, the Project considers the construction and operation of new oil and gas production facilities within an existing and secured oil field. As required by the Baldwin Hills CSD EIR, an Emergency Response Plan was developed by FM O&G (the previous Oil Field Operator of the Inglewood Oil Field), including the portion of the oil field within the city limits of Culver City. Also, Drilling Regulations Section 12 requires preparation of an Emergency Response Plan that satisfies all rules and regulations of the U.S. Environmental Protection Agency, California Code of Regulations, Spill Prevention, Control, and Countermeasure Plan (SPCCP), the California Office of Spill Prevention and Response, and the US Department of Transportation relating to onshore pipeline spills. With the implementation of these Plans, the Project would not impair the implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. No mitigation would be required.

There are existing gates that serve as emergency access to the Project Site and the site is served by a developed roadway network that would provide emergency access and evacuation routes to existing developments on and near the Project Site. As discussed in Section 4.14, Transportation and Traffic, the Project is expected to have less than significant impacts on traffic around the Project Site. As such, the Project related traffic would not impair the implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Impacts would be less than significant. No mitigation would be required.

Threshold 7-6: Would the project expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Sections 51175 –51189 of the California Government Code direct the California Department of Forestry and Fire Protection (CAL FIRE) to map areas of significant fire hazards. The maps identify Fire Hazard Severity Zones (Very High, High, and Moderate) where the application of various mitigation strategies is needed to reduce risks associated with wildland fires. The Fire Hazard Severity Zones were developed using a computer model that factors in the fire history; existing and potential fuel (natural vegetation); flame length; blowing embers; terrain; and typical weather for an area. The severity of the hazard is based on a likelihood that, over a 30- to 50-year period, an area will burn without fuel-reduction efforts. Given the results of the modeling, the State identifies an area as a “moderate”, “high”, or “very high” Fire Hazard Severity Zone.

The Project Site is not located within a Very High Fire Hazard Severity Zone. However, there are VHFHSZ immediately east and south of the Project Site. The area around the Project Site has experienced brush fires in the past, primarily as a result of electrical transformer failures and is considered a wildlife-urban interface (CCFD 2014).

As outlined in Drilling Regulations Section 12 , the Oil Field Operator shall obtain an Annual Operating Permit, in accordance with the California Fire Code. The Culver City Fire Chief may require immediate cessation of all operations within the Project Site if a fire hazard exists, and annual audits will be required to address fire-related concerns such as fire monitor placements, water and detection capabilities and fire foam requirements. With these requirements in place, the Project would not contribute significantly to wildland fires and would not expose people or structures to significant risk of loss, injury or death involving wildland fires. Impacts would be less than significant and no mitigation would be required.

Threshold 7-7: Would the project cause deterioration of components of oil field infrastructure due to corrosion, weathering, fatigue, or erosion that could reduce structural stability?

Under the Maximum Buildout Scenario, the Project would allow expanded oil and gas production facilities within the City IOF subject to certain regulations. Therefore, the Project in and of itself would not cause the deterioration of components of the oil field infrastructure due to corrosion, weathering, fatigue or erosion that could reduce structural stability. However, oil field infrastructure including pipelines, storage tanks, valves, manifolds, and injection well casing, would be susceptible to oil leaks related to corrosion, weathering, fatigue, or erosion throughout the term of the Project (2031) and over the operating lifetime of the oilfield operations.

As discussed under Threshold 7-1, the Oil Field Operator has a Pipeline Management Plan, Integrated Contingency Plan with Spill Prevention Control and Countermeasures Plan, and an Emergency Response Plan in place. These plans include the regular inspection of pipelines and provision of the necessary maintenance to prevent structural deficiencies. Therefore, potential impacts associated with deterioration of oil field infrastructure due to corrosion, weathering, fatigue, or erosion, would be less than significant through implementation of the Pipeline Management Plan, the Integrated Contingency Plan with Spill Prevention Control and Countermeasures Plan, and the Emergency Response Action Plan and the Drilling Regulations. No mitigation is required.

4.7.7 CUMULATIVE IMPACTS

Cumulative impacts assessed below are analyzed in consideration of the cumulative projects listed in Section 2.0, Environmental Setting, of this EIR. The nearest cumulative project to the Project Site is the buildout of the County IOF, which is immediately adjacent to the Project Site to the south.

Hazardous Materials

After mitigation, Project-specific impacts related to hazardous materials would be reduced to levels that are less than significant. Although some of the cumulative projects listed also have potential impacts associated with hazardous materials, the environmental concerns associated with hazardous materials are site specific. Each project is required to address any issues related to hazardous materials or wastes. Federal, State and local regulations require mitigation to protect against site contamination by hazardous materials. Therefore, there would be no significant adverse cumulative hazardous materials impacts associated with the routine transport, use, or disposal of hazardous materials; emit hazardous emissions or the handling of hazardous or acutely hazardous materials, substances, or wastes, including those located within one-quarter mile of an existing or proposed school; sites included in the "Cortese" list; and sites located near an airport or airstrip. Also, cumulative impacts related to interference with an adopted emergency response or evacuation plan or exposure of people or structures to wildfires would be less than significant.

The Baldwin Hills CSD includes requirements and provisions for oilfield operations relative to fire and emergency response; safety and risk of upset; lighting; signs; fencing; security; storage of hazardous materials; drilling, re-drilling, and reworking operations; tanks; safety inspection, maintenance, and quality assurance program; and annual emergency response drills.

Risk of Upset

For risk of upset and safety, cumulative impacts may occur due to increases in the receptor populations that could be affected by the future field operations; in the frequency or volume of oil spills into the same environment as the potential development; or in public safety risks to the same populations as the potential development.

Upset or accident conditions were assessed at the County IOF, and documented in the CSD EIR. The County IOF assessment scenarios included:

- Scenario 1: Rupture or Leak of Gas Plant Low Side Equipment
- Scenario 1a2: Rupture of Field Vacuum piping under pressure
- Scenarios 2–5: Rupture or Leak of Gas Plant Equipment
- Scenario 6: Rupture or Leak at Propane Vessels and Loading Equipment
- Scenario 7: Rupture or Leak at Gas Liquids Vessel
- Scenario 8: Rupture or Leak at Propane Refrigeration System
- Scenario 9: Crude Oil Release with Fire at Storage or Spill Outside Field
- Scenario 10: Odorant Releases

The analysis indicated that most of the potential releases would not produce fatalities at populated areas. The gas plant is located more than 300 feet from La Cienega Boulevard and more than 600 feet from the Kenneth Hahn State Recreation Area. The field gas piping is located no closer

than 250-300 feet from residences and roadways. The only scenarios that could produce fatalities offsite, at a frequency of about once in a million years, are:

- The rupture releases from the propane storage and transfer facilities and the gas liquids facility, including explosions and Boiling Liquid Expanding Vapor Explosions that could reach Kenneth Hahn State Recreation Area.
- The crude oil tanks at the LAI facility, if a large spill occurred with a subsequent fire, could cause thermal radiation on La Cienega Blvd that could cause fatalities.

The proximity of the gas liquid (e.g., propane and butane) storage system to the Kenneth Hahn State Recreation Area could produce a significant risk due to the potential for large gas liquids releases. The injury scenarios that could reach populated areas include:

- Release of flammable gas from the gas plant impacting La Cienega Boulevard.
- Releases of propane and gas liquids.
- Releases of crude oil at the LAI tank farm causing thermal impacts along La Cienega Boulevard.
- Releases from field piping near Windsor Hill, Kenneth Hahn State Recreation Area and Freshman Avenue.

The odorant releases producing concentrations sufficient to produce serious injuries or fatalities would not reach populated areas. None of the injury scenarios would occur at a frequency or of sufficient magnitude to produce significant risk. This is due to the separation distances from the gas plant to residences or the Kenneth Hahn State Recreation Area and the Oil Field Operator's use of a vacuum based field gas gathering system, which reduces the frequency of piping releases.

With the exception of potential accident conditions associated with induced seismicity from well stimulation treatments (see Section 4.5, Geology, Soils, and Seismicity), the Project will not result in significant and unavoidable cumulative impacts due to a reasonably foreseeable upset or accident condition involving the release of hazardous materials into the environment, with the implementation of the Drilling Regulations, RR HAZ-1, and MMs HAZ-1 through HAZ-14.

As such, the Project would have significant and unavoidable cumulative impacts related to accident conditions associated with induced seismicity from well stimulation treatments.

4.7.8 MITIGATION MEASURES

MM HAZ-1 (see **SB4 RSK-2a**) Prior to the commencement of any well stimulation activities, the Oil Field Operator shall implement a strategy for reducing the inventory of the hazardous materials with the aim to reduce the total mass of potential accidental releases, and thus, also the consequences and effects for workers and public in the surroundings. This Inventory Reduction Plan shall include documentation of anticipated chemical use and a clear articulation of how the reductions will be realized, subject to the review and approval of the City of Culver City and DOGGR. Upon completion of the well stimulation activity, the Oil Field Operator shall provide an accounting of the chemicals actually used to the City of Culver City, with a comparison to the quantities set forth in the Inventory Reduction Plan.

- MM HAZ-2** (see **SB4 RSK-2b**) Prior to the commencement of any well stimulation activities, the Oil Field Operator shall conduct a Facility Siting Study or Quantitative Risk Assessment using the accepted industry standards, including API 753 Management of Hazards Associated With Location of Process Plant Portable Buildings, to select the best location of all well stimulation equipment and to ensure the proper features to confine and minimize any surface spills. If any increase in pipeline and/or vessel operating pressure and/or hydrogen sulfide concentration is proposed, the Facility Siting Study or Quantitative Risk Assessment shall identify effective isolation systems that demonstrate to satisfaction of the City of Culver City and DOGGR that such increase would not generate an incremental risk. In order to be able to assess the risk, the Oil Field Operator shall have a risk matrix (which depicts likelihood and consequences) that reflects established risk assessment standards and sets forth tolerability criteria (e.g., HSE UK standards) that are acceptable to the City of Culver City and DOGGR.
- MM HAZ-3** (see **SB4 RSK-4a**) Prior to the commencement of any well stimulation activities, the Oil Field Operator shall conduct a Process Hazard Analysis (PHA) followed by a Layer of Protection Analysis (LOPA) to determine if the proposed safeguards for the well stimulation event allow result in a residual risk is as low as reasonably practicable (ALARP). The PHA and LOPA shall be submitted to the City of Culver City and DOGGR for review and approval. If the PHA shows an unacceptable level of risk, the well stimulation event shall not proceed until such risks are shown to be reduced to acceptable levels to the satisfaction of the City of Culver City and DOGGR. In order to be able to assess the risk, the Oil Field Operator shall have a risk matrix (which depicts likelihood and consequences) that reflects established risk assessment standards and sets forth tolerability criteria that are acceptable to the City of Culver City and DOGGR.
- MM HAZ-4** (see **SB4 RSK-5a**) Prior to the commencement of any well stimulation activities, the Oil Field Operator shall prepare an Operating Procedures Plan for the planned well stimulation activities, subject to the review and approval of the City of Culver City and DOGGR. The Operating Procedures Plan shall include the volumes, rates, and pressures of fluids used during stimulation, shall address the steps of each operation, shall address pump cavitation, and shall discuss the potential the hazards for each operation. The Plan shall include the consequence of deviation and the steps to correct in case of deviation.
- MM HAZ-5** (see **SB4 RSK-5b**) Prior to the commencement of any well stimulation activities, the Oil Field Operator shall evaluate the need for installation of flame arrestors on the tank vents in accordance with the guidance set forth in National Fire Protection Association (NFPA) 30 Flammable and Combustible Liquids Code, API recommended Practice 2210 and API recommended Practice 2028. The evaluation and results shall be provided to the City of Culver City and DOGGR for review and approval. If a need is identified in the evaluation, the Oil Field Operator shall install flame arrestors on the tank vents.
- MM HAZ-6** (see **SB4 RSK-5c**) Prior to the commencement of any well stimulation activities, the Oil Field Operator shall prepare and implement a Control of Ignition Sources Plan following NFPA 30. The Plan shall articulate how the well stimulation activity will avoid the presence of an ignition source during the installation, and shall be provided to the City of Culver City and DOGGR for review and approval.

- MM HAZ-7** (see **SB4 RSK-7a**) Prior to the commencement of any well stimulation activities that would use a proppant, the Oil Field Operator shall notify the City Fire Department and DOGGR in writing about the anticipated proppant(s) to be used at the City IOF. If the Oil Field Operator requests to use silica as a proppant, the City shall require that alternative proppants are adequately considered and determined to be infeasible by the Oil Field Operator, subject to the City's review and concurrence. Before authorizing the use of any proppants, the Oil Field Operator shall conduct a hazard evaluation of the proppant(s). The use of the proppant(s) shall only be approved if the hazard evaluation demonstrates its safety to on-site workers and adjacent sensitive receptors to the satisfaction of the City of Culver City and DOGGR. Additionally, the Oil Field Operator shall be required to ensure that the proppant delivery system is a closed system and that incorporates the best available feasible technology to reduce dust and truck traffic when compared to traditional methods. The proppant delivery system shall prohibit pneumatic conveying of sand from the bulk truck trailers into silos, and belt conveying from the silos to the blender.
- MM HAZ-8** (see **SB4 RSK-7b**) Prior to the commencement of any well stimulation activities, the Fugitive Dust Control Plan prepared in compliance with Section 21 of the Specific Plan shall incorporate safety measures to address well stimulation activities. The Fugitive Dust Plan shall address emissions of fugitive dust during all stages of well stimulation treatment and shall prohibit the release of particulate matter (PM10) levels to exceed 50 $\mu\text{g}/\text{m}^3$. Particulate matter consists of solid particles and liquid droplets suspended in the air. Compliance with this restriction on PM10 shall be monitored and the results of monitoring shall be provided to the City at the completion of each well stimulation event.
- MM HAZ-9** (see **SB4 HAZ-1b**) Prior to approval of the Annual Drilling Plan, the City of Culver City shall mandate that the Oil Field Operator conduct an annual inventory of the oil field equipment, well stimulation equipment and supporting infrastructure, and well stimulation fluids with hazardous materials, and provide the report to the City of Culver City and DOGGR for review and approval. The inventory shall include information regarding the integrity of aged equipment and infrastructure (e.g., cathodic protection, pipeline metal thickness), and the steps that will be taken to guard against failure of older infrastructure. The inventory shall demonstrate compliance with relevant State and local regulations such as the Hazardous Liquid Pipeline Safety Act (California Government Code, Sections 51010-51019.1).
- MM HAZ-10** (see **SB4 RSK-2c**) Prior to the commencement of any well stimulation activities, the Oil Field Operator shall establish a Mechanical Integrity Testing And Maintenance Program for all equipment used in well stimulation treatments, consistent with Section 1782, General Hydraulic Fracturing Requirements, of the DOGGR regulations. The program shall identify the frequency of testing and inspection of process equipment, and shall provide for testing before the commencement of well stimulation activities, subject to the review and approval of the City of Culver City and DOGGR.
- MM HAZ-11** If stained, discolored or odorous soils are encountered during earthmoving and excavation activities on the City IOF, work in the immediate area shall cease and the soils shall be tested to determine if contamination is present. The Oil Field Operator shall notify the City of Culver City and the California Department of Toxic Substances Control and/or the Regional Water Quality Control Board of the soil

testing results and shall coordinate with these agencies on the appropriate means to address any identified contaminated soils in accordance with applicable regulations. All environmental investigation and/or remediation shall be conducted under a Workplan to be prepared by the Oil Field Operator and approved by agency having jurisdiction to remediate the contamination to achieve the cleanup objectives and associated risk levels and/or the removal of the contamination in accordance with applicable regulations, subject to approval and oversight of the remedial efforts by the applicable regulatory agency.

MM HAZ-12 To decrease the probability and/or potential impacts of tank rupture oil fires, future storage tanks shall be located at least 907 feet from developed areas, or the size of the diked area could be reduced to 15,228 square feet to reduce the threat zone distance, resulting in a minimum of 655 feet of distance between the tank site and developed areas. Alternately, the Oil Field Operator may conduct a Facility Siting Study or Quantitative Risk Assessment using accepted industry standards, to select the best location future tanks and identify the proper features to confine and minimize any risks of surface spills that could result in oil fires. In order to be able to assess the risk, the Oil Field Operator shall have a risk matrix (which depicts likelihood and consequences) that reflects established risk assessment standards and sets forth tolerability criteria that are acceptable to the City of Culver City.

MM HAZ-13 As a part of the site specific geotechnical investigation required by Section 24 of the Specific Plan, the Oil Field Operator shall test the local soils to determine soil methane levels, to establish a baseline condition within the City IOF, and to confirm that soil methane levels do not pose an explosive hazard to buildings. Based on the results of this evaluation, the Oil Field Operator shall periodically monitor, as needed but no less than one time per year, and shall document on-site soil gas levels to determine whether changed conditions are re-pressurizing the soil gas at the Project Site. If soil gas levels are found to substantially increase or to approach explosive levels, immediate action shall be taken to prevent further re-pressurization of soils, and to alleviate the cause of the pressurized soil gas, in consultation with a qualified geotechnical engineer, to the satisfaction of the City of Culver City.

MM HAZ-14 The following measure is an interim MM to be implemented and enforced by the City until such time as DOGGR adopts the equivalent measure listed as a Regulatory Requirement in this Draft EIR (SB4 HAZ-1a Ensure that Spill Contingency Plan Provides Adequate Protection Against Leaks or Discharges of Dangerous Fluids and Other Potentially Dangerous Materials). This MM shall become inapplicable when DOGGR enacts this measure as a formal regulation; the regulation shall then become applicable as part of approving a well stimulation treatment permit.

The Oil Field Operator shall demonstrate that the spill contingency plan required by Section 1722.9 of Title 14 of the California Code of Regulations and provided to DOGGR is sufficient to prevent any leaks, spills or other discharges of well stimulation fluids, flowback fluids, produced water, hazardous chemicals, contaminated surface water runoff, oil, or other potentially dangerous materials that might occur before, during, and after the well stimulation process from reaching the soil at all site pads. The use of barriers or other control devices shall not interfere with safety protocols during well stimulation operations. Prior to approving an Annual Drilling Plan, the Oil Field Operator shall provide evidence to

the City that the actions prescribed in this measure have been completed, including but not limited to an approved well stimulation permit from DOGGR for the well(s) addressed in the proposed Annual Drilling Plan.

4.7.9 LEVEL OF SIGNIFICANCE

With implementation of MM HAZ-1 through MM HAZ-14, potential direct and cumulative impacts related to hazards, hazardous materials, and risk of upset would be less than significant, with the exception potential accident conditions associated with induced seismicity from well stimulation treatments, as summarized below.

Significant Unavoidable Impact GEO-1: Even with implementation of MM GEO-1, which requires implementation of an Induced Seismicity Avoidance, Monitoring, Evaluation, and Mitigation Protocol (e.g. traffic-light system); MM GEO-2, which prohibits deep well wastewater disposal in the City IOF unless otherwise approved by the City; interim MMs GEO-3 and MM GEO-4, which address seismicity, fault rupture, and groundshaking hazards from well stimulation activities; and interim MM GEO-5, which addresses post-earthquake response requirements are part of the spill contingency plan for well stimulation treatments, the potential for well stimulation treatments to result in induced seismicity cannot definitively be reduced to a level less than significant. As such, the Project could result in both direct and cumulative significant and unavoidable impacts for induced seismicity, rupture of a known earthquake fault, and for strong seismic groundshaking, also resulting in significant and unavoidable direct and cumulative impacts related to accident conditions associated with induced seismicity.

Table 4.7-8 below summarizes the significance finding of each threshold addressed in this section before and after mitigation, where applicable.

**TABLE 4.7-8
SIGNIFICANCE SUMMARY**

Threshold	Project Level of Significance	Mitigation Measure(s)	Level of Significance after Mitigation
7-1 Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	Potentially Significant	MM HAZ-1 through MM HAZ-10, MM HAZ-14	Less than Significant With Mitigation
7-2 Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	Potentially Significant	MM HAZ-1 through MM HAZ-13	Significant and Unavoidable
7-3 Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter-mile of an existing or proposed school?	Less than Significant	N/A	Less than Significant
7-4 Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	Potentially Significant	MM HAZ-3	Less than Significant With Mitigation
7-5 Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	Less than Significant	N/A	Less than Significant

**TABLE 4.7-8
SIGNIFICANCE SUMMARY**

Threshold	Project Level of Significance	Mitigation Measure(s)	Level of Significance after Mitigation
7-6 Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	Less than Significant	N/A	Less than Significant
7-7 Cause deterioration of components of oil field infrastructure due to corrosion, weathering, fatigue, or erosion that could reduce structural stability?	Less than Significant	N/A	Less than Significant
N/A: not applicable			

4.7.10 REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR). 2016 (December). Public Health Statement- Hydrogen Sulfide. Atlanta, GA: ATSDR. <http://www.atsdr.cdc.gov/PHS/PHS.asp?id=387&tid=67>.

California Department of Conservation (DOC). 2015a (June). *Final Environmental Impact Report, Analysis of Oil and Gas Well Stimulation Treatments in California*. Sacramento, CA: DOC.

———. 2015b (July). *Draft Mitigation Policy Manual for Well Stimulation Treatment Permits for Well Stimulation Treatment Permits* (Prepared Pursuant to Senate Bill 4 (2013 Pavley)). Sacramento, CA: DOC. ftp://ftp.consrv.ca.gov/pub/oil/CEQA/Oil%26Gas/Mitigation_Policy_for_WST-Draft.pdf.

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR). 1996. *A Study of NORM Associated with Oil and Gas Production Operations in California*. Sacramento, CA: DOGGR.

California Department of Forestry and Fire Protection (CAL FIRE). 2011 (September). Very High Fire Hazard Severity Zones in LRA: Culver City. Sacramento, CA; CDF. http://www.fire.ca.gov/fire_prevention/fhsz_maps/FHSZ/los_angeles/Culver_City.pdf.

———. 2010 (March). California Fire Plan. Sacramento, CA: CAL FIRE. http://cdfdata.fire.ca.gov/fire_er/fpp_planning_cafireplan.

California Department of Toxic Substances Control (DTSC). 2017a (March 3, access date). Envirostor – Hazardous Waste and Substances Site List. Sacramento, CA: DTSC. http://www.envirostor.dtsc.ca.gov/public/search.asp?cmd=search&reporttype=CORTES&site_type=CSITES,OPEN,FUDS,CLOSE&status=ACT,BKLG,COM&reporttitle=HAZARDOUS+WASTE+AND+SUBSTANCES+SITE+LIST.

———. 2017b (March 3, access date). Information Required from the Department of Toxic Substances Control Under Government Code Section 65962.5(a). Sacramento, CA: DTSC. <https://www.calepa.ca.gov/sitecleanup/corteselist/section-65962-5a/>.

California Environmental Protection Agency (CalEPA). 2002 (May). Oil Exploration and Production Wastes Initiative. Sacramento, CA: CalEPA.

Culver City, City of. 2017 (September). *Oil Drilling Regulations for the Culver City Portion of the Inglewood Oil Field* ("Inglewood Oil Field Specific Plan"). Culver City, CA: the City.

Culver City Fire Department (CCFD). 2014. Community Risk Assessment and Standards of Cover. Culver City, CA: CCFD.

———. 2012 (June). Culver City Fire Department Very High Fire Hazard Severity Zones (VHFHSZ) Map. Culver City, CA: CCFD.
<http://www.culvercity.org/home/showdocument?id=164>.

Freeport McMoRan Oil and Gas Inc (FM O&G). 2016 (December 27). Personal communication. Email correspondence occurring from November 2015 to December 2016 between FM O&G and Psomas regarding the Inglewood Oil Field.

Hermosa Beach, City of. 2014 (June). *E & B Oil Drilling & Production Project FINAL Environmental Impact Report* (prepared by Marine Research Specialists). Hermosa Beach, CA: the City.
<http://www.hermosabch.org/index.aspx?page=755>.

Kleinfelder, Inc. 2017 (March). *Risk of Upset Analysis – Inglewood Oil Field Specific Plan EIR, Culver City, California*. Redmond, WA: Kleinfelder.

Los Angeles County Department of Regional Planning (LACDRP). 2015 (September). *Baldwin Hills Community Standards District Period Review, Final Report*. Los Angeles, CA: LACDRP.

———. 2008 (October). *Final Environmental Impact Report Baldwin Hills Community Standards District* (SCH# 2007061133). Los Angeles, CA: LACDRP.
http://www.inglewoodoilfield.com/res/docs/baldwin_hills_community_standards_district_final_eir%20.pdf.

Marine Research Specialists (MRS). 2013 (October). FM O&G Baldwin Hills 2012 EQAP Audit Report. Santa Barbara, CA: MRS.
http://planning.lacounty.gov/assets/upl/project/bh_2012-eqap.pdf.

Office of Environmental Health Hazard Assessment (OEHHA). 2008 (June). Appendix D.2 to the *Risk Assessment Guidelines Technical Support Document for the Derivation of Noncancer Reference Exposure Levels*. Oakland, CA: OEHHA.
<https://oehha.ca.gov/media/downloads/cnr/appendixd2final.pdf>

Occupational Safety and Health Administration (OSHA). 2017 (March, access date). Health Hazards Associated with Oil and Gas Extraction Activities. Washington, D.C.: OSHA.
<https://www.osha.gov/SLTC/oilgaswelldrilling/healthhazards.html>.

Sentinel Peak Resources. 2017 (March, access date). 2015 Archives: 2015 EQAP Report. Los Angeles, CA: Sentinel Peak Resources. <http://www.inglewoodoilfield.com/2015-archives.html>.

State Water Resources Control Board (SWRCB). 2017a (March 3, access date). GeoTracker. Search for Culver City, California. Sacramento, CA: SWRCB. <https://geotracker.waterboards.ca.gov/>.

———. 2017b (March 3, access date). Cortese List Data Resources: List of solid waste disposal sites identified by Water Board with waste constituents above hazardous waste levels outside the waste management unit. Sacramento, CA: SWRCB. <http://www.calepa.ca.gov/sitecleanup/corteselist/>.

———. 2017c (March 3, access date). List of “Active” CDO and CAO from Water Board (Microsoft Excel File). Sacramento, CA: SWRCB. <http://www.calepa.ca.gov/sitecleanup/corteselist/>.

———. 2015 (July 30, USEPA Final Approval). *2012 California Integrated Report*. Sacramento, CA: SWRCB. http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2012.shtml. Sepich, J., Brownfield Subslab. 2006. Hazard Assessment by Methane CVP (Concentration/Volume/Pressure). Presented at Sixth Annual Battelle Conference, May 19–22, 2006. Monterey, CA: Sepich.

United States Environmental Protection Agency (USEPA). 2002 (October). *Exemption of Oil and Gas Exploration and Production Wastes from Federal Hazardous Waste Regulations*. Washington D.C.: USEPA.

United States Geological Survey (USGS). 1999 (September). *Naturally Occurring Radioactive Materials (NORM) in Produced Water and Oil-Field Equipment—An Issue for the Energy Industry*. Reston, VA: USGS. <https://pubs.usgs.gov/fs/fs-0142-99/fs-0142-99.pdf>.

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