

**Health Concerns Related to Proposed Expansion of
Oilfield Operations in the Baldwin Hills**

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Summary

Expanded oil drilling, extraction and production in the Baldwin Hills/Inglewood Oilfield has the potential to affect public health through a number of different routes, including both direct environmental exposures, such as releases of toxic air pollutants, and indirect effects, such as effects on land-use that could limit recreational opportunities in an area that is park-poor and has high rates of obesity. Some of these hazards may be amenable to technical or administrative controls to minimize potential health risks. Other risks may be difficult to predict and control, such as releases of oilfield gases through ground fissures or abandoned wellheads. Furthermore, in some cases, mitigation procedures such as desulphurization, may create new hazards. Close proximity to a dense urbanized area leaves little margin for error in planning for such events.

Sources of information

To better understand the potential health¹ impacts related to oilfield operations, the author reviewed information from relevant environmental impact studies and published, peer-reviewed research reports, including:

1. Environmental reviews (CEQA-EIRs and other documents) of other proposed actions in the Baldwin Hills;
2. Environmental reviews (CEQA-EIRs and other documents) of proposed projects involving oil field operations interfacing with other urban land-uses in California;
3. Research literature (peer-reviewed or from a reputable, minimally biased source) on health and environmental conditions in the Baldwin Hills area;
4. Research literature (peer-reviewed or from a reputable, minimally biased source) on health and environmental concerns related to oil extraction in an urban area.

Information on the scope of the proposed action was obtained from the Notice of Preparation (NOP) for the Baldwin Hills Community Standards District (Los Angeles County, Department of Regional Planning 2007).

Potential health risks and pathways

Preliminary review of these documents suggests that the following health impacts could result from the proposed action. They are organized by the following pathways: air-borne, water-borne, noise, greenspace/resources for recreational physical activity, and geologic events. Italicized text in square brackets [] indicates where discussion of such issues would typically be found in an EIR.

1. Air-borne

- 1.1. Generation of dust and other particulates as soil is disturbed (including soil contaminated with hazardous substances from previous oilfield operations). Such particulates could cause or exacerbate asthma and reactive airway syndrome of downwind residents and park visitors. *[may be addressed in CEQA Air Quality Section]*
- 1.2. Soil disturbance during site preparation resulting in the airborne dispersal of coccidioidomycosis (aka “Valley Fever”) spores. These spores frequently contaminate soils in arid areas of California. The resulting disease, which produces flu-like symptoms lasting

¹ Throughout this report the term “health” refers to human health.

one to several weeks in most cases, is endemic to inland valleys in California. Since the symptoms are usually transient and resemble many other common illnesses, many cases are not recognized or diagnosed. Disseminated disease, which develops in about 1/1000 recognized cases, can spread to many organ systems, manifesting in a variety of ways including lung disease and meningitis. Dissemination is more likely among Blacks, Asians and individuals who are immuno-suppressed. Although coccidioidomycosis is endemic to Los Angeles County and the incidence has increased sharply in the past five years, it is unknown whether the spores are found in soils in the Baldwin Hills. See reviews at <http://www.cdc.gov/ncidod/EID/vol2no3/kirkland.htm>, and <http://lapublichealth.org/acd/Diseases/Cocci.pdf> [may be addressed in CEQA Human Health, Safety Hazardous Materials Section]

- 1.3. Releases into the atmosphere of toxic or carcinogenic components of petroleum from currently operating wells and facilities, and from accelerated migration of these constituents to abandoned or “sealed” wellheads that are leaking. These chemicals may also be released during the atmosphere in production facilities, such as dehydration facilities. The hazardous petroleum components of most concern, referred to collectively as BTEX chemicals, include benzene, a known human toxin and carcinogen. The composition of petroleum varies widely. More information is necessary to determine whether BTEX releases will pose a hazard at this site. [may be addressed in CEQA Air Quality Section, possibly also Human Health, Safety, Hazardous Materials Section]
- 1.4. Releases into the atmosphere of hydrogen sulfide (H₂S), which can occur naturally in petroleum and can be formed when bacteria are introduced into wells and pipes breakdown organic sulfur compounds in crude oil. Plans for expanded oil production in the Baldwin Hills include facilities for removal of H₂S. Safety at such facilities should receive the highest attention. Due to the highly toxic nature of H₂S, worst case risk assessment scenarios should consider the consequences of simultaneous failure of multiple safeguards. Even brief exposure to very low doses of H₂S can be fatal. Although a limit of 10 ppm (parts per million) has been set for occupational settings, exposures as low as 1 ppm can cause neurological damage and can exacerbate asthma and reactive airway disease. Some agencies (e.g. The City of Hermosa Beach approval of MacPherson Oil’s extraction operations) have set limits of 40 ppm of H₂S in extracted oil. Any well with oil showing higher levels of H₂S must be capped and sealed. [may be addressed in CEQA Human Health, Safety, Hazardous Materials Section]
- 1.5. Releases of methane creating potential for explosions. Explosive concentrations are most likely to build up in subterranean basements and parking structures. While there are few structures in the portion of the oilfield where expanded petroleum extraction is proposed, drilling and other oilfield operations may facilitate increased migration and leakage of methane through ground fissures and faults and through old shafts and wellheads where it can then build up to explosive concentrations in buildings. Such off-site migration and release of methane is believed to be responsible for the 1985 Ross Store explosion in the nearby Fairfax district of Los Angeles (Chilingar and Endres, 2005). The Baldwin Hills (Inglewood Oilfield) is rife with old wellshafts making such offsite migration a distinct possibility:

“There are hundreds of abandoned wells in the Baldwin Hills area adjacent to the park, many of which predate recent decades when abandoned wells have been

required to be sealed under State supervision. Experience elsewhere, such as the Los Angeles, Salt Lake, and Playa Vista oil field areas, indicate the possibility of hydrocarbon (gas) seeps for those early vintage wells.” (Hahn SRA EIR, Chapter 2, page 12)

Even if methane is “safely” vented to the atmosphere, it is also a potent greenhouse gas. Direct health effects linked to such greenhouse effects are negligible in isolation, but cumulatively contribute to the global burden of greenhouse gases with far reaching effects on the physical environment and human health. *[may be addressed in Air Quality, Human Health, Safety, Hazardous Materials, and Cumulative Impacts (greenhouse gas emissions)]*

2. Water-borne

2.1. Surface and sub-surface water may become contaminated with drilling muds and petroleum constituents. Run-off, particularly during rainy periods, may carry contaminants to waterways and beaches, as can subterranean migration through naturally occurring fissures and abandoned oil wells. Although groundwater in the area is not currently used for any municipal water supply, contamination of ground water resources and domestic wells has occurred in other locations as a result of oil and gas exploration and production activities. Waste water and steam pumped back into wells in order to increase oil well output can migrate offsite, contaminating both ground water and surface water, particularly in a highly fissured area such as the Baldwin Hills. . *[CEQA Water Quality Section]*

3. Noise

3.1. Noise from construction equipment used for site preparation and drill rigs will be periodic, but could be a significant impact. (NB: drilling operations typically will run 24/7 for one to several weeks). This noise may deter recreational use of adjacent land and could lead to sleep disturbance of nearby residents. Since drilling sites in the Baldwin Hills will typically be at higher elevations than most residences, noise may travel further than if at the same elevation with more noise buffering from vegetation, walls and buildings. *[may be addressed in CEQA Noise Section]*

4. Traffic

4.1. Increased traffic from site operation and maintenance vehicles and possible transport of oil and by-products off site will likely impair walkability and bikeability along the few roads accessing the area. Access to recreation facilities in the Baldwin Hills is already problematic for people living in the area. The health impacts of impaired walkability and bikeability include increase traffic injuries to pedestrians and bicyclists and decreased physical activity in the affected population. Traffic related to oilfield operations is also likely to be a significant generator of air emissions *[may be addressed in CEQA Traffic Section, also CEQA Land use Section]*

5. Greenspace and resources for physical activity

5.1. Expanded oilfield operations may preclude or deter recreational activities on land that is currently dedicated for recreational use, as well as on land that might be converted to such use in the near future. *[may be addressed in CEQA Land use and Aesthetics Sections]*

“The Baldwin Hills area is one of the most park-poor in California, with barely one acre of park space per 1,000 people, it falls far below the nationally recommended standard of six to ten acres per 1000 people.” (*Quote from Hahn SRA EIR Chapter 2, page 40*)

While the proposed oilfield operations are on private land, they can impinge on recreational use in several ways. First, having active oilfield operations adjacent to public lands designated for recreational use can preclude their development as park space, due to real or perceived hazards posed by those operations. Second, oilfield operations can negatively impact visual, olfactory and noise aesthetics, making an area unattractive for potential users. Perceptions play a critical role in park utilization (Cohen et al, 2007; Mowen et al, 2007). If it looks and smells like an oil field, then it will be perceived as one, and it will not be seen as a recreational resource for families in this park-poor area.

“Industrial operations in the central part of the site have produced considerable alteration of the natural topography. Areas graded for roadways and oil and gas extraction operations are characterized by steep and often unvegetated earthen slopes.” (*Quote from Hahn SRA EIR Chapter 2, page 60*)

The derricks, pumps and disturbed soil and vegetation of the current oilfield operations make visits unappealing. Nuisance odors, especially, from H₂S and fugitive hydrocarbon vapors, even if they are at sub-toxic levels, can provoke concern among potential visitors. For many families with children with a history of asthma or related conditions (which are disproportionately high among area residents), perceived risk of respiratory attack due to exposure to airborne pollutants is likely to outweigh perceived benefits of utilizing recreational facilities adjacent to oilfield operations.

The potential health benefits of access to recreational areas and greenspace are many. According to a recent study from the Los Angeles County Department of Public Health:

“Many children, especially those living in lower income neighborhoods, lack access to safe places to play. Parents living in lower income households are less likely to report their children having a safe place to play. In the City of Los Angeles, only 30% of residents are estimated to live within a quarter mile of a park. Having access to recreation areas such as parks is associated with increased levels of physical activity, and residential proximity is one of the key factors related to park use.”

Preventing Childhood Obesity: The need to create healthier places, October, 2007 (p. 5)
Los Angeles County Department of Public Health

Studies in Britain (Mitchell and Popham, 2007) and the Netherlands (de Vries et al., 2003), have demonstrated an association between proximity of greenspace and general health status, even after taking into account economic and demographic factors that affect health.

Research in the U.S. has shown that access to greenspace can reduce the manifestation of symptoms among children with attention-deficit disorder (Faber Taylor, Sullivan and Kuo, 2001). A study of low income, “minority” residents in Los Angeles found that residents living within one mile of a park had higher rates of park usage and physical activity than those who lived further away. Although not all studies have shown such an association, this may be due to a methodological failure to take into account the types of facilities available. A multi-city study on the East Coast found that greater density of recreational facilities was associated with increased physical activity, especially for low-income residents (Diez Roux et al., 2007).

Impacts of oilfield development on recreational resources may also be considered an issue of “environmental justice.” California law defines environmental justice as “the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies” (Cal. Gov. Code § 65040.12). Given the existing inequities in the distribution of recreational resources and the deficit in such resources in the communities surrounding the Baldwin Hills oilfield, any action that limits the fullest development and utilization of recreational resources in this area could be seen as inimical to environmental justice. (See California, Governor’s Office of Planning and Research, 2003; Garcia and White, 2007)

6. *Geologic events*

6.1. The Baldwin Hills area, with unstable natural geology of poorly consolidated rocks, steep topography, and a major fault zone, compounded by subsidence and fluid injection from decades of oilfield operations, has a long history of significant, sometimes catastrophic ground movement. As summarized in the EIR of the General Plan for the adjacent Kenneth Hahn State Recreation Area:

“The park has a well-documented history of landslide and erosion problems that are associated with their unstable soil strata and the destabilizing effects of rainfall. Slope failures are manifested by shallow slides and wet season debris flows especially on slopes, which have been artificially oversteepened by grading. Combined with these properties, the geologically young relief of several hundred feet assures chronic slope instability on the exterior rim and in the many gullies that dissect the terrain of the park. This is exhibited in the form of landslides and debris flows which typically occur every three to five years, especially on the outer rim of the Baldwin Hills.” *(from Hahn SRA, EIR Chapter 2, page 13)*

Expanded oilfield operations, including extraction and fluid injection as proposed, could exacerbate ground movement (e.g. subsidence, liquefaction, lubrication of slip zones, etc.) that results in landslides and local seismic events with potential loss of life and property. Extensive discussion of these issues can be found in Chilingar and Endres, 2005. Dr. Endres has also expressed concern in hearings specifically on expanded oilfield operations in the Baldwin Hills (see Los Angeles County Board of Supervisor minutes, 2007). *[addressed in CEQA Geological Resources Section]*

7. *Greenhouse gas emissions*

Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.

(California Global Warming Solutions Act of 2006 (AB 32). Codified in California Health and Safety Code Section 38501).

Besides downstream release of carbon dioxide and other greenhouse gases from the use of petroleum products, oilfield operations may also increase greenhouse gas emissions directly from the oilfield and production facilities. Among these gases, methane is an especially potent greenhouse gas. While the direct effects of these gases on human health via global warming are less than significant when viewed in isolation, cumulatively global warming effects are likely to substantially influence human health and well being.

Pursuant to AB 32 and SB 97, environmental documents prepared in compliance with CEQA need to assess proposals' impacts on global warming/greenhouse emissions. For a proposal such as expanded oilfield operations, at a minimum environmental documents should include estimates of greenhouse gas emissions and plans for mitigation of potential emissions. Failure to adequately address greenhouse gas emissions for such a project may provide grounds for CEQA lawsuits. (See *CEQA Guidelines and Greenhouse Gases at <http://opr.ca.gov/index.php?a=ceqa/index.html>; and the San Bernardino-AG Settlement Agreement at http://opr.ca.gov/ceqa/pdfs/San_Bernardino_AG_settlement_agreement.pdf*).

A note on mitigation of potential health impacts

Expanded oilfield operations could have significant health impacts through a number of different pathways. Mitigation measures could reduce some of these potential impacts, but several issues need to be considered:

1. Health risks of oil field operations in urban areas pose special risks due to reduced safety margins. Technical mitigation measures (i.e. engineering controls) cannot be assumed to be failsafe. In an urban environment where people's homes and daily activities are in close proximity to oil field operations safety margins may be significantly less than in an area far from population centers. Secondary mitigation measures and procedural controls are necessary for severe hazards such as accidental release of H₂S.
2. In some cases mitigation measures can introduce new hazards. For instance, an H₂S treatment plant that was put in place to remove H₂S in pipelines and storage tanks, could great a new, potentially catastrophic hazard, if such a facility were to fail. To limit the consequences of such potential failure, it may be necessary to cap any well testing above a certain level of H₂S (see MacPherson proposal for Hermosa Beach). Large buffer zones could reduce potential exposure to airborne toxics, but they would also preclude other land-uses and perhaps even encourage more extensive oilfield operations than would otherwise occur.

Documents Reviewed:

A. Environmental Reviews of projects in the Baldwin Hills/Inglewood Oilfield

1. Notice of Preparation of an Environmental Impact Report for the Baldwin Hills Community Standards District (2007)

Project Summary: Establish standards and requirements for oilfield activities in the Baldwin Hills (aka Inglewood Oilfield), in an unincorporated area in West Los Angeles County, over the next 10-20 years and could include up to 1065 new oil wells.

Agency/Document Authority: Los Angeles County Department of Regional Planning

Health Pathways: Air, hazardous materials (H₂S), water, land-use (recreational resources)

Doc. Source: <http://planning.lacounty.gov/doc/baldwin/NoticeofPrep.pdf>

2. Inglewood Oil Field PXP Well Drilling Program In Los Angeles County For 2007 (Initial Study/Negative Declaration) NB: Proposal withdrawn as of June 14, 2007

Project Summary: Proposal to drill twenty-four (24) oil wells in the Inglewood oilfield from a total of thirteen (13) well pads. Total time required to complete drilling is anticipated to be 29 to 51 weeks. After the drilling rig moves off it takes approximately 7-10 additional days to complete a well and connect to existing production facilities.

Agency/Document Authority: State Division of Oil, Gas and Geothermal Resources

Health Pathways: Environmental impact pathways that could affect health, including air emissions, noise, hazardous materials and recreational resources are discussed, but all environmental impacts are asserted to be less than significant. See comment letter from SCAQMD regarding factual inaccuracies and lack of quantitative substantiation of assertions. In addition to issues raised by AQMD, assessment of other impact areas is rather cursory and contains inaccuracies (e.g. oilfield gases referred to as “fumes” and deemed to be non-hazardous. Throughout the document additional impacts from the project are deemed non-significant by virtue of fact that extensive drilling and environmental degradation have already taken place throughout the 82 years of oilfield operations in the Baldwin Hills.

Doc. Source:

<http://digitalarchive.oclc.org/da/ViewObject.jsp?objid=0000063057&reqid=44524>

3. Comment letter from SCAQMD on the Initial Study/Negative Declaration for the proposed Inglewood Oil Field PXP Well Drilling Program In Los Angeles County For 2007 (January 5, 2007) NB: header on the letter are misdated January 5, 2006

Project Summary: (see above)

Agency/Document Authority: South Coast Air Quality Management District

Health Pathways: Air emissions, including hydrocarbons and hydrogen sulfide detected offsite along La Cienega Boulevard

Doc. Source: <http://www.aqmd.gov/CEQA/igr/2007/jan/1212-05.pdf>

4. West LA College Expansion EIR (2003)

Project Summary: proposed Facilities Master Plan (Master Plan) to guide campus development through 2022 and to accommodate a projected enrollment increases.

Agency/Document Authority: Los Angeles Community College District and West Los Angeles College

Health Pathways: Transient air and noise impacts during construction phase. Lighting affecting nearby residences. Concern about encountering hazardous waste during soil excavation.

Doc. Source: <http://www.wlac.edu/DEIR/>

4. Kenneth Hahn SRA Recirculated General Plan Amendment and EIR (2002)

Project Summary: General plan portraying “the desired resource conditions of the [Kenneth Hahn State Recreation Area] and desired visitor experience, and to provide goals and guidelines that will direct future management of efforts toward achieving those desires.

Agency/Document Authority: California Department of Parks and Recreation

Health Pathways: Recreation/physical activity, greenspace

Doc. Source: http://www.parks.ca.gov/pages/21299/files/ar_516_954-1.pdf

5. Baldwin Hills Energy Facility No.1 (01-EP-11) Staff Assessment for Emergency Permit (Baldwin Hills “Peakers”/Power Generation) (2001)

Project Summary: Construction of emergency peak electricity generators in Baldwin Hills

Agency/Document Authority: California Energy Commission

Health Pathways: Exposure to various pollutants via releases into air and water, seismicity, liquefaction, slope instability, environmental justice issues related to air releases

Doc. Source: <http://www.energy.ca.gov/sitingcases/peakers/baldwin/documents/index.html>

B. EIRs and other assessments for projects at other sites involving oil drilling, etc.

6. Long Beach Sports Park DEIR (Long Beach) (2004)

Project Summary: Proposed sports park on abandoned oil field and storage site

Agency/Document Authority: City of Long Beach

Health Pathways: Hazardous materials, recreational resources

Doc. Source: http://www.longbeach.gov/cd/project_development/sports_park.asp

7. Staff Report: Windward Associates (MacPherson Oil Company) Proposal (permit #E-96-28) (Hermosa Beach) (1998)

Project Summary: Drilling 30 new wells, construction of on-site storage facilities and pipeline,

Agency/Document Authority: California Coastal Commission

Health Pathways: H₂S production and on-site treatment, seismic activity from subsidence, oil spills, degraded visual aesthetics, loss of public access and loss of open space, release of lead from pre-existing soil contamination.

Doc. Source: <http://www.coastal.ca.gov/pdf/e9628.pdf>

Note 1: This project was the subject of a major court case. See http://www.ceres.ca.gov/ceqa/cases/2001/Hermosa_Beach-2001.html

Note 2: Note Hermosa Beach ordinance requiring sealing of any well with H₂S levels exceeding 40 ppm.

8. Holly-Seacliff Specific Plan FEIR (YEAR)

Project Summary: Specific plan (mostly for new residences) in and adjacent to active oil fields.

Agency/Document Authority: City of Huntington Beach Planning Dept.

Health Pathways: Noise, Noxious odors, precluding other uses, traffic, heavy metal contamination from drilling fluids, air releases of methane, H₂S, VOCs, degradation of aesthetics (esp. from on-site production facilities)

Doc. Source: <http://www.surfcity-hb.org/files/users/planning/HSSP98%20Revised%20VI.pdf>

9. North Park Specific Plan DEIR (2001)

Project Summary: Clean-up of old oil field and facilities for alternative uses

Agency/Document Authority: City of Moorpark Planning Dept.

Health Pathways: Airborne exposure to constituents of crude oil mostly rated as not significant, asbestos exposure to workers demolishing old equipment and buildings, fire hazards, valley fever from disturbance of soil, exposure to unknown hazardous substances in soil from previous contamination

Doc. Source: <http://www.ci.moorpark.ca.us/EIR/Section%201-071003.pdf>

10. Beverly Hills High School Phase II Environmental Site Assessment (YEAR)

Project Summary: Site assessment of possible human health risks due to chemical exposure on the site (oil well on school property)

Agency/Document Authority: Beverly Hills School District

Health Pathways: Isolated pockets of methane and H₂S (at below hazardous levels), levels of arsenic in soil higher than background.

Doc. Source: <http://www.beverlyhills.k12.ca.us/environment/>

11. Remedial Action Plan for the Mandalay Bay Site (Oxnard) (YEAR)

Project Summary: Clean-up of an oil field waste disposal facility

Agency/Document Authority: California Department of Toxic Substance Control

Health Pathways: Potential exposure to total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), metals, semi volatile organic compounds (SVOCs), organochlorine pesticides (OCPs), and/or dioxins mixed in sludge, soil and/or groundwater at the Site.

Doc. Source: http://www.dtsc.ca.gov/SiteCleanup/Projects/upload/Mandalay_FS_dRAP.pdf

Comments/Responses at:

http://www.envirostor.dtsc.ca.gov/public/community_involvement/5604886710/MandalayResptoCmtspubliccopy.pdf

12. Venoco Ellwood Marine Terminal Lease Renewal Project EIR (2006)

Project Summary: Ten-year extension of lease of state lands to allow Venoco to continue operating the offshore Ellwood Marine Terminal (EMT), a crude oil marine loading terminal and associated storage facility in Santa Barbara County.

Agency/Document Authority: State Lands Commission

Health Pathways: Discussion of potential exposure to toxic substances, explosive and fire risks associated with accidental spills and building in areas with soil contamination from previous oil operations, nuisance odor (H₂S) releases from operations and natural seeps, potential excess cancer risk from air emissions (found to be below threshold), extensive discussion of procedures for minimizing releases of H₂S and criteria pollutants (esp. NO_x) produced by machinery (marine vessels and trucks). Potential conflicts with recreational uses through accidental spills are recognized and various mitigation measures are proposed, however mitigation is not proposed for land use conflicts arising from on-going normal oil operations.

Doc. Source:

http://www.slc.ca.gov/Division_Pages/DEPM/DEPM_Programs_and_Reports/Venoco_Ellwood_DEIR/Venoco_Ellwood_DEIR.html

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Study/Negative Declaration for the 2007 PXP Baldwin Hills Drilling Plan (see citation #2 above).

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