Initial Study/Mitigated Negative Declaration

Division of Oil, Gas, and Geothermal Resources

PROJECT TITLE
McDonald Anticline Project

LEAD AGENCY
Department of Conservation
Division of Oil, Gas, and Geothermal Resources (Division)
801 K Street, MS 18-05
Sacramento, CA 95814-3530
Contact: Adele Lagomarsino
(916) 323-2258

APPLICANT
E&B Natural Resources Management Corporation
1600 Norris Road
Bakersfield, CA 93308
Contact: Michael Finch
661-679-1700

PROJECT DESCRIPTION AND LOCATION

E&B Natural Resources Management Corporation (E&B) is proposing to the Division of Oil, Gas, and Geothermal Resources (Division) the McDonald Anticline Project, a project to drill ten (10) oil wells to depths not exceeding 1,400 feet subsurface. The proposed project is located in the McDonald Anticline Oil Field in Section 20, Township 28 South, Range 20 East MDBM of the U.S. Geological Survey (USGS) Carneros Rocks 7.5-minute quadrangle map. If economical quantities of oil are discovered in a well, E&B would install the necessary production equipment on that well site as described in this Project Description. No hydraulic fracturing is proposed as part of this project. The surface locations for the proposed Theta 252C-20, Theta 253A-20, Theta 253D-20, Theta 262C-20 and Theta 264C-20 wells would be on land owned by Aera Energy LLC and the surface locations for the proposed E&B Fee #271B-20, E&B Fee #271D-20, E&B Fee #281C-20, E&B Fee #281D-20 and E&B Fee #282D-20 wells would be on land owned by Theta Oil and Land Company. The proposed project is located 12 miles southwest of Lost Hills in Kern County, California (Figure 1). Specific locations of wells are listed in Table 1 and surface disturbance for each well are listed in Table 2.

The areas surrounding the proposed project sites consist of natural lands/non-native annual grasslands used for cattle grazing. Land uses within and adjacent to the proposed project sites include cattle grazing and oil and gas drilling and production activities. State Highway 33 provides the primary access to the project area. From State Highway 33, the project sites are accessed on existing private roads. Two of the proposed well sites (Theta 253A-20 and Theta 262C-20) would require a short extension of the existing access road to access the project site.

The proposed project sites are located on natural lands/non-native annual grassland. As shown in Figure 2: McDonald Anticline Project Location Map, dirt ranch access roads are located throughout the area and

would be used to access the Theta 252C-20, Theta 253D-20, Theta 264C-20, E&B Fee #271B-20, E&B Fee #271D-20, E&B Fee #281C-20, E&B Fee #281D-20 and E&B Fee #282D-20. Access to the Theta 253A-20 site would require constructing a new access road, 20 feet by 315 feet (6,300 square feet or .14 acres), to extend access from an existing dirt road located east of the Theta 253A-20 project site. Access to the Theta 262C-20 site would require constructing a new access road, 20 feet by 75 feet (1,500 square feet or 0.03 acre) to extend access from an existing dirt road located east of the Theta 262C-20 project site. The proposed project would result in 5.91 acres of new surface disturbance to natural lands/non-native annual grassland as detailed in Table 2: Surface Disturbance.

Table 1
Site Specific Location

Well Name	Latitude	Longitude
Theta 252C-20	35.481181	-119.840213
Theta 253A-20	35.479947	-119.839880
Theta 253D-20	35.479100	-119.839569
Theta 262C-20	35.479656	-119.838758
Theta 264C-20	35.477732	-119.838759
E&B Fee #271B-20	35.484062	-119.835682
E&B Fee #271D-20	35.482791	-119.835422
E&B Fee #281C-20	35.483146	-119.833928
E&B Fee #281D-20	35.483292	-119.832984
E&B Fee #282D-20	35.481546	-119.833060

Table 2
Surface Disturbance

Well Name	Site Size	New Access Road	Total Acres of Land Disturbed
Theta 252C-20	85 feet by 210 feet	0	0.41 Acres
Theta 253A-20	150 feet by 160 feet	20 feet by 315 feet	0.55 Acres
Theta 253D-20	150 feet by 160 feet	0	0.55 Acres
Theta 262C-20	90 feet by 210 feet	20 feet by 75 feet	0.43 Acres
Theta 264C-20	120 feet by 265 feet	0	0.73 Acres
E&B Fee #271B-20	105 feet by 240 feet	0	0.58 Acres
E&B Fee #271D-20	100 feet by 200 feet	0	0.46 Acres
E&B Fee #281C-20	150 feet by 170 feet	0	0.59 Acres
E&B Fee #281D-20	150 feet by 160 feet	0	0.55 Acres
E&B Fee #282D-20	125 feet by 310 feet	0	0.89 Acres
Total Surface Disturbance		**0.17 Acres**	**5.74 Acres**

The objective of the proposed project is to locate untapped oil sources with potential for development. E&B willfully comply with all application of federal, state, regional and local laws, regulations and requirements.

Table 3
Summary of Responsible Agencies

Agency	Permits and Other Approvals	Environmental Review/Consultation Requirements
Division of Oil, Gas and Geothermal Resources (DOGGR)	▪ Approves environmental documentation ▪ Application for well drilling permits	▪ Lead agency ▪ Certifies environmental documentation
Kern County	▪	▪ Responsible agency ▪ Reviews Draft Initial Study/Mitigated Negative Declaration
San Joaquin Valley Air Pollution Control District (SJVAPCD)	▪ SJVAPCD Regulation VIII Fugitive Dust Rules (Rule 8011, 8021, 8031, 8061, and 8071).	▪ Responsible agency ▪ Consulted during process ▪ Reviews Draft Initial Study/Mitigated Negative Declaration
California Regional Water Quality Control Board (RWQCB)	▪ Notice of Intent - Construction General Permit and 401 Water Quality Certification if needed	▪ Responsible agency ▪ Reviews Draft Initial Study/Mitigated Negative Declaration
California Department of Fish and Wildlife (CDFW)	▪ Burrowing Owl Management Plan if needed ▪ Section 2081 State Incidental Take Permit	▪ Responsible agency/Trustee agency ▪ Consulted during process Reviews Draft Initial Study/Mitigated Negative Declaration
US Fish and Wildlife Service (USFWS)	▪ Incidental Take permit and/or Habitat Conservation Plan (HCP)	▪ Responsible agency ▪ Reviews Draft Initial Study/Mitigated Negative Declaration

E&B anticipates commencing project activities in September of 2013 and completing all drilling activities by June of 2014. All wells will be drilled within this time period.

Site preparation activities for the proposed project sites would include clearing, grading, and compaction of soil. Once a proposed project site has been cleared, it would be graded, watered and compacted to establish a level and solid foundation for the drilling rig. Written notification shall be given to the San Joaquin Valley Air Pollution Control District (SJVAPCD) at least 48 hours prior to beginning earthmoving operations. Typical equipment used for this project (in and beyond the site preparation phase) may include diesel drill rig, bulldozer, grader, loader, compacter, heavy-duty trucks, baker tanks, air compressors, pumps, and generators. Personnel will be notified prior to ground disturbing activities of the possibility of buried prehistoric or historic cultural deposits. Earthmoving activities at any of the proposed project sites will not exceed either the project limit of 5.0 acres nor involve movement, depositing, or relocation of more than 2,500 cubic yards per day of bulk materials on any three or more days.

Unless shallow ground water is encountered, a reserve pit will be excavated during site preparation for storage and handling of drilling mud and cuttings during the drilling process within the boundaries the proposed project site. If shallow ground water is encountered, drilling mud and cuttings shall be contained

in above ground tanks. Soil will be stockpiled on site and used as backfill upon completion of drilling. If constructed, the reserve pit will be 75 feet long by 25 feet wide by six (6) feet deep. The reserve pit will hold 84,150 gallons with a two-foot freeboard. Reserve pits would be constructed by mechanical compaction. Compaction of the surface, combined with the deposition of bentonite drilling mud during drilling operations, would give the pit a bentonite seal with a maximum permeability of approximately 10^{-6} cm/sec (International Journal of the Physical Sciences Vol. 5(11) pp. 1647-1659, 18 Sept 2012). Groundwater in the project area occurs at a depth of approximately 135 to 150 below ground surface (California Department of Water Resources Water Data Library 2013). Based on evaluation of subsurface conditions by the Division, the McDonald Anticline Field contains no fresh water. Completing the site preparation and proposed access road construction would require approximately one (1) day for each site.

Drilling equipment, including a 100-foot high drilling rig (double drill rig, or equivalent) will be mobilized to the site and temporary facilities, equipment and materials necessary for the drilling operation will be set up and stored on site (i.e., drilling mud supplies, water, drilling materials and casing, crew support trailers, pumps and piping, portable generators, fuels and lubricants, etc.). During rig mobilization/demobilization, when drilling equipment is moved on and off site, the maximum number of daily vehicle trips will be 58 one-way trips. The 58 vehicle one way trips will include 38 heavy truck/semi one way trips, 16 car / pickup truck one way trips, two (2) crane and two (2) water truck one way trips. Night lighting will be required and required only during the drilling phase. However, to the greatest extent possible night lighting will be directed inward and down to minimize off site impacts without compromising safety.

The drilling of each well will require the use of approximately 500 barrels of water. Therefore, approximately 21,000 gallons of water would be used during the drilling phase of each well.

All hazardous materials such as diesel fuel will be stored according to applicable federal, state and local regulations. Portable tanks and mud pits will be used for mixing and storing drilling fluids. All fluids will be disposed of in accordance with the requirements of the Central Valley Regional Water Quality Control Board (RWQCB). If a reserve pit/sump is used, the use and closure of the reserve pit/sump will be handled in accordance with Title 27, CCR, Section 20090(g), and Regional Board Waiver Resolution No. R5-2008-0182. The solids that accumulate in the mud pits/tanks will be reused if demonstrated to be nonhazardous. If any wastes test positive for hazardous material they will be disposed of at the Clean Harbors Buttonwillow, LLC, located at 2500 West Lokern Road, Buttonwillow, CA, 93206 with a permitted capacity of 10,482 tons/day. The Clean Harbors Buttonwillow facility is located approximately 13.8 miles to the southeast of the proposed project sites.

Surface casing would be set, cemented, and blowout prevention equipment installed at each wellhead and tested. The amount of surface casing used depends upon factors such as expected well pressures, the depth of fresh water, and the competence of the strata in which the well casing will be cemented. Blowout prevention equipment is bolted to the surface casing. All successive drilling occurs through the blowout prevention equipment, which can be operated to control well pressures at any time. Blowout prevention equipment will be regulated by the Division. Division engineers will be notified for required tests and other operations (blowout prevention, surface casing integrity).

Well casing is designed to protect underground and surface waters suitable for irrigation or domestic purposes. The Division's well construction standards have the fundamental purpose to ensure zonal isolation. Zonal isolation means that oil coming up a well from the productive, underground geologic zone

will not escape the well and migrate into other geologic zones, including zones that might contain fresh water. Zonal isolation also means that the fluids that are put down a well for any purpose will stay in that zone and not migrate to another zone. To achieve zonal isolation, Division regulations require that a cement barrier be placed between the well and surrounding geologic strata or stratum. The cement bonds to the surrounding rock and well casing and forms a barrier against fluid migration. Cement barriers must meet certain standards for strength and integrity. If these cement barriers do not meet the standards, the Division requires the oil operator to remediate the cement barrier. Metal casings, which can be several layers depending on the depth of a well, also separate the fluids going up and down a well bore from the surrounding geology. If the integrity of a well is compromised by ground movement or other mechanisms, the well operator must remediate the well to ensure zonal isolation. Well casing standards are prescribed in Title 14 CCR, Division 2, Chapter 4, Subchapter 1, Article 3, Sections 1722.2 – 1722.4. Groundwater in the project area occurs at a depth of approximately 135 to 150 below ground surface. Based on evaluation of subsurface conditions by the Division, the McDonald Anticline Field contains no fresh water. Blowout prevention equipment is regulated by the Division. Sufficient weighted drilling fluid would be used to prevent any uncontrolled flow from each well and additional quantities of drilling fluid would be available at each site (Title 14, CCR Section 1722.6). Drilling would continue until target depth is reached. Equipment, personnel and supply deliveries would continue through the course of the drilling program.

Once target depth is reached for a given well, the well will be fully evaluated and either completed and produced or plugged and abandoned. E&B estimates that approximately three (3) days would be required for drilling and approximately two (2) days would be required for testing and completion operations for each of the proposed wells.

Equipment, personnel and supply deliveries would continue through the course of the drilling program. Drilling activities would operate 24 hours per day. Approximately 7 to 10 personnel would be on site at any given time during the drilling operations.

If economic quantities of oil are discovered, a given well will be completed and production equipment including a well head and API 10 hp electronic motor pumping unit will be installed on site. Flowlines will be installed aboveground adjacent to the existing and proposed access roads. The proposed flowlines will connect the proposed wells to the existing E&B production facility located west of the E&B Fee #271B-20, E&B Fee #271D-20, E&B Fee #281C-20, E&B Fee #281D-20 and E&B Fee #282D-20 project sites and east of the Theta 252C-20, Theta253A-20, Theta253D-20, Theta 262C-20 and Theta264C-20 project sites. In the production phase, oil and produced water from each well would be transported together to the existing E&B production facility through a combination of proposed and existing flow lines. The oil and produced water would be separated, held in existing tanks at the production facility and separated transported offsite. The E&B production facility is located within the McDonald Anticline Oil Field. E&B currently operates 8 wells within the McDonald Anticline Oil Field, in which 6 wells are active and 2 wells are classified as new wells. The proposed flowlines will measure approximately 6,167 feet in length (see Figure 2). E&B proposes to paint all production equipment in camouflage or an earthen tone to blend in with the environment and to prevent glare. E&B estimates that approximately two (2) days would be required for flow line installation activities for each well. E&B anticipates 15 barrels of oil and 15 barrels of production water will be produced daily from each well. The oil will be transported from the E&B production facility by truck and sold to Conoco Phillips Company located at 6601 Franco Western, McKittrick, California 93251, 15 miles to the southeast of the proposed project sites. Accordingly, assuming all ten (10) wells go into production, E&B estimates that 11 truck trips per week will be required

to transport the oil to Conoco Phillips Company. The production water will be transported offsite from the existing E&B Production Facility by truck to the Central Valley Waste Water LLC Class II Disposal Well (SWCC-1) in the South Belridge Oil Field This SWCC-1 disposal well operates under a permit issued by Kern County and has been operating since March 2011. The SWCC-1 disposal well is located 4 miles to the east of the proposed project sites. Accordingly, assuming all ten (10) wells go into production, E&B estimates that 11 truck trips per week will be required to transport the production water from the existing E&B Production Facility to the SWCC-1 disposal well. Production site will be visited daily, which will result in a further daily pick-up truck round-trip.

Once a well stops producing, it will be plugged and abandoned in accordance with CCR Sections 1723 – 1723.8. In this case, a Notice of Intention to abandon the well will be submitted to the Division for review and approval. During a typical well abandonment, recoverable casing will be salvaged from the well and the hole will be plugged with cement. The wellhead (and any other equipment) will be removed, the casing cut off 6 feet below ground surface, capped with a welded plate and the cellar backfilled. This process will be completed in three (3) days. The land contours of each well site would be re-established to near grade conditions as present at the time of project initiation. After all equipment is removed, the site would be restored to its condition prior to construction of the well pad. Table 4 lists the estimated days it would take to complete each phase of the project at each site.

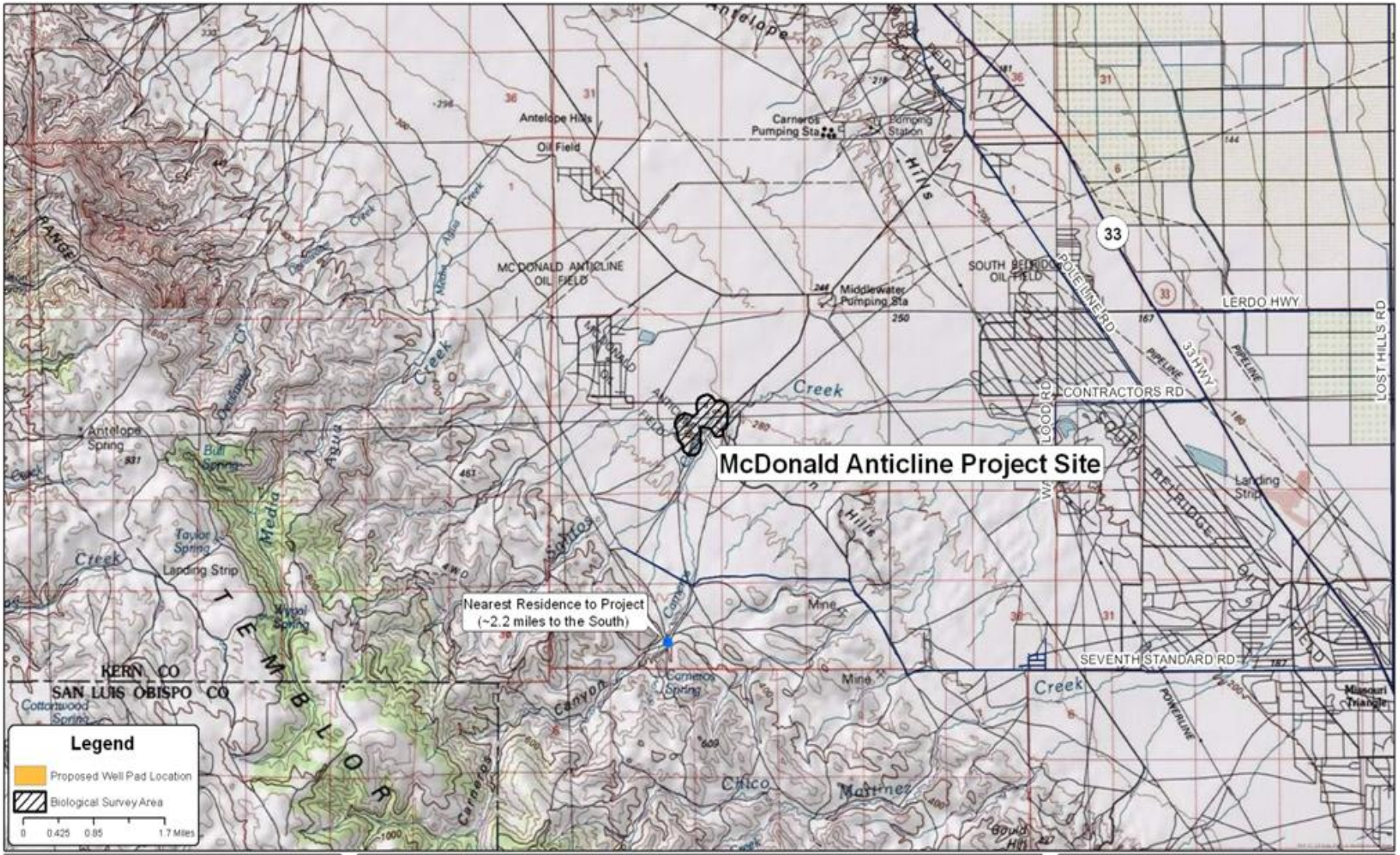
Table 4
Estimated Days to Complete Activity at Each Site

Activity	Days
Site Preparation	1
Drilling	3
Testing and Completion	2
Installation of Production Equipment	2
Plugging and Abandonment	3
Total days per site	**11**

MITIGATION MONITORING AND REPORTING PLAN

The proposed project incorporates Mitigation Measures designed to avoid or reduce environmental impacts to less-than-significant levels. Mitigation Measures are fully described in the following sections and are included in the Mitigation Monitoring and Reporting Plan (Attachment A).

Photographs representative of the proposed project sites are attached.



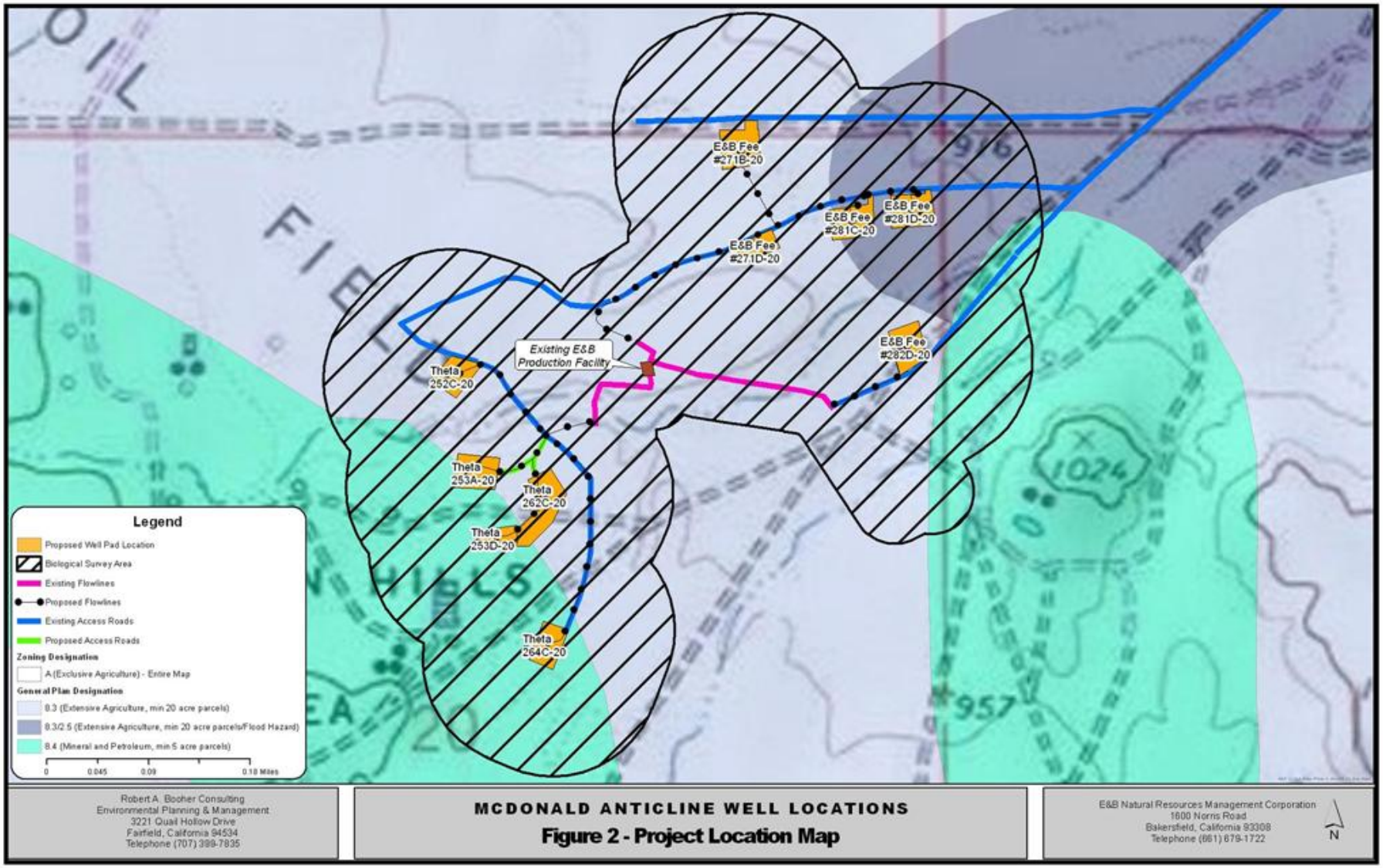
Robert A. Booher Consulting
Environmental Planning & Management
3221 Quail Hollow Drive
Fairfield, California 94534
Telephone (707) 399-7835

MCDONALD ANTICLINE WELL LOCATIONS

Figure 1 - Project Vicinity Map

E&B Natural Resources Management Corporation
1600 Norris Road
Bakersfield, California 93308
Telephone (661) 679-1722

N


E&B Fee #271B-20
E&B Fee #281C-20
E&B Fee #281D-20
E&B Fee #271D-20
E&B Fee #282D-20
Existing E&B Production Facility
Theta 252C-20
Theta 253A-20
Theta 262C-20
Theta 253D-20
Theta 264C-20
Legend
Proposed Well Pad Location
Biological Survey Area
Existing Flowlines
Proposed Flowlines
Existing Access Roads
Proposed Access Roads
Zoning Designation
A (Exclusive Agriculture) - Entire Map
General Plan Designation
8.3 (Extensive Agriculture, min 20 acre parcels)
8.3/2.5 (Extensive Agriculture, min 20 acre parcels/Flood Hazard)
8.4 (Mineral and Petroleum, min 5 acre parcels)
0 0.045 0.09 0.18 Miles
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MCDONALD ANTICLINE WELL LOCATIONS
Figure 2 - Project Location Map
E&B Natural Resources Management Corporation
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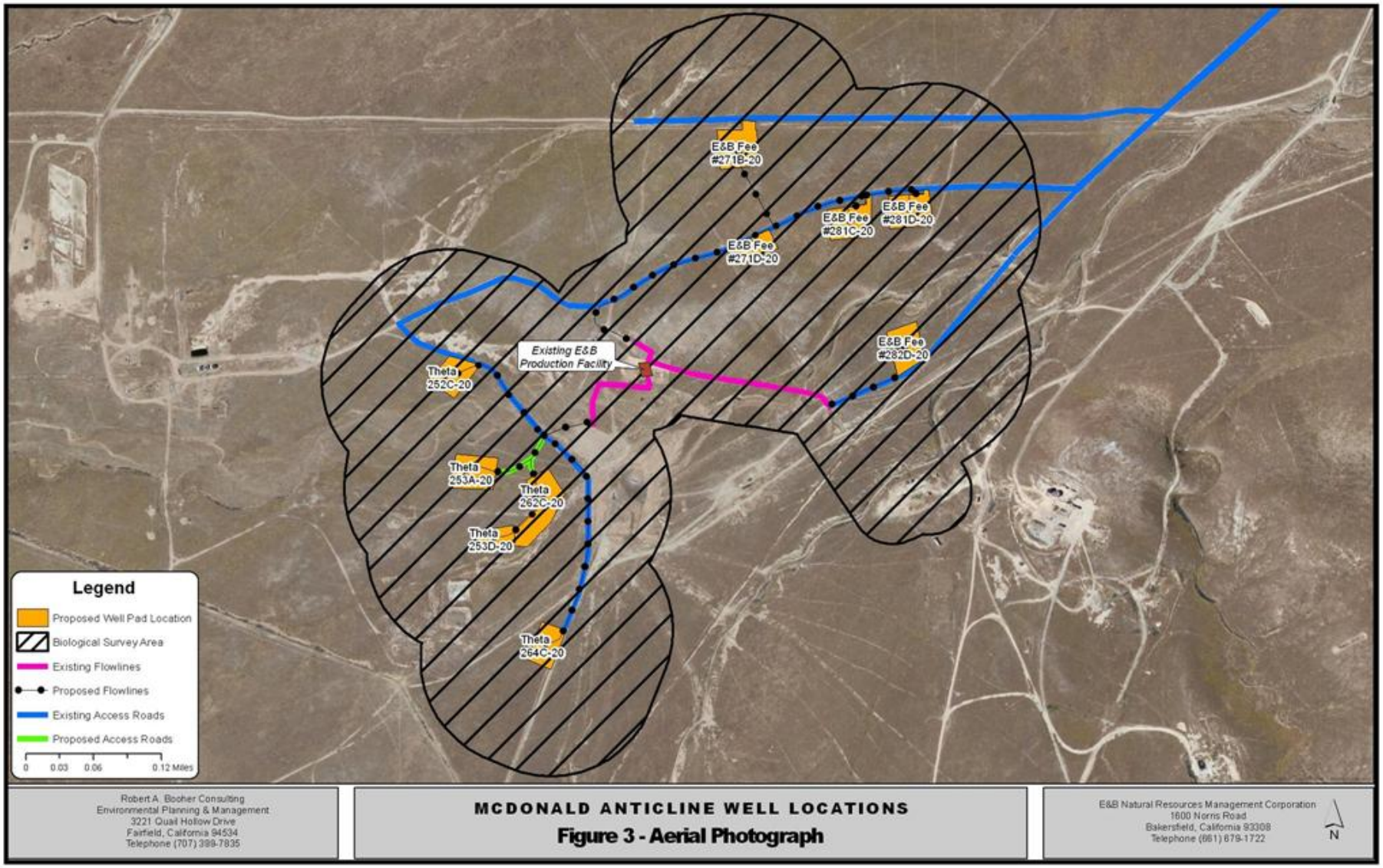

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MCDONALD ANTICLINE WELL LOCATIONS

Figure 3 - Aerial Photograph

E&B Natural Resources Management Corporation
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Photograph 1
View toward existing E&B McDonald Anticline Production Facility.
Photograph taken from Highway 33, looking west.

Photograph 2
Photograph of the proposed E&B Fee#271B-20 project site, view north.

Photograph 3
View south toward proposed E&B Fee#271D-20 project site.

Photograph 4
View north of existing access road from proposed E&B Fee#281C-20 project site.

Photograph 5
View east of proposed E&B Fee#281D-20 project site.

Photograph 6
View west toward proposed E&B Fee#282D-20 project site.

Photograph 7
Photograph of the proposed Theta 252C-20 project site, view south.

Photograph 8
View north from the proposed Theta 253A-20 project site.

Photograph 9
View north from the proposed Theta 253D-20 project site.

Photograph 10
View east/northeast from the proposed Theta 262C-20 project site.

Photograph 11
View south of existing access road and proposed Theta 264C-20 project site.

Photograph 12
Existing E&B Production Facility, view north from existing E&B well 263B-20.

GENERAL PLAN DESIGNATION

The proposed project is located on property designated as Extensive Agriculture (8.3), Mineral Petroleum, minimum 5 acre parcel and Extensive Agriculture (8.3), with the overlay zone of Flood Hazard (2.5) on the Kern County General Plan land use map which lists uses such as mineral, aggregate, and petroleum exploration and extraction as acceptable uses. The proposed project is consistent with the land use and zoning designation for the area. The Kern County General Plan Land Use, Open Space and Conservation Element states that petroleum exploration and extraction are consistent uses with agricultural designations (see Figure 2).

ZONING

The proposed project area is zoned Exclusive Agriculture (A). The project is consistent with the Exclusive Agriculture (A) zoning designations per Kern County, California Municipal Code Chapters 19.12.020 and 19.98.020 which include oil and gas drilling and production as a permitted use (see Figure 2).

Table 5
General Plan and Zoning Designation

Well Name	General Plan	Zoning
Theta 252C-20	8.3 (Extensive Agriculture, minimum 20 acre parcel)	A(Exclusive Agriculture)
Theta 253A-20	8.3 (Extensive Agriculture, minimum 20 acre parcel)/8.4 (Mineral Petroleum, minimum 5 acre parcel)	A(Exclusive Agriculture)
Theta 253D-20	8.4 (Mineral Petroleum, minimum 5 acre parcel)	A(Exclusive Agriculture)
Theta 262C-20	8.3 (Extensive Agriculture, minimum 20 acre parcel)/8.4 (Mineral Petroleum, minimum 5 acre parcel)	A(Exclusive Agriculture)
Theta 264C-20	8.4 (Mineral Petroleum, minimum 5 acre parcel)	A(Exclusive Agriculture)
E&B Fee #271B-20	8.3 (Extensive Agriculture, minimum 20 acre parcel)	A(Exclusive Agriculture)
E&B Fee #271D-20	8.3 (Extensive Agriculture, minimum 20 acre parcel)	A(Exclusive Agriculture)
E&B Fee #281C-20	8.3 (Extensive Agriculture, minimum 20 acre parcel)/Flood Hazard	A(Exclusive Agriculture)
E&B Fee #281D-20	8.3 (Extensive Agriculture, minimum 20 acre parcel)/Flood Hazard	A(Exclusive Agriculture)
E&B Fee #282D-20	8.3 (Extensive Agriculture, minimum 20 acre parcel)	A(Exclusive Agriculture)

ENVIRONMENTAL ANALYSIS
McDonald Anticline Project

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
I. AESTHETICS				
Would the project:				
a. Have a substantial adverse effect on a scenic vista?	_____	_____	_____	X
b. Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?	_____	_____	_____	X
c. Substantially degrade the existing visual character or quality of the site and its surroundings?	_____	_____	_____	X
d. Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	_____	_____	_____	X

Discussion: The proposed project sites are located within a high density active oil field on and adjacent to natural lands/non-native annual grasslands. The closest residential structures are located 2.27 miles to the south from any of the proposed project sites. The wells are proposed in the Bacon Hills area; however, topography is generally flat in the proposed project sites and to the north. Elevations in the proposed well sites are approximately 920 feet, while nearby peaks of the Bacon Hills to the east are just over 1000 feet in elevation. Carneros Rocks occur to the south, at the base of the hills. The Temblor Range is situated along the edge of the valley, to the south and west. No designated scenic roadways are located adjacent to or in the vicinity of the proposed project sites. No significant scenic resources are located at or near the proposed project sites. The project is consistent with polices in the Land Use, Open Space, and Conservation Element of the Kern County General Plan:

Policy 47 – Ensure that light and glare from discretionary new development projects are minimized in rural as well as urban areas.

Policy 48 – Encourage the use of low glare lighting to minimize nighttime glare effects on neighboring properties.

The project is consistent with land use and zoning designation for the area, and is, therefore, considered consistent with the associated visual resource for planning purposes and General Plan.

Ia. The proposed project will not have a substantial adverse effect on a scenic vista as existing oil field equipment surround the proposed project sites to the north, west, east and south. Additionally the proposed project is set back from public roadways and residential structures. Figure 4 is a photo simulation of how the drill rig and associated drilling equipment would appear from State Highway 33. Figure 5 is a photo simulation of how the well site would appear during production from State Highway 33. No impact.

Ib. The proposed project sites are not located adjacent to a state scenic highway. Therefore, the proposed project would not damage the scenic resources within a state scenic highway. No Impact.

Ic. Project activities will not change the existing quality and visual character at any of the proposed project sites, as the proposed project sites are located within a high density active oil field. Project related equipment is the same or similar in size and shape to oil field equipment located throughout the McDonald Anticline Oil Field and other fields located adjacent to it. No impact.

Id. Night lighting will be used during the short-term drilling phase of the project which is expected to last 3 days for each of the ten (10) wells. Night lighting will not be used for any other phase of the project. The project is designed so night lighting would be directed downward and inward to minimize potential offsite impacts. Based upon the results of site visits conducted by Robert A. Booher Consulting (RAB Consulting), on November 9 and 13, 2012, January 16 and 22, February 25 and March 5, 2013, the nearest residence to the proposed project sites is located approximately 2.27 miles to the south of the proposed project sites. The closest residence to the proposed project sites will not be impacted by the temporary presence of night lighting during the drilling phase as views of the project site will be blocked by existing topography. The proposed project will not create a new source of substantial light that will adversely affect nighttime views in the area. No impact.

Conclusion: No Impact.

Mitigation Measures: No impact identified. No mitigation necessary.

References:

California Department of Transportation. *Officially Designated State Scenic Highways*
Website: www.dot.ca.gov/hg/lLandArch/scenic/shwy.htm

County of Kern. *2009 General Plan*
Website: http://co.kern.ca.us/planning/pdfs/kcgp/KCGP.pdf

Figure 4
McDonald Anticline Oil and Gas Exploration Project
Photo Simulation of Drill Rig
View to the southwest of the proposed project sites from State Highway 33
Approximately 5.1 Miles Northeast of Well Sites

Robert A. Booher Consulting Environmental Planning & Management 3221 Quail Hollow Drive Fairfield, California 94533 Telephone (707) 399-7835	E & B Natural Resources Management Corporation 1600 Norris Road Bakersfield, California 93311 Telephone (661) 679-1722

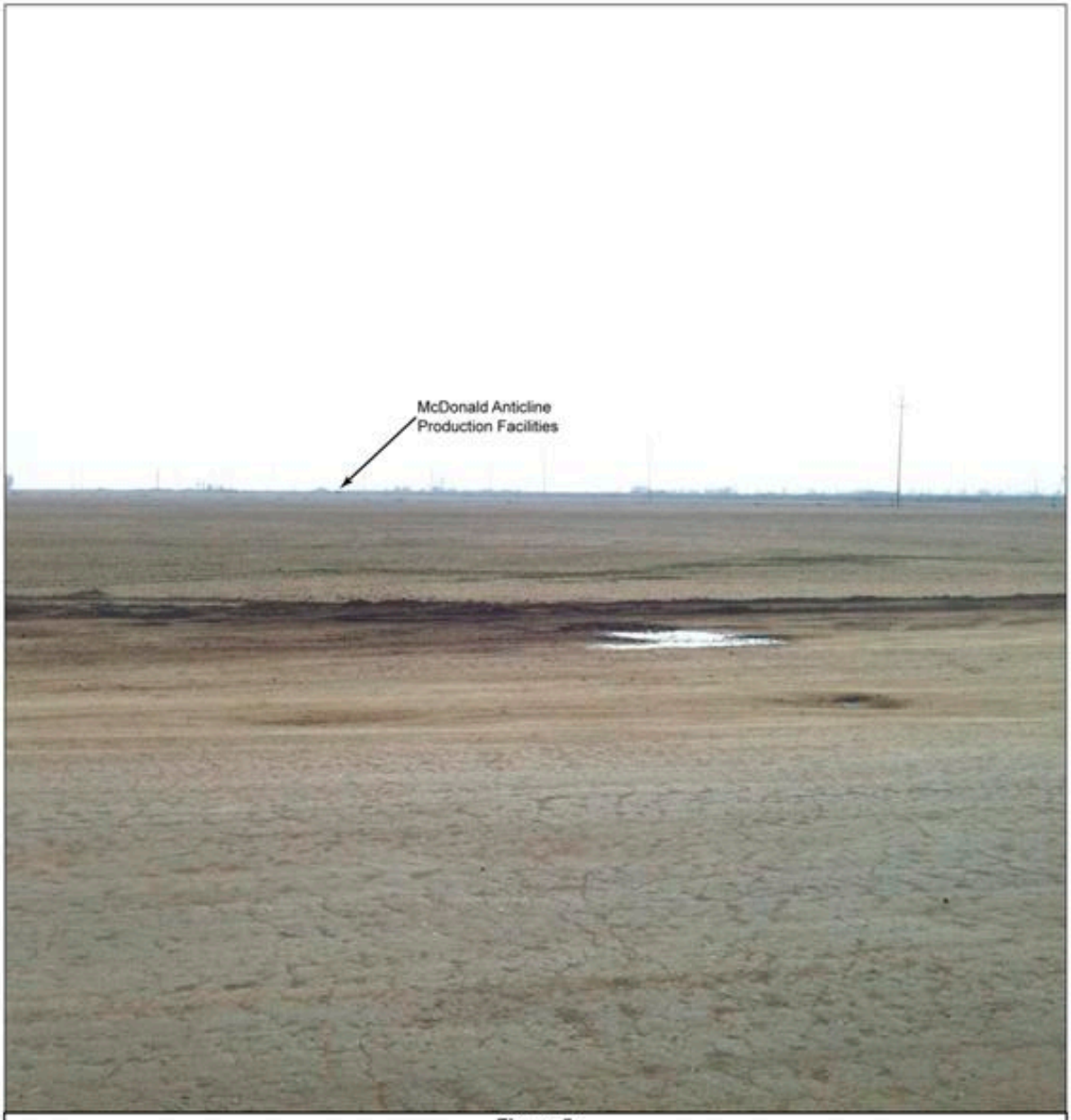


Figure 5
McDonald Anticline Oil and Gas Exploration Project
Photo Simulation of Production Facilities
View to the southwest of the proposed project sites from State Highway 33
Approximately 5.1 Miles Northeast of Well Sites

Robert A. Booher Consulting Environmental Planning & Management 3221 Quail Hollow Drive Fairfield, California 94533 Telephone (707) 399-7835	E & B Natural Resources Management Corporation 1600 Norris Road Bakersfield, California 93311 Telephone (661) 679-1722

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
II. AGRICULTURAL AND FOREST RESOURCES				
Would the project:				
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	_____	_____	_____	X
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?	_____	_____	_____	X
c. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use, or conversion of forest land to non-forest use?	_____	_____	_____	X
d. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104 (g))?	_____	_____	_____	X
e. Result in the loss of forest land or conversion of forest land to non-forest use?	_____	_____	_____	X

Discussion: The proposed project sites are located on natural lands/non-native annual grassland. The project is consistent with land use and zoning designation for the area. The project is located on non-native grasslands identified in the General Plan as Extensive Agriculture (8.3), Mineral Petroleum, minimum 5 acre parcel and Extensive Agriculture (8.3), with the overlay zone of Flood Hazard (2.5). All ten project sites are included in the Kern County Agriculture Preserve and all the proposed project sites are located on a parcel under a Williamson Act Contract. Furthermore, all ten proposed project sites are identified on the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP) as Grazing land.

Iia. The proposed project sites are designated as Grazing Land (lands with vegetation suitable for livestock) on the Kern County Important Farmland 2010 Map. The proposed project would convert 5.91 acres of grazing land zoned Exclusive Agriculture to non-agricultural use. Thus, there would be no impact to Prime Farmland, Unique Farmland or Farmland of Statewide Importance.

Iib. The Kern County Williamson Act Lands Map indicates that all the proposed project sites are currently under a Williamson Act Contract. The Williamson Act allows county governments to enter into contracts with private landowners who agree to restrict parcels of land to agricultural uses or open space uses for at least ten years. In return, landowners receive property tax assessments that are much lower than normal because they are based upon income derived from farming and open space use as opposed to fair market value of the property. The proposed project sites are located within a 485.19 acre Williamson Act contracted parcel. The project is zoned Exclusive Agriculture (A). The proposed project will be consistent with the Kern County Zoning Ordinance, Chapters 19.12.020 (Exclusive Agriculture (A) District) and 19.98.020 (Oil and Gas Production). Participating local governments adopt agricultural preserve standard uniform rules to administer Williamson Act contracts (Government Code Section 51231). The agricultural preserve rules adopted by the Kern County Board of Supervisors lists oil and gas drilling and production in accordance with the provisions of Kern County Zoning Ordinance, Chapter 19.98 (Oil and Gas Production) as a consistent use for lands within the agricultural preserve and subject to a Williamson Act contract. No impact.

Iic. The project will impact 5.91 acres of grazing land. The project will not involve other changes in the existing environment which, due to their location or nature, could result in conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance Farmland (Farmland), to non-agricultural use, or conversion of forest land to non-forest use. No impact.

Iid. No forest resources are located within the proposed project sites and the sites are not zoned for timber harvest. No impact.

Iie. No forest resources are located within the proposed project sites and the sites are not zoned for timber harvest. No impact.

Conclusion: No impact.

Mitigation Measures: No impact identified. No mitigation necessary.

References:

California Department of Conservation. *Farmland Mapping & Monitoring Program*.
Website: http://www.conservation.ca.gov/dlrp/fmmp/Pages/Index.aspx.

California Department of Conservation. *Williamson Act Program*.
Website: http://www.conservation.ca.gov/dlrp/lca/Pages/Index.aspx.

Kern County, *Agricultural Preserve Uniform Standard Rules*
Website: http://www.co.kern.ca.us/planning/pdfs/form80.pdf

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
III. AIR QUALITY				
Would the project:				
a. Conflict with or obstruct implementation of the applicable air quality plan?	_____	_____	X	_____
b. Violate any air quality standard or contribute to an existing or projected air quality violation?	_____	X	_____	_____
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors?	_____	X	_____	_____
d. Expose sensitive receptors to substantial pollutant concentrations?	_____	_____	X	_____
e. Create objectionable odors affecting a substantial number of people?	_____	_____	X	_____

Discussion: The proposed project site lies within the south central portion of the San Joaquin Valley Air Basin (SJVAB), which is the second largest air basin in the state. The SJVAB encompasses eight counties; San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and the western portion of Kern. The SJVAB is managed by the San Joaquin Valley Air Pollution Control District (SJVAPCD) and is defined by the Sierra Nevada Mountains in the east, the Coast Ranges in the west, and the Tehachapi Mountains in the south. These surrounding mountains serve to confine or "trap" air pollution. The valley is characterized by low wind speed, and hot sunny weather which is conducive to the formation of ozone (smog).

The main sources of ozone precursors in the valley (NOx and ROG) are cars and trucks. Based on the 2010 emissions inventory for the San Joaquin Valley, cars and trucks contribute 81% of the NOx emissions and 35% of the ROG emissions. Stationary sources contribute 15% of the NOx emissions and 5% of the ROG emissions. Oil and gas production and marketing releases 0.007% of the NOx and 9.7% of the ROG emissions, while the majority of the ROG emissions from oil and gas production and marketing come from petroleum marketing and distribution—as opposed to oil exploration and production.

To reduce emissions and bring the valley into compliance with ozone and PM-10 standards, the SJVAPCD adopted the 2007 Ozone Plan. This Plan was reviewed and approved by CARB and the federal EPA. This Plan sets forth specific requirements which will substantially lessen cumulative impacts from NOx and ROG emissions. The Plan was formally adopted by the

SJVACPD through a public review process in 2007. Details of the Plan can be found at: http://www.valleyair.org/Air_Quality_Plans/Ozone_Plans.htm

Consistent with this Plan, SJVAPCD has adopted an aggressive set of policies, rules and regulations that include the adoption of indirect source review (ISR) and the nation's most stringent limits on NOx emissions from boilers, heater and IC engines. The following rules are aimed at reducing emissions from oil and gas production:

Rule 4306 – Reduction of NOx from boilers, heaters and steam generators
Rule 4624 – Transfer of organic liquids
Rule 4702 – Limits on NOx emissions from IC engines

Collectively, these policies are reducing NOx and ROG emissions. See attached forecast of NOx emissions in San Joaquin Valley for the period 2005 thru 2023. This forecast appears as Figure ES-1 in the Executive Summary for the 2007 Ozone Plan, dated April 30, 2007. The project will comply with the 2007 Ozone Plan and with the above noted rules.

The air pollutants emitted into the ambient air by stationary and mobile sources are regulated by federal and state law. These regulated air pollutants are known as "criteria air pollutants" and are categorized into primary and secondary pollutants. Primary air pollutants are those that are emitted directly from sources. Carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NO_X), sulfur dioxide (SO_2), coarse inhalable particulate matter (PM_{10}), fine inhalable particulate matter ($PM_{2.5}$), and lead (Pb) are primary air pollutants. VOC and NO_X go on to form secondary criteria pollutants through chemical and photochemical reactions in the atmosphere. Ozone (O_3) and nitrogen dioxide (NO_2) are the principal secondary pollutants. Other pollutants, such as carbon dioxide (CO_2), a natural by-product of animal respiration that is also produced in the combustion process, have been linked to such phenomena as global climate change. A discussion of CO_2 and greenhouse gases is included in Section VII, Greenhouse Gas Emissions.

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. The SJVAPCD defines sensitive receptors as locations where there are human populations and where there is a reasonable expectation of continuous human exposure according to the averaging period for the ambient air quality standards (AAQS). The most sensitive portions of the population are children, the elderly, the acutely ill, and the chronically ill, especially those with cardiorespiratory diseases. Residential areas are considered to be sensitive receptors to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Other sensitive receptors include retirement facilities, hospitals, and schools. The closest residence to the proposed E&B McDonald Anticline project site is located 2.27 miles to the south. The project would not create objectionable odors that would affect a substantial number of people as it is located in a remote, rural location.

The SJVAPCD has established Thresholds of Significance[1]: Criteria for Determining Environmental Significance. These thresholds separate a project's short-term emissions from its long-term emissions. Short-term emissions are mainly related to the construction phase of the project and are recognized to be short in duration. Long-term emissions are primarily related to activities that will occur indefinitely as a result of project operations.

Conversion of an oil well into a producing well will result in operational emissions, which have the potential to contribute to the possible violation of an existing air quality standard or an existing or projected air quality violation. Sources of operational emissions include fugitive emissions from the well, some storage tanks, piping, compressors, separators, and loading racks and point source emissions from steam generators, some storage tanks, and internal combustion equipment installed as part of the operation of a new well, including thermally enhanced wells. Indirect operational emissions include vehicle trips associated with employees and contractors needed to operate and maintain the oil production operation.

The installation of the above equipment is subject to permit requirements of the SJVAPCD. One major requirement is that new and modified equipment that has air contaminant emissions must satisfy the requirements of New Source Review (NSR). The main requirements of NSR are to require the installation of best available control technology to minimize emission increases from such equipment and to mitigate emission increases over certain thresholds by providing emission reductions either by limiting the use of existing equipment or by providing emission offsets.

These requirements are intended to allow for economic growth but not interfere with the District's efforts to achieve or maintain attainment with ambient air quality standards.

As a result of compliance with SJVAPCD Air Pollution Control District permit requirements, and implementation of the identified mitigation measures, project related impacts on air quality will be reduced to less than significant.

IIIa. The SJVAPCD has prepared an Air Quality Attainment Plan to enable the San Joaquin Valley to attain air quality standards by the earliest practicable date. Short-term emission impact is anticipated as part of the proposed project, but with measures included in the project it will be a less than significant impact. Particulate matter emissions can be expected to occur during the construction of the drill site and from daily ingress and egress of vehicles on the unpaved access road. Earthmoving activities at the proposed project sites will not exceed the non-residential project limit of 5.0 or more acres per day and will not move, deposit, or relocate more than 2,500 cubic yards per day of bulk materials on at least three days. Therefore, a Dust Control Plan will not be required as specified in Regulation VIII, Rule 8021, Section 6.3.1. The operator will provide written notification to the SJVAPCD at least 48 hours prior to beginning earthmoving operations as required. Construction also will produce exhaust emissions with transport of workers and machinery to and from the site as well as operation of equipment on-site. Typical equipment used for this project may include diesel drill rig, bulldozer, grader, loader, compacter, heavy-duty trucks, baker

[1] SJVAPCD (1999) "Guide for Assessing and Mitigating Air Quality Impacts", Section 4.3. San Joaquin Valley Air Pollution Control District.

tanks, air compressors, pumps, and generators. The proposed project will not significantly conflict with or obstruct implementation of the SJVAPCD Air Quality Attainment Plan.

IIIb,c. RAB Consulting prepared emissions calculations to determine the quantity of following category of air pollutants:

- Criteria Air Pollutants (ROG, NOx, PM-10)
- Toxic Air Contaminants
- Greenhouse Gases (GHG)

The procedure for estimating these emissions and their significance is discussed below.

Estimate of Criteria Air Pollutant Emissions

Criteria pollutant emissions were estimated using Road Construction Emissions Model, Version 7.1.3 software, which is recommended by the SJVAPCD for use in calculating air emissions for this type of project. Criteria pollutant emissions for the project were estimated based upon equipment list for each phase of the E&B McDonald Anticline project provided by its proponents. The project's phases and the duration of each phase of a single well site is summarized below:

- Site preparation phase 1 day
- Drilling phase 3 days
- Testing and Completion phase 2 days
- Installation of Production Equipment 2 days
- Production phase 365 days
- Plugging and Abandonment phase 3 days

Equipment used for each phase of the project is summarized in Tables 6, 7, 8, 9, 10 and 11. All round trip distances in the following tables are assumed to be travelling to and from Bakersfield with the exception of the roundtrip distances described during the production phase in Table 10.

Table 6
Equipment Used During Site Preparation Phase

On Site Equipment	**# of Equipment**	**HP**	**Total Hours/Day**	**Total Days**
Grader	1	265	8	1
Front End Loader	1	179	4	1
Water Truck	1	246	8	1
Mobile Sources	**Round Trips/Day**	**Total Days**	**Round Trip Distance**	
Worker Transport - Light Trucks/Passenger	1	1	120	

Cars				
Heavy Duty Trucks - Semi	2	1	120	

Table 7
Equipment Used During Drilling Phase

On Site Equipment	**# of Equipment**	**HP**	**Total Hours/Day**	**Total Days**
Crane	1	485	6	2
Backhoe	1	91	2	3
Fork Lift	1		2	3
Electric Generator (Genset/ICE)	2	500	24	3
Pump (ICE)	1	1000	24	3
Draw Works (ICE)	1	540	24	3
Welder	1	20	4	2
Water Truck	1	246	8	3
Mobile Sources	**Round Trips/Day**	**Total Days**	**Round Trip Distance**	
Worker Transport - Light Trucks/Passenger Cars	8	3	120	
Heavy Duty Trucks - Semi Normal Operations	4	3	120	
Heavy Duty Trucks Semi Mobilization/Demobilization	15	2	120	

Table 8
Equipment Used During Testing and Completion Phase

On Site Equipment	**# of Equipment**	**HP**	**Total Hours/Day**	**Total Days**
Completion Drill Main Drive Motor (Production Drill)	1	470	10	2
Truck Mounted Pumps	1	245	4	1
Water Truck	1	246	8	1
Mobile Sources	**Round Trips/Day**	**Total Days**	**Round Trip Distance**	
Worker Transport – Light Trucks/Passenger Cars	2	2	120	
Heavy Duty Trucks (Semi)	1	1	120	

Table 9
Equipment Used During Production Equipment Installation Phase

On Site Equipment	**# of Equipment**	**HP**	**Total Hours/Day**	**Total Days**
Front End Loader	1	179	4	1
Backhoe	1	91	4	2
Welder	1	20	6	2
Side-Boom Crane	1	485	2	2
Mobile Sources	**Round Trips/Day**	**Total Days**	**Round Trip Distance**	
Worker Transport - Light Trucks/Passenger Cars	3	1	120	
Heavy Duty Trucks (Semi)	4	1	120	

Table 10
Equipment Used During Production Phase

On Site Equipment	**# of Equipment**	**HP**	**Total Hours/Day**	**Total Days**
Well Head/Pumping Unit (electric)	1	10	24	365
Mobile Sources	**Round Trips/Day**	**Total Days**	**Round Trip Distance**	
Worker Transport - Light Trucks/Passenger Cars	1	365	4	
Heavy Duty Trucks Oil Transportation	2 (Assumes all ten wells in production)	365	30	
Heavy Duty Trucks Water Transportation	2 (Assumes all ten wells in production)	365	8	

Table 11
Equipment Used During Plugging and Abandonment Phase

On Site Equipment	**# of Equipment**	**HP**	**Total Hours/Day**	**Total Days**
Completion Drill Main Drive Motor	1	470	8	3
Water Truck	1	246	6	2
Mobile Sources	**Round Trips/Day**	**Total Days**	**Round Trip Distance**	
Worker Transport - Light Trucks/Passenger Cars	2	3	120	
Heavy Duty Trucks (Semi)	4	1	120	

The maximum tons per year of criteria pollutant emissions that could be produced during the site preparation, drilling, testing and completion, production equipment installation, production, and plugging and abandonment of one (1) well are summarized in Table 12. Detailed calculations are provided in Attachment B.

Table 12
Criteria Pollutant Emissions Rates for One (1) Well Site and One (1) Well
(Emissions estimated as 0.0 tons/year in the Roadway Model are reported as 0.04 tons/year)

Project Phase	**ROG** *(ton/yr)*	**NOX** *(ton/yr)*	**PM-10** *(ton/yr)*
Site Preparation	0.04	0.04	0.04
Drilling Phase	0.04	0.50	0.04
Testing & Completion Phase	0.04	0.04	0.04
Production Equipment Installation	0.04	0.04	0.04
Production Phase	0.10	0.20	0.04
Plugging & Abandonment Phase	0.04	0.04	0.04
Total	**0.30**	**0.86**	**0.24**

It should be noted that Table 13 presents the maximum tons per year of criteria pollutant emissions that could be produced during the site preparation of ten (10) well sites and the drilling, testing and completion, production equipment installation, production, and plugging and abandonment of ten (10) wells in a year.

Therefore, the emissions presented in Table 13 should be viewed as a maximum ceiling of emissions that would not be exceeded.

Table 13
Maximum Annual Criteria Pollutant Emissions Rates for Ten (10) Well Sites and Ten (10) Wells
(Emissions estimated as 0.0 tons/year in the Roadway Model are reported as 0.04 tons/year)

Project Phase	ROG *(ton/yr)*	NOX *(ton/yr)*	PM-10 *(ton/yr)*
Site Preparation	0.40	0.40	0.40
Drilling Phase	0.40	5.00	0.40
Testing & Completion Phase	0.40	0.40	0.40
Production Equipment Installation	0.40	0.40	0.40
Production Phase	1.0	2.0	0.40
Plugging & Abandonment Phase	0.40	0.40	0.40
Total	**3.0**	**8.60**	**2.40**

Project Impacts from Criteria Air Pollutants

SJVAPCD has established thresholds of significance for several criteria air pollutants. The thresholds of significance are in terms of annual tons of PM10, ROG and NOx. CEQA Guidelines Section 15064.7 expressly authorizes the adoption of thresholds of significance and these thresholds may be used by a lead agency to determine the significance of a project's impacts.

A comparison of project emissions with the adopted thresholds of significance is presented in Table 14. As data in this table shows, project impacts are below the thresholds of significance. Cumulative impacts are discussed in Section XVIII Mandatory Findings of Significance.

Table 14
SJVAPCD Significance Thresholds compared to Maximum Annual Criteria Pollutants

Air Pollutant	Significance Criteria Tons/Year	Maximum Annual Construction Emissions	Maximum Annual Production Emissions
Reactive Organic Gas (ROG)	10	2.0	1.0
Nitrogen Oxides (NO_X)	10	6.6	2.0
Particulates (PM_{10})	15	2.0	0.4

Additionally, engines and generators used during implementation of the proposed project will be registered under the California Air Resources Board (CARB) Portable Engine Registration Program. This program was officially implemented in March 1997, and the program was reviewed and approved under CEQA prior to implementation. The program was revised in December 1998, February 2004 and February 2011. E&B shall comply with the air emissions control measures described in the SJVAPCD *Guide for Assessing and Mitigating Air Quality Impacts* document to control dust and other emissions during construction. Under SJVAPCD guidance, the implementation of these control measures will reduce impacts from criteria air pollutants to a less than significant level.

The proposed project includes the use of equipment that may contribute to or violate air quality standards. The project will comply with SJVAPCD Regulation VIII Fugitive Dust Rules (in particular, Rule 8021-Construction, demolition, excavation, and extraction) and Rule 8031 – transportation of bulk materials which reduce effects of this project with regard to air quality to the level of less than significant.
All engines used shall be maintained in compliance with the U.S. Environmental Protection Agency (USEPA) and the CARB engine standards. Mitigation measures are presented below and in attachment A.

SJVAPCD Rule 2280 Portable Equipment Registration for certain portable emissions units shall be required for well drilling, service or work-over rigs, pumps, compressors, generators and field flares.

IIId. The proposed project sites are located in the McDonald Anticline Oil Field. Scattered rural residences are located throughout the project area. The proposed project sites will be located away from rural residences. Rural residences are considered a sensitive receptor. The closest residence is located 2.27 miles south of the proposed project sites.

Criteria Air Pollutant Concentrations

Project activities will create pollutants that will be released to the localized area of the proposed project sites. However, these pollutants will greatly disperse prior to reaching a sensitive receptor. Due to the distance of the proposed project sites from the closest sensitive residential receptor, and the fact that project emissions are below the thresholds of significance, the project is not expected to subject sensitive receptors to substantial pollutant concentrations.

Estimate of Toxic Air Contaminants

CEQA Guidelines require that a project proponent analyze the types and quantities of toxic air contaminants (TACs) and assess if such emissions are likely to pose a health risk to individuals living or working near the proposed project sites. The CEQA Guidelines distinguish between short-term and long-term emissions. Short-term

emissions are mainly related to the construction phase of the project and are recognized to be of short duration. For the current project, short-term emissions are associated with site preparation, drilling, and testing and completion. Long-term emissions are related to activities that will occur indefinitely, as a result of project operations (production activities). The proposed project will use an electrically powered 10 hp motor during the production phase. No long term emissions would be released from the electrically powered 10 hp motor during the production phase of the project. However, there would be trace amount of toxic emissions from the transportation of the produced oil and water. Current CEQA guidelines have not set a threshold of significance with respect to risk for short-term emissions. The guidelines have established a threshold of significance for long-term emissions, such as those associated with the operations (production) phase of a project. The threshold of significance is a probability of 10 cancer cases per million (or 1:100,000) for the maximally exposed individuals. For residences near the project sites, this threshold of significance assumes continuous exposure (24/7) for 70 years. For individuals working near the site, the exposure assumes 8 hours/day, 5 days/week for 40 years.

In an effort to quantify the potential short term risk and actual cancer risk associated with exposure to TACs released during site preparation, drilling and testing and completion phases of a project, these activities were assessed to determine actual exposure times based upon a 8 day scenario to complete these activities. Sources of TACs were reviewed as well as the quantity and duration of TAC emissions. The associated cancer risk was then estimated based on this information.

Short-Term Public Health Risks

The main source of toxic air contaminants is diesel combustion. Equipment such as pumps, drill rigs, and construction equipment are powered by diesel engines. The exhaust from this equipment is considered a toxic air contaminant. Trace amounts of fugitive volatile organic compounds (VOC) are also released during the drilling and testing and completion phases. The amount of VOCs, however, is small compared with the emission rate of diesel exhaust. On the basis of the amount and toxicity of various TACs, the current analysis is limited only to diesel exhaust.

Diesel exhaust consists of gaseous and particulate emissions which collectively, are referred to as diesel particulate matter or DPM. Table 15 summarizes the emission rate of DPM associated with the construction phase of the project. It is estimated that 34.1 lbs of DPM would be released during the construction phases for each well. The remaining 36.5 lbs would be released during the production phase annually for each well.

Table 15
Breakdown of Diesel Particulate Emissions
By Phase

	Duration	Emissions	
Project Phase	*Days*	*(lbs/day)*	*(lbs)*
Site Preparation	2	0.4	0.8
Drilling Phase	3	9.5	28.5
Testing/Completion Phase	2	0.7	1.4
Installation of Production Equipment	2	0.8	1.6
Production Phase	365	0.1	36.5
Plugging and Abandonment	3	0.6	1.8
Totals		**12.1**	**70.6**

Short-term impacts to public health were estimated on the basis of the facility risk prioritization score. The score is based on the AB-2588 Air Toxics Hotspots Information and Assessment Act of 1987. The spreadsheet for estimating the facility score was obtained from the SJVAPCD. The facility score is based on 34.1 lbs/yr of DPM. A score of 0.02 "Low" was calculated at the nearest residence 2.27 miles (3,746 meters) away. The risk would be even lower at residences located beyond 2.27 miles. Given this low level or projected public health risk, a more refined risk analysis is not necessary. Since the facility prioritization score is well below 10, this indicates that short-term impacts associated with the proposed project would not lead to significant public health risks and that a detailed risk analysis is not required. A copy of the prioritization score is provided in Attachment B.

Long-Term Public Health Risks

There would not be any long-term on-site emissions of toxic air pollutants during the production phase as the equipment will be powered electrically. An analysis was conducted to evaluate public health risk associated with fugitive emissions associated with the production phase. Fugitive hydrocarbon emissions occur from production equipment such as pumps, valves and connectors. The amounts of such emissions are very low, typically in the range of 0.5 to 1.5 lbs/year (Attachment B). The risk from fugitive hydrocarbon emissions was calculated to be 0.0 or "Low" at the nearest residence (Attachment B). The risk would be lower at residences located beyond 2.27 miles.

Since the facility prioritization score is well below 10, this indicates that operation of the ten wells would not lead to significant public health risks and that a detailed risk analysis is unnecessary.

IIIe. The proposed project is located in the McDonald Anticline Oil Field. Scattered rural residences are located throughout the project area. The proposed project sites will be located away from rural residences. Rural residences are considered a sensitive receptor. The closest residence is located 2.27 miles south of the proposed project sites.

Project activities may create odors, but they will only be perceptible in close proximity to the proposed project sites. Due to the distance of the proposed project sites from the closest residence, the project is not expected to create objectionable odors that will be noticeable at this residence. As such, impacts from odors will be considered less than significant.

Conclusion: Mitigation measures and compliance with regulations and permit requirements shall reduce potential impacts to air quality to a level of less than significant.

Mitigation Measures: In order to reduce impacts to air quality to a less than significant level, the following mitigation measures will be implemented:

Air Quality 1 - All disturbed areas, including storage piles, which are not being actively used for construction purposes, shall be effectively stabilized using water.

Air Quality 2 - Unpaved access roads shall be effectively stabilized of dust emissions using water.

Air Quality 3 - All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions by using the application of water or by presoaking.

Air Quality 4 - When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, or at least six (6) inches of freeboard space from the top of the container shall be maintained.

Air Quality 5 - Following addition of materials to, or removal of materials from the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions by using sufficient water.

Air Quality 6 - Limit traffic speeds on unpaved access roads to 15 mph.

References:

San Joaquin Valley Air Pollution Control District, *Guide for Assessing and Mitigating Air Quality Impacts.*
Website: http://www.valleyair.org/transportation/ceqa_idx.htm

SJVAPCD Rules Website: http://www.valleyair.org/rules/1ruleslist.htm

California Environmental Quality Act (CEQA Guidelines)

California Environmental Protection Agency, *Air Toxics Hot Spots Program Risk Assessment Guidelines; The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessment* (August 2003)

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
IV. BIOLOGICAL RESOURCES				
Would the project:				
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	_____	X	_____	_____
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	_____	_____	_____-	X
c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	_____	_____	_____	X
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	_____	_____	_____	X
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	_____	_____	_____	X
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community, Conservation Plan, or other approved local, regional, or state habitat conservation plan?	_____	_____	_____	X

Discussion: A biological assessment report was prepared for the proposed project in April 2013, and is attached to this initial study/mitigated negative declaration (Attachment C). This report provides a detailed discussion of the biological resources present and potentially present within the project area. Field surveys were conducted to determine if special-status plant or animal species or suitable habitats occurred within the proposed project sites and access roads. Surveys also sought to determine if the proposed project would have an adverse effect on these species or habitats. No valley saltbush scrub, wetlands, streams, or other sensitive habitats were identified on the proposed project sites, access roads or buffer areas.

RAB Consulting conducted biological surveys of the proposed project sites and buffer areas on November 9 and 13, 2012 to identify known or potential habitat for special-status wildlife and plant species. Biological surveys were completed on January 16 and 22, 2013 for the proposed flow lines and along existing access routes. Additional surveys were conducted February 25, 2013 and March 5, 2013 targeting special-status plant species and to detect special-status wildlife. RAB Consulting found no sensitive plant or animal species present within the boundaries of the proposed project sites. However, habitat that could potentially support sensitive species was observed. Special-status species potentially occurring in the proposed project area and locations where these species could potentially occur are presented in Table 16.

Table 16
Special-Status Species Potentially Occurring in the Project Sites

Common Name	Scientific Name	Federal Status	State Status	Habitat/Observances	Potential to Occur in Project Sites
Mammals					
San Joaquin (Nelson's) antelope squirrel	*Ammospermophilus nelsoni*	-	CT	Found in the western San Joaquin Valley from 200 to 1,200 feet in elevation. Found on dry sparsely vegetated loam soils. This species digs burrows or uses kangaroo rat (or California ground squirrel) burrows. Requires widely scattered shrubs, forbs, and grasses in broken terrain with gullies and washes.	Known to Occur. Potential habitat (annual grassland) is present in the proposed project sites and buffer areas. No potential burrows that were of appropriate size for use by this species were observed within the boundaries of the proposed project sites, or within 50 feet of each well site. One (1) individual San Joaquin antelope squirrel was observed approximately 0.20 miles (1,060 feet) north of proposed Theta 264C-20 project site. This species has been historically recorded in proximity to the proposed project sites (in Section 20, T28S, R20E). San Joaquin antelope squirrels have also been documented approximately 1.2 miles east of the proposed project sites (CDFW 2013) (see Figure 6).
Pallid bat	*Antrozous pallidus*	-	SSC	Found in deserts, grasslands, shrublands, woodlands, and forests. Most common in dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Low Potential. Potential foraging habitat was observed in the project sites and buffer areas. However, no suitable roosting areas for this species were present in the proposed project sites and buffer areas.
Giant kangaroo rat	*Dipodomys ingens*	FE	CE	Prefer annual grassland on gentle slopes of generally less than 10°, with friable, sandy-loam soils. However, most remaining populations are found on poorer, marginal habitats which include shrub communities on a variety of soil types and on slopes up to about 22°. Giant kangaroo rats develop burrow systems with one to five or more separate openings. Utilize two types of burrow: 1) a vertical shaft with a circular opening and no dirt apron, and 2) a larger, more horizontally-opening shaft, usually wider than high with a well-worn path leading from the mouth.	Low Potential. Potential habitat (non-native annual grassland) was observed in the proposed project sites and buffer areas. No burrows suitable for use by this species were observed in the proposed project sites, or within 50 feet of each site. No sign of species presence (i.e., mowing, hay stacking, seed caching, vertical burrow entrances, etc.) was observed in the project sites or buffer areas. This species has not been documented in the project area (CDFW 2013).

Table 16
Special-Status Species Potentially Occurring in the Project Sites

Common Name	Scientific Name	Federal Status	State Status	Habitat/Observances	Potential to Occur in Project Sites
Hoary bat	*Lasiurus cinereus*	-	-	Prefers open habitats with access to tress for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Requires water and feeds primarily on moths.	No Potential. Although potential foraging habitat is present in the proposed project sites and buffer areas, no potential roosting habitat or surface water was observed in the proposed project sites or buffer areas.
San Joaquin kit fox	*Vulpes macrotis mutica*	FE	CT	Inhabit annual grasslands or grassy open stages with scattered shrubby vegetation. Require loose-textured sandy soils for burrowing, and a suitable prey base.	Potentially Present. Potential habitat is present in the project sites and buffer areas. No potential burrows suitable for use by this species were observed within the boundaries of the proposed project sites. However, two (2) potential burrows were observed approximately 130 feet southwest of proposed well E&B Fee #271D-20. No sign (i.e., scat, tracks, digging, prey remains, etc.) of kit fox activity was observed in the biological survey area. This species has been documented approximately 0.5 miles south of the existing E&B production facility, and approximately 1.2 miles to the east (CDFW 2013) (see Figure 6).
Birds					
Burrowing owl	*Athene cunicularia*	-	SSC	Open grasslands, prairies, farmlands, and deserts.	Known to Occur. Potential habitat for this species was observed within the proposed project sites and buffer areas. No potential burrows that were of appropriate size for use by this species were observed within the boundaries of the proposed project sites. However, two (2) potential burrows were observed approximately 130 feet southwest of proposed well E&B Fee#271D-20 during biological surveys in 2012. Sign (i.e., whitewash, castings, feathers, etc.) of the species presence and one (1) individual burrowing owl was observed at this location during biological surveys in 2013. This species has not been previously documented in the project sites or buffer areas (CDFW 2013).
Prairie falcon	*Falco mexicanus*	-	WL	Dry, open terrain in level or hilly areas. Breeding sites are located on cliffs. This species forages far afield, even to marshlands and ocean shores.	Known to Occur. Potential foraging habitat is present within the proposed project sites and buffer areas. No breeding/nesting sites (cliffs) suitable for use by this species were observed in the project sites, buffer areas, or the general project area. This species has been documented in

Table 16
Special-Status Species Potentially Occurring in the Project Sites

Common Name	Scientific Name	Federal Status	State Status	Habitat/Observances	Potential to Occur in Project Sites
					proximity to the proposed project sites (CDFW 2013) (see Figure 6).
California condor	*Gymnogyps californianus*	FE	CE, Fully protected	Found as a recently reintroduced species primarily in the mountains of Ventura, Santa Barbara, and Los Angeles Counties. However, individuals are known to be wide ranging and have even been seen soaring over the Tehachapi Mountains and southern Sierra Nevada. The species is strictly a scavenger and may travel up to 35 miles or more from roost sites in search of carrion. Most foraging occurs in open habitats that facilitate landings and takeoffs. Traditional roost sites are on cliffs or ledges, but snags and trees in old growth coniferous forest may also be used.	Low Potential. While California condor may occasionally fly over the proposed project sites and buffer areas, the proposed project sites are not favorable for landings and/or takeoffs. No suitable roost sites, or potential nesting habitat for this species was observed in the proposed project sites or buffer areas. No individual condors were observed during field surveys, and this species has not been documented in proximity to the proposed well sites (CDFW 2013).
Invertebrates					
Vernal pool fairy shrimp	*Branchinecta lynchii*	FT	-	Found in short-lived seasonal cool-water vernal pools with low to moderate dissolved solids.	No Potential. No suitable habitat (vernal pools) was observed within the proposed project sites or buffer areas.
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	FT	-	Occurs only in the Central Valley of California, in association with blue elderberry (*Sambucus mexicana*). Prefers to lay eggs in elderberries 2-8 inches in diameter; some preference shown for stressed elderberry shrubs.	No Potential. No suitable habitat (elderberry bushes) was observed within the proposed project sites or buffer areas.
Amphibians and Reptiles					
California red-legged frog	*Rana draytonii*	FT	CSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11 to 20 weeks of permanent water for larval development. Must have access to aestivation habitat, consisting of small mammal burrows and moist leaf litter.	No Potential. No suitable habitat was observed within the proposed project sites or buffer areas.

Table 16
Special-Status Species Potentially Occurring in the Project Sites

Common Name	Scientific Name	Federal Status	State Status	Habitat/Observances	Potential to Occur in Project Sites
Blunt-nosed leopard lizard	*Gambelia sila*	FE	CE, Fully Protected	Resident of sparsely vegetated alkali and desert scrub habitats, in areas of low topographic relief. Seeks cover in mammal burrows, under shrubs or structures such as fence posts. They do not excavate their own burrows.	Potentially Present. Potential habitat (annual grassland) was observed in the proposed project sites and buffer areas. No potential burrows that were of appropriate size for use by this species were observed within the boundaries of the proposed project sites, or within 50 feet of each well site. No individual blunt-nosed leopard lizards were observed during biological surveys. This species was noted in proximity to the proposed project sites (Section 20, T28S, R20E); this information was included in an observation record of San Joaquin antelope squirrel. Blunt nosed leopard lizards have also been documented approximately 2.0 miles and 2.6 miles east of the existing E&B production facility (CDFW 2013) (see Figure 6).
Giant garter snake	*Thamnophis gigas*	FT	CT	Prefers fresh water marsh and low gradient streams. Has adapted to drainage ditches and irrigation canals.	No Potential. No suitable habitat was observed within the proposed project sites or buffer areas.
Plants					
Oval-leaved snapdragon	*Antirrhinum ovatum*	-	Rank 4	Chaparral, cismontane woodland, pinyon and juniper woodland, valley and foothill grassland. Found on clay, gypsum, and alkaline soils. Elevation range: 200 to 1,000 meters. Blooming period: May through November.	Low Potential. Potential habitat (annual grassland) was observed in the proposed project sites and buffer areas. Floristic surveys were conducted during the blooming period of this species; however, no individuals were observed during biological field surveys. This species has not been documented within the proposed project sites or in vicinity to the McDonald Anticline Field (CDFW 2013).
Round-leaved filaree	*California macrophylla*	-	Rank 1B	Cismontane woodland, valley and foothill grassland. Found on clay soils. Elevational range: 15 to 1,200 meters. Blooming period: March through May.	Low Potential. Potential habitat (annual grassland) was observed in the proposed project sites and buffer areas. Floristic surveys were conducted during the blooming period of this species; however, no individuals were observed during biological field surveys. This species has not been documented within the proposed project sites or in vicinity to the McDonald Anticline Field (CDFW 2013).

Table 16
Special-Status Species Potentially Occurring in the Project Sites

Common Name	Scientific Name	Federal Status	State Status	Habitat/Observances	Potential to Occur in Project Sites
Temblor buckwheat	*Eronum temblorense*	-	Rank 1B	Valley and foothill grassland. Often found on northeast and south facing slopes of steep, barren, white shale. Elevation range: 300 to 1,000 meters. Blooming period: April through September.	Low Potential. Potential habitat (annual grassland) was observed in the proposed project sites and buffer areas. However, the proposed project sites do not support steep slopes or shale soils. No individuals were observed in the proposed well sites or buffer areas during biological surveys. This species has not been documented within the proposed project sites or in vicinity to the McDonald Anticline Field (CDFW 2013).
Pale-yellow layia	*Layia heterotricha*	-	Rank 1B	Pinyon and juniper woodland, valley and foothill grassland, and cismontane woodland. Elevation range: 300 to 1,750 meters. Blooming period: March through June.	Low Potential. Potential habitat (annual grassland) was observed in the proposed project sites and buffer areas. Floristic surveys were conducted during the blooming period of this species; however, no individuals were observed during biological field surveys. This species has not been documented within the proposed project sites or in vicinity to the McDonald Anticline Field (CDFW 2013).
San Joaquin woollythreads	*Monolopia congdonii*	FE	Rank 1B	Chenopod scrub, valley and foothill grassland. Found on sandy soils. Elevation range: 60 to 800 meters. Blooming period: February through May.	Low Potential. Potential habitat (annual grassland) was observed in the proposed project sites and buffer areas. Floristic surveys were conducted during the blooming period of this species; however, no individuals were observed during biological field surveys. This species has been documented approximately 1.2 miles east and approximately 1.5 miles northeast of the existing E&B production facility (CDFW 2013) (see Figure 6).

Status Codes:

Federal	**State**
FE = Federally listed as Endangered	CE = California listed as Endangered
FT = Federally listed as Threatened	CT = California listed as Threatened
FC = Federal Candidate species	CR = California listed as Rare
	CFP = California Fully Protected
	SSC = Species of Special Concern
	WL = CDFW Watch List

California Rare Plant Rank (formerly known as CNPS Lists)
California Rare Plant Rank 1A = Plants presumed extinct in California
California Rare Plant Rank 1B = Plants rare, threatened, or endangered in California and elsewhere
California Rare Plant Rank 2 = Plants rare or endangered in California, but more common elsewhere
California Rare Plant Rank 3 = Plants about which we need more information; a review list
California Rare Plant Rank 4 = Plants of limited distribution; a watch list.

Status and habitat information from the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database RareFind 4 (CDFW 2013); California Native Plant Society, California Rare Plant Electronic Inventory (CNPS 2013); and USFWS Online Endangered Species Database (USFWS 2013).

The wildlife and plant species observed during biological surveys are listed in Table 17.

Table 17
List of Wildlife and Plant Species Observed During Biological Surveys

Scientific name	Common name
Wildlife	
Ammospermophilus nelsoni	San Joaquin antelope squirrel
Athene cunicularia	Western burrowing owl
Corvus corax	Common raven
Eremophila alpestris	Horned lark
Spermophilus beecheyi	California ground squirrel
Uta stansburiana	Common side-blotched lizard
Zenaida macroura	Mourning dove
Plants	
Amsinckia intermedia	Fiddleneck
Bromus madritensis ssp. *rubens*	Red brome
Centaurea solstitialis	Yellow star-thistle
Croton setigerus	Doveweed
Distichlis spicata	Saltgrass
Erodium cicutarium	Redstem filaree
Isocoma arcadenia	Alkali goldenbush
Salsola tragus	Russian thistle

Results from biological surveys for the proposed project are presented below:

San Joaquin Kit Fox (*Vulpes macrotis mutica*) historically occurred throughout the southern portion of the San Joaquin Valley, along the eastern edge of the San Joaquin Valley, and in the dry interior valleys of the Coast Ranges. The species occurs in a variety of open grassland, oak savannah, and shrub vegetation communities. However, in the southern portion of its range it is generally found in sparse annual grassland and scrub communities (e.g., valley sink scrub, saltbush scrub). Den characteristics of the subspecies vary across its range. In the southern portion of its range the taxon often creates dens with two entrances; natal/pupping dens typically have multiple entrances. Entrances range from 8 to 10 inches in diameter and are normally higher than wide, but kit foxes can utilize dens with entrances as small as four (4) inches in diameter. Kit foxes often change dens on a regular basis. Home ranges for the taxon have been reported by several authors to range from 1 to 12 square miles (USFWS 1998).

Potential habitat (annual grassland) for the San Joaquin kit fox was observed within the proposed project sites and buffer areas during biological surveys. Two potential burrows were observed approximately 130 feet southwest of the proposed E&B Fee#271D-20 project site. In addition, several California ground squirrel burrows were observed along the banks of Santos Creek, approximately 600 feet southwest of the existing E&B Production Facility. However, no potential burrows that were of adequate size for use by San Joaquin kit foxes were observed within the boundaries of the proposed project sites. There were no “active signs” (i.e., scat, prey

remains, tracks, digging, fur, etc.) of use by San Joaquin kit fox observed in the proposed project sites or buffer areas.

Historical CNDDB records suggest that the surrounding project vicinity does support this species. San Joaquin kit fox activity (scat) was documented in 1988, in the SE ¼ of Section 20, T28S, R20E, approximately 0.5 miles south of the existing E&B Production Facility (CDFW 2013). This species has also been documented approximately 1.2 miles east of the existing E&B Production Facility (CDFW 2013) (see Figure 6). This CNDDB observation record is of a den that was observed between 1972 and 1975, and is based on maps showing kit fox distribution and abundance in 1975. Although no denning was observed within the proposed project sites at the time of our field surveys, it is possible that the proposed project sites may accommodate the occasional foraging San Joaquin kit fox. However, forage would be limited in the project area based on a lack of small mammal burrows that would support a suitable prey base.

San Joaquin (Nelson's) Antelope Squirrel (*Ammospermophilus nelsoni*) historically occurred in the western and southern portions of the Tulare Basin, San Joaquin Valley, and contiguous areas to the west in the upper Cuyama Valley, and on the Carrizo and Elkhorn plains (Williams *et al*. 1998). However, the current distribution is extremely fragmented due to agricultural conversions that have occurred during the last century. Thus, substantial populations now occur only around Lokern and Elk Hills in western Kern County, and on the Carrizo and Elkhorn plains in southeastern San Luis Obispo County. Within its occupied range the species inhabits arid annual grassland and shrubland communities and is most numerous in areas with a sparse to moderate cover of shrubs. Occupied habitat also typically occurs on open, gentle slopes with friable soils. Areas with high water tables, steep slopes, or broken, rocky upland terrain appear to be avoided by the species (Williams *et al*. 1998). Habitats that are considered fair to good in quality typically support between 3 and 10 antelope squirrels per acre (Williams *et al*. 1998). This species is primarily diurnal and may be active throughout the day.

Potential habitat for San Joaquin antelope squirrels was observed in annual grassland within the proposed project sites and buffer areas during biological surveys. Surveyors searched for burrows and scat of this species and were vigilant for sightings (and listened for vocalizations). No burrows appropriate for use by this species were observed within the boundaries of the proposed project sites, or within 50 feet of each site. No individual San Joaquin antelope squirrels were observed within the boundaries of the proposed project sites during biological field surveys; however, one individual San Joaquin antelope squirrel was observed in the buffer area, approximately 0.2 miles (1,600 feet) north of proposed Theta 264C-20 project site. The squirrel was observed entering a small mammal burrow along the fence line of an active livestock grazing holding area.

San Joaquin antelope squirrels have been documented in the Bacon Hills area, in the southern portion of the McDonald Anticline Field, specifically in Section 20, T28S, R20E (CDFW 2013) (see Figure 6). This CNDDB observation record is dated 1987, and noted other species known from the area at that time included San Joaquin kit fox and BNLL. The observation record also indicates rodenticide use was possible, as rodent holes were extremely sparse in 1987. San Joaquin antelope squirrel have also been historically recorded approximately 2.0 miles east of the existing E&B Production Facility (CDFW 2013). An unknown number of San Joaquin antelope

squirrels were observed in this location during 1988 California Energy Commission Southern San Joaquin Valley Habitat Preservation Program Sensitive Species Surveys.

Giant Kangaroo Rat (*Dipodomys ingens*) prefers annual grassland on gentle slopes of generally less than 10 percent with friable, sandy-loam soils. However, most remaining populations are on poorer, marginal habitats which include shrub communities on a variety of soil types and slopes up to 22 percent. The historical distribution of the species encompasses a narrow band of gently sloping ground along the western edge of the San Joaquin Valley, with occasional colonies on steeper slopes and ridgetops, from the base of the Tehachapi Mountains in Kern County along the western edge of the valley to near Los Banos in Merced County. The species' occupied range is currently fragmented into six major geographic units that include the Panoche Region in western Fresno and eastern San Benito counties; Kettleman Hills in Kings County; San Juan Creek Valley in San Luis Obispo County; western Kern County in the area of the Lokern, Elk Hills, and other uplands around McKittrick, Taft, and Maricopa; Carrizo Plain National Monument in eastern San Luis Obispo County; and Cuyama Valley in Santa Barbara and San Luis Obispo Counties.

Giant kangaroo rats are primarily seedeaters, but also eat green plants and insects. They cut the ripening heads of grasses and forbs and cure them in small surface pits located on the area over their burrow system (Shaw 1934, Williams *et al*. 1993). They also gather individual seeds scattered over the surface of the ground and mixed in the upper layer of soil. Surface pits are uniform in diameter and depth (about 1 inch), placed vertically in firm soil, and filled with seedpods. After placing seeds and seed heads in pits, the animal covers them with a layer of loose, dry dirt. Pits are filled with the contents of the cheek pouches after a single trip to harvest seeds. Before being moved underground, the seeds are sun-dried which prevents molding (Shaw 1934). Individuals in many populations also make large stacks of seed heads (i.e., haystacks) on the surface of their burrow systems (Hawbecker 1944, Williams *et al*. 1993). The material is cured and then stored underground. Amounts cached in haystacks may not correspond with annual herbaceous productivity.

Estimated home range size ranges from about 646 to 3,768 square feet (0.02 to 0.09 acres). There is no significant difference in size of home range between sexes. The core area of the territory, located over the burrow system (i.e., precinct) is the most intensely used location in the home range (Braun 1985). Grinnell (1932) and Shaw (1934) suggested that territories were occupied by a single animal. More recent studies indicate that multiple individuals may live in a precinct. These individuals appear to be family groups of females and offspring of different ages (Randall 1997). Estimates of density, employing both trapping and counts of precincts, ranged from 1 to 44 individuals per acre (Grinnell 1932, Braun 1985, Williams 1992). Giant kangaroo rat burrow systems (precincts) are distinctive because of the size and orientation of the individual entrances and the presence of cleared vegetation in the vicinity of the system. Precincts may include one to several burrow openings and a colony may consist of two to thousands of precincts. Burrows of two types may be observed within the precincts. Horizontal burrow openings are typical in appearance compared to other kangaroo rats. However, these openings are usually quite large in comparison to the burrow openings of other species. Giant kangaroo rats also may construct vertical burrow openings. Other characteristics of giant kangaroo rat precincts include tracks from their distinctively large feet and tail drags, haystacks near the

burrows, and large scat near the burrow entrances. Individual precincts are usually connected to other precincts by well-worn paths and are relatively easy to detect, even from a distance (Williams 1980).

Potential habitat (annual grassland) for giant kangaroo rat was observed within the proposed project sites and buffer areas during biological surveys. No small mammal burrows suitable for potential use by giant kangaroo rats were observed within the proposed project sites, or within 50 feet of each proposed project site. Surveyors found no evidence (i.e., precinct mounds, vertical and pit cache holes, scats, tracks, tail drags, etc.) of giant kangaroo rats (recent and/or past use) within the proposed project sites or buffer areas during biological surveys. This species has not been documented in the area by CNDDB (CDFW 2013).

Pallid Bat (*Antrozous pallidus*) is a locally common species of low elevations in California. The species occurs throughout the State, except for the high Sierra Nevada from Shasta to Kern Counties (Zeiner *et al*., 1990). Pallid bats are year round occupants of grassland, shrubland, woodland, and forest habitats (CDFW 2013). These bats prefer rocky outcrops, cliffs, and crevices with access to open habitats for foraging. Unlike other bat species, pallid bats prey on the ground or in foliage, rather than in flight.

Potential foraging habitat for pallid bats was observed in the proposed project sites and buffer areas. However, no potential roosting or breeding sites suitable for use by this species were observed in the proposed project sites or buffer areas. No individuals were observed in the proposed project sites or buffer areas during the course of biological surveys. Furthermore, this species has not been documented in the project area (CDFW 2013).

Blunt-Nosed Leopard Lizard (*Gambelia sila*) inhabits open, sparsely vegetated areas of low relief (particularly annual and perennial grasslands, alkali scrub, and saltbush scrub). It is absent from areas of steep slope, dense vegetation, or seasonal flooding. The current range of the species includes undeveloped parcels in the southern-most portion of the San Joaquin Valley (Tulare and Kings Counties south), San Joaquin Valley floor in the vicinity of western Madera County, and along the western edge of the San Joaquin Valley from Merced County south. Its range also extends into the Carrizo Plain and Cuyama Valley southwest of the San Joaquin Valley. Estimated densities in occupied habitat have varied from 0.1 to 8.5 lizards per acre (Uptain *et al*. 1985, Williams and Germano 1991, Williams *et al*. 1993, Germano *et al*. 1994). Individuals use small rodent burrows for shelter from predators and temperature extremes. Their burrows are usually abandoned ground squirrel tunnels, or occupied or abandoned kangaroo rat tunnels (Montanucci 1965). Seasonal above-ground activity is correlated with weather conditions (primarily temperature). Optimal activity occurs when air temperatures are between 23.5 °C and 40 °C and ground temperatures are between 22 °C and 36 °C (USFWS 1985). Adults are active above ground in the spring months from March or April through June or July with the level of activity decreasing until approximately late June when most adults go underground and become inactive. At this latter time only subadult and hatchling individuals generally continue to be active. By August or September generally all adults have retreated to burrows to begin over-wintering. Hatchlings may be active until mid-October or November.

Potential habitat for the blunt-nosed leopard lizard was observed within annual grassland habitat in the proposed project sites and buffer areas during biological surveys. No burrows suitable for use by blunt-nosed leopard lizards were observed within the boundaries of the proposed project sites, or within 50 feet of each proposed project site. As such, additional protocol level surveys were not conducted.

Although no specific location information is provided, A CNDDB observation record of San Joaquin antelope squirrel noted that BNLL (and San Joaquin kit fox) were additional species known to occur in the Bacon Hills area (Section 20, T28S, R20E) (CDFW 2013). This observation record indicated rodenticide use was possible, as small mammal burrows were extremely sparse when the observation was documented in 1987. This species has been historically recorded approximately 2.0 miles and 2.6 miles east of the existing E&B production facility (CDFW 2013) (see Figure 6). BNLL were documented at these locations on and north of Santos Creek, approximately 1.2 miles and 1.6 miles southeast of the Middle Water Pumping Station. This CNDDB observation record was made in 1987.

Western Burrowing Owl (*Athene cunicularia*) is a ground dwelling owl that occurs in grassland habitats. Burrowing owls typically uses burrows of small mammals and large rodents, particularly California ground squirrels, for shelter and breeding. The species is listed by the CDFW as a species of special concern

Potential habitat for western burrowing owls was observed within the proposed project sites and buffer areas during biological surveys. No potential burrows that were of appropriate size for use by this species (i.e., California ground squirrel burrows) were observed during surveys within the proposed project sites. However, two (2) potential burrows were observed approximately 130 feet southwest of proposed E&B Fee#271D-20 project site during biological surveys in conducted in 2012. Sign (i.e., whitewash, castings, feathers, etc.) of the species presence and one (1) individual burrowing owl was observed at this location during biological surveys in 2013. Burrowing owls have not been previously documented in the project sites or buffer areas (CDFW 2013).

Prairie Falcon (*Falco mexicanus*) occurs as an uncommon nesting species throughout the Sierra Nevada foothills, Coast Ranges, Modoc Plateau and adjacent mountains, Great Basin mountains, and southern California desert and mountains. Nests are typically located on a sheltered ledge of a cliff overlooking a large, open area (generally supporting grassland, rangeland, savannah, or desert scrub). However, the species sometimes utilizes old nests of other cliff-nesting species (e.g., great-horned owl, common raven, golden eagle, etc.). Although southeast-facing nest sites are preferred, orientation is secondary to the nature of the ledge. Nesting occurs from mid-February through mid-September with a peak during April to early August (Zeiner *et al*. 1990). Home range and nest territory size varies with availability of suitable nesting habitat and adjacent foraging habitat (Craighead and Craighead 1956).

Potential foraging habitat for prairie falcon was observed within the proposed project sites and buffer areas during biological surveys. This species may forage intermittently throughout the project area, but is not expected to nest in the project area or vicinity. No known roosts or potential breeding sites (cliffs) were identified in the proposed project sites or buffer areas. No

individual prairie falcons were observed during biological surveys. Although location information is suppressed based on sensitivity, prairie falcons have been historically documented in vicinity to the proposed project sites (CDFW 2013) (see Figure 6). These CNDDB observation records are dated 1979 and are based on CDFW Swainson's hawk and prairie falcon nest records compiled by the CDFW Wildlife Branch in 1981.

California Condor (*Gymnogyps californianus*) typically nest in chaparral, conifer forest, or oak woodland communities. Historically, condors nested on bare ground in caves and crevices, behind rock slabs, or on large ledges or potholes on high sandstone cliffs in isolated, extremely steep, rugged areas. Cavities in giant sequoia (*Sequoiadendron giganteum*) and redwood (*Sequoia sempervirens*) have also been documented. Nest sites are often surrounded by dense brush. Nest sites also have the following requirements:

- Entrances large enough for the adults to fit through;
- Ceiling height of at least 14.8 inches at the egg position;
- Floors fairly level with some loose surface substrate;
- Nest space unconstricted for incubating adults; and
- A nearby landing point (Zeiner et al. 1990).

Most foraging occurs in open terrain of foothills, grasslands, potreros with chaparral areas, or oak savannah habitats. Historically, foraging also occurred on beaches and large rivers along the Pacific coast. Water is required for drinking and bathing (Zeiner et al. 1990).

California condors are opportunistic scavengers, feeding exclusively on the carcasses of dead animals. Typical foraging behavior includes long-distance reconnaissance flights, lengthy circling flights over a carcass, and hours of waiting at a roost or on the ground near a carcass. California condors travel up to 150 miles in a single day in search of food. They typically fly at a height of approximately 600 feet while in search of carrion. However, they have been recorded at heights of 15,000 feet while in flight (Zeiner et al. 1990).

The last wild California condors were captured in 1987 and taken into captivity due to the precipitous decline in the species (fewer than 20 remaining individuals). Captivity-produced condors, as well as some of the originally captured condors, have been reintroduced into the wild since 1992. The reintroductions in California have been focused in northeastern Ventura County (including the Sespe Condor Sanctuary), Big Sur mountains and coast, and Pinnacles National Monument. This species, which is considered a permanent resident of the semi-arid, rugged mountain ranges surrounding the southern San Joaquin Valley (i.e., Coast Range from Santa Clara County south to Los Angeles County, Transverse Ranges, Tehachapi Mountains, and southern Sierra Nevada), travels over a wide area when foraging. The species is known to regularly fly 35 miles or more from roost sites and occasionally travels even greater distances. Individuals that normally confine their activities to Ventura and Santa Barbara counties have occasionally been observed over the southern Sierra Nevada. The species roosts on cliffs and in large trees and snags in remote areas. Nest sites historically were sited in caves, crevices, behind rock slabs, or on large ledges on high sandstone cliffs. The first California condors produced in the wild in more than 20 years have hatched during the last five years. However, only one of the 10 chicks produced in the wild during this time has survived and is now two year old. The low

survivorship is likely related to the inexperience of the nesting pairs. In addition, one nestling was found to have died from the ingestion of broken glass, bottle tops, and other man-made items that were left littered in the nest site.

Potential foraging habitat for California condors was observed in the proposed project sites and buffer areas during biological surveys. This species may forage intermittently throughout the area, but is not expected to land in the proposed project sites. No known roosts or potential nesting sites (cliffs at higher elevations or old growth forest) were identified in the proposed project sites or buffer areas. No individual California condors were observed during biological surveys. Since the species is wide-ranging, and the buffer area provides potential foraging habitat the species has some potential to occur on site. The species is not expected to nest in the project area based on a lack of suitable nesting sites. No condor sightings have been documented in the immediate area of the proposed project site by CNDDB (CDFW 2013) and no individual condors were observed during field surveys.

Incidental Wildlife – Wildlife species that were recorded during focused surveys for special-status species are listed in Table 17. A few avian species protected under the Federal Migratory Bird Treaty Act were observed foraging during field surveys (see Table 17). Common raven may construct nests on power poles that occur along existing access roads, north of the proposed E&B Fee#271B-20 and E&B Fee#281D-20 project sites. Species such as horned lark and mourning dove nest on the open ground; as such, potential nesting habitat (annual grassland) for common bird species that use ground nests was observed in the proposed project sites and buffer areas.

Special-Status Plant Species

Oval-leaved snapdragon (*Antirrhinum ovatum*) is an annual herb that occurs in chaparral, cismontane woodland, pinyon juniper woodland, and valley and foothill grassland habitats. This species is known from a total of 16 occurrences and may appear only in favorable years (CNPS 2013). This species has not been recorded in the proposed project sites or buffer areas (CDFW 2013) and no individuals or evidence of this species was observed during focused surveys.

Round-leaved filaree (*California macrophylla*) is known to occur in California, Oregon, and Baja California. In California, it is known from scattered occurrences in the Sacramento and San Joaquin Valleys, southern North Coast Ranges, San Francisco Bay Area, South Coast Ranges, Channel Islands, Transverse Ranges, and Peninsular Ranges (Hickman 1996, CDFG 2011). Most of the recently documented occurrences are in the interior foothills of the South Coast Ranges (Gillespie 2003). The species occurs in clay soils in cismontane woodland, valley and foothill grassland. Though the species occurs in grasslands on friable clay soils (CNPS 2001, CDFW 2013), it may historically have been common on other soil types (Gillespie 2003). It has been found in non-native grassland on clay soils with a relatively low cover of annual grasses (Jones & Stokes 2002 and 2003). It most often occurs in foothill locations at elevations between 200 and 2,000 feet, but it has been collected from elevations as low as 30 feet and as high as 4,000 feet. Round-leaved filaree is an annual herb that blooms between March and May (CNPS 2013). This species has not been recorded in the project sites or vicinity (CDFW 2013). No individuals or evidence of this species was observed during focused surveys.

Pale-yellow layia (*Layia heterotricha*) has been reported from about 58 occurrences in the inner South Coast Ranges, eastern and western edges of the San Joaquin Valley, western Transverse Ranges, and Tehachapi Mountains (Hickman 1996, Calflora 2002, CDFW 2013). Many of these occurrences were derived from collections made prior to the 1950s. In 1988, attempts to locate historical occurrences were largely unsuccessful (Baldwin and Bainbridge 1992), but subsequent efforts have resulted in the documentation of at least 25 extant occurrences in Santa Barbara and Ventura counties. Pale-yellow layia blooms from March to June and then rapidly senesces after seed set. It occurs in grasslands and open areas in oak woodland, pinyon-juniper woodland, and sagebrush scrub below 5,200 feet elevation (CDFW 2013). The species grows on fragile soils variously described as sandy, calcareous, gypseous clay, decomposed shale, ultra-fine friable (dry bog) clay, clay vertisols, or alkaline clay (Hoover 1970, Twisselmann 1995, Lewis 1997, Stephenson and Calcarone 1999, CDFW 2013). On the Los Padres National Forest, it is most often associated with calcareous potreros and Lockwood clays. Baldwin (1994) noted that it often occurs on sites with "below-average exotic vegetative cover." Documenting trends in population abundance is complicated by the large natural variance in population numbers that occurs in response to yearly changes in annual rainfall. Wet years tend to favor the expression of pale-yellow layia populations, while in dry years few if any seeds germinate or the plants do not produce flowers. No individuals or evidence of the species was observed during focused surveys.

San Joaquin woolly-threads (*Monolopia congdonii*) historically occurred primarily in the San Joaquin Valley, with a few occurrences in the hills to the west and in the Cuyama Valley of San Luis Obispo and Santa Barbara counties. Many new occurrences of San Joaquin woollythreads have been discovered since 1986, primarily in the hills and plateaus west of the San Joaquin Valley. The largest extant population occurs on the Carrizo Plain Natural Area in San Luis Obispo County. Much smaller populations are found in Kern County near Lost Hills, in the Kettleman Hills of Fresno and Kings Counties, and in the Jacalitos Hills of Fresno County. The isolated occurrences are known from the Panoche Hills in Fresno and San Benito counties, the Bakersfield vicinity in Kern County, and the Cuyama Valley. However, the majority of occurrences in the San Joaquin and Cuyama Valleys were extirpated by intensive agriculture. In addition, several sites in and around Bakersfield were eliminated by urban and intensive oilfield development.

The phenology of San Joaquin woolly-threads varies with weather and site conditions. In years of below-average precipitation, few seeds of this species germinate, and those that do typically produce tiny plants. Seed germination may begin as early as November, but usually occurs in December and January. San Joaquin woolly-threads typically flowers between late February and early April, but flowering may continue into early May if conditions are optimal. Furthermore, populations in the northern part of the range tend to flower earlier than those in the south. Each plant may have from 1 to more than 400 flower heads. Seed production depends on plant size and the number of flower heads. The seeds are shed immediately upon maturity, and all trace of the plant disappears after senescence in April or May. Seed dormancy mechanisms apparently allow the formation of a substantial seed bank in the soil.

San Joaquin woolly-threads occur in non-native grassland, valley saltbush scrub, and other arid scrubs. This species typically occupies microhabitats with less than 10 percent shrub cover, although herbaceous cover may be either sparse or dense. Plant species that often occur with San Joaquin woolly-threads include red brome, red-stemmed filaree, goldfields (*Lasthenia* spp.), Arabian grass (*Schismus* spp.), and mouse-tail fescue (*Vulpia myuros*). The species occurs on sandy, sandy loam, or silty soils with neutral to subalkaline pH. No individuals or evidence of the species was found during focused surveys.

Based on CNDDB records, San Joaquin woollythreads (*Monolopia congdonii*) has been historically documented approximately 1.2 miles east and approximately 1.5 miles northeast of the proposed project sites. These CNDDB observations were recorded south of the Middle Water Pumping Station, and the locations are known from 1952 and 1954 Twissellmann plant collections. These CNDDB records indicate these locations may have been extirpated, as the vegetation was noted as degraded in 1989 (CDFW 2013).

Temblor buckwheat (*Eriogonum temblorense*) is an annual herb that occurs in valley and foothill grassland. This species is found on barren clay or sandstone substrates, in outcrop areas with little vegetation (CDFW 2013). Temblor buckwheat is often associated with steep slopes and/or shale soils (CNPS 2013). This species has not been documented in the project area (CDFW 2013). No individuals or evidence of this species was observed during surveys in the proposed project sites or buffer areas.

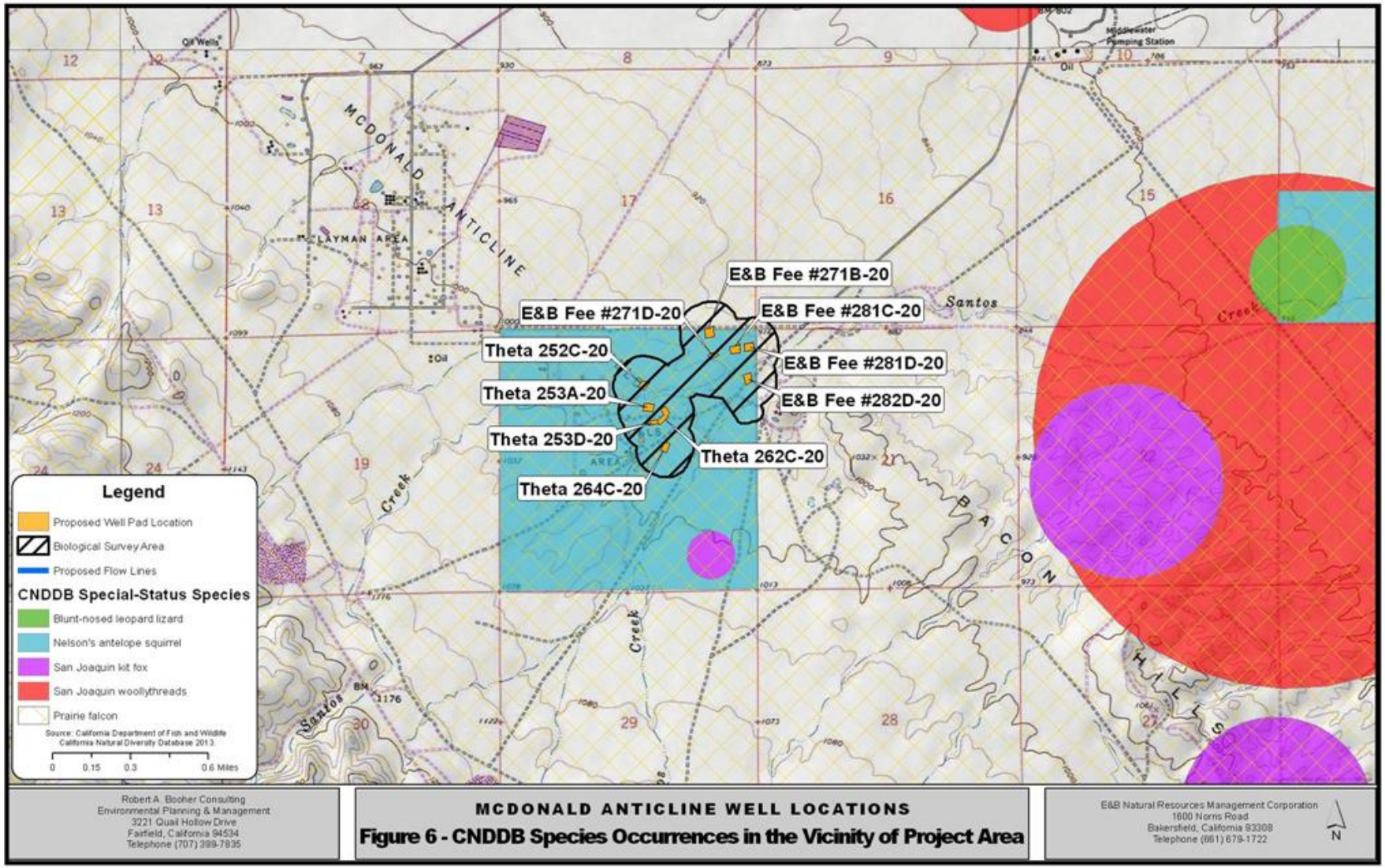
No special-status plants have been recorded in the project sites or buffer areas (CDFW 2013) (see Figure 6). No special-status plant species were identified during biological surveys within the proposed project sites or buffer areas. Although no sensitive plants were observed during biological surveys, they may potentially occur under favorable conditions in annual grassland habitat.

Habitat Types – Habitat types observed during field surveys are described further below: No perennial or intermittent streams, wetland, vernal pool, or other sensitive habitats were observed within the boundaries of the proposed project sites.

Non-Native Annual Grassland

The proposed project sites are located in non-native, annual grassland habitat. Common species found in this vegetative community were composed of introduced grasses and broadleaf weedy species. Plant species observed during field surveys included fiddleneck (*Amsinckia intermedia*), red brome (*Bromus madritensis* ssp. *rubens*), saltgrass (*Distichlis spicata*), doveweed (*Croton setigerus*), redstem filaree (*Erodium cicutarium*), and alkali goldenbush (*Isocoma arcadenia*).

Wildlife species observed in this community during field surveys included Western burrowing owl (*Athene cunicularia*), common raven (*Corvus corax*), horned lark (*Eremophila alpestris*), California ground squirrel (*Spermophilus beecheyi*), common side-blotched lizard (*Uta stansburiana*), and mourning dove (*Zenaida macroura*).


E&B Fee #271B-20
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E&B Fee #282D-20
Theta 252C-20
Theta 253A-20
Theta 253D-20
Theta 262C-20
Theta 264C-20
MCDONALD ANTICLINE
LAYMAN AREA
Santos
Creek
BACON HILLS
Legend
Proposed Well Pad Location
Biological Survey Area
Proposed Flow Lines
CNDDB Special-Status Species
Blunt-nosed leopard lizard
Nelson's antelope squirrel
San Joaquin kit fox
San Joaquin woollythreads
Prairie falcon
Source: California Department of Fish and Wildlife California Natural Diversity Database 2013.
0 0.15 0.3 0.6 Miles
Robert A. Booher Consulting
Environmental Planning & Management
3221 Quail Hollow Drive
Fairfield, California 94534
Telephone (707) 399-7835
MCDONALD ANTICLINE WELL LOCATIONS
Figure 6 - CNDDB Species Occurrences in the Vicinity of Project Area
E&B Natural Resources Management Corporation
1600 Norris Road
Bakersfield, California 93308
Telephone (661) 679-1722
N

Ruderal/Disturbed

This habitat type was observed in previously disturbed areas and along the edges of existing roads traveled throughout the McDonald Anticline Field. Common plant species found in this community were composed primarily of weedy non-native and native species. Vegetative species observed included fiddleneck (*Amsinckia intermedia*), red brome (*Bromus madritensis* ssp. *rubens*), doveweed (*Croton setigerus*), redstem filaree (*Erodium cicutarium*), Russian thistle (*Salsola tragus*), and yellow star-thistle (*Centaurea solstitialis*).

Wildlife use of this community is often limited due to the monocultural and weedy nature of plant species present. Although the diversity of wildlife is limited, species that do occur in the habitat type are often abundant and well adapted to the presence of humans and disturbance. Wildlife species observed in this community included San Joaquin antelope squirrel (*Ammospermophilus nelsoni*) and common raven (*Corvus corax*).

The biological assessment conducted for the project found that no special-status animal or plant species were present within the boundaries of the proposed project sites. No riparian, wetland, stream, vernal pool, or other sensitive community types were observed within the proposed project sites during our biological surveys and assessment. Santos Creek, an intermittent stream bisects the Bacon Hills area, trending in a west to east direction through the project area. Carneros Creek, an intermittent tributary to Santos Creek occurs east of the existing E&B production facility. These streams were observed to be dry during biological surveys. No construction activities are proposed in or along Santos Creek or Carneros Creek; therefore no impacts to these intermittent streams are expected to result from proposed project activities.

Direct mortality or injury to common wildlife and plant populations could occur during ground disturbance activities associated with implementation of the project. Small vertebrate, invertebrate, and plant species are particularly prone to impact during project implementation because they are much less to non-mobile, and cannot easily move out of the path of project activities. Other more mobile wildlife species, such as most birds and larger mammals, can avoid project-related activities by moving to other adjacent areas temporarily. Increased human activity and vehicle traffic in the vicinity may disturb some wildlife species. However, common wildlife species have likely become acclimated to livestock grazing and oil drilling and production activities. Because common wildlife species found in the project area are locally and regionally common, potential impacts to these resources are considered less than significant. Therefore, no avoidance or minimization measures are proposed at this time.

Implementation of the proposed project could potentially impact individual San Joaquin kit fox or their dens, should they become established within the proposed project sites or buffer areas prior to project implementation. Impacts to kit fox could occur through crushing by construction equipment during project activities. This species could also be affected due to noise and vibration from project activities if dens are located closer than 250 feet to the proposed project sites; project related noise and vibration could cause the abandonment of occupied den sites. Impacts to this species would be considered significant. Since two (2) burrows were observed approximately 130 feet southwest of proposed E&B Fee#271D-20 project site that may serve as potential dens for this species, den monitoring prior to earth disturbing activities associated with proposed project site preparation (i.e., grading and compacting) is recommended. In the unlikely event that a San Joaquin kit fox or dens are establish within a proposed project site or buffer area in the future, measures included as recommendations in the attached biological assessment report will be implemented as mitigation measures.

Implementation of the proposed project could potentially impact individual and nesting burrowing owls should they become established within the proposed project sites prior to project implementation. Impacts to this species could occur through crushing by construction and drilling equipment during implementation of project activities. Actively nesting burrowing owls could also be affected due to noise and vibration from project activities if nests are located closer than 250 feet to the proposed project sites; project related noise and vibration could cause the abandonment of active nest sites. Impacts to this species would be considered significant. Since two (2) burrows were observed approximately 130 feet southwest of proposed E&B Fee #271D-20 project site that may serve as potential for this species, additional surveys are recommended to determine species presence and document use in the area. In the unlikely event that burrowing owls become establish within a proposed project site or buffer area in the future, measures included as recommendations in the attached biological assessment report will be implemented as mitigation measures.

Implementation of the proposed project could potentially impact individual and nesting migratory bird species should they become established within the proposed project sites or buffer areas prior to project implementation. Impacts to migratory bird species could occur through crushing by construction and drilling equipment during implementation of project activities. Actively nesting birds could also be affected due to noise and vibration from project activities if nests are located closer than 250 feet to the proposed project sites; project related noise and vibration could cause the abandonment of active nest sites. Impacts to these species would be considered significant. In the event that nesting birds become established in the proposed project sites or buffer areas, measures included as recommendations in the attached biological assessment report will be implemented as mitigation measures.

Direct mortality or injury to sensitive animal populations could occur from earth-moving activities (i.e., grading and compacting), assuming that sensitive animal populations become established within the boundaries of the proposed project sites prior to or during project implementation. To protect sensitive animal species from potential impacts, measures included as recommendations in the attached biological assessment report will be implemented as mitigation measures. Biological surveys are recommended prior to earth disturbing activities associated with well site preparation and access road construction. Preconstruction surveys are also recommended prior to flow line construction and installation.

Although no special-status plant species were observed in the proposed project sites or buffer areas, there is potential, albeit low, for them to occur under more favorable conditions (CNPS 2013). Implementation of the proposed project could potentially impact individuals or populations of special-status plant species, should they become established within the proposed project sites prior to project implementation. Impacts to special-status plant species could occur through crushing by construction equipment, vehicles, or foot traffic during project activities. . To protect sensitive plant species from potential impacts, measures included as recommendations in the attached biological assessment report will be implemented as mitigation measures. Pre-construction surveys are recommended prior to earth disturbing activities associated with project site preparation and access road construction (i.e., grading and compacting) to ensure no sensitive plants are present

If the proposed oil wells prove productive, construction of flow lines will be required to transport oil and/or water to the existing E&B production facility. Special-status plants or animal species could potentially be impacted during this phase of the project, should they become established within the proposed project sites prior to project implementation. Direct mortality, injury, or crushing could occur from vehicles or equipment used for flow line construction. Assuming a sensitive species or population becomes established in the project sites, similar impacts could result from sleeper placement or trampling (foot traffic) during flow line installation. To

protect sensitive species or populations during flow line installation from potential impacts, measures included as recommendations in the attached biological assessment report will be implemented as mitigation measures.

Traffic, consisting predominantly of ranching vehicles within the project area varies from sporadic to moderate. Additional traffic associated with oil drilling and production occurs from ongoing activities in the project area, and on adjacent lands in vicinity to the proposed project area. A short-term increase in vehicle traffic is anticipated during project implementation and less so after project completion. This will result in a short-term increase in associated noise, which may cause temporary disturbance to common wildlife species. Increased vehicular traffic could cause direct mortality to these species or impede normal activities such as dispersal (Luckenbach 1975, Weinstein 1978). Species intolerant of human activities may use the proposed project site less when humans are regularly present in the area (Bushnel 1978, Lee and Griffith 1977). Those species observed at or near the proposed project sites appear to have acclimated to ongoing livestock grazing activities.

The project would not interfere with movements of wildlife species or with established native resident or migratory wildlife corridors. Native resident and/or migratory fish and known native wildlife nursery sites are not present within the proposed project sites or buffer area.

IVa. The biological assessment found no sensitive plant or animal species present within the proposed project sites and access roads. Those species observed at or near the proposed project sites or buffers of the proposed project sites appear to have acclimated to ongoing activities. However, to ensure there are no impacts to sensitive plants or sensitive animal species, E&B will be required to implement measures that were included in the biological assessment report as mitigation measures.

IVb. No riparian, wetland, stream, vernal pool, or other sensitive community types were observed within the footprint of the proposed project sites and existing or proposed access roads during the biological assessment. Therefore, the proposed project sites would not have any substantial adverse effect on sensitive natural communities.

IVc. No federally protected wetland habitat was observed within the footprint of the proposed project sites, existing or proposed access roads, or buffer areas during the biological assessment. Therefore, the proposed project sites would not have any substantial adverse effect on federally protected wetlands.

IVd. The proposed project sites would not interfere with movement of any wildlife species or with established native resident or migratory wildlife corridors. Native resident and/or migratory fish and known native wildlife nursery sites are not present within the proposed project sites or area. No impact.

IVe. The project as proposed would not conflict with any local policies or ordinances protecting biological resources or local tree preservation policies/ordinances. No native trees are present within the proposed project sites. The project will be in compliance with applicable policies and ordinances. No impacts are anticipated. As discussed above, land uses of this type are allowed if appropriate mitigation measures are implemented during project implementation (see the discussion in IV.a), and applicable agencies are consulted.

IVf. The proposed project occurs within the boundary of the Draft Kern County Valley Floor Habitat Conservation Plan (VFHCP), which is currently in the planning stage. However, there are no

adopted Habitat Conservation Plans, Natural Community Conservation Plans or other approved local, regional, or state habitat conservation plans in the project areas. No conflict is anticipated with any conservation plans.

Conclusion: No sensitive plant or animal species are present within the proposed project sites or access roads; however, measures included in the biological assessment report will be implemented as mitigation measures to reduce potential impacts to biological resources to a level of less than significant.

Mitigation Measures: In order to reduce potential impacts to biological resources to a less than significant level, the following mitigation measures will be implemented:

Biological 1 - As close to beginning of project activities as possible, but not more than 14 days prior to project activities, a qualified biologist shall conduct a final pre-construction survey of the proposed project sites to insure that no special-status wildlife species have recently occupied the project sites or buffer areas. A qualified biologist shall be present immediately prior to project activities that have potential to impact sensitive species to identify and protect potentially sensitive resources.

Biological 2 - Site boundaries shall be clearly delineated by stakes and /or flagging to minimize inadvertent degradation or loss of adjacent habitat during project operations. Staff and/or its contractors shall post signs and/or place fence around the site to restrict access of vehicles and equipment unrelated to drilling operations.

Biological 3 - An Environmental Awareness Program shall be conducted to orient all employees involved in project activities. The program shall consist of a brief presentation in which biologists knowledgeable of endangered species biology and legislative protection shall explain endangered species concerns. The program shall include a discussion of special-status plants and sensitive wildlife species. Species biology, habitat needs, status under the Endangered Species Act, and measures being taken for the protection of these species and their habitats as a part of the project shall be discussed.

Biological 4- A biological monitor is recommended during initial ground disturbance associated with proposed well site preparation, access road construction, and during sleeper placement for flow line installation.

Biological 5 – If any suitable small animal burrows become established within the proposed project sites prior to project implementation, E&B will implement a 50 foot avoidance buffer from the burrow.

Biological 6 - If San Joaquin kit foxes become established within the proposed project sites prior to project implementation, E&B will implement the following measures (4-9) contained in the USFWS's *Standardized Recommendations For Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (USFWS 2011). These measures also apply to potential dens observed within the buffer area:

a) For kit fox dens within 200 feet of proposed construction area(s), exclusion zones shall be established prior to construction by a qualified biologist. Exclusion zones shall be roughly circular with a radius of the following distances measured outward from the entrance:

Potential den	50 feet
Atypical den	50 feet
Known den	100 feet
Natal/pupping den (occupied and unoccupied)	UWFWS must be contacted

b) Protective exclusion zones can be placed around all known and potential dens which occur outside the project footprint (conversely, the project boundary can be demarcated).

c) To ensure protection of known dens, exclusion zones will be demarcated by fencing that encircles each den at the appropriate distance and does not prevent access to the den by kit foxes. Acceptable fencing includes untreated wood particle-board, silt fencing, or orange construction fencing, as long as it has opening for kit fox ingress/egress and keeps humans and equipment out.

d) Exclusion zone barriers shall be maintained until all construction related or operational disturbances have been terminated. At that time all fencing shall be removed to avoid attracting subsequent attention to the dens.

e) For potential and/or atypical dens, placement of 4-5 flagged stakes 50 feet from the den entrance(s) will suffice to identify the den location; fencing will not be required, but the exclusion zone must be observed.

f) Only essential vehicle operation on existing roads and foot traffic should be permitted. Otherwise, all construction, vehicle operation, material storage, or any type of surface-disturbing activity will be prohibited or greatly restricted within the exclusion zones.

Biological 7 - If a natal/pupping den is discovered within the project area or within 200-feet of the project boundary, the USFWS shall be immediately notified and under no circumstances will the den be disturbed or destroyed without prior authorization. If the preconstruction/pre-activity survey reveals an active natal pupping den or new information, E&B will contact the USFWS immediately to obtain the necessary take authorization/permit.

Biological 8 - Destruction of any known or natal/pupping kit fox den requires take authorization/permit from the USFWS. Limited destruction of kit fox dens may be allowed, if avoidance is not a reasonable alternative, provided the following procedures are observed:

a) Known dens occurring within the footprint of the project must be monitored for three consecutive days with tracking medium or an infra-red camera beam to determine the current use. If no kit fox activity is observed during this period, the den will be destroyed immediately to preclude subsequent use.

b) If kit fox activity is observed at the den during this period, the den will be monitored for at least five consecutive nights from the time of the observation to allow any resident animal to move to another den during its normal activity. Only when the den is determined unoccupied may the den be excavated.

c) Destruction of the den will be accomplished by careful excavation until it is certain that no kit foxes are inside. The den will be fully excavated, filled with dirt and compacted to ensure that kit foxes cannot reenter to use the den during the construction period. If at any point during excavation, a kit fox is discovered inside the den, the excavation activity shall cease immediately and monitoring the den as described above will resume. Destruction of the den may be completed when in the judgment of the biologist, the animal has escaped, without further disturbance, from the partially destroyed den.

Biological 9 - Potential dens occurring within the footprint of the project or within 50 feet must be monitored for three consecutive days with tracking medium or an infra-red camera beam to determine the current use. If no kit fox activity is observed during this period, the den will be destroyed immediately to preclude subsequent use.

a) Destruction of the den will be accomplished by careful excavation until it is certain that no kit foxes are inside. The den will be fully excavated, filled with dirt and compacted to ensure that kit foxes cannot reenter to use the den during the construction period. If at any point during excavation, a kit fox is discovered inside the den, the excavation activity shall cease immediately and monitoring the den as described above will resume. Destruction of the den may be completed when in the judgment of the biologist, the animal has escaped, without further disturbance, from the partially destroyed den.

Biological 10 - If any den was considered to be a potential den, but is later determined during monitoring or destruction to be currently, or previously used by kit fox (e.g., if kit fox sign is found inside), then all construction activities shall cease and the USFWS shall be notified immediately.

Biological 11 - Pre-construction nesting surveys shall be conducted for nesting migratory avian species in the project sites and buffer areas. Pre-construction surveys shall occur prior to the proposed project implementation, and during the appropriate survey periods for nesting activities. Surveys will follow required CDFW and USFWS protocols, where applicable. A qualified biologist will survey suitable habitat for the presence of these species. If a migratory avian species is observed and suspected to be nesting, a 250-foot buffer area will be established to avoid impacts to the active nest. If no nesting avian species are found, project activities may proceed and no further mitigation measures will be required. If active nesting sites are found, the following exclusion buffers will be established, and no project activities will occur within these buffer zones until young birds have fledged.

a) If ground disturbing activities occur during breeding season (February through mid-September), surveys for active nests will be conducted by a qualified biologist no more than 10 days prior to start of activities. Minimum no disturbance of 250 feet around active nest of non-listed bird species and 250 foot no disturbance buffer around migratory birds; and 0.5-mile no disturbance buffer from listed species and fully protected species until breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival.

Biological 12 - The following measures included in the CDFW's *Staff Report on Burrowing Owl Mitigation* (CDFG 2012) shall be implemented by E&B for the proposed project:

a) If preconstruction surveys determine that burrowing owls are present in the project sites and buffer areas, a burrowing owl mitigation plan shall be prepared by a qualified biologist describing recommended site specific shelter-in-place measures, worker training, and/or other measures to ensure that Project construction does not result in adverse impacts to the burrowing owls.

b) Occupied burrows shall not be disturbed during the burrowing owl nesting season (February 1 through August 31) unless a qualified biologist approved by the CDFW verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

c) Burrowing owls present in the project sites or within 500 feet (as identified during preconstruction surveys) shall be moved away from the disturbance area using passive relocation techniques. Prior to commencement of relocation, a management plan shall be prepared and approved by CDFW. Relocation shall be completed between September 1 and January 31 (outside of breeding season). A minimum of one or more weeks is required to relocate the owls and allow them to acclimate to alternate burrows. Passive relocation techniques will follow the CDFG Staff Report on Burrowing Owl Mitigation Guidelines (2012) and include the following measures:

    i. Install one-way doors in burrow entrances. Leave doors in place for 48 hours to ensure owls have left the burrow.

    ii. Allow one or more weeks for owls to acclimate to off-site burrows. Daily monitoring shall be required for the passive relocation period.

    iii. Once owls have relocated off-site, collapse existing burrows to prevent reoccupation. Prior to burrow excavation, flexible plastic pipe shall be inserted into the tunnels to allow escape of any remaining owls during excavation. Excavation shall be conducted by hand whenever possible.

    iv. Destruction of burrows shall occur only pursuant to a management plan approved by CDFW.

    v. As an alternative (if approved by CDFW), all occupied burrows identified off-site within 500 feet of construction activities outside of nesting season (September through January) and during nesting season (February 1 through August 31) could be buffered by hay bales, fencing (e.g. sheltering in place) or as directed by a qualified biologist and the CDFW.

Biological 13 - A project representative shall establish restrictions on project-related traffic to approved project areas, storage areas, staging and parking areas via signage. Off-road traffic outside of designated project areas shall be prohibited.

Biological 14 - Project-related traffic shall observe a 20 mph speed limit in all project areas except on County roads and State and federal highways to avoid impacts to special-status and common wildlife species.

Biological 15 - Project activities during the drilling phase of the proposed project shall be scheduled to avoid evening hours, as feasible, to avoid special-status wildlife species that are active in the nighttime.

Biological 16 - All vehicle operators shall check under vehicles and equipment before moving them if they have remained parked and/or idle for 10 minutes or longer.

Biological 17 - Hazardous materials, fuels, lubricants, and solvents that spill accidentally during project-related activities shall be cleaned up and removed from the project as soon as possible according to applicable federal, state and local regulations.

Biological 18 - All equipment storage and parking during site development and operation shall be confined to the proposed project sites.

Biological 19 - All excavated steep-walled holes or trenches in excess of three feet in depth shall be provided with one or more escape ramps constructed of earth fill to prevent entrapment of endangered species or other animals. Ramps shall be located at no greater than 1,000-foot intervals (for pipelines etc.) and at not less than 45-degree angles. Trenches shall be inspected for entrapped wildlife each morning prior to onset of project activities and immediately prior to the end of each working day. Before such holes or trenches are filled they shall be inspected thoroughly for entrapped animals. Any animals discovered shall be allowed to escape voluntarily without harassment before project activities related to the trench resume, or removed from the trench or hole by a qualified biologist and allowed to escape unimpeded.

Biological 20 - All pipes, culverts, or similar structures stored at the proposed project site overnight having a diameter of four inches or greater shall be inspected thoroughly for wildlife species before being buried, capped, or otherwise used or moved in any way. Pipes laid in trenches overnight shall be capped. If during project implementation a wildlife species is discovered inside a pipe, that section of pipe shall not be moved or, if necessary, moved only once to remove it from the path of project activity, until the wildlife species has escaped.

Biological 21 - Above ground flow lines shall be installed along existing access roads and/or existing pipeline routes. Concrete pipeline sleepers or supports shall be placed to avoid impacting all small mammal burrows.

Biological 22 - All food-related trash items such as wrappers, cans, bottles or food scraps generated during project activities shall be disposed of only in closed containers and regularly removed from the proposed project site. Food items may attract wildlife species onto the proposed well site, consequently exposing such animals to increased risk of injury or mortality. No deliberate feeding of wildlife shall be allowed.

Biological 23 - To prevent harassment or mortality of wildlife species via predation, or destruction of their dens or nests, no domestic pets shall be permitted on-site.

References:

Robert A. Booher Consulting, *Biological Assessment E&B Natural Resources Management Corporation, McDonald Anticline Project Kern County, California* **(**April 2013)

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California Department of Fish and Wildlife, *Staff Report on Burrowing Owl Mitigation* (CDFW 2012).

California Department of Fish and Wildlife**.** *Conservation and Mitigation Banks in California Approved by the Department of Fish and Wildlife***.**
Website: http://www.dfg.ca.gov/habcon/conplan/mitbank/catalogue/

United States Fish and Wildlife Service. *Conservation Plans and Agreements Database*.
Website: http://ecos.fws.gov/conserv_plans/public.jsp

United State Fish and Wildlife Service, *Standardized recommendation for protection of the San Joaquin kit fox prior to or during ground disturbance*, (USFWS 2011)

California Department of Fish and Wildlife, *Staff Report on Burrowing Owl Mitigation* (CDFW 2012).

California Department of Fish and Wildlife**.** *Conservation and Mitigation Banks in California Approved by the Department of Fish and Wildlife***.**
Website: http://www.dfg.ca.gov/habcon/conplan/mitbank/catalogue/

United States Fish and Wildlife Service. *Conservation Plans and Agreements Database*.
Website: http://ecos.fws.gov/conserv_plans/public.jsp
United States Code. 1918. Migratory Bird Treaty Act. 16 U.S.C. §§ 703–712. Revised August 2006.

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
V. CULTURAL RESOURCES				
Would the project:				
a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	_____	X	_____	
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	_____	X	_____	
c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	_____	X	_____	
d. Disturb any human remains, including those interred outside of formal cemeteries?	_____	X	_____	_____

Discussion: ASM Affiliates, Inc. (ASM) conducted a cultural resources record and information search of the proposed project sites in January 2013. The Phase I survey fieldwork was conducted on January 31, 2013, with parallel transects spaced at 15-meter intervals walked across the well pad study areas. The field methods employed included intensive, on-foot examination of the ground surface for evidence of archaeological sites, in the form of artifacts, surface features (such as bedrock mortars or historical mining equipment), and archaeological indicators (e.g., organically enriched midden soil or burnt animal bone) following the California Office of Historic Preservation Instructions for Recording Historic Resources, using DPR 523 forms. The results of the Phase I survey fieldwork is presented in Table 18. A copy of the ASM Affiliates report is attached.

The cultural resources record and information search for the project area was conducted at California State University, Bakersfield, Southern San Joaquin Valley Archaeological Information Center (IC). The archival records search was completed to determine: (1) if prehistoric or historical archaeological sites had previously been recorded within the E&B Natural Resources well pad study areas; (2) if the project area had been systematically surveyed by archaeologists prior to the initiation of this field study; and/or (3) whether the region of the field project was known to contain archaeological sites and to thereby be archaeologically sensitive. Records examined included archaeological site files and maps, the National Register of Historic Places, Historic Property Data File, California Inventory of Historic Resources, and the California Points of Historic Interest.

Table 18
Results from Phase 1 Survey

Well Name (Project Site)	Survey Results
Theta 252C-20	Situated on a nearly level, undeveloped plain bisected by several existing dirt roads, vegetation in the area of these pads consisted of annual grasses and small Russian thistle shrubs. An existing, in use cattle pen is located to the southeast of the well pads. No cultural resources were observed.
Theta 253A-20	Situated on a nearly level, undeveloped plain bisected by several existing dirt roads, vegetation in the area of these pads consisted of annual grasses and small Russian thistle shrubs. An existing, in use cattle pen is located to the southeast of the well pads. No cultural resources were observed.
Theta 253D-20	Situated on a nearly level, undeveloped plain bisected by several existing dirt roads, vegetation in the area of these pads consisted of annual grasses and small Russian thistle shrubs. An existing, in use cattle pen is located to the southeast of the well pads. No cultural resources were observed.
Theta 262C-20	Situated on a nearly level, undeveloped plain bisected by several existing dirt roads, vegetation in the area of these pads consisted of annual grasses and small Russian thistle shrubs. An existing, in use cattle pen is located to the southeast of the well pads. No cultural resources were observed.
Theta 264C-20	The proposed project site is located in the southern portion of the survey area. Located on a gently sloping alluvial fan with a southern aspect, vegetation is dominated by annual grasses. Evidence of livestock grazing and trampling is present throughout the well pad area. No cultural resources were observed.
E&B Fee #271B-20	The proposed project site is located in the northeast portion of the study area in a zone that is bisected by numerous dirt access roads. Situated on flat to gently sloping alluvial fan, the Santos Creek drainage bisects through the area trending northeast/southwest. Vegetation at the time of the study consisted of annual grasses and some Russian thistle shrubs. No cultural resources were observed.
E&B Fee #271D-20	The proposed project site is located in the northeast portion of the study area in a zone that is bisected by numerous dirt access roads. Situated on flat to gently sloping alluvial fan, the Santos Creek drainage bisects through the area trending northeast/southwest. Vegetation at the time of the study consisted of annual grasses and some Russian thistle shrubs. No cultural resources were observed.
E&B Fee #281C-20	The proposed project site is located in the northeast portion of the study area in a zone that is bisected by numerous dirt access roads. Situated on flat to gently sloping alluvial fan, the Santos Creek drainage bisects through the area trending northeast/southwest. Vegetation at the time of the study consisted of annual grasses and some Russian thistle shrubs. No cultural resources were observed.
E&B Fee #281D-20	The proposed project site is located in the northeast portion of the study area in a zone that is bisected by numerous dirt access roads. Situated on flat to gently sloping alluvial fan, the Santos Creek drainage bisects through the area trending northeast/southwest. Vegetation at the time of the study consisted of annual grasses and some Russian thistle shrubs. No cultural resources were observed.
E&B Fee #282D-20	The proposed project site is located in the northeast portion of the study area in a zone that is bisected by numerous dirt access roads. Situated on flat to gently sloping alluvial fan, the Santos Creek drainage bisects through the area trending northeast/southwest. Vegetation at the time of the study consisted of annual grasses and some Russian thistle shrubs. No cultural resources were observed.

The records search at the IC indicated that the study area had not been previously surveyed by archaeologists. No archaeological sites were known within the study area and, overall, the surrounding area exhibited little archaeological sensitivity. The Native American Heritage Commission (NAHC) was contacted and the NAHC *Sacred Lands File* did not have any cultural places recorded within the project area.

Va. The records search and Native American Consultation did not identify any cultural or historic resources at the proposed project sites. Based on these results, the proposed project is not anticipated to affect any historical resources; however during construction activities cultural or historic resources may be unearthed. Compliance with mitigation measures would reduce the potential impact to a less than significant level.

Vb. The records search and Native American Consultation did not identify any cultural or historic resources at the proposed project sites. The proposed project would include notification of personnel prior to ground disturbing activities of the possibility of buried prehistoric or historic cultural deposits. In the unlikely event prehistoric or historical cultural deposits are observed, compliance with mitigation measures would reduce the potential impact to a less than significant level.

Vc. The records search and Native American Consultation did not identify any cultural or historic resources at the proposed project sites. The proposed project would include notification of personnel prior to ground disturbing activities of the possibility of buried prehistoric or historic cultural deposits. In the unlikely event prehistoric or historical cultural deposits are observed, compliance with mitigation measures would reduce the potential impact to a less than significant level.

Vd. The records search and Native American Consultation did not identify any cultural or historic resources at the proposed project sites. In the unlikely event human remains are encountered, compliance with mitigation measures would reduce the potential impact to a less than significant level.

Conclusion: No impact to cultural resources. No cultural or historical resources were identified at the proposed project sites. In the unlikely event that such resources are unearthed during construction activities; the following mitigation measures and compliance with statute and regulations would reduce potential impacts to cultural resources to a level of less than significant, and will be required.

Mitigation Measures: In order to reduce potential impacts to cultural resources to a less than significant level, the following mitigation measures will be implemented:

Cultural 1 – In the unlikely event archeological resources are identified on a project site, all ground disturbing activities will cease and a qualified archaeologist will be retained by E&B to assess the significance of any find. The archeologist will have the authority to stop or divert the construction excavation as necessary. The archaeologist will evaluate the find in conformance with section 15064.5 of CEQA. A plan to mitigate any adverse impacts will be prepared by the archaeologist and contain procedures to follow. Work may proceed on the site once evaluation of the find is complete.

Cultural 2 – In the unlikely event paleontological resources are identified on a project site, a qualified paleontologist will be retained by E&B to assess the significance of any find and will have the authority to stop or divert the construction excavation as necessary. A plan to mitigate any adverse impacts will be

prepared by the paleontologist and contain procedures to follow. Work may proceed on the site once evaluation of the find is complete.

Cultural 3 – In the unlikely event human remains are discovered during construction of a project site, site personnel will contact the County Coroner and stop work as required by Public Resources Code §5097.98-99 and Health and Safety Code §7050.5. If the remains are determined to be Native American, the County Coroner will notify the NAHC in accordance with PRC §5097.98. E&B shall, in consultation with the identified descendants of the remains and/or NAHC, identify the appropriate measures for treatment or disposition of the remains.

References:

California Public Resources Code §5097.98-99, 15064.5

California Health and Safety Code §7050.5

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
VI. GEOLOGY AND SOILS				
Would the project:				
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i. Landslides?	_____	_____	_____	X
ii. Strong seismic ground shaking?	_____	_____	_____	X
iii. Seismic-related ground failure, including liquefaction?	_____	_____	_____	X
b. Result in substantial soil erosion or the loss of topsoil?	_____	_____	_____	X
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as result of the project, and potentially result in on-or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	_____	_____	_____	X
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1194), creating substantial risks to life or property?	_____	_____	_____	X
e. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	_____	_____	_____	X

Discussion: E&B proposes to construct ten well pads, identified as wells Theta 252C-20, Theta 253A-20, Theta 253D-20, Theta 262C-20, Theta 264C-20, E&B Fee #271B-20, E&B Fee #271D-20, E&B Fee #281C-20, E&B Fee #281D-20 and E&B Fee #282D-20, and drill an oil well from each of the proposed well pads. The proposed project sites consist of areas of natural lands/non-native annual grassland with nearby existing gas and oil wells on lands owned by Theta Oil and Land Company and Aera Energy LLC. State Highway 33 and oil fields roads provide access to the proposed project sites. Unpaved access roads also exist within the vicinity of the proposed project sites. Based on the result of the site visits conducted by Robert A. Booher Consulting on November 9 and 13, 2012, January 16 and 22, February 25 and March 5, 2013, the topography at the proposed project sites is relatively flat. No buildings or structures are currently present. The depth of the proposed wells range from 900 to 1,400 feet.

Regional Geological Setting

The proposed project sites are located in the Great Valley Geomorphic Province of California, which is an alluvial plain about 50 miles wide and 400 miles long. The Great Valley comprises the Sacramento Valley in the north and the San Joaquin Valley in the south. The alluvial plain is composed of thousands of feet of

sedimentary deposits that have undergone periods of subsidence and uplifting over millions of years. Most of the surface of the Great Valley is covered with Recent (Holocene, i.e., 10,000 years before present to present day) and Pleistocene (i.e.,10,000 to 1,800,000 years before present) alluvium. This alluvium is composed of sediments from the Sierra Nevada to the east and the Coast Range to the west that were carried by water and deposited on the valley floor. Siltstone, claystone, and sandstone are the primary types of sedimentary deposits. Surface elevations within the Great Valley generally range from several feet below mean sea level (msl) to more than 1,000 feet above msl.

The McDonald Anticline field lies on the western edge of the southern San Joaquin Valley, approximately fifty (50) miles west of Bakersfield, California. The field is located mostly in T. 28 S., R. 20 E. but extends into T. 28 S., R. 19 E., M. D. B. & M. It is about five miles west of South Belridge Oil field and two miles south of Antelope Hills Oil field. Commercial development in the field began in 1945. The field became known as McDonald Anticline because it was thought to be on a portion of a fold bearing that name which forms a part of the Temblor Range approximately one mile to the west. Now, however, it is evident that they are two separate structures. The McDonald Anticline Oil field is comprised of a number of small productive areas, some quite widely separated, located along an intensely faulted, steeply plunging, buried anticline. The topography, giving no indication of the underlying structure, is very flat except for the Bacon Hills which, for the most part, lie beyond the field but extend over a portion of the nose of the buried anticline The entire area is characterized by sparse desert vegetation that is even less in evidence in the immediate vicinity of the field.

The proposed project sites are in a seismically active region subject to future seismic shaking during earthquakes generated by active faults. The San Andreas Fault Cholame-Carrizo section is located approximately 7.2 miles west of the proposed project sites (see Figure 7). It is a right-lateral strike slip fault that extends over 700 miles from the Gulf of California to Cape Mendocino in northern California. Several historic earthquakes on the San Andreas Fault zone have produced significant ground shaking in the northwestern areas of Kern County. The most notable example is the January 9, 1857 Fort Tejon Earthquake, one of the greatest earthquakes ever recorded in the United States. The Fort Tejon Earthquake produced a surface rupture over 217 miles in length along the San Andreas Fault from Cholame on the north to the Cajon Pass area on the south. The epicenter of the Fort Tejon Earthquake was located approximately 25 miles southeast of the proposed project sites. This earthquake which was estimated to be near magnitude 8 produced an average slip of 15 feet and a maximum slip of 30 feet in the Carrizo Plain area. Strong shaking caused by the earthquake was reported to have lasted at least one minute. Accordingly, the proposed project site would be subject to future seismic shaking and strong ground motion resulting from seismic activity along local and more distant active faults. However, there are not habitable structures present at the project sites. Refs: Kern County Planning Department, Lost Hills Solar by NextLight, Notice of Draft Environmental Impact Report, March 2010 - http://www.co.kern.ca.us/planning/pdfs/notices/lost_hills_solar_nop.pdf and 2010 Fault Activity Map of California, California Geological Survey, Geologic Data Map No. 6 - http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

Additionally, the proposed project sites are not included within the boundaries of an “Earthquake Fault Zone,” as defined by the State of California in the Alquist-Priolo Earthquake Fault Zoning Act. Ref: http://gmw.consrv.ca.gov/shmp/

Soil liquefaction is a phenomenon which can potentially occur during periods of oscillatory ground motion caused by an event such as an earthquake. The pore water in a loose, saturated granular soil and some fine grained soils increases to the point where the effective stress in the soil is zero and the soil loses a portion of its shear strength (initial liquefaction). Structures founded on or above potentially liquefiable soils may experience

bearing capacity failures, vertical settlement (both total and differential) and lateral displacement (due to lateral spreading of the ground). The factors known to influence liquefaction potential includes soil characteristics (particle size, distribution, plasticity, water content), relative density, presence or absence of groundwater, stress tensor (effective confining stresses, shear stress), and the intensity and duration of the seismic ground shaking. The granular soils most susceptible are loose, saturated sands and non-plastic silty soils located below the water table.

According to United States Department of Agriculture Natural Resource Conservation Service mapping, the soils at the proposed project sites (See Figure 8 – Soils Map) are identified as follows: 196 - Milhan sandy loam (0-2% slopes), and 197 - Milham sandy loams (0-2% slopes) and 211 - Panoche clay loam. These soils are each described as: "This deep, well drained soil is on alluvial fans, plains and low terraces. It formed in alluvium derived dominantly from granitic and sedimentary rock. The vegetation in areas not cultivated is mainly annual grasses and forbs with scattered shrubs." Ref: 1) http://soildatamart.nrcs.usda.gov/manuscripts/CA666/0/kern.pdf, and 2) http://soildatamart.nrcs.usda.gov/manuscripts/CA666/0/map5.pdf.

According to the 2010 Geologic Map of California prepared by the California Department of Conservation soils located in the project area are considered to be unconsolidated and semi-consolidated younger Quaternary alluvium, lake, playa and terrace deposits. Such deposits are generally characterized as non-marine deposits because the proposed project sites are not located near the coast. Groundwater in the project area occurs at a depth of approximately 135 to 150 below ground surface. Additionally, based on evaluation of subsurface conditions by the Division, the McDonald Anticline Field contains no fresh water. Therefore, the potential for liquefaction at the proposed project sites are considered to be low. This is due to the absence of near surface groundwater and the generally dense subsurface materials. The proposed project sites will not include any habitable structures that would expose occupants to liquefaction potential. Therefore, the impacts related to seismic-related ground failure are considered to be less than significant. Ref: 2010 Geological Map of California, California Geological Survey, Geologic Data Map No. 2 - http://www.quake.ca.gov/gmaps/GMC/stategeologicmap.html

The proposed project sites lie in the relatively flat lying topography plain, where landslides would not be expected to occur. Therefore, impacts related to landslides are not expected to occur or pose a hazard to the proposed project sites.

VIa. The closest inhabited structure (residence) is located 2.27 miles south of the proposed project sites. The proposed project would not expose people or structures to potential adverse effects from landslides as the project topography is flat and there are no inhabited structures that would be impacted by strong seismic ground shaking, or seismic-related ground failure (including liquefaction and lateral spreading).

Several significant active faults are located in the vicinity (50 miles) of the proposed project, including the San Andreas, Pond Poso, and White Wolf faults. The San Andreas Fault Cholame-Carrizo section is the closest active fault located approximately 7.2 miles west of the proposed project sites. The proposed project sites are not located within any of the Alquist-Priolo Special Studies Zones of any of these faults.

Furthermore, the proposed drill rig has a low center of gravity with heavy base sub-structures that up to smaller top member. This design, with low center of gravity, along with support cables used to additionally stabilize the tower, effectively allows the rig to with stand shaking and movement without falling over.

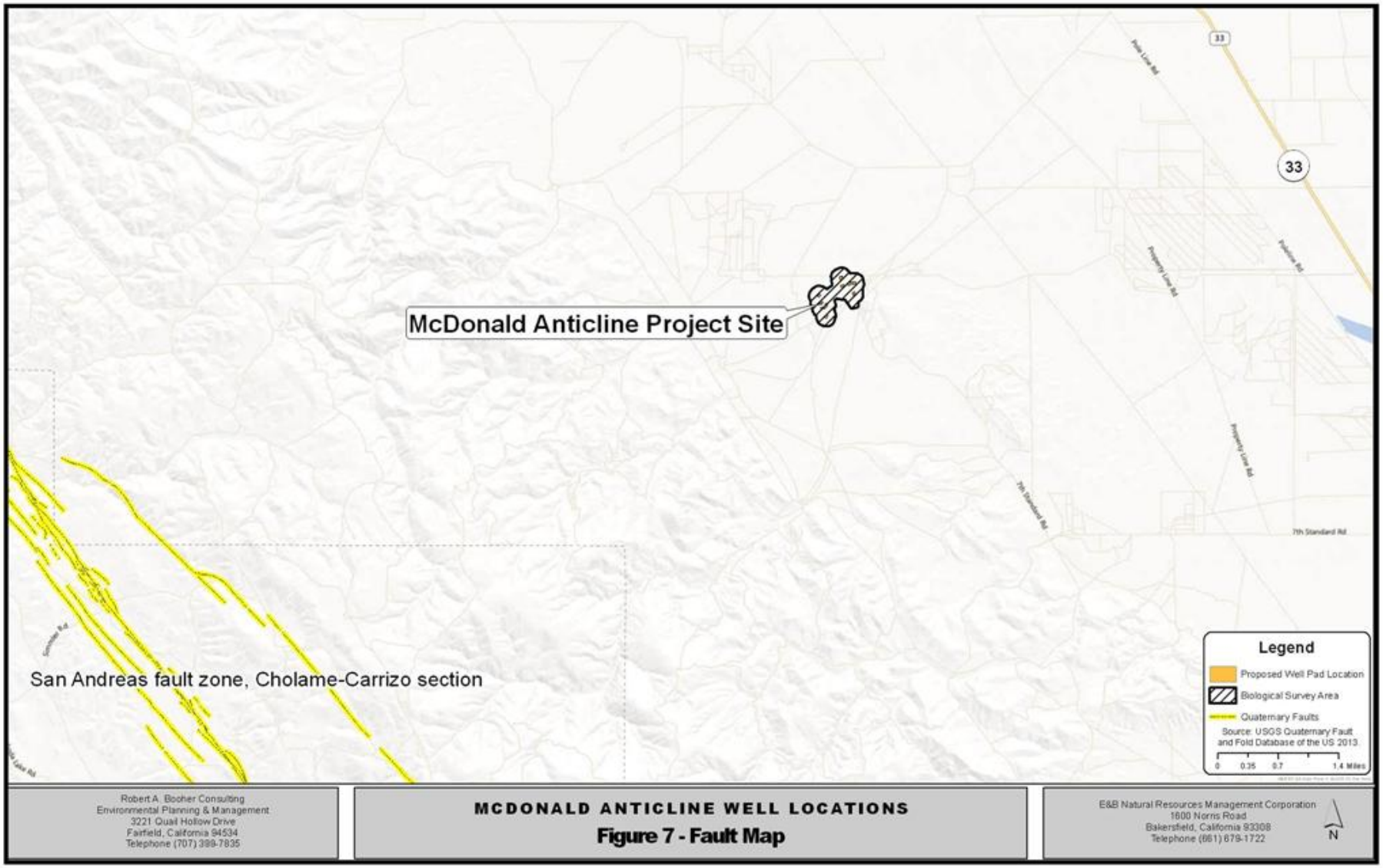
Project oil field equipment, including temporary drilling equipment during the drilling phase and the well head/pumping unit in the production phase is designed to meet American Petroleum Institute (API) Standards as well the California Building Code (CBC) in particular Title 24, Part 2, Chapter 17. Section 1708 details structural testing for seismic resistance and seismic design category as determined in CBC Section 1613. Section 1708.4 outlines specific design compliance by referring to American Society of Civil Engineers (ASCE) ASCE 7 Chapter 13 (13.2.1 & 13.2.2) specifications and recommendations. Both API and ASCE have adopted the same recommendations regarding seismic design.

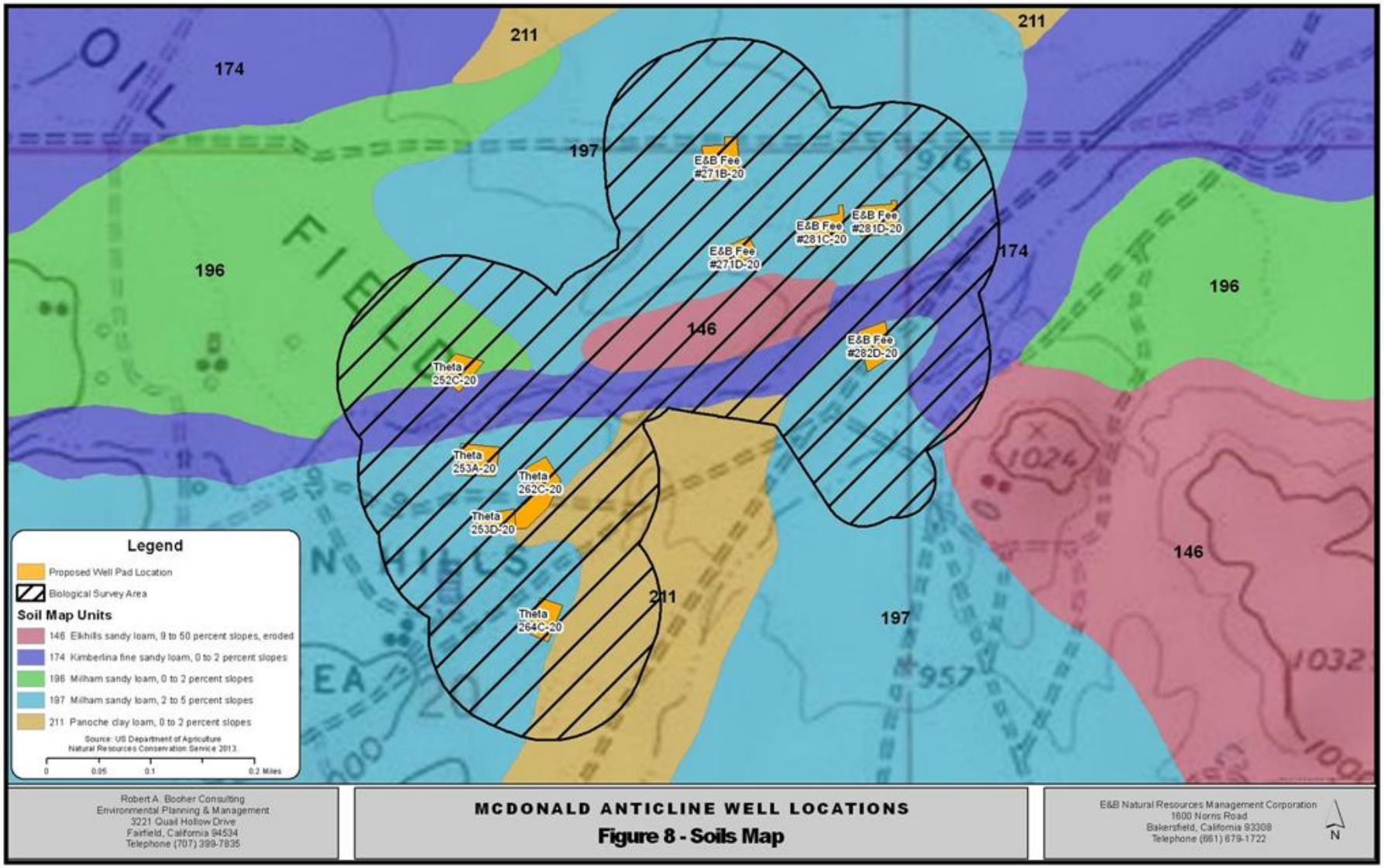
Kern County Building Code of Regulations provides oil field permit exemptions under section 17.08.060 providing compliance with API standards.

Additionally, Division regulations (CCR Section 1773.1) require secondary containment of all production facilities storing and/or processing fluids. The regulations require secondary containment capable of confining liquid for a minimum of 72 hours.

Additionally, in the event of an earthquake, the emergency response plan will be implemented to address potential releases of petroleum, produced water and other fluids. Accordingly, the proposed project will not expose people or structures to potential adverse effects from landslides, strong seismic ground shaking, or seismic-related ground failure (including liquefaction).

VIb. The proposed project will not result in substantial soil erosion or the loss of topsoil. The proposed project sites are flat, and the existing drainage patterns will be maintained. No impact is anticipated from soil erosion or loss of topsoil.


33
McDonald Anticline Project Site
San Andreas fault zone, Cholame-Carrizo section
Legend
Proposed Well Pad Location
Biological Survey Area
Quaternary Faults
Source: USGS Quaternary Fault and Fold Database of the US 2013
0 0.35 0.7 1.4 Miles
Robert A. Booher Consulting
Environmental Planning & Management
3221 Quail Hollow Drive
Fairfield, California 94534
Telephone (707) 399-7835
MCDONALD ANTICLINE WELL LOCATIONS
Figure 7 - Fault Map
E&B Natural Resources Management Corporation
1600 Norris Road
Bakersfield, California 93308
Telephone (661) 679-1722
N


211
174
211
197
E&B Fee #271B-20
E&B Fee #281C-20
E&B Fee #281D-20
E&B Fee #271D-20
174
196
196
146
E&B Fee #282D-20
Theta 252C-20
Theta 253A-20
Theta 262C-20
Theta 253D-20
Theta 264C-20
211
197
146
1024
1032
957
Legend
Proposed Well Pad Location
Biological Survey Area
Soil Map Units
146 Elkhills sandy loam, 9 to 50 percent slopes, eroded
174 Kimberlina fine sandy loam, 0 to 2 percent slopes
196 Milham sandy loam, 0 to 2 percent slopes
197 Milham sandy loam, 2 to 5 percent slopes
211 Panoche clay loam, 0 to 2 percent slopes
Source: US Department of Agriculture
Natural Resources Conservation Service 2013
0 0.05 0.1 0.2 Miles
Robert A. Booher Consulting
Environmental Planning & Management
3221 Quail Hollow Drive
Fairfield, California 94534
Telephone (707) 399-7835
MCDONALD ANTICLINE WELL LOCATIONS
Figure 8 - Soils Map
E&B Natural Resources Management Corporation
1600 Norris Road
Bakersfield, California 93308
Telephone (661) 679-1722
N

VIc. Any potential for subsidence resulting from the proposed project would be either as a result of groundwater overdraft or oil fluid withdrawal.

Groundwater overdraft subsidence is caused by aquifer-system compaction due to the lowering of ground-water levels by sustained ground-water overdraft. However, water for the proposed project will be purchased from Randy's Trucking meter located at Blackwells Corner, approximately 9.3 miles north of the proposed project sites. Accordingly, water use during the site preparation and drilling phases will have no impact on subsidence as a result of groundwater overdraft.

Oil fluid withdrawal subsidence is related to fluid withdrawal from oil fields. Subsidence related to fluid withdrawal in oil operations will not be an issue due to the character and depth of the formation. The proposed wells will be drilled to target the McDonald shale formation at a depth of 1,400 feet. Shale formations have porosity and permeability that allows fluids to flow through the formation in such a manner that structural stability is maintained and have structural strength that is not hydration dependent for structural stability. Accordingly, based on the depth of each of the wells and the geological formation of the target location, the wells will have no impact on subsidence due to oil fluid withdrawal.

Topography in the proposed project area is flat. Additionally, no evidence of historical landslides or mudslides was observed during site visits. No buildings or structures are currently present or proposed on the any of the proposed project sites. During ongoing production activities, the proposed project sites would be un-manned. Therefore, no impacts are expected.

VId. The proposed project sites are underlain by Milhan sandy loam and Panoche clay loam. a series of sandy loams which are classified as B-Class, well drained soils on flood plains and recent alluvial fans. These soils are each described as: "a well drained soil on alluvial fans, plains and low terraces." These soil types consist of non-expansive loams. Due to the loamy content of the soils along with proper moisture conditioning during compaction activities, these soils are not considered expansive. Therefore, there will be no impacts due to expansive soils.

VIe. The proposed project does not involve the construction of any facilities requiring the use of septic tanks or any waste disposal systems. Production water is the only potential wastewater that would be generated during project activities, and production water will be transported offsite by truck to the Central Valley Waste Water LLC Class II Disposal Well (SWCC-1) located in the South Belridge Oil Field. This SWCC-1 disposal well operates under a permit issued by Kern County and has been operating since March 2011. The SWCC-1 disposal well is located approximately 4 miles to the east of the proposed project sites. E&B anticipates that 15 barrels (630 gallons) of production water a day would be generated at each of the well sites that are put into production. No impact.

Conclusion: No impact.

Mitigation Measures: No impact identified. No mitigation necessary.

References:

United States Department of Agriculture, Natural Resources Conservation Service, Soil Survey of Kern County, Northwestern Part.
Website: http://soildatamart.nrcs.usda.gov/manuscripts/CA666/0/kern.pdf

Department of Conservation, California Geological Survey, Probabilistic Seismic Hazards Mapping Ground Motion Page.
Website: http://redirect.conservation.ca.gov/cgs/rghm/pshamap/pshamap.asp

Department of Conservation, California Geological Survey, Alquist-Priolo Earthquake Fault Zone Maps.
Website: http://www.quake.ca.gov/gmaps/ap/ap_maps.htm

Department of Conservation, California Geological Survey, Index to Landslide Maps in California.
Website: http://www.conservation.ca.gov/cgs/rghm/landslides/Pages/ls_index.aspx

USGS Earthquake Hazards Program, California-Nevada Fault Map, website address: http://earthquake.usgs.gov/earthquakes/recenteqscanv/FaultMaps/119-35.html.

Kern County Planning Department *"Draft Environmental Impact Report, Lost Hills Solar by Nextlight, Section 4.6 Geology", July 2010*
Website: http://www.co.kern.ca.us/planning/pdfs/eirs/lost_hills/lost_hills_solar_ch4.6.pdf

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
VII. GREENHOUSE GAS EMISSIONS				
Would the project:				
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	_____	_____	X	_____
b. Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	_____	_____	X	_____

Discussion: Global warming refers to an increase in the earth's average temperature as a result of increased concentration of greenhouse gases (GHG) in the atmosphere. GHGs include any gas that absorbs infrared radiation in the atmosphere. GHGs include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), halogenated fluorocarbons (HCFCs), ozone (O_3), perfluorinated carbons (PFCs), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF_6).

Over the past decades, there is growing evidence of increase temperatures and increased concentrations of GHGs in the atmosphere. In response to the possibility that the increased temperatures are a result of human activity, the Environmental Protection Agency (EPA), California Air Resources Board (CARB) and local governments have enacted regulations aimed at curbing GHG emissions. Several of these regulations are listed below.

- Revisions to the Clean Air Act (EPA) affecting Title V and PSD Sources (Tailoring Rule)
- Mandatory Reporting of GHG Emissions (EPA and CARB)
- CEQA Guidelines (California SB 97)
- Statewide GHG Reductions (California AB-32)
- Cap and Trade Regulation (CCR Article 5, Subarticle 2, Sections 95801-96022)

The current project would be exempt from permit requirements under the Title V or PSD programs as the annual emissions of criteria air pollutants are below 100 tons per year. The project would also be exempt from mandatory state and federal reporting since annual emissions are below 25,000 tons per year.

The project is subject to the December 2009 amended CEQA Guidelines Sections 15064 and 15064.4. These sections address the determination of significance of impacts from greenhouse gas emissions from a project as well as cumulative impacts. The updated CEQA Guidelines assert that a project would not have a significant impact either at a project level or cumulatively if the project complies with a previously approved plan or mitigation.

On December 17, 2009, SJVAPCD adopted District's Policy for addressing GHG emissions and impacts. This policy was for both the District and other lead agencies when addressing GHG impacts. This policy does not recommend the use numerical thresholds. Instead, it advocates that projects comply with other emission reduction plans under AB-32. Projects complying with such plans are considered to have less than significant impact on global climate change. Under such a scenario, impacts will be considered less than significant individually and cumulatively.

IIa,b. RAB Consulting prepared emissions calculations to determine GHGs emitted by the proposed project. GHG emissions were estimated using Road Construction Emissions Model, Version 6.3.2 software, which is recommended by the SJVAPCD for use in calculating air emissions for this type of project. This program determined that CO_2 will be released from the project. In addition to CO_2, trace amounts of N_2O and CH_4 will also be released during the fuel combustion process. However, N_2O and CH_4 will contribute less than 1% of the total amount GHG generated during the project.

GHG emissions for the project were estimated based on lists of equipment for each phase of the project and the corresponding assumptions provided by E&B. Equipment proposed for use during the proposed project and corresponding assumptions are found in Tables 6, 7, 8, 9, 10 and 11 in Section III, Air Quality.

Table 19 summarizes the tons per year of GHG emissions that could be produced during the site preparation, drilling, testing and completion, production equipment installation, production, and plugging and abandonment phases of the proposed project.

Table 19
Summary of Greenhouse Gas Emissions

Project Phase	**CO_2**			**CO_2(e)**	
	1 Well *(ton/yr)*	All Wells *(ton/yr)*	Ratio[1] *CO2(e)/CO2*	1 Well *(ton/yr)*	All Wells *(ton/yr)*
Site Preparation Phase	0.80	8.0	1.0034	0.80	8.0
Drilling Phase	59	592.0	1.0034	59.40	594
Testing & Completion Phase	3.7	37.0	1.0034	3.71	37
Production Equipment Installation Phase	3.4	34.0	1.0034	3.41	34.1
Production Phase	101	1010.0	1.0034	101.34	1013.4
Plugging & Abandonment Phase	3.7	37.0	1.0034	3.71	37.1
Project Total	**172**	**1,718**		**172.4**	**1,723.8**

1 - See Attachment B for calculation of the CO2(e)/CO2 Ratio

Significance of GHG Emissions

E&B is a private company engaged in drilling and production of oil and gas resources in California. As a company, E&B is subject to and compliant with Cap and Trade regulations. Cap and Trade has been adopted in California for reducing GHG emissions from certain industries, such as oil and gas drilling and production.

Compliance with Cap and Trade regulations specifically allow for growth in emissions from individual projects as long as there is an overall reduction in emissions. As a result, GHG emissions from the current project would be fully mitigated.

Conclusion: Impacts resulting from GHG emissions will be less than significant.

Mitigation Measures: No impact identified. No mitigation necessary.

References:

San Joaquin Valley Unified Air Pollution Control District, Final Draft *Addressing Greenhouse Gas Emission Impacts Under the California Environmental Quality Act. (*December 2009*)*
Website: http://www.valleyair.org/programs/CCAP/12-17-09/1%20CCAP%20-%20FINAL%20CEQA%20GHG%20Staff%20Report%20-%20Dec%2017%202009.pdf

San Joaquin Valley Unified Air Pollution Control District, *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA,(*December 2009)
Website: http://www.valleyair.org/Programs/CCAP/12-17-09/3%20CCAP%20-%20FINAL%20LU%20Guidance%20-%20Dec%2017%202009.pdfGas Emissions under the California Environmental Quality Act"

San Joaquin Valley Unified Air Pollution Control District, *Rule 2280 Portable Equipment Registration*
Website: http://www.valleyair.org/rules/1ruleslist.htm

USEPA Standards for Non-Road Diesel Engines
The engines must comply with federal 40 CFR 1068 requirements. Tier 3 and older engines must comply with 40 CFR 89. Newer engines (Tier 4) must comply with 40 CFR 1039. We note that compliance with these requirements is handled by the engine manufacturer before the engines can be sold in California.

CARB Standards
The engines must meet CARB standards as regulated in the California Code of Regulations, Sections 2421 to 2427 of Title 13, Division 3, Chapter 9, Article 4.

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
VIII. HAZARDS & HAZARDOUS MATERIALS *Would the project:*				
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	_____	X	_____	_____
b. 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?	_____	X	_____	_____
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	_____	_____	_____	X
d. Be located on a site which is included on a list of hazardous materials compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment?	_____	_____	_____	X
e. 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?	_____	_____	_____	X
f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	_____	_____	_____	X
g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	_____	_____	_____	X

h. 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?	_____	_____	_____	X

Discussion: The proposed project sites are located on land currently used for cattle grazing and oil and gas production. Project activities with the exception of production require minimal transportation, use or storage of hazardous materials including fuels, oils, lubricants, hydraulic fluids and solvents used at the proposed project site. All hazardous materials will be transported and stored according to the following applicable federal, state and local regulations:

Federal:
- Clean Water Act
- Resource Conservation and Recovery Act – 40 Code of Federal Regulations (CFR) Parts 240-299
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
- National Oil and Hazardous Substances Pollution Contingency Plan
- Spill Prevention, Control, and Countermeasures Plan – 40 CFR Part 112
- Occupational Safety and Health Standards (Title 29 CFR Parts 1910 and 1926)

State:
- Porter-Cologne Water Quality Control Act (Porter-Cologne) (Cal. Water Code, § 13000 et seq.)
- Hazardous Waste Control Law, California Health and Safety Code Sections 25100-25249
- California Health and Safety Code Sections 25359.60-25395.106 and Sections 25395.110-25395.119

Local:
- Kern County General Plan, Safety Element
- Kern County Hazardous Waste Management Plan
- Kern County Emergency Operations Plan
- Kern County Multi-Hazard Mitigation Plan

Portable tanks and mud pits will be used for mixing and storing drilling fluids. All fluids will be disposed of in accordance with the requirements of the Central Valley Regional Water Quality Control Board (RWQCB). If a reserve pit/sump is used, the use and closure of the reserve pit/sump will be handled in accordance with Title 27, CCR, Section 20090(g), and Regional Board Waiver Resolution No. R5-2008 - 0182.

If economic quantities of oil are discovered, a given well will be completed and production equipment including a well head and API 10 hp electronic motor pumping unit will be installed on site. Flowlines will be installed aboveground adjacent to the existing and proposed access

roads. The proposed flowlines will connect the proposed wells to the existing E&B production facility located west of the E&B Fee #271B-20, E&B Fee #271D-20, E&B Fee #281C-20, E&B Fee #281D-20 and E&B Fee #282D-20 project sites and east of the Theta 252C-20, Theta 253A-20, Theta 253D-20, Theta 262C-20 and Theta 264C-20 project sites. The proposed flowlines will measure approximately 6,167 feet in length (see Figure 2). E&B proposes to paint all production equipment in camouflage or an earthen tone to blend in with the environment and to prevent glare. E&B estimates that approximately two (2) days would be required for flow line installation activities for each well. E&B anticipates 15 barrels of oil and 15 barrels of production water will be produced daily from each well. The oil will be transported from the E&B production facility by truck and sold to Conoco Phillips Company located at 6601 Franco Western, McKittrick, California 93251. Accordingly, assuming all ten wells go into production, E&B estimates that 11 truck trips per week will be required to transport the oil to Conoco Phillips Company. The production water will be transported offsite from the existing E&B Production Facility by truck to the Central Valley Waste Water LLC Class II Disposal Well (SWCC-1) located in the South Belridge Oil Field for disposal. This SWCC-1 disposal well operates under a permit issued by Kern County and has been operating since March 2011. The SWCC-1 disposal well is located approximately 4 miles to the east of the proposed project sites. Accordingly, assuming all ten wells go into production, E&B estimates that 11 truck trips per week will be required to transport the production water from the existing E&B Production Facility to the SWCC-1 disposal well. The production site will be inspected daily, which will result in a further daily pick-up truck round-trip.

The nearest public airport is the Lost Hills-Kern County Airport (Hwy 46 and Lost Hills Road, Lost Hills, CA 93429) located 14.0 miles northeast of the proposed project sites. The closest residence to the proposed project sites is located between approximately 2.27 miles south of the proposed project sites.

VIIIa. There is potential for accidental releases of hazardous materials during project operations, also including a potential for an accidental release during drilling operations if there were a blowout; however, as required by Division regulations (CCR Section1722.2-1724.10) surface casing will be set, cemented, and blowout prevention equipment will be installed at each of the wellheads and tested to minimize the potential releases associated with blowouts. Potential impacts associated with the accidental release of these materials depend on the quantity and type, the location where it is used, the toxicity or other hazardous characteristics of the material, and whether it is transported, stored, and used in a solid, liquid, or gaseous form. A Spill Contingency Plan shall be required in accordance with CCR Section 1772.9.

With the implementation of the standard preventive and mitigation measures presented below, the proposed project will not impact the public or the environment through the routine transport, use, or disposal of hazardous materials.

VIIIb. See VIIIa.

VIIIc. No existing or proposed schools are located within one-quarter mile of the proposed project sites. The Belridge School District is located 4.8 miles southeast of the proposed project sites. Therefore, the proposed project will not have the potential to emit hazardous emissions or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. No impact.

VIIId. The proposed project sites were not identified as a hazardous material/hazardous waste facility site on any of the California hazardous materials regulatory agency database websites. A search of the proposed project sites in the California Environmental Protection Agency (Cal/EPA) Cortese List compiled pursuant to Government Code Section 65962.5 for the California Department of Toxic Substances hazardous waste sites, the Envirostor database of sites where hazardous substances have been released; and Geotracker, the California database of leaking underground storage tanks, were negative. No impact.

VIIIe,f. The nearest public airport is the Lost Hills-Kern County Airport (Hwy 46 and Lost Hills Road, Lost Hills, CA 93429) located 14.0 miles northeast of the proposed project sites. Therefore, the proposed project sites will not result in a safety hazards for people residing or working in the project area related to public airport activities.

VIIIg. The proposed project sites are located in a rural area with access provided from State Highway 33; and established oil field roads provide access to the proposed project sites. Therefore, no impacts related to impairment of or physical interference of any existing or adopted emergency response plan or emergency evacuation plan would occur.

VIIIh. The proposed project sites are not located in a wildland area. No permanent buildings or structures are proposed as part of the project. It is designated Non-wildland/Non-urban in the Kern County Local Responsibility Area. It is designated as "Moderate" in the Fire Hazard Severity Zone map prepared by the California Department of Forestry and Fire Protection (CalFire). The proposed project will not increase fire risk in wildland areas. Fire protection is provided by the Kern County Fire Department Station 26 located at 14670 Lost Hills Road, Lost Hills, California. No permanent structures are proposed as part of the project. No impact.

Conclusion: Mitigation measures shall reduce any potential impacts relative to hazards and hazardous materials to a level of less than significant.

Mitigation Measures: The following mitigation measures will be implemented to avoid and/or minimize potential impacts resulting from hazards or hazardous materials:

Hazards 1 - All hazardous materials such as diesel fuel shall be stored according to the California Code of Regulations (CCR) Title 22, 23, 26 & 27 and California Fire Codes (CFR) Title 24 and Kern County hazardous materials ordinance and Material Safety Data Sheets shall be on the site. Waste materials shall be managed properly in accordance with requirements that comply with, or are authorized by, the Code of Federal Regulations (40 CFR) and refined in California through CCR, Title 14, 22,

23, 26 & 27. Training shall be provided to all personnel involved in handling of hazardous materials/waste.

Hazards 2 - In order to minimize potential impacts associated with a blowout, E&B shall comply with CCR Title 14, Division 2, Chapter 4, Articles 3 and 4, specifically Article 4, Sections 1941-1942. Requirements for well casing design and blowout prevention equipment are regulated by the Division. Division engineers shall be notified for required tests and other operations.

Hazards 3 - A Spill Contingency Plan shall be required in accordance with CCR Section 1772.9 and a copy of the plan shall be kept on site. The plan shall discuss methods to avoid and/or minimize impacts in the event of a release. The purpose of the plan shall be to ensure that adequate containment will be provided to control accidental spills, that adequate spill response equipment and absorbents will be readily available, and that personnel will be properly trained in how to control and clean up any spills.

Hazards 4 - All above ground storage tanks will be located within a bermed area which provides a storage volume of at least 110% of the storage volume of the largest tank. Daily inspections of the above ground storage tanks will be conducted and an inspection log will be maintained for review by regulatory agency personnel. The inspection log will also document corrective actions taken, if necessary.

Hazards 5 - Fluid disposal shall follow RWQCB regulations (CCR Title 23 Waters).

Hazards 6 - If project development uncovers any previously unknown oil, gas, or injection wells, the Division shall be notified. If unrecorded wells are uncovered during excavation or grading, remedial plugging operations may be required.

References:

Central Valley Regional Water Quality Control Board, *Laws and Regulations*
Website: http://www.waterboards.ca.gov/centralvalley/laws_regulations/

California State Water Resources Control Board, *Geotracker*
Website: http://geotracker.waterboards.ca.gov

California Department of Forestry and Fire Protection, *Kern County FHSZ Maps*
Website: http://www.fire.ca.gov/fire_prevention/fhsz_maps/fhsz_maps_kern.php and

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources, *Publications: Laws and Regulations*
Website: http://www.conservation.ca.gov/dog/pubs_stats/Pages/law_regulations.aspx

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources,

Publications: Laws and Regulations

Website: http://www.conservation.ca.gov/dog/pubs_stats/Pages/law_regulations.aspx

California Code Regulations Title 14 CCR

Website: ftp://ftp.consrv.ca.gov/pub/oil/publications/PRC04_January_11.pdf

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
IX. HYDROLOGY AND WATER QUALITY				
Would the project:				
a. Violate any water quality standards or waste discharge standards?	_____	_____	_____	X
b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	_____	_____	_____	X
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on-or off-site?	_____	_____	_____	X
d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-or off-site?	_____	_____	_____	X
e. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	_____	_____	_____	X
f. Otherwise substantially degrade water quality?	_____	_____	_____	X
g. Place housing within a 100-year flood hazard area?	_____	_____	_____	X
h. Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	_____	_____	_____	X
i. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	_____	_____	_____	X
j. Inundation by mudflow?	_____	_____	_____	X

Discussion: The proposed project sites fall within the Tulare Lake-South Valley-Antelope Plain Watershed. The watershed supports a variety of water uses including municipal and agricultural supply systems and recreation. Surface water in many areas is intimately connected with the ground water, thereby having a profound effect on local groundwater supplies. As previously discussed, no hydraulic fracturing is proposed as part of this project. The proposed project would not alter current drainage patterns in the project area. Approximately 500 bbls of water will be required for the site preparation and drilling phases of each well. All water required will be obtained from Randy's Trucking meter located at Blackwells Corner located 9.3 miles north of the proposed project sites and no new entitlements will be required.

IXa. The proposed project sites will not conflict with applicable water quality and waste discharge standards relating to hydrology and water quality. The project will comply with all requirements established by the Central Valley Regional Water Quality Control Board (CVRWQCB). CVRWQCB Waiver Resolution No. R5-2008-0182 waives the requirement to file a Report of Waste Discharge and/or issue Waste Discharge Requirements for the temporary discharge of drilling mud to a sump (pit). Resolution No. R5-2008-0182 includes several conditions including: a sump design must assure no overflow; drilling mud can remain in a sump only if it can be demonstrated to be non-hazardous; drilling mud in a sump must be dried by evaporation or pumping; and the site must be restored to pre-sump conditions and the area shall be restored within 60 days of completion of a well. Resolution No. R5-2008-0182 expires December 4, 2013. If drilling occurs after December 4, 2013, Tamarack will contact CVRWQCB to inquire on the status of Resolution No. R5-2008-0182, and inquire whether an additional form (i.e. Report of Waste Discharge) is required. The solids that accumulate in the mud pits/tanks can be reused if it is demonstrated that they are nonhazardous. If any wastes test positive for hazardous material they will be disposed of at the Clean Harbors Buttonwillow, LLC, located at 2500 West Lokern Road, Buttonwillow, CA, 93206 with a permitted capacity of 10,482 tons/day. The Clean Harbors Buttonwillow facility is located 13.8 miles to the southeast of the proposed project sites.

Based upon the California Department of Water Resources Water Data Library 2013, groundwater in the project area occurs at a depth of approximately 135 to 150 below ground surface. Additionally, based on evaluation of subsurface conditions by the Division, the McDonald Anticline Field contains no fresh water. As a result, groundwater is not expected to be encountered during site preparation or other project surface activity and operations. However, in the unlikely event that shallow ground water is encountered while constructing the sump, drilling mud shall be contained in aboveground tanks. The project will not cause direct or indirect wastewater discharges that will result in an exposure to levels of hazardous materials that will adversely affect human health, wildlife or plant species. No impact.

IXb. E&B shall follow all applicable statutes and regulations; therefore, the project will not degrade groundwater quality or interfere with groundwater recharge, or deplete groundwater resources in a manner that will cause water-related hazards such as subsidence. Water will be purchased from Randy's Trucking meter and no new entitlements will be required. In compliance with Division regulations, California

Code of Regulations (CCR) Title 14 Division 2, Chapter 4, Articles 3, E&B shall install and cement surface casing to prevent blowouts and contamination of fresh water aquifers. Division regulations specify that the base of fresh water must be protected with cemented casing to prevent any contamination from migrating fluids encountered in oil and gas zones. The regulations also specify that oil and gas zones must be protected with cemented casing to prevent any contamination from infiltrating water. Division engineers review the drilling and completion operations to ensure these requirements have been met. Based upon the California Department of Water Resources Water Data Library 2013, groundwater in the project area occurs at a depth of approximately 135 to 150 below ground surface. Based on evaluation of subsurface conditions by the Division, the McDonald Anticline Field contains no fresh water. The production water will be transported offsite from the existing E&B Production Facility by truck to the Central Valley Waste Water LLC Class II Disposal Well (SWCC-1) located in the South Belridge Oil Field for disposal. This SWCC-1 disposal well operates under a permit issued by Kern County and has been operating since March 2011. The SWCC-1 disposal well is located 4 miles to the east of the proposed project sites. Therefore, the project will not be expected to substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there will be a net deficit in aquifer volume or a lowering of the local groundwater table level. No impact.

IXc-d. Even though the total area of disturbance exceeds 1.0 acre and compliance with the General Permit to Discharge Storm Water with Construction Activity (WQ Order No. 99-08-DWQ) is required, the project will not alter the current drainage pattern of the proposed project in a manner that will promote flooding, erosion or siltation either on or off the site. The project will maintain existing agricultural drainage patterns. The project will create minimal runoff as the total area of the proposed project sites is 5.91 acres in size and flat. However, as there are no existing or planned stormwater drainage systems, the capacity of these systems cannot be exceeded. No impact.

IXe. There are no existing or planned stormwater drainage systems; therefore the capacity of these systems cannot be exceeded. The total project area of disturbance is greater than one (1) acre. The calculated rainfall erosivity factor (R-factor) for the proposed project is 2.55. As the calculated R-factor is less than 5, E&B will be required to submit a Notice Of Intent (NOI) to the State Water Resources Control Board for a erosivity waiver certification for the proposed project. Accordingly, E&B will not be required to prepare and submit a Storm Water Pollution Prevention Plan to comply with the terms of the General Permit to Discharge Storm Water with Construction Activity (WQ Order No. 2009-0009 DWQ).

IXf. See IXa-e.

IXg. The proposed project sites are not located within the 100 year flood zone (A). In addition, the proposed project does not include construction of any housing within a 100-year flood hazard area. No impact.

IXh. The proposed project sites are not located within the 100 year flood zone (A). No impact.

IXi. The proposed project sites are not located within the 100 year flood zone (A). The closest dam to the proposed project sites is the Berrenda Mesa Dam located 9.3 miles to the northwest of the proposed project sites. Based upon the result of the site visit conducted by RAB Consulting on November 9 and 13, 2012, January 16 and 22, February 25 and March 5, 2013, there were no levees observed in vicinity of the proposed project sites. Accordingly, the project as proposed will not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam. No impact.

IXj. No evidence of past mudflows was observed within or adjacent to the proposed project sites. The proposed project would not be impacted by mudflow due to the topography of the area. No impact.

Conclusion:

Mitigation measures shall reduce any potential impacts relative to hydrology and water quality to a level of less than significant.

Mitigation Measures:
The following mitigation measure will be implemented to reduce any potential impacts relative to hydrology and water quality:

Hydrology 1 – E&B will provide a copy of the submitted NOI and verification of an approved erosivity waiver from the SWRCB to the Division prior to initiation of the project.

References:
Calflora, *Watersheds in Kern County*
Website: http://www.calflora.org/app/wgh?page=wcprofile&cc=KRN

California Department of Conservation, *California Oil & Gas Fields Volume 1 – Central California*
Website: http://www.conservation.ca.gov/dog/pubs_stats/Pages/technical_reports.aspx

California Department of Resources, Recycle, and Recovery, *Active Landfills Profile*
Website: www.calrecycle.ca.gov

California Department of Water Resources, *Water Data Library*
Website: http://www.water.ca.gov/waterdatalibrary/

Federal Emergency Management Agency, *Map Service Center*
Website: http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping

Kern Council of Government, *Flood Plain & Dam Inundation Areas* –
Website: http://www.kerncog.org/maps/MEAR_atlas/21FloodPlainandDamInnundationAreas.pdf)

State Water Resources Control Board, *Construction General Permit Risk Assessment R-Factor Calculation Notification*
Website: http://www.swrcb.ca.gov/water_issues/programs/stormwater/docs/constpermits/cgp_r_factor

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
X. LAND USE AND PLANNING *Would the project:*				
a. Physically divide an established community?	_____	_____	_____	X
b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	_____	_____	_____	X
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?	_____	_____	_____	X

Discussion: Primary land uses within the proposed project area include cattle grazing and oil exploration and production. Table 5 details the General Plan designations and the zoning for the proposed project sites. The proposed project is located on property designated as Extensive Agriculture (8.3), Mineral Petroleum, minimum 5 acre parcel and Extensive Agriculture (8.3), with the overlay zone of Flood Hazard (2.5) on the Kern County General Plan land use map which lists uses such as mineral, aggregate, and petroleum exploration and extraction as acceptable uses. The proposed project is consistent with the land use and zoning designation for the area. The Kern County General Plan Land Use, Open Space and Conservation Element states that petroleum exploration and extraction are consistent uses with agricultural designations.

The proposed project area is zoned Exclusive Agriculture (A). The project is consistent with the Exclusive Agriculture (A) zoning designations per Kern County, California Municipal Code Chapters 19.12.020 and 19.98.020 which include oil and gas drilling as a permitted use. The proposed project is consistent with existing land uses.

Xa. The proposed project sites would not physically divide an established community because the proposed project sites are located in un-incorporated agricultural areas. No impact.

Xb. The proposed project is consistent with the land use and zoning designation for the area, and is therefore considered consistent with associated agricultural resource planning purposes and General Plan requirements. The proposed project is consistent with the Land Use, Open Space and Conservation Element, Chapter 1, Figure 3 (Land Use Designation), 1.9 (Resource), Map Provisions Resource, Map Code 2.5 (Flood Hazard), 8.3 (Extensive Agriculture), and Energy Element, Chapter 5, Petroleum Resources and Development 5.3, of the Kern County General Plan. Additionally, the project is

consistent with agricultural usage in accordance with the Kern County Zoning Ordinance, Chapter 19.12 (Exclusive Agriculture) A District, 19.12.020 (Permitted Uses) and Chapter 19.98 (Oil and Gas Production) Section 19.98.020 (Unrestricted Drilling). No impact.

Xc. There are no adopted Habitat Conservation Plans, Natural Community Conservation Plans or other approved local, regional, or state habitat conservation plans in the project areas.

Conclusion: No impact to land use and planning.

Mitigation Measures: No impact identified. No mitigation necessary.

References:

Kern County *General Plan 2009*
Website: http://pcd.kerndsa.com/planning/planning-documents/general-plans

Kern County, Zoning Ordinance
Website: http://www.co.kern.ca.us/planning/pdfs/KCZOJul12.pdf

California Department of Fish and Wildlife**.** *Conservation and Mitigation Banks in California Approved by the Department of Fish and Wildlife***.**
Website: http://www.dfg.ca.gov/habcon/conplan/mitbank/catalogue/

United States Fish and Wildlife Service. *Conservation Plans and Agreements Database*.
Website: http://ecos.fws.gov/conserv_plans/public.jsp

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XI. MINERAL RESOURCES				
Would the project:				
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	_____	_____	_____	X
b. Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	_____	_____	_____	X

Discussion: Kern County, including the general project area, serves as an important regional source of oil and natural gas. Oil facilities and transmission pipelines are located throughout the general project area. The proposed project sites are located within the McDonald Anticline Oil Field designated by the Division. According to Division record, within six miles of the proposed project sites there are 4,440 active wells, 670 idle wells, 1,241 new wells, 6,378 plugged or abandoned wells and 533 wells of unknown status. The nearest classified new well is the E&B "Oxy" 100-20 which is located 0.33 miles west of the proposed Theta 252C-20 project site (see Figure 9). No other mineral resources have been identified within six miles of the proposed project sites.

The objective of this project is to identify and develop further mineral resources. If successful, its impacts will enhance rather than negatively impact the realization of the values and policies protected by this specific issue area. If the project is not successful, the well or wells will be plugged and abandoned, and the site restored, with no negative impact.

The proposed project is consistent with the Kern County Land Use, Open Space and Conservation Element of the Kern County General Plan. The Kern County General Plan Land Use, Open Space and Conservation Element states that petroleum exploration and extraction are consistent uses with agricultural designations. Additionally, the project is consistent with agricultural usage in accordance with the Kern County Ordinance Code (July 2003), Chapter 19.98 "Oil and Gas Production."

XIa,b. The proposed project would not result in the loss of availability of a known mineral resource, or the loss of a locally important mineral resource recovery site.

Conclusion: No impact to mineral resources.

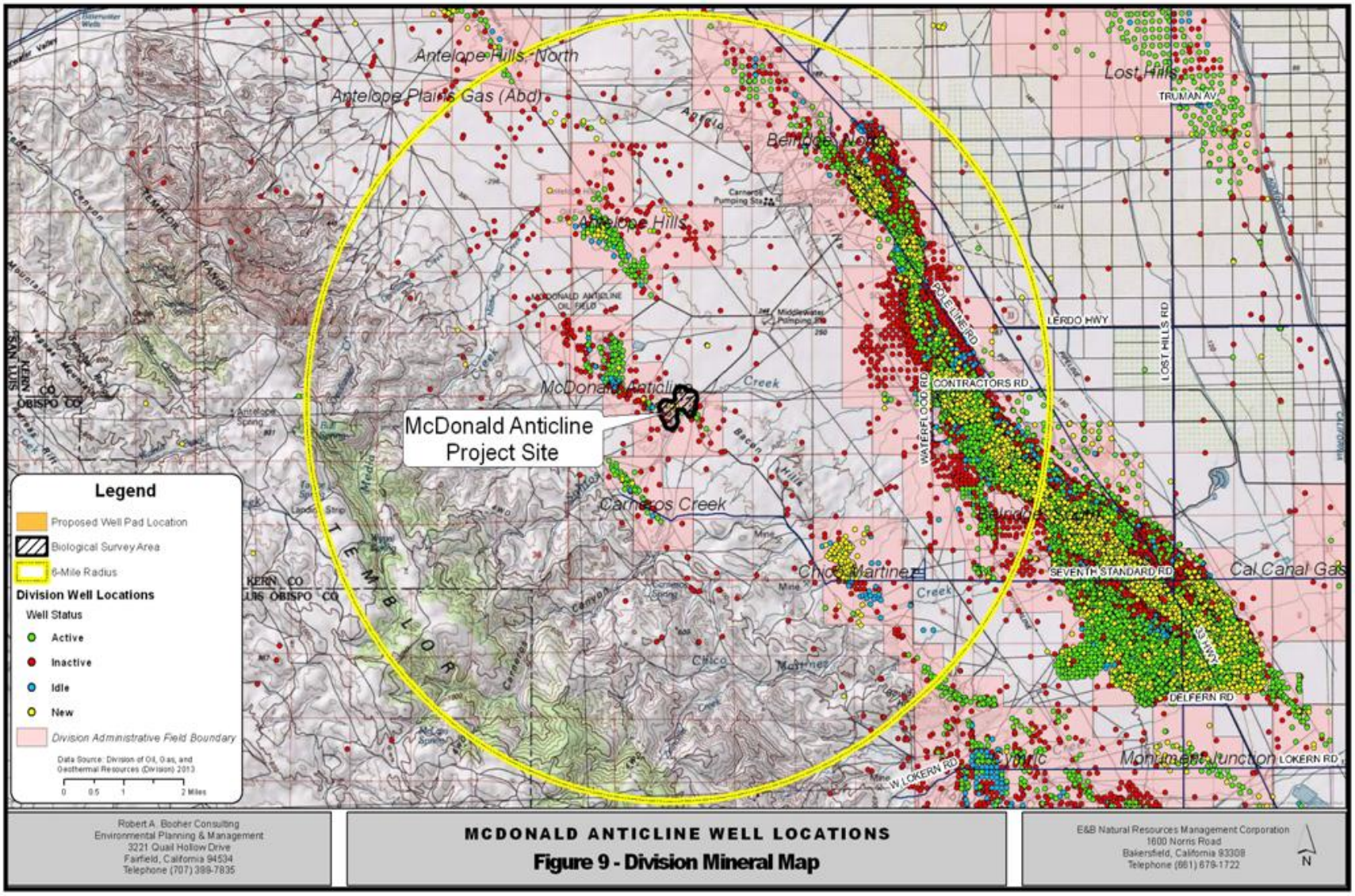
Mitigation Measures: No impact identified. No mitigation necessary.

References:

Kern County *General Plan 2009*
Website: http://pcd.kerndsa.com/planning/planning-documents/general-plans

Kern County, Zoning Ordinance
Website: http://www.co.kern.ca.us/planning/pdfs/KCZOJul12.pdf

State of California, Department of Conservation, Division of Oil, Gas and Geothermal Resources
Website: http://maps.conservation.ca.gov/doms/doms-app.html


Antelope Hills, North
Antelope Plains Gas (Abd)
Lost Hills
TRUMAN AV
Antelope Hills
McDonald Anticline
McDonald Anticline Project Site
Carneros Creek
Chico Martinez
Creek
LERDO HWY
LOST HILLS RD
CONTRACTORS RD
WATERFLOOD RD
SEVENTH STANDARD RD
Cal Canal Gas
DELFERN RD
Monument Junction
LOKERN RD
W LOKERN RD
TEMBLOR
KERN CO
SAN LUIS OBISPO CO
Legend
Proposed Well Pad Location
Biological Survey Area
6-Mile Radius
Division Well Locations
Well Status
Active
Inactive
Idle
New
Division Administrative Field Boundary
Data Source: Division of Oil, Gas, and Geothermal Resources (Division) 2013
0 0.5 1 2 Miles
Robert A. Booher Consulting
Environmental Planning & Management
3221 Quail Hollow Drive
Fairfield, California 94534
Telephone (707) 389-7835
MCDONALD ANTICLINE WELL LOCATIONS
Figure 9 - Division Mineral Map
E&B Natural Resources Management Corporation
1600 Norris Road
Bakersfield, California 93308
Telephone (661) 679-1722
N

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XII. NOISE				
Would the project:				
a. Exposure of people to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	_____	_____	X	___
b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	_____	_____	X	_____
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	_____	_____	_____	X
d. 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 expose people residing or working in the project area to excessive noise levels?	_____	_____	_____	X
e. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	_____	_____	_____	X

Discussion: The proposed project is consistent with existing land uses in the project area and areas immediately adjoining the project parcels.

Drilling, testing and completion activities will result in short term noise impacts and would use the following types of equipment: drilling equipment, truck-mounted crane, pumps, pneumatic tools, loaders, and a variety of miscellaneous equipment including air compressors. The number and type of equipment used during drilling, testing and completion activities will vary from day to day.

The U.S. EPA has found that the noisiest equipment types operating at construction sites typically range from 88 dBA to 101 dBA at a distance of 50 feet. *Table 20: Noise Levels Generated by Construction Equipment* below lists noise levels typically generated by construction equipment; however, not all equipment listed will be used during the proposed project.

Table 20
Noise Level Generated by Construction Equipment

Type of Equipment	Typical Sound Level (dBA at 50 feet)
Pump	76
Generator	76
Air Compressor	81
Concrete Mixer (truck)	85
Pneumatic Tools	85
Backhoe	85
Excavator	86
Dozer	87
Front-End Loader	88
Dump Truck	88
Jack Hammer	88
Scraper	88
Pavers	89
Pile Driver	101

Sources: *U.S. Environmental Protection Agency, 1974; Noise Control for Building and Manufacturing Plants, BBN Layman Miller Lecture Notes, 1987.*

In order to determine typical sound levels associated with oil and gas well drilling operations, Robert A. Booher Consulting conducted a sound survey on November 18, 2005 of Kenai Rig #38 using a Metrosonics 3080 Metrologger, Portable Audio Dosimeter. At the time of the survey, Kenai Rig #38 was drilling a natural gas well in Sutter County, California. Weather conditions at the time were clear with little to no wind, and a temperature of 48 degrees Fahrenheit. At the time of the survey, all drilling equipment was operating including multiple engines and both drilling mud pumps. The results of the survey are presented below in Table 21. E&B anticipates using the same or equivalent drilling rig for its proposed project.

Table 21
Sound Survey Kenai Rig #38

Distance (feet)	North (dBA)	South (dBA)	West (dBA)	East (dBA)
50	87	78	85	83
100	80	72	78	76
150	75	68	72	69

Source: Robert A. Booher Consulting, November 18, 2005. Sound Survey Kenai Rig#38. Sutter County, CA.

Based on the data in Tables 20 and 21, equipment associated with the construction of a drill site and drilling will produce maximum sound levels of 88 dBA at a distance of 50 feet from each of

the proposed project sites during construction and 87 dBA during drilling. The closest residence to the proposed project sites is located 2.27 miles to the south.

The noise level during drilling at the closest residence to the proposed project sites was calculated using the equation below (www.animations.physics.unsw.edu).

$L_1 = L_2 + 20\log_{10}(R_2/R_1)$
$L_2 = L_1 - 20\log_{10}(R_2/R_1)$
$L_2 = 87 – 20\log_{10} (11{,}986'/50')$
$L_2 = 87 – 47.6$
$L_2 = 39.4$ dBA

$\Delta L = L_1 – L_2$
L_1 = Sound level at Object 1, the dosimeter of the noise source (87 dBA).
L_2 = Estimated sound Level at Object 2, the nearest residence
R_1 = Distance from the source of noise to the southeast dosimeter (50 feet)
R_2 = Distance from the source of noise to the nearest residence (11,986 feet)

Production activities will result in long term noise impacts. In order to quantify these impacts, RAB Consulting conducted a sound survey at the Naftex Operating Company USL 1-3 site located in the Edison Oil Field in Kern County, California. At the time of the survey, a 10.6 hp Westinghouse torkmate oil field electric motor, model T70D, Serial #8010, 460 volt was operating on site. Weather conditions were sunny with wind 2-6 mph from the west. The sound meter used was an Extech Instruments, model 407780 integration sound level meter, range 30-130 dB datalogger. E&B will install like or equivalent equipment at each of the proposed project sites. The results of the survey are presented in Table 22.

Table 22
Sound Survey Measurements (dBA)

Direction From Unit	50 feet from unit	100 feet from unit	200 feet from unit
North	51.2	46.0	39.6
South	56.0	49.2	42.1
East(directly facing the engine)	54.1	48.7	40.8
West	49.6	44.7	40.1

Based on the data in Table 22, the maximum sound level resulting from production activities will be 56.0 dBA at a distance of 50 feet from each of the electric motors.

The noise level during production at the closest residence to the proposed project sites was calculated using the equation below (www.animations.physics.unsw.edu).

$L_1 = L_2 + 20\log_{10} (R_2/R_1)$
$L_2 = L_1 - 20\log_{10} (R_2/R_1)$
$L_2 = 56.0 – 20\log_{10} (11{,}986'/50')$
$L_2 = 56.0 – 47.6$
$L_2 =$ **8.4 dBA**

$\Delta L = L_1 – L_2$
L_1 = Sound level at Object 1, the dosimeter due north of the noise source (51.2 dBA).
L_2 = Estimated sound Level at Object 2, the nearest residence
R_1 = Distance from the source of noise to the south dosimeter (50 feet)
R_2 = Distance from the source of noise to the nearest residence (11,986 feet)

XIIa. Based upon the results presented above, the outdoor noise level at the nearest residence is expected to be 39.4 dBA during drilling activities and 8.4 dBA during production. The proposed project will be in compliance with the Noise Control Ordinance in the Kern County Code (Section 8.36.020 et seq.) and with Kern County General Plan Noise Element. The Noise Control Ordinance in the Kern County Code (Section 8.36.020 et seq.) prohibits a variety of nuisance noises but does not specifically mention construction or related noise. The Kern County General Plan Noise Element establishes a 65 dBA maximum Day-Night Average Noise Level (Ldn) as being considered consistent with residential uses or development. Accordingly, noise impacts at the nearest residence throughout the life of the project are well within established limits for residential uses.

XIIb. Vibration is oscillating motion of structures or the ground. The rumbling sound caused by the vibration in the ground is called ground-borne vibration. The proposed project is expected to create ground-borne vibration as a result of project activities (e.g. during drilling and production activities). Two elements need to be generally concerned regarding ground-borne vibration impacts: damage to buildings and annoyance to humans.

One of the accepted measurements for evaluating building damage associated with ground-borne vibration is peak particle velocity (PPV). According to the U.S. Department of Transportation, Surface Transportation Board (2009), “PPV is the maximum instantaneous positive or negative peak of the vibration signal, measured as distance per time (inches per second). PPV has been used historically to evaluate shock wave type vibrations from actions like blasting, pile driving and mining activities and their relationship to building damage.” Table 23 shows effects of construction vibrations on buildings.

Table 23*
Effects of Construction Vibration

Peak Particle Velocity (in/sec)	Effects on Buildings
< 0.05	No effect on buildings
0.1 to 0.5	Minimal potential for damage to weak and sensitive structures
0.5 to 1.0	Threshold at which there is a risk of architectural damage to buildings with plastered ceilings and walls. Some risk to ancient monuments and ruins.
1.0 to 2.0	U.S. Bureau of Mines data indicates that blasting vibrations in this range will not harm most buildings. Most construction vibration limits are in this range.
>3.0	Potential for architectural damage and possible minor structural damage.

*Modified from Vibration at http://www.drnoise.com/PDF_files/Vibration%20Primer.pdf

In order to estimate ground-borne vibration impacts associated with the proposed project activities, RAB Consulting retained the services of Gasch Geophyiscal Services, Inc. (GGSI) to conduct a ground vibration monitoring study of a triple rig operating near Lost Hills, California. The proposed study used Instantel vibration monitoring instruments and all units were calibrated according to manufacturer's specifications. A 3-component tri-axial geophone was utilized to record vibration levels in the longitudinal (toward the source), transverse (horizontally orthogonal to the longitudinal direction), and vertical (up and down) directions. Measurements were recorded on two sides (north side and south side) of the drill rig. The power system including mud pumps, water and fuel storage and compressors were located on the north side of the drill rig. The catwalk and other minor transient vibration generating equipment were located on the south side of the drill rig. The results of the study are presented in Table 24.

Table 24*
Vibration Monitoring Study Results

Distance from Drill Hole (feet)	Transverse Direction (in/sec)	Vertical Direction	Longitudinal Direction
87 feet north	0.0550	0.105	0.0600
152 feet north	0.0400	0.0300	0.0200
225 feet north	0.0150	0.01000	0.01000
321 feet north	0.01000	0.01000	0.01000
105 feet south	0.0150	0.01000	0.01000
188 feet south	0.0150	0.0150	0.01000
335 feet south	0.01000	0.01000	0.01000

*Gasch Geophysical Services, Inc. Vibration Monitoring of a Large Drill Rig, December 2012.

GGSI recorded a PPV of 0.105 inches/second at 87 feet during drilling activities associated with a triple rig. The following calculation was used to determine the PPV (in/sec) at the nearest residence to the proposed project sites.

$PPV_{equipment} = PPVref\ (25/D)^n$

Where:

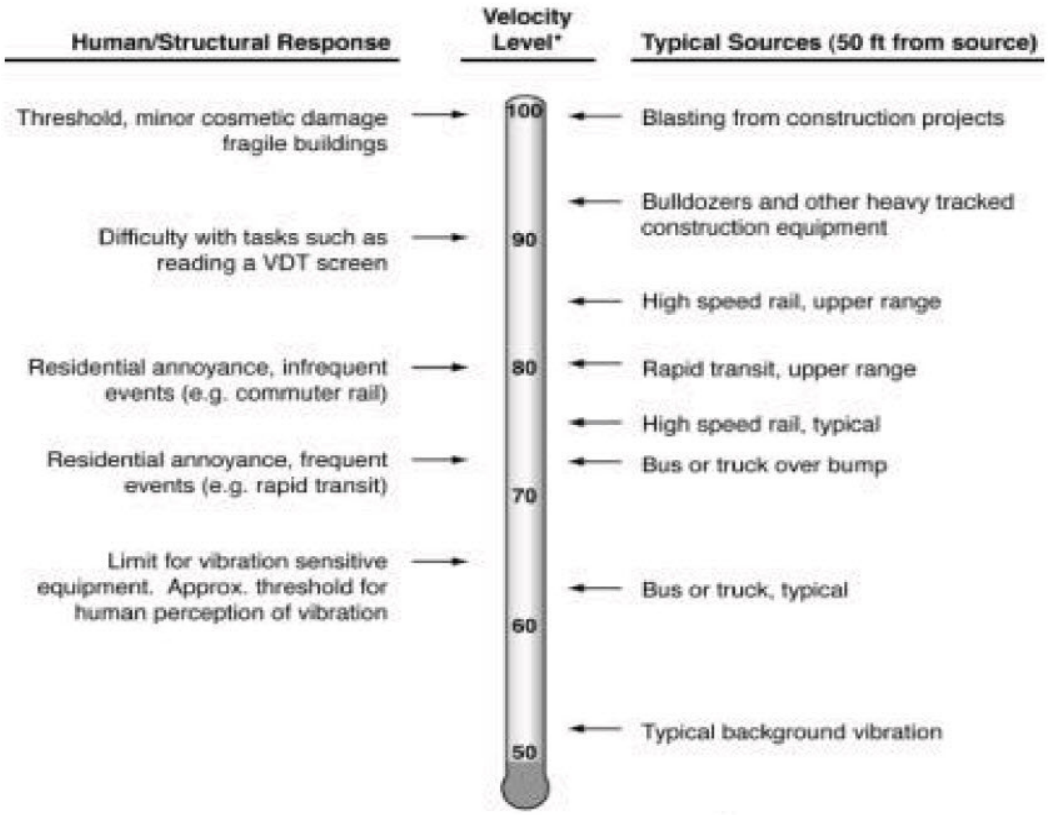
$PPV_{equipment}$ = peak particle velocity in in/sec of the equipment adjusted for the distance
PPV_{ref} = reference vibration level in in/sec at 87 feet (drill rig)
D = distance from equipment to the nearest residence in feet
n = 1.5 (the value related to the attenuation rate through the ground)

$PPV = 0.105(87/11{,}986)^{1.5} = 0.000065$ in/sec

Ground borne vibration impacts are based upon a study of a triple rig described above. E&B proposes to use a double rig for the proposed drilling activities; therefore, our analysis presents a more conservative value where impacts will be even less than calculated above. The estimated PPV at the nearest residences is lower than the PPV of 0.05 in/sec that may cause effects on buildings as shown in (Table 23). Therefore, the estimated ground-borne vibration generated by the proposed project will have less than significant impact to structures.

Another widely accepted source of measurements, as an alternative to using PPV, for evaluating human annoyance associated with ground-borne vibration is root-mean-square (rms) amplitude. According to the U.S. Department of Transportation, Federal Transit Administration (2006), “It takes some time for human body to respond to vibration signals. In a sense, the human body responds to an average vibration amplitude. Because the net average of a vibration is zero, the root mean square (rms) amplitude is used to describe the “smoothed” vibration amplitude. The root mean square of a signal is the square root of the average of the squared amplitude of the signal. The average is typically calculated over a one-second period.” The rms, connoted as vibration decibels (VdB) on a log scale, is used to evaluate human annoyance against ground-borne vibration. Table 25 shows the human/structural response to different levels of ground-borne vibration velocity levels.

Table 25
Human/Structural Response to Different Levels of Ground-Bourne Vibration Velocity Levels



According to the U.S. Department of Transportation, Federal Transit Administration (2006), the background vibration velocity level in residential areas is usually 50 VdB or lower well below the threshold of perception for humans which is around 65 VdB. The range of interest is from approximately 50 VdB to 100 VdB." Although the *CEQA Guidelines* do not specifically define the levels at which ground-borne vibration is considered "excessive.", Table 26 is an example to show the human response to different levels of ground-borne noise and vibration.

Table 26
Human response to different levels of ground-borne noise and vibration

Vib. Velocity Level	Noise Level		Human Response
	Low Freq1	Mid Freq2	
65 VdB	25 dBA	40 dBA	Approximate threshold of perception for many humans. Low-frequency sound usually inaudible, mid-frequency sound excessive for quiet sleeping areas.
75 VdB	35 dBA	50 dBA	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying. Low-frequency noise acceptable for sleeping areas, mid-frequency noise annoying in most quiet occupied areas.
85 VdB	45 dBA	60 dBA	Vibration acceptable only if there are an infrequent number of events per day. Low-frequency noise annoying for sleeping areas, mid-frequency noise annoying even for infrequent events with institutional land uses such as schools and churches.

Notes:
1. Approximate noise level when vibration spectrum peak is near 30 Hz.
2. Approximate noise level when vibration spectrum peak is near 60 Hz.

In order to estimate ground-borne vibration impacts to humans by the proposed project activities, the velocity level in decibels, Lv (VdB) at the nearest residence to each of the proposed project sites was calculated using the following equation:

$$Lv = 20 \times \log_{10}(v/v_{ref})$$

Where:

Lv = velocity level in decibels (VdB)
v = RMS velocity amplitude = PPV/Crest Factor
v_{ref} = reference velocity amplitude (1×10^{-6})

Crest Factor is defined as the ratio of the PPV amplitude to the RMS velocity amplitude. To calculate the RMS velocity amplitude, a crest factor of 4 for random ground vibration was used.

RMS velocity amplitude = PPV/Crest Factor = 0.000065/4= 0.000016

The vibration velocity level for the proposed project sites is calculated below:

$$Lv = 20 \times \log_{10}(0.000016/1 \times 10^{-6}) = 24.1 \text{ VdB}$$

The calculated vibration velocity at the nearest residence is lower than the threshold of perception for humans of 65 VdB as shown in Table 26. Therefore, the estimated

ground-borne vibration generated by the proposed project will have less than significant impact to structures.

XIIc. The site preparation, drilling, testing and completion and plugging and abandonment phases of the proposed project are short term and temporary in nature; accordingly, these activities will not increase the permanent ambient noise levels in the project vicinity. However, long term impacts associated with the production phase of the proposed project will continue through the life of each well. Noise is a highly localized phenomenon, and it is important to keep in mind that because decibels are logarithmic ratios, decibels cannot be manipulated in the same way as arithmetic numbers. Addition of decibels produces such results as 70 dB + 70 dB = 73 dB. Thus, if the proposed production equipment located on a proposed project site produced a sound level of 70 dB and similar equipment associated with other oil and gas wells is located immediately adjacent to the project site; the resulting sound level would be 73 dB. This is twice as much acoustic energy, with only a three dB change. As the proposed project sites are located within a high density oil field and will have equipment similar to the other oil and gas well sites located in the proposed project vicinity, there will be no substantial increase in the permanent ambient noise levels in the project vicinity.

XIId,e. The proposed project sites are not located within an airport land use plan or within two miles of a public airport or public use airport. Therefore, the project would not expose people to excessive noise levels. No impact.

Conclusion: Impacts will be less than significant.

Mitigation Measures: No significant impacts identified. No mitigation necessary.

References:

U.S. Environmental Protection Agency, *1974; Noise Control for Building and Manufacturing Plants*, BBN Layman Miller Lecture Notes, 1987.

California Department of Transportation, Noise, Vibration, and Hazardous Waste Management Office (2004) *Transportation and Construction Induced Vibration Guidance Manual*. Prepared by Jones & Stokes, Sacramento, CA

Kern County *General Plan 2009*
Website: http://pcd.kerndsa.com/planning/planning-documents/general-plans

Kern County, Zoning Ordinance
Website: http://www.co.kern.ca.us/planning/pdfs/KCZOJul12.pdf

U.S. Department of Transportation, Surface Transportation Board (2009*) Northern Rail Extension Final Environmental Impact Statement, Appendix J – Noise and Vibration, for STB Finance Docket No. 35468, Alaska Railroad Corporation – Petition for Exemption – To Construct and Operate a Rail Line Between North Pole, Alaska and Delta Junction, Alaska*.

U.S. Department of Transportation, Federal Transit Administration (2006) *Transit Noise and Vibration Impact Assessment.* FTA-VA-90-1003-06

Vibration at http://www.drnoise.com/PDF_files/Vibration%20Primer.pdf

County of Santa Barbara Planning and Development (Published October 2008) *Environmental Thresholds and Guidelines Manual*. Pages 119-126

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XIII. POPULATION AND HOUSING				
Would the project:				
a. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension or roads or other infrastructure?	_____	_____	_____	X
b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	_____	_____	_____	X
c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	_____	_____	_____	X

Discussion: The proposed project sites are located in an unincorporated area of western Kern County. The closest community to the proposed project sites is Lost Hills, located 12 miles northeast in Kern County, California. The project area is used primarily for cattle grazing and oil and gas production. The closest residence to the proposed project sites is located 2.27 miles (11,986 feet) to the south.

XIIIa. E&B project personnel, drilling company employees and other support personnel currently reside within Bakersfield. The project activities at the proposed project sites will primarily be handled by the local employees in the Bakersfield area. Accordingly, the proposed project would not induce population growth in the project area. No impact.

XIIIb,c. The project does not propose to displace or relocate any existing housing or persons. Therefore, no persons will be displaced nor housing be constructed elsewhere during project implementation. No impact.

Conclusion: No impact.

Mitigation Measures: No impacts identified. No mitigation necessary.

References:
Kern County *General Plan 2009*
Website: http://pcd.kerndsa.com/planning/planning-documents/general-plans

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XIV. PUBLIC SERVICES				
Would the project:				
a. result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	_____	_____	_____	X
Police protection?	_____	_____	_____	X
Schools?	_____	_____	_____	X
Parks?	_____	_____	_____	X
Other public facilities?	_____	_____	_____	X

Discussion: Distances from the proposed project sites to the nearest cities and public or private facilities are listed in Table 27

Table 27: Approximate Location of Proposed Project Sites to Public and Private Facilities

Type	Miles	Direction
City/Town		
Lost Hills	12	NE
Buttonwillow	21	SE
McKittrick	17	SE
Public Facilities		
School - Belridge School District	4.8	SE
Health Facility - Mercy Hospital, Bakersfield	46	SE
Airport - Lost Hills-Kern County Airport	14	NE
Fire Station - Lost Hills Fire Station (26)	12	NE
Police/Sheriff Station - Kern County Sheriff's Office (Buttonwillow)	21	SE

Source: Kern County, 2012.
Note: Measurements were taken from the project site closest to each private and public facility.

XIVa. As illustrated, the proposed project sites are located in an unincorporated area of western Kern County. The closest community to the proposed project sites is Lost Hills, which is located 12.0 miles to the northeast. The Kern County Sheriff's Department, Buttonwillow Substation provides law enforcement services in the project area and its

main office located at 181 East First, Buttonwillow, CA is 21 miles to the southeast of the proposed project sites. Fire protection is provided by the Kern County Fire Department and its Fire Station No. 26 located at 14670 Lost Hills Road, Lost Hills, California is 12 miles to the northeast of the proposed project sites. No cities, schools, parks, or other public facilities are located in the general vicinity of the proposed project sites. No existing or proposed schools are located within one-quarter mile of the proposed project sites. The nearest school (Belridge School District) is 4.8 miles southeast of the proposed project sites. The proposed project sites are not located within two miles of a public airport, public use airport, or private airstrip. The nearest public airport is the Lost Hills-Kern County Airport (Hwy 46 and Lost Hills Road, Lost Hills, CA 93429) located approximately 14 miles northeast of the proposed project sites. Therefore, implementation of the proposed project is not expected to interfere with or adversely affect fire protection, police protection, school, airports, parks, or other public services or facilities in the project area.

Conclusion: No impact.

Mitigation Measures: No impact identified. No mitigation necessary.

References:
Kern County Online Mapping System
Website: http://maps.co.kern.ca.us/imf/imf.jsp?site=krn_pub

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XV. RECREATION				
Would the project:				
a. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	_____	_____	_____	X

Discussion: The proposed project sites are located on private land that is used primarily for cattle grazing and oil and gas production. This land does not provide recreational activities to the public.

XVa. There are no recreational facilities within the project area. The proposed project would not require the use of recreational resources and would not create the need for new recreational facilities. Therefore, no impacts to recreational facilities are expected.

Conclusion: No impact.

Mitigation Measures: No impact identified. No mitigation necessary.

References:
Kern County Online Mapping System
Website: http://maps.co.kern.ca.us/imf/imf.jsp?site=krn_pub

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XVI. TRANSPORTATION/TRAFFIC				
Would the project:				
a. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e. result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections?	_____	_____	X	_____
b. Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	_____	_____	X	_____
c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	_____	_____	_____	X
d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	_____	_____	_____	X
e. Result in inadequate emergency access?	_____	_____	_____	X
f. Result in inadequate parking capacity?	_____	_____	_____	X
g. Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	_____	_____	_____	X

Discussion: Primary vehicle access to the proposed project sites will be via existing access roads from State Highway 33 2.2 miles north of Lerdo Highway. Vehicle travel to the project sites will be via oil field roads.

XVIa. As reflected in Table 28, the maximum number of daily vehicle trips will be 58 one-way trips over a combined period of 2 days, during the mobilization/ demobilization when drilling equipment is moved on and off site during the drilling phase of each well. The 58 vehicle one way trips will include 38 heavy truck/semi one way trips, 16 car / pickup truck one way trips, two (2) crane and two (2) water truck one way trips.

Table 28
Maximum Daily Vehicle Trip Generation during the Drilling Phase for Each Well

Vehicle Type	**One Way Trips Per Well**
Crane	2
Water Truck	2
Worker Transport – Light Truck/Passenger Cars	16
Heavy Duty Trucks/Semi - Mobilization and Demobilization of Equipment	30
Heavy Duty Trucks Semi – Normal Operations	8
Total Trips	**58**

RAB Consulting reviewed traffic counts conducted by Caltrans at the intersection of State Highway 33 Lost Hills Road /County Road P213 which is the closest measurement point to the proposed project sites for 2011 (2.24 miles north of the access to the proposed project sites) to quantify the average annual daily traffic (AADT) levels. According to Caltrans, the 2011 AADT for this segment of Highway 33 is 5,000 vehicles.

The project will contribute a maximum of 58 additional daily one way vehicle trips during the drilling phase of each well. As such, the proposed project increases the roadway traffic on Highway 33 a maximum of 1.2% (58/5000) for the three days during the drilling phase for each of the proposed wells. Based on the additional maximum daily increase of 1.2% on State Highway 33, and the short term and temporary nature of the drilling phase of each of the proposed wells, the drilling phase vehicle traffic will not represent a significant impact.

The maximum number of daily one way vehicle trips during the production phase of the proposed project will be 10 assuming all ten (10) wells are producing. The production phase is the longest phase of the project. The 10 vehicle one way trips will include two (2) operator pickup truck one way trips, four (4) heavy truck/semi one way trips (oil transportation) and four (4) heavy truck/semi one way trips (water transportation). It should be noted that the four (4) heavy truck/semi one way trips (oil transportation) and four (4) heavy truck/semi one way trips (water transportation) will occur from the existing E&B Production Facility and the two (2) operator pickup truck one way trips will occur from each of the proposed project sites as well as the existing E&B Production Facility.

Table 29
Maximum Daily Vehicle Trip Generation during the Production Phase of Ten (10) Wells

Vehicle Type	**One Way Trips**
Operator Pickup Truck	2
Heavy Truck/Semi - Oil Transportation	4
Heavy Truck/Semi - Water Transportation	4
Maximum Total Daily Trips	**10**

RAB Consulting reviewed traffic counts conducted by Caltrans at the intersection of State Highway 33 Lost Hills Road /County Road P213 which is the closest measurement point to the proposed project sites for 2011 (2.24 miles north of the access to the proposed project sites) to quantify the average annual daily traffic (AADT) levels. According to Caltrans, the 2011 AADT for this segment of Highway 33 is 5,000 vehicles.

Assuming all ten wells are in production, the project will contribute a maximum of 10 additional daily vehicle trips during the production phase of the proposed project. As such, the proposed project increases the roadway traffic on State Highway 33 a maximum of 0.2% (10/5000) during the production phase of the proposed project. Based on the additional maximum daily increase of 0.2% on State Highway 33, the proposed project will not significantly increase vehicle traffic of the roadways during the production phase of the proposed project.

XVIb. The General Plan classifies roadway Level of Service (LOS) for rural and unincorporated areas of the County with a rating of A, B, C, D, E, or F with A representing the best LOS, and F representing the worst LOS. LOS ratings are defined briefly below:

LOS A - Conditions of free flow. Speed is controlled by drivers' desires, speed limits, or physical roadway conditions, not other vehicles.

LOS B - Conditions of stable flow. Operating speeds beginning to be restricted, but little or no restrictions on maneuverability.

LOS C - Conditions of stable flow. Speeds and maneuverability somewhat restricted. Occasional back-ups behind left-turning vehicles at intersections.

LOS D - Conditions approach unstable flow. Tolerable speeds can be maintained, but temporary restrictions may cause extensive delays. Speeds may decline to as low as 40% of free flow speeds. Little freedom to maneuver; comfort and convenience low.

LOS E - Unstable flow with stoppages of momentary duration. Average travel speeds decline to one-third the free flow speeds or lower, and traffic volumes approach

capacity. Maneuverability severely limited.

LOS F - Forced Flow. Represents jammed conditions. Intersection operates below capacity with several delays; may block upstream intersections.

The relevant portion of State Highway 33 has a current rating of LOS B. RAB Consulting contacted the Kern County Roads Department, Traffic Engineering on April 8, 2013 to determine the LOS for specific roads in the project area. Saul Gomez with Traffic Engineering reported that the project area roads (Lerdo Highway, Contractors Road) have not been assigned LOS ratings at this time. The Kern County General Plan Circulation element establishes LOS D as the minimum acceptable standard for principal arterial roadways. The increase in traffic trips due to the project are not considered to be a significant impact in light of the lack of established LOS ratings by the Kern County Roads Department.

XVIc. The project should have no impact on air traffic patterns. The proposed project sites do not occur within the immediate vicinity of any public airstrips as the nearest public airport is the Lost Hills-Kern County Airport (Hwy 46 and Lost Hills Road, Lost Hills, CA 93429) located approximately 14.0 miles northeast of the proposed project sites. The project will be less than 200 feet above ground level and will be more than 10,000 feet from an airport with a runway of 3,200 feet. In addition, the project area is not located in an airport influence area. No impact.

XVId. No public roads will be constructed or improved as part of this project. Therefore, the project is not expected to increase the hazards due to a design feature or incompatible uses of a roadway. No impact.

XVIe. The proposed project sites have adequate emergency access. No impact.

XVIf. The proposed project sites will have adequate parking for workers and equipment required to drill and produce each well. The proposed project will not use any public parking and will not result in inadequate parking capacity. No impact.

XVIg. Drilling and producing an oil well will not affect pedestrian or bicycle circulation as no public roadways will be altered or improved during project activities. The proposed project will have restricted access; accordingly, bicyclists and pedestrians will not have access to each of the proposed project sites. Additionally, the proposed project is in a remote area and pedestrians and bicyclists are not common in this area. No impact.

Conclusion: Impacts will be less than significant.

Mitigation Measures: No significant impacts identified. No mitigation necessary.

References:

California Department of Transportation, Caltrans Website 2011
Website: http://traffic-counts.dot.ca.gov/index.htm

Kern County *General Plan 2009*

Website: http://pcd.kerndsa.com/planning/planning-documents/general-plans

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XVII. UTILITY AND SERVICE SYSTEMS				
Would the project:				
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	_____	_____	_____	X
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	_____	_____	_____	X
c. Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	_____	_____	_____	X
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or new or expended entitlements needed?	_____	_____	_____	X
e. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	_____	_____	_____	X
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	_____	_____	_____	X

Discussion: No utility or service systems expansion will be required to support the drilling or operation of the wells, or other aspects of the project.

XVIIa. The project does not conflict with applicable water quality and waste discharge standards relating to water quality. Production water is the only potential wastewater that would be generated during project activities, and production water will be transported offsite from the existing E&B Production Facility by truck to the Central Valley Waste Water LLC Class II Disposal Well (SWCC-1) located in the South Belridge Oil Field for disposal. This SWCC-1 disposal well operates under a permit issued by Kern County and has been operating since March 2011. The SWCC-1

disposal well is located approximately 4 miles to the east of the existing E&B Production Facility. This disposal well is permitted to receive up to 5,000 bbls per day of fluids including production water for disposal. E&B anticipates that 15 barrels (630 gallons) of production water a day would be generated at each of the wells that are put into production. Accordingly the proposed project will not exceed wastewater treatment requirements of the CVRWQCB. No impact.

XVIIb. The project as proposed will not require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities and, therefore, no such construction or expansion which could cause significant environmental effects. No impact.

XVIIc. The project will create negligible runoff as the proposed project sites range in size from 0.41 acres to 0.89 acres in size, topography is flat. Accordingly, the proposed project will not require or result in the construction of new storm water drainage facilities or expansion of existing facilities and, therefore, no such construction or expansion which could cause significant environmental effects. No impact.

XVIId. Water would be purchased from Randy's Trucking meter, and no new entitlements would be required. There is no impact anticipated on water supplies.

XVIIe. See XVIIb.

XVIIf. E&B does not anticipate any non-hazardous solid waste to be produced during project activities; however, if any non-hazardous solid waste is produced it will be disposed at the Kern County Waste Management Shafter Wasco Landfill, located at 17621 Scofield Road, Shafter 93263. The Kern County Waste Management Shafter Wasco Landfill is located approximately 24 miles to the east of the proposed project sites. This landfill is permitted to receive up to 1,500 tons/day. The minimal amount of waste generated during the proposed project will not exceed capacity of waste disposal facilities.

Conclusion: No Impact.

Mitigation Measures: No impact identified. No mitigation necessary.

References:

California Department of Resources, Recycle, and Recovery, *Active Landfills Profile*
Website: www.calrecycle.ca.gov/SWFaciliates/Landfills/

ISSUES	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE				
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	_____	X	_____	_____
b. Does the project have impacts that are individually limited, but cumulatively considerable ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	_____	_____	X	_____
c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	_____	_____	_____	X

XVIIIa. Impacts on the Environment and Special Status Species

With the incorporation of required mitigation measures as outlined in this initial study, the project does not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory.

XVIIIb. Cumulative Impacts

CEQA Guidelines state that a Lead Agency shall consider whether the cumulative impact of a project is significant and whether the effects of the project are cumulatively considerable (CCR §15065). The assessment of the significance of the cumulative effects of the project must, therefore, be conducted in connection with the effects of past projects, other current projects, and probable future projects.

Past, Other Current and Probable Future Projects

For purposes of this cumulative impacts analysis, projects within a six mile radius were utilized for evaluating all environmental factors. Projects used for this cumulative analysis are presented below (Table 30). These projects were identified through a review of the Division 2013 CEQA Notices, the Kern County Planning and Community Development Department 2013 CEQA Notices of Preparation and the Kern County Planning and Community Development Department 2013 CEQA Environmental Documents. The proposed project is not a part of any larger, planned development.

Table 30
Projects Considered in Cumulative Impacts Analysis

Project	Location	Distance from McDonald Anticline Project Sites	Site Area	Description	Status
Aera Energy LLC 825C-20	Section 20, T 28S, R21E MDB&M	5.3 miles East	1.15 Acres	An exploratory oil and gas well to be drilled by Aera Energy, LLC, from an existing oil and gas well site in the South Belridge Oilfield in Kern County.	Notice of Exemption: 11/14/12
Aera Energy LLC Galatea 845Z-8	Section 8, T28S, R21E, MDB&M	5.8 miles Northeast	2.01 Acres	Project proposes activities necessary to drill and test one exploratory oil and gas well.	Notice of Determination 05/23/11
Kern Solar, LLC Kern Solar Ranch Project	Sections 8, 9, 10, 17, 21, 22, 23, 24, 25, 26, 35 and 36, T27S, R19E, Sections 19, 29, 30, 31, 32 and 33, T27S, R20E, Sections 1, 2, 11 and 12, T28S, R19E, Sections 3, 4, 5, 6, 7, 8, 9, 10, 11 and 16, T28S, R20E	590 feet Northeast	6,100	The proposed project requested 4 General Plan Amendments to amend the Circulation Element of the Kern County General Plan to eliminate future road reservations along section and midsection lines, as well as 4 Conditional Use Permits to allow for the construction and operation of a solar PV power generating facility with a capacity of 1 gigawatt of electricity. The proposed project boundary is approximately 14,400 total acres. However, 6,100 are to be developed. In addition, the project includes a petition to cancel a Williamson Act Land Use Contract for 965	Notice of Preparation: January 2013

				acres of grazing land. Due to the size of the project site, for ease of review, the site has been divided into seven subareas. The anticipated start date for the project is early 2014.	

The proposed project sites are located within the McDonald Anticline Oil Field as designated by the Division. According to Division record, within six miles of the proposed project sites there are 4,440 active wells, 670 idle wells, 1,241 new wells, 6,378 plugged or abandoned wells and 533 wells of unknown status. The majority of these wells are located within high density oil fields that have been active since 1911. The nearest classified new well is the E&B "Oxy" 100-20 which is located 0.33 miles west of the proposed Theta 252C-20 project site. No other mineral resources have been identified within six miles of the proposed project sites.

Potential Cumulative Impacts

Based upon the results of the initial study, it was determined that there would be no impacts associated with Aesthetics, Agriculture and Forest Resources, Geology and Soil, Hydrology and Water Quality, Land Use and Planning, Mineral Resources, Vibration, Population and Housing, Public Services, Recreation and Utility and Service Systems. Accordingly, the proposed project would not result in cumulative impacts to Aesthetics, Agriculture and Forest Resources, Geology and Soil, Hydrology and Water Quality, Land Use and Planning, Mineral Resources, Population and Housing, Public Services, Recreation and Utility and Service Systems.

The following is a discussion of cumulative impacts that could result from the proposed project in conjunction with past, other current and probable future projects as described above. The term "cumulatively considerable", for the purposes of this analysis, means the effects of a project are considerable when viewed in connection with effects past, other current and probable future projects.

Air Quality

The SJVAPCD's *Guide for Assessing and Mitigating for Air Quality Impacts* (GAMAQI) revised in 2002 provides guidance on evaluation cumulative air quality impacts.

> "Cumulative Impacts. Any proposed project that would individually have a significant air quality impact (see Section 4.3.2-Threshold of Significance for Impacts from Project Operations) would also be considered to have a significant cumulative air quality impacts." (GAMAQI pg. 29)

The San Joaquin Valley is in non-attainment for ozone for federal and state standards. The SJVAB is in attainment with PM-10 for federal standards. To reduce emissions and bring the valley into compliance with ozone and PM-10 standards, the SJVAPCD adopted the 2007 Ozone Plan. This Plan was reviewed and approved by CARB and the federal EPA. This Plan sets forth specific requirements what will substantially lessen cumulative impacts from NOx and ROG emissions. The SJVAPCD is in the process of updating its ozone plan for the Revoked 1-hour Ozone standard. However, the 2007 Ozone Plan is still in effect and can be found at the District's website: http://www.valleyair.org/Air_Quality_Plans/Ozone_Plans.htm

Consistent with this Plan, SJVAPCD has adopted an aggressive set of policies, rules and regulations. These include adoption of indirect source review (ISR) and the nation's most stringent limits on NOx emissions from boilers, heater and IC engines. The following rules aimed at reducing emissions from oil and gas production:

Rule 4306 – Reduction of NOx from boilers, heaters and steam generators
Rule 4624 – Transfer of organic liquids
Rule 4702 – Limits on NOx emissions from IC engines

Collectively, these policies are reducing NOx and ROG emissions from stationary sources, including sources at oil production facilities. A detailed discussion and a chart showing the reduction in NOx emissions in the valley can be found at: http://www.valleyair.org/Air_Quality_Plans/Ozone_Plans.htm.

The current project complies with the 2007 Ozone Plan and with the above noted Rules. In addition, the project's emissions are below the SJVAPCD's Thresholds of Significance. Therefore, the project impacts both individually and cumulatively are less than significant.

Biological Resources

The biological assessment found no sensitive plant or animal species present within the proposed project sites or proposed access roads. No riparian, wetland, stream, vernal pool, federally protected wetland habitat or other sensitive community types were observed within the footprint of the proposed project sites, existing access roads or proposed access roads during the biological assessment. The proposed project sites would not interfere with movement of any wildlife species or with established native resident or migratory wildlife corridors. Native resident and/or migratory fish and known native wildlife nursery sites are not present within the proposed project sites or area. The project as proposed would not conflict with any local policies or ordinances protecting biological resources or local tree preservation policies/ordinances.

With respect to probable future projects, the Aera Galatea 845Z-8 well is located in an orchard within an active agricultural area and the Aera 825C-20 is located on an existing well site within a high density oil field. As such, these two wells will not cumulatively impact biological resources. The proposed Kern Solar Ranch Project

will impact approximately 6,100 acres of natural lands/non-native annual grassland. Kern County has determined that it will prepare an Environmental Impact Report for the proposed project. If the proposed project is approved, mitigation for loss of habitat would be required and as such the project would not cumulatively impact biological resources.

As shown on the following figure, there are approximately 62,518 acres of natural lands/non-native grassland within a six mile radius of the proposed project sites. Excluding high density oil fields, other developed lands encompass approximately 246 acres within a six mile radius of the proposed project sites. Additionally, there are approximately 343 oil wells outside of high density oil fields within a six mile radius of the proposed project sites and it is estimated that these wells would encompass a maximum of 343 acres. As only 21 of these wells are considered active by the Division, this estimate is extremely conservative. Many of these wells may have been plugged and abandoned and the sites restored. Accordingly, past and other current projects would impact approximately 589 acres of natural lands/non-native grassland within a six mile radius of the proposed project sites. Accordingly, when combined with 5.91 acres of surface disturbance to natural lands/non-native grassland disturbed by the proposed project, 594.91 acres of natural lands/non-native annual grassland will be cumulatively impacted within a six mile radius of the proposed project sites. This represents a cumulative impact of 0.9% to natural lands/non-native annual grassland within a six mile radius of the proposed project sites. Accordingly, the project will not result in a cumulatively considerable effect on biological resources.

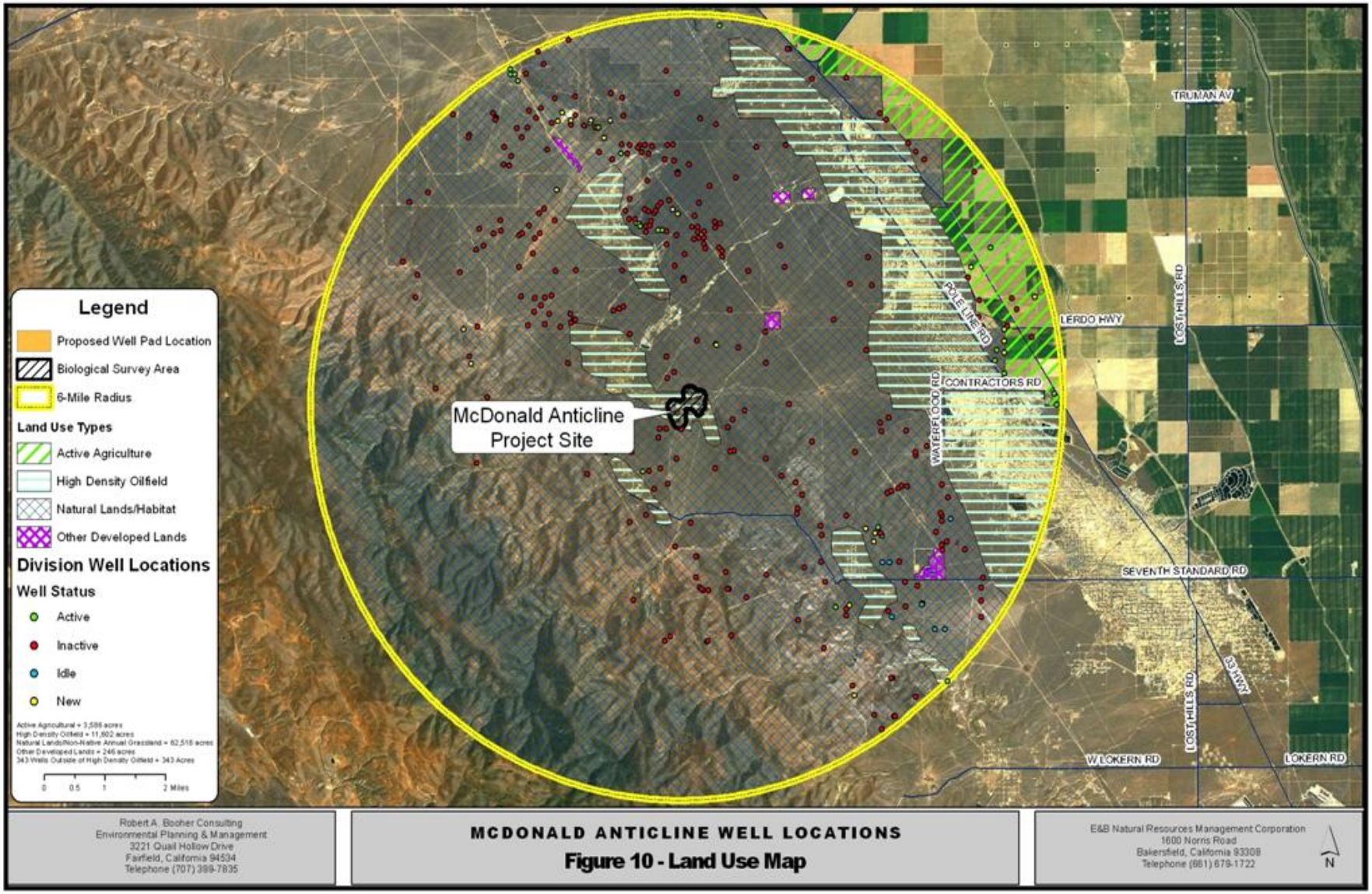
Cultural Resources

The pedestrian survey, cultural resources records search and Native American Consultation did not identify any cultural or historic resources within the proposed project sites. Accordingly, there will be no cumulative impact to cultural resources.

Greenhouse Gas Emissions

E&B is a private company engaged in drilling and production of oil and gas resources in California. As a company, E&B is subject to and compliant with Cap and Trade regulations. Cap and Trade has been adopted in California for reducing GHG emissions from certain industries, such as oil and gas drilling and production.

Compliance with Cap and Trade regulations specifically allow for growth in emissions from individual projects as long as there is an overall reduction in emissions. As a result, emissions of GHG emissions from the current project would be fully mitigated and the project and cumulative impacts would be less than significant. This conclusion is further supported under Section 15064 subpart (h)(3) of the CEQA Guidelines that specifically include GHG to the list of plans and programs that may be considered in a cumulative impact analysis.



Robert A. Booher Consulting
Environmental Planning & Management
3221 Quail Hollow Drive
Fairfield, California 94534
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MCDONALD ANTICLINE WELL LOCATIONS

Figure 10 - Land Use Map

E&B Natural Resources Management Corporation
1600 Norris Road
Bakersfield, California 93308
Telephone (661) 679-1722

Hazards and Hazardous Materials

The proposed project includes the transportation and storage of hazardous materials including fuels, oils, lubricants, hydraulic fluids, and solvents. All hazardous materials, such as diesel fuel, will be transported and stored according to applicable federal, state, and local regulations. In the event of a hazardous materials spill at a proposed project site, impacts would be localized, not extending beyond the specific site. If a spill occurs at another oil and gas well site location, resulting impacts would also be localized. The closest existing well is located 480 feet west from the proposed Theta 252C-20 project site and the closest residence to any proposed project site is located approximately 11,986 feet south of the proposed project sites. Accordingly, no cumulative impacts are anticipated.

Noise

The geographic scope of the cumulative noise analysis consists of the immediate project vicinity (adjacent parcels) and surrounding sensitive receptors. Noise impacts associated with the proposed project would result in short term impacts associated with project activities prior to the ongoing production phase and long term impacts associated with production phase of the project.

The Division identified 1,241 other planned oil and gas projects (new wells) within a six mile radius of the proposed project sites as well as multiple existing oil and gas wells. Even though other planned and approved projects would be required to evaluate short and long-term noise impacts and implement mitigation, as necessary, it is reasonable to assume that the planned projects would have similar impacts as compared to the proposed project.

However, noise is a highly localized phenomenon, and the other existing and planned projects are expected to be located a considerable distance from the proposed project sites. The closest existing well is located 480 feet west from the proposed Theta 252C-20 project site. It is also important to keep in mind that because decibels are logarithmic ratios, they cannot be manipulated in the same way as arithmetic numbers. Addition of decibels produces such results as 70 dB + 70 dB = 73 dB. Thus, if a single production facility produced a sound level of 73 dB and another identical facility was located adjacent to the first site, the two production sites would produce a total sound level of 73 dB. This is twice as much acoustic energy, with only a three dB change. As a second example of decibel addition, if one production site produces a sound level of 70 dB and the other 60 dB, the combined sound level will be 70.4 dB. When the difference between two sound levels is greater than 10 decibels, the lesser sound is negligible in terms of affecting the total level. It is therefore reasonable to conclude that project generated noise would not combine with noise from other projects in a manner resulting in cumulatively considerable noise impacts County of Santa Barbara Planning and Development (Published October 2008) *Environmental Thresholds and Guidelines Manual*. Pages 119-126
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The combined cumulative impact of noise from the proposed project would not result in cumulative noise levels in excess of 49.4 dBA at any sensitive receptor. Implementation of the proposed project would not exceed noise thresholds; therefore, the project would not contribute in a cumulatively considerable manner to noise impacts.

Transportation

The relevant portion of State Highway 33 has a current rating of LOS B. The Kern County General Plan Circulation element establishes LOS D as the minimum acceptable standard for principal arterial roadways.

Based upon a review of Division records, if the two probable future Aera projects and the proposed project occurred simultaneously, the maximum number of daily vehicle trips on State Highway 33 would be 134. This assumes the Aera projects would have the same or similar number of daily vehicle trips. The proposed projects drilling activities are scheduled for completion in 2013. Assuming the Kern Solar Ranch Project is approved, it would begin in the first quarter of 2014. Accordingly, the Kern Solar Ranch Project would not contribute cumulatively to the cumulative impacts associated with the proposed project.

The increase in traffic trips due to the cumulative impact of the proposed project in conjunction with the two Aera projects is not considered to be a significant impact to the established LOS ratings since the additional traffic from the project when added to the current traffic on State Highway 33 will not alter the Level of Service ratings on the roadway or increase traffic so as to cause the roadway to be reclassified to an unacceptable LOS rating.

XVIIIc. Impacts on Humans

The analyses of environmental issues contained in this Initial Study indicate that the project is not expected to have a substantial impact on human beings, either directly or indirectly. Mitigation measures have been incorporated into the project to reduce all potentially significant impacts to less than significant.

ENVIRONMENTAL DETERMINATION

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a **NEGATIVE DECLARATION** will be prepared. ___ ___

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A **MITIGATED NEGATIVE DECLARATION** will be prepared. __X___

I find that the proposed project MAY have a significant effect on the environment, and an **ENVIRONMENTAL IMPACT REPORT** is required.

I find that the proposed project MAY have a significant effect on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets, if the effect is a "potentially significant impact" or "potentially significant unless mitigated." An **ENVIRONMENTAL IMPACT REPORT** is required, but it must analyze only the effects that remain to be addressed. _____

I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier **EIR** or **NEGATIVE DECLARATION** pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier **EIR** or **NEGATIVE DECLARATION**, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required. _____

_____

Signature: _____ Date: _____
State Oil and Gas Supervisor

DOCUMENT RECIPENTS

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San Joaquin Valley APCD ISR/CEQA Department 1990 E. Gettysburg Ave. Fresno, CA 93726	Mr. Michael Finch E&B Natural Resources Management Corporation 1600 Norris Road Bakersfield, California 93308
Mr. Shelton Gray Ca Regional Water Quality Control Board 1685 E Street Fresno, CA 93706	Theta Oil and Land Company 2890 North Main Street, Suite 200 Walnut Creek, California 94597
Ms. Julie Vance California Department of Fish and Wildlife 1234 E. Shaw Avenue Fresno, CA 93710	Aera Energy LLC 10000 Ming Avenue Bakersfield, California 93311
Beale Memorial Library 701 Truxton Avenue Bakersfield, CA 93301	Dr. Gordon Nipp Sierra Club Kern-Kaweah Chapter P.O. Box 3357 Bakersfield, CA 93385
Mr. Thomas Leeman U.S. Fish and Wildlife Service Sacramento Fish and Wildlife Office 2800 Cottage Way, W-2605 Sacramento, CA 95825-1846	Dr. Tom Williams Sierra Club Angeles Chapter California Fracking Group 4117 Barrett Road Los Angeles, CA 90032-1712

ATTACHMENT A

MITIGATION MONITORING AND REPORTING PLAN

E&B Natural Resources Management Corporation
McDonald Anticline Project
MITIGATION MONITORING AND REPORTING PLAN

Environmental Impact	Mitigation Measures	Timing of Monitoring Requirement	Responsibility for Compliance	Method for Compliance	Enforcement	Checkoff Date/ Initials
III. Air Quality						
b) Violate any air quality standard or contribute to an existing or projected air quality violation? c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors?	Air Quality 1.All disturbed areas, including storage piles, which are not being actively used for construction purposes, shall be effectively stabilized using water.	Ongoing during project activities.	Division and E&B.	Inspection by environmental monitor.	Require as condition of approval.	
	Air Quality 2. Unpaved access roads shall be effectively stabilized of dust emissions using water.	Ongoing during project activities.	Division and E&B.	Inspection by environmental monitor.	Require as condition of approval.	
	Air Quality 3. All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions by using the application of water or by presoaking.	Ongoing during project activities.	Division and E&B.	Inspection by environmental monitor.	Require as condition of approval.	
	Air Quality 4. When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, or at least six (6) inches of freeboard space from the top of the container shall be maintained.	Ongoing during project activities.	Division and E&B.	Inspection by environmental monitor.	Require as condition of approval.	
	Air Quality 5. Following addition of materials to, or removal of materials from the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions by using sufficient water.	Ongoing during project activities.	Division and E&B.	Inspection by environmental monitor.	Require as condition of approval.	
	Air Quality 6. Limit of traffic speeds on unpaved access roads to 15mph.	Ongoing during project activities.	Division and E&B.	Inspection by environmental monitor.	Require as condition of approval.	

E&B Natural Resources Management Corporation McDonald Anticline Project MITIGATION MONITORING AND REPORTING PLAN						
Environmental Impact	**Mitigation Measures**	**Timing of Monitoring Requirement**	**Responsibility for Compliance**	**Method for Compliance**	**Enforcement**	**Checkoff Date/ Initials**
IV. Biological Resources						
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Dept. of Fish & Game or US Fish & Wildlife Service?	Biological 1 - As close to beginning of project activities as possible, but not more than 14 days prior to project activities, a qualified biologist shall conduct a final pre-construction survey of the proposed project sites to insure that no special-status wildlife species have recently occupied the project sites or buffer areas. A qualified biologist shall be present immediately prior to project activities that have potential to impact sensitive species to identify and protect potentially sensitive resources.	Prior to initiation of construction activities.	Division and E&B.	Submission of pre-activity biological clearance to Division.	Require as condition of approval.	
	Biological 2 - Site boundaries shall be clearly delineated by stakes and /or flagging to minimize inadvertent degradation or loss of adjacent habitat during project operations. Staff and/or its contractors shall post signs and/or place fence around the site to restrict access of vehicles and equipment unrelated to drilling operations.	Ongoing during project activities.	Division and E&B.	Site inspection by environmental monitor.	Require as condition of approval.	
	Biological 3 - An Environmental Awareness Program shall be conducted to orient all employees involved in project activities. The program shall consist of a brief presentation in which biologists knowledgeable of endangered species biology and legislative protection shall explain endangered species concerns. The program shall include a discussion of special-status plants and sensitive wildlife species. Species biology, habitat needs, status under the Endangered Species Act, and measures being taken for the protection of these species and their habitats as a part of the project shall be discussed.	Prior to initiation of construction activities.	Division and E&B.	Sign in sheets for Environmental Awareness Training will be provided to the Division upon completion.	Require as condition of approval.	
	Biological 4- A biological monitor is recommended during initial ground disturbance associated with proposed well site preparation, access road construction, and during sleeper	Ongoing during initial ground	Division and E&B.	Site inspection by environmental monitor.	Require as condition of approval.	

Environmental Impact	Mitigation Measures	Timing of Monitoring Requirement	Responsibility for Compliance	Method for Compliance	Enforcement	Checkoff Date/ Initials
	placement for flow line installation.	disturbance and construction.				
	Biological 5 – If any suitable small animal burrows become established within the proposed project sites prior to project implementation, E&B will implement a 50 foot avoidance buffer from the burrow.	Prior to project initiation.	Division and E&B.	Site inspection by environmental monitor.	Require as condition of approval.	
	Biological 6 - If San Joaquin kit foxes become established within the proposed project sites prior to project implementation, E&B will implement the following measures (4-9) contained in the USFWS's *Standardized Recommendations For Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (USFWS 2011). These measures also apply to potential dens observed within the buffer area: a) For kit fox dens within 200 feet of proposed construction area(s), exclusion zones shall be established prior to construction by a qualified biologist. Exclusion zones shall be roughly circular with a radius of the following distances measured outward from the entrance: Potential den 50 feet Atypical den 50 feet Known den 100 feet Natal/pupping den UWFWS must be contacted (occupied and unoccupied) b) Protective exclusion zones can be placed around all known and potential dens which occur outside the project footprint (conversely, the project boundary can	Ongoing during project activities.	Division and E&B.	Site inspection by environmental monitor.	Require as condition of approval.	

Environmental Impact	Mitigation Measures	Timing of Monitoring Requirement	Responsibility for Compliance	Method for Compliance	Enforcement	Checkoff Date/ Initials
	be demarcated). c) To ensure protection of known dens, exclusion zones should be demarcated by fencing that encircles each den at the appropriate distance and does not prevent access to the den by kit foxes. Acceptable fencing includes untreated wood particle-board, silt fencing, or orange construction fencing, as long as it has opening for kit fox ingress/egress and keeps humans and equipment out. d) Exclusion zone barriers shall be maintained until all construction related or operational disturbances have been terminated. At that time all fencing shall be removed to avoid attracting subsequent attention to the dens. e) For potential and/or atypical dens, placement of 4-5 flagged stakes 50 feet from the den entrance(s) will suffice to identify the den location; fencing will not be required, but the exclusion zone must be observed. f) Only essential vehicle operation on existing roads and foot traffic should be permitted. Otherwise, all construction, vehicle operation, material storage, or any type of surface-disturbing activity should be prohibited or greatly restricted within the exclusion zones.		.			
	Biological 7 - If a natal/pupping den is discovered within the project area or within 200-feet of the project boundary, the USFWS shall be immediately notified and under no circumstances should the den be disturbed or destroyed	Ongoing during project activities	Division and E&B	Site inspection by environmental monitor. Submission of pre-activity biological clearance to	Require as condition of approval	

Environmental Impact	Mitigation Measures	Timing of Monitoring Requirement	Responsibility for Compliance	Method for Compliance	Enforcement	Checkoff Date/ Initials
	without prior authorization. If the preconstruction/pre-activity survey reveals an active natal pupping den or new information, E&B should contact the USFWS immediately to obtain the necessary take authorization/permit.			Division.		
	Biological 8 - Destruction of any known or natal/pupping kit fox den requires take authorization/permit from the USFWS. Limited destruction of kit fox dens may be allowed, if avoidance is not a reasonable alternative, provided the following procedures are observed: a) Known dens occurring within the footprint of the project must be monitored for three consecutive days with tracking medium or an infra-red camera beam to determine the current use. If no kit fox activity is observed during this period, the den should be destroyed immediately to preclude subsequent use. b) If kit fox activity is observed at the den during this period, the den should be monitored for at least five consecutive nights from the time of the observation to allow any resident animal to move to another den during its normal activity. Only when the den is determined unoccupied may the den be excavated. c) Destruction of the den should be accomplished by careful excavation until it is certain that no kit foxes are inside. The den should be fully excavated, filled with dirt and compacted to ensure that kit foxes cannot reenter to use the den during the construction period. If at any point during excavation, a kit fox is discovered inside the de, the excavation activity shall cease immediately and monitoring the den as	Ongoing during project activities	Division and E&B	Site inspection by environmental monitor.	Require as condition of approval	

Environmental Impact	Mitigation Measures	Timing of Monitoring Requirement	Responsibility for Compliance	Method for Compliance	Enforcement	Checkoff Date/ Initials
	described above should resume. Destruction of the den may be completed when in the judgment of the biologist, the animal has escaped, without further disturbance, from the partially destroyed den.					
	Biological 9 - Potential dens occurring within the footprint of the project or within 50 feet must be monitored for three consecutive days with tracking medium or an infra-red camera beam to determine the current use. If no kit fox activity is observed during this period, the den should be destroyed immediately to preclude subsequent use. a) Destruction of the den should be accomplished by careful excavation until it is certain that no kit foxes are inside. The den should be fully excavated, filled with dirt and compacted to ensure that kit foxes cannot reenter to use the den during the construction period. If at any point during excavation, a kit fox is discovered inside the de, the excavation activity shall cease immediately and monitoring the den as described above should resume. Destruction of the den may be completed when in the judgment of the biologist, the animal has escaped, without further disturbance, from the partially destroyed den.	Ongoing during project activities	Division and E&B	Site inspection by environmental monitor.	Require as condition of approval	
	Biological 10 - If any den was considered to be a potential den, but is later determined during monitoring or destruction to be currently, or previously used by kit fox (e.g., if kit fox sign is found inside), then all construction activities shall cease and the USFWS shall be notified immediately.	Ongoing during project activities.	Division and E&B	Site inspection by environmental monitor.	Require as condition of approval.	
	Biological 11 - Pre-construction nesting surveys shall be	Ongoing	Division and	Submission of pre-activity	Require as	

Environmental Impact	Mitigation Measures	Timing of Monitoring Requirement	Responsibility for Compliance	Method for Compliance	Enforcement	Checkoff Date/ Initials
	conducted for nesting migratory avian species in the project sites and buffer areas. Pre-construction surveys shall occur prior to the proposed project implementation, and during the appropriate survey periods for nesting activities. Surveys will follow required CDFW and USFWS protocols, where applicable. A qualified biologist will survey suitable habitat for the presence of these species. If a migratory avian species is observed and suspected to be nesting, a 250-foot buffer area will be established to avoid impacts to the active nest. If no nesting avian species are found, project activities may proceed and no further mitigation measures will be required. If active nesting sites are found, the following exclusion buffers will be established, and no project activities will occur within these buffer zones until young birds have fledged. a) If ground disturbing activities occur during breeding season (February through mid-September), surveys for active nests will be conducted by a qualified biologist no more than 10 days prior to start of activities. Minimum no disturbance of 250 feet around active nest of non-listed bird species and 250 foot no disturbance buffer around migratory birds; and 0.5-mile no disturbance buffer from listed species and fully protected species until breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival.	during project activities.	E&B.	biological clearance to Division.	condition of approval.	
	Biological 12 - The following measures included in the CDFW's *Staff Report on Burrowing Owl Mitigation* (CDFG 2012) shall be implemented by E&B for the proposed project:	Prior to initiation of construction activities.	Division and E&B	Submission of pre-activity biological clearance to Division.	Require as condition of approval.	

Environmental Impact	Mitigation Measures	Timing of Monitoring Requirement	Responsibility for Compliance	Method for Compliance	Enforcement	Checkoff Date/ Initials
	a) If preconstruction surveys determine that burrowing owls are present in the project sites and buffer areas, a burrowing owl mitigation plan shall be prepared by a qualified biologist describing recommended site specific shelter-in-place measures, worker training, and/or other measures to ensure that Project construction does not result in adverse impacts to the burrowing owls. b) Occupied burrows shall not be disturbed during the burrowing owl nesting season (February 1 through August 31) unless a qualified biologist approved by the CDFW verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival. c) Burrowing owls present in the project sites or within 500 feet (as identified during preconstruction surveys) shall be moved away from the disturbance area using passive relocation techniques. Prior to commencement of relocation, a management plan shall be prepared and approved by CDFW. Relocation shall be completed between September 1 and January 31 (outside of breeding season). A minimum of one or more weeks is required to relocate the owls and allow them to acclimate to alternate burrows. Passive relocation techniques will follow the CDFG Staff Report on Burrowing Owl Mitigation Guidelines (2012) and include the following measures:					

Environmental Impact	Mitigation Measures	Timing of Monitoring Requirement	Responsibility for Compliance	Method for Compliance	Enforcement	Checkoff Date/ Initials
	i. Install one-way doors in burrow entrances. Leave doors in place for 48 hours to ensure owls have left the burrow. ii. Allow one or more weeks for owls to acclimate to off-site burrows. Daily monitoring shall be required for the passive relocation period. iii. Once owls have relocated off-site, collapse existing burrows to prevent reoccupation. Prior to burrow excavation, flexible plastic pipe shall be inserted into the tunnels to allow escape of any remaining owls during excavation. Excavation shall be conducted by hand whenever possible. iv. Destruction of burrows shall occur only pursuant to a management plan approved by CDFW. v. As an alternative (if approved by CDFW), all occupied burrows identified off-site within 500 feet of construction activities outside of nesting season (September through January) and during nesting season (February 1 through August 31) could be buffered by hay bales, fencing (e.g. sheltering in place) or as directed by a qualified biologist and the CDFW.					
	Biological 13 - A project representative shall establish restrictions on project-related traffic to approved project areas,	Ongoing during project	Division and E&B.	Inspections by environmental monitor.	Require as condition of	

Environmental Impact	Mitigation Measures	Timing of Monitoring Requirement	Responsibility for Compliance	Method for Compliance	Enforcement	Checkoff Date/ Initials
	storage areas, staging and parking areas via signage. Off-road traffic outside of designated project areas shall be prohibited.	activities.			approval.	
	Biological 14 - Project-related traffic shall observe a 20 mph speed limit in all project areas except on County roads and State and federal highways to avoid impacts to special-status and common wildlife species.	Ongoing during project activities.	Division and E&B.	Site inspection by environmental monitor.	Require as condition of approval.	
	Biological 15 - Project activities during the drilling phase of the proposed project shall be scheduled to avoid evening hours, as feasible, to avoid special-status wildlife species that are active in the nighttime.	Ongoing during project activities.	Division and E&B.	Site inspection by environmental monitor.	Require as condition of approval.	
	Biological 16 - All vehicle operators shall check under vehicles and equipment before moving them if they have remained parked and/or idle for 10 minutes or longer.	Ongoing during project activities.	Division and E&B.	Site inspection by environmental monitor.	Require as condition of approval.	
	Biological 17 - Hazardous materials, fuels, lubricants, and solvents that spill accidentally during project-related activities shall be cleaned up and removed from the project as soon as possible according to applicable federal, state and local regulations.	Ongoing during project activities.	Division and E&B.	Site inspection by environmental monitor.	Require as condition of approval.	
	Biological 18 - All equipment storage and parking during site development and operation shall be confined to the proposed project sites.	Ongoing during project activities.	Division and E&B.	Site inspection by environmental monitor.	Require as condition of approval.	
	Biological 19 - All excavated steep-walled holes or trenches in excess of three feet in depth shall be provided with one or more escape ramps constructed of earth fill to prevent entrapment of endangered species or other animals. Ramps shall be located at no greater than 1,000-foot intervals (for pipelines etc.) and at not less than 45-degree angles. Trenches	Ongoing during project activities.	Division and E&B.	Site inspection by environmental monitor.	Require as condition of approval.	

Environmental Impact	Mitigation Measures	Timing of Monitoring Requirement	Responsibility for Compliance	Method for Compliance	Enforcement	Checkoff Date/ Initials
	shall be inspected for entrapped wildlife each morning prior to onset of project activities and immediately prior to the end of each working day. Before such holes or trenches are filled they shall be inspected thoroughly for entrapped animals. Any animals discovered shall be allowed to escape voluntarily without harassment before project activities related to the trench resume, or removed from the trench or hole by a qualified biologist and allowed to escape unimpeded.					
	Biological 20 - All pipes, culverts, or similar structures stored at the proposed project site overnight having a diameter of four inches or greater shall be inspected thoroughly for wildlife species before being buried, capped, or otherwise used or moved in any way. Pipes laid in trenches overnight shall be capped. If during project implementation a wildlife species is discovered inside a pipe, that section of pipe shall not be moved or, if necessary, moved only once to remove it from the path of project activity, until the wildlife species has escaped.	Ongoing during project activities.	Division and E&B.	Site inspection by environmental monitor.	Require as condition of approval.	
	Biological 21 - Above ground flow lines shall be installed along existing access roads and/or existing pipeline routes. Concrete pipeline sleepers or supports shall be placed to avoid impacting all small mammal burrows.	Ongoing during project activities.	Division and E&B.	Site inspection by environmental monitor.	Require as condition of approval.	
	Biological 22 - All food-related trash items such as wrappers, cans, bottles or food scraps generated during project activities shall be disposed of only in closed containers and regularly removed from the proposed project site. Food items may attract wildlife species onto the proposed well site, consequently exposing such animals to increased risk of injury or mortality. No deliberate feeding of wildlife shall be allowed.	Ongoing during project activities.	Division and E&B.	Provide trash containers. Site inspection by environmental monitor.	Require as condition of approval.	

Environmental Impact	Mitigation Measures	Timing of Monitoring Requirement	Responsibility for Compliance	Method for Compliance	Enforcement	Checkoff Date/ Initials
	Biological 23 - To prevent harassment or mortality of wildlife species via predation, or destruction of their dens or nests, no domestic pets shall be permitted on-site.	Ongoing during project activities.	Division and E&B.	Site inspection by environmental monitor.	Require as condition of approval.	
V. Cultural Resources						
a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5? b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	Cultural -1. In the unlikely event archeological resources are identified on the project site, all ground disturbing activities will cease and a qualified archaeologist will be retained by E&B to assess the significance of any find. The archeologist will have the authority to stop or divert the construction excavation as necessary. The archaeologist will evaluate the find in conformance with section 15064.5 of CEQA. A plan to mitigate any adverse impacts will be prepared by the archaeologist and contain procedures to follow. Work may proceed on the site once evaluation of the find is complete.	Ongoing during project activities.	Division and E&B.	Include archeological awareness in environmental awareness training.	Require as condition of approval.	
c. Directly or indirectly destroy a unique paleontological resources or site or unique geologic feature?	Cultural 2 – In the unlikely event paleontological resources are identified on the project site, a qualified paleontologist will be retained by E&B to assess the significance of any find and will have the authority to stop or divert the construction excavation as necessary. A plan to mitigate any adverse impacts will be prepared by the paleontologist and contain procedures to follow. Work may proceed on the site once evaluation of the find is complete.	Ongoing during project activities.	Division and E&B.	Include paleontological awareness in environmental awareness training.	Require as condition of approval.	
d. Disturb any human remains, including those interred outside of formal cemeteries?	Cultural 3 – In the unlikely event human remains are discovered during construction of the site, site personnel will contact the County Coroner and stop work as required by	Ongoing during project activities.	Division and E&B.	Include archeological awareness in environmental awareness	Require as condition of approval.	

Environmental Impact	Mitigation Measures	Timing of Monitoring Requirement	Responsibility for Compliance	Method for Compliance	Enforcement	Checkoff Date/ Initials
	Public Resources Code §5097.98-99 and Health and Safety Code §7050.5. If the remains are determined to be Native American, the County Coroner will notify the NAHC in accordance with PRC §5097.98. E&B shall, in consultation with the identified descendants of the remains and/or NAHC, identify the appropriate measures for treatment or disposition of the remains.			training.		
VIII. Hazards & Hazardous Materials						
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? b. Create a significant hazard to public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	Hazards 1. All hazardous materials such as diesel fuel shall be stored according to the California Code of Regulations (CCR) Title 22, 23, 26 & 27 and California Fire Codes (CFR) Title 24 and Kern County hazardous materials ordinance and Material Safety Data Sheets shall be on each site. Waste materials shall be managed properly in accordance with requirements that comply with or given authority by the Code of Federal Regulations (40 CFR) and refined in California through CCR, Title 14, 22, 23, 26 & 27. Training shall be provided to all personnel involved in handling of hazardous materials/waste.	Ongoing during project activities.	Division and E&B.	Include handling of hazardous materials/wastes training in environmental awareness training. Inspection by environmental monitor.	Require as condition of approval.	
	Hazards 2. In order to minimize potential impacts associated with a blowout, E&B shall comply with CCR Title 14, Division 2, Chapter 4, Articles 3 and 4, specifically Article 4, 1941-1942. Requirements for well casing design and blowout prevention equipment are regulated by Division. Division engineers shall be notified for required tests and other operations.	Ongoing during drilling and testing activities for each well.	Division and E&B.	Inspection by Division.	Require as a condition of approval.	
	Hazards 3. A Spill Contingency Plan shall be required in accordance with CCR § 1772.9 and a copy of the plan shall	Prior to construction	Division and E&B.	Spill Contingency Plan will be kept on site.	Require as a condition of	

Environmental Impact	Mitigation Measures	Timing of Monitoring Requirement	Responsibility for Compliance	Method for Compliance	Enforcement	Checkoff Date/ Initials
	be kept on site. The plan shall discuss methods to avoid and/or minimize impacts in the event of a release. The purpose of the plan shall be to ensure that adequate containment would be provided to control accidental spills, that adequate spill response equipment and absorbents would be readily available, and that personnel would be properly trained in how to control and clean up any spills.	activities.			approval.	
	Hazards 4 - All above ground storage tanks will be located within a bermed area which provides a storage volume of at least 110% of the storage volume of the largest tank. Daily inspections of the above ground storage tanks will be conducted and an inspection log will be maintained for review by regulatory agency personnel. The inspection log will also document corrective actions taken, if necessary.	Ongoing during project activities.	Division and E&B.	Inspection of environmental monitor.	Require as a condition of approval.	
	Hazards 5. Fluid disposal shall follow RWQCB regulations (CCR Title 23 Waters).	Ongoing during project activities.	Division and E&B.	Inspection by environmental monitor	Require as a condition of approval.	
	Hazards 6. If project development uncovers any previously unknown oil, gas, or injection wells, the Division shall be notified. If unrecorded wells are uncovered during excavation or grading, remedial plugging operations may be required.	Ongoing during project activities.	Division and E&B.	Inspection by environmental monitor and notification of Division if unknown wells discovered. Except as where otherwise noted, the environmental monitor shall verify the mitigation measures and send documentation to the	Require as a condition of approval.	

E&B Natural Resources Management Corporation McDonald Anticline Project MITIGATION MONITORING AND REPORTING PLAN						
Environmental Impact	**Mitigation Measures**	**Timing of Monitoring Requirement**	**Responsibility for Compliance**	**Method for Compliance**	**Enforcement**	**Checkoff Date/ Initials**
				Division's CEQA Unit at 801 K Street, MS 18-05, Sacramento, CA 95841		
IX. Hydrology and Water Quality						
e. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	Hydrology 1. – E&B will provide a copy of the submitted NOI and verification of an approved erosivity waiver from the SWRCB to the Division prior to initiation of the project.	Prior to project initiation.	E&B and Division	E&B will submit a copy of the NOI and verification of an approved erositivity waiver to the Division's CEQA Unit prior to project initiation.	Require as a condition of approval.	

ATTACHMENT B

AIR CALCULATIONS

Attachment 1

Copies of Emission Reports and Input Data for Site Preparation
Based on the Road Construction Model

Road Construction Emissions Model, Version 7.1.3

Emission Estimates for -> McDonald Anticline Site Preparation Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)
Grubbing/Land Clearing	1.2	11.3	11.4	9.5	0.5	9.0	2.3	0.4	1.9	2,463.9
Grading/Excavation	-	-	-	-	-	-	-	-	-	-
Drainage/Utilities/Sub-Grade	-	-	-	-	-	-	-	-	-	-
Paving	-	-	-	-	-	-	-	-	-	-
Maximum (pounds/day)	1.2	11.3	11.4	9.5	0.5	9.0	2.3	0.4	1.9	2,463.9
Total (tons/construction project)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8

Notes: Project Start Year -> 2013
Project Length (months) -> 0
Total Project Area (acres) -> 1
Maximum Area Disturbed/Day (acres) -> 1
Total Soil Imported/Exported (yd^3/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> McDonald Anticline Site Preparation Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)
Grubbing/Land Clearing	0.5	5.1	5.2	4.3	0.2	4.1	1.0	0.2	0.9	1,120.0
Grading/Excavation	-	-	-	-	-	-	-	-	-	-
Drainage/Utilities/Sub-Grade	-	-	-	-	-	-	-	-	-	-
Paving	-	-	-	-	-	-	-	-	-	-
Maximum (kilograms/day)	0.5	5.1	5.2	4.3	0.2	4.1	1.0	0.2	0.9	1,120.0
Total (megagrams/construction project)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7

Notes: Project Start Year -> 2013
Project Length (months) -> 0
Total Project Area (hectares) -> 0
Maximum Area Disturbed/Day (hectares) -> 0
Total Soil Imported/Exported ($meters^3$/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model
Data Entry Worksheet

Version 7.1.3

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells C10 through C25.

Input Type

Project Name	McDonald Anticline Site Preparation	
Construction Start Year	2013	Enter a Year between 2009 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	0.0	months
Predominant Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length		miles
Total Project Area	0.9	acres
Maximum Area Disturbed/Day	0.9	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	0.0	yd^3/day
Soil Exported	0.0	yd^3/day
Average Truck Capacity	20.0	yd^3 (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of Construction Months	Program Calculated Months	2005	%	2006	%	2007	%
Grubbing/Land Clearing	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation		0.02	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade		0.01	0.00	0.00	0.00	0.00	0.00	0.00
Paving		0.01	0.00	0.00	0.00	0.00	0.00	0.00
Totals	0.03	0.03						

Hauling emission default values can be overridden in cells C45 through C46.

Soil Hauling Emissions

User Input	User Override of Soil Hauling Defaults	Default Values
Miles/round trip	120.00	30
Round trips/day	2.00	0
Vehicle miles traveled/day (calculated)		240

Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
Tons per contruction period	0.00	0.00	0.00	0.00	0.00	0.00

Worker commute default values can be overridden in cells C60 through C65.

Worker Commute Emissions

	User Override of Worker Commute Default Values	Default Values
Miles/ one-way trip	60.00	20
One-way trips/day	2.00	2
No. of employees: Grubbing/Land Clearing	6.00	3
No. of employees: Grading/Excavation		15
No. of employees: Drainage/Utilities/Sub-Grade		13
No. of employees: Paving		9

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.204	0.283	2.490	0.047	0.020	443.262
Emission rate - Grading/Excavation (grams/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Paving (grams/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Grubbing/Land Clearing (grams/trip)	0.678	0.455	5.753	0.004	0.004	95.442
Emission rate - Grading/Excavation (grams/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Paving (grams/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Grubbing/Land Clearing	0.359	0.472	4.253	0.076	0.032	708.016
Tons per const. Period - Grub/Land Clear	0.000	0.000	0.002	0.000	0.000	0.260
Pounds per day - Grading/Excavation	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Grading/Excavation	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Drainage/Utilities/Sub-Grade	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Drain/Util/Sub-Grade	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Paving	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Paving	0.000	0.000	0.000	0.000	0.000	0.000
tons per construction period	0.000	0.000	0.002	0.000	0.000	0.260

Water truck default values can be overriden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Miles Traveled/Day	Default Values Miles Traveled/Day
Grubbing/Land Clearing - Exhaust	1.00	1	120.00	40
Grading/Excavation - Exhaust		1		40
Drainage/Utilities/Subgrade		1		40

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.40	11.32	1.78	0.35	0.26	1716.84
Emission rate - Grading/Excavation (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grubbing/Land Clearing	0.11	2.99	0.47	0.09	0.07	453.79
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00	0.00	0.07
Pound per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Pound per day - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing		0.9	9.0	0.0	1.9	0.0
Fugitive Dust - Grading/Excavation		0	0.0	0.0	0.0	0.0
Fugitive Dust - Drainage/Utilities/Subgrade		0	0.0	0.0	0.0	0.0

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Graders	0.60	5.19	7.08	0.27	0.25	999.59
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Tractors/Loaders/Backhoes	0.10	1.42	0.87	0.03	0.03	302.55
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing	pounds per day	0.7	6.6	8.0	0.3	0.3	1302.1
	Grubbing/Land Clearing	tons per phase	0.0	0.0	0.0	0.0	0.0	0.5

Grading/Excavation	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Grading	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Drainage	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Drainage	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0

Paving	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Pavers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Paving	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Paving	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0
Total Emissions all Phases (tons per construction period) =>			0.0	0.0	0.0	0.0	0.0	0.5

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

Equipment		Default Values Horsepower		Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		106		8
Bore/Drill Rigs		206		8
Cement and Mortar Mixers		10		8
Concrete/Industrial Saws		64		8
Cranes		226		8
Crawler Tractors		208		8
Crushing/Proc. Equipment		142		8
Excavators		163		8
Forklifts		89		8
Generator Sets		66		8
Graders	265.00	175		8
Off-Highway Tractors		123		8
Off-Highway Trucks		400		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		167		8
Pavers		126		8
Paving Equipment		131		8
Plate Compactors		8		8
Pressure Washers		26		8
Pumps		53		8
Rollers		81		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		255		8
Rubber Tired Loaders		200		8
Scrapers		362		8
Signal Boards		20		8
Skid Steer Loaders		65		8
Surfacing Equipment		254		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes	179.00	98	4.00	8
Trenchers		81		8
Welders		45		8

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END OF DATA ENTRY SHEET

Attachment 2

Copies of Emission Reports and Input Data for Site Drilling
Based on the Road Construction Model

Road Construction Emissions Model, Version 7.1.3

Emission Estimates for -> McDonald Anticline Drilling Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)
Grubbing/Land Clearing	35.5	175.9	435.3	13.0	13.0	-	11.7	11.7	-	56,910.7
Grading/Excavation	5.4	45.7	58.1	2.4	2.4	-	1.7	1.7	-	13,027.7
Drainage/Utilities/Sub-Grade	-	-	-	-	-	-	-	-	-	-
Paving	-	-	-	-	-	-	-	-	-	-
Maximum (pounds/day)	35.5	175.9	435.3	13.0	13.0	-	11.7	11.7	-	56,910.7
Total (tons/construction project)	0.0	0.2	0.5	0.0	0.0	-	0.0	0.0	-	72.0

Notes: Project Start Year -> 2013
Project Length (months) -> 0
Total Project Area (acres) -> 1
Maximum Area Disturbed/Day (acres) -> 0
Total Soil Imported/Exported (yd^3/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> McDonald Anticline Drilling Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)
Grubbing/Land Clearing	16.1	79.9	197.9	5.9	5.9	-	5.3	5.3	-	25,868.5
Grading/Excavation	2.5	20.8	26.4	1.1	1.1	-	0.8	0.8	-	5,921.7
Drainage/Utilities/Sub-Grade	-	-	-	-	-	-	-	-	-	-
Paving	-	-	-	-	-	-	-	-	-	-
Maximum (kilograms/day)	16.1	79.9	197.9	5.9	5.9	-	5.3	5.3	-	25,868.5
Total (megagrams/construction project)	0.0	0.2	0.5	0.0	0.0	-	0.0	0.0	-	65.3

Notes: Project Start Year -> 2013
Project Length (months) -> 0
Total Project Area (hectares) -> 0
Maximum Area Disturbed/Day (hectares) -> 0
Total Soil Imported/Exported ($meters^3$/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model
Data Entry Worksheet

Version 7.1.3

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells C10 through C25.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

Input Type		
Project Name	McDonald Anticline Drilling	
Construction Start Year	2013	Enter a Year between 2009 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	0.1	months
Predominant Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length		miles
Total Project Area	0.9	acres
Maximum Area Disturbed/Day		acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	0.0	yd^3/day
Soil Exported	0.0	yd^3/day
Average Truck Capacity	20.0	yd^3 (assume 20 if unknown)

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of Construction Months	Program Calculated Months	2005	%	2006	%	2007	%
Grubbing/Land Clearing	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.07	0.05	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade		0.03	0.00	0.00	0.00	0.00	0.00	0.00
Paving		0.02	0.00	0.00	0.00	0.00	0.00	0.00
Totals	0.17	0.10						

Please note: You have entered a different number of months than the project length shown in cell C13.

Hauling emission default values can be overridden in cells C45 through C46.

Soil Hauling Emissions

User Input	User Override of Soil Hauling Defaults	Default Values
Miles/round trip	120.00	30
Round trips/day	14.00	0
Vehicle miles traveled/day (calculated)		1680

Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate (grams/mile)	0.40	11.32	1.78	0.35	0.26	1716.84
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day	1.5	41.9	6.6	1.3	1.0	6353.1
Tons per contruction period	0.00	0.03	0.00	0.00	0.00	4.66

Worker commute default values can be overridden in cells C60 through C65.

Worker Commute Emissions

	User Override of Worker Commute Default Values	Default Values
Miles/ one-way trip	60.00	20
One-way trips/day	16.00	2
No. of employees: Grubbing/Land Clearing	6.00	0
No. of employees: Grading/Excavation		0
No. of employees: Drainage/Utilities/Sub-Grade		0
No. of employees: Paving		0

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.204	0.283	2.490	0.047	0.020	443.262
Emission rate - Grading/Excavation (grams/mile)	0.204	0.283	2.490	0.047	0.020	443.262
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Paving (grams/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Grubbing/Land Clearing (grams/trip)	0.678	0.455	5.753	0.004	0.004	95.442
Emission rate - Grading/Excavation (grams/trip)	0.678	0.455	5.753	0.004	0.004	95.442
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Paving (grams/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Grubbing/Land Clearing	2.872	3.779	34.023	0.604	0.258	5664.128
Tons per const. Period - Grub/Land Clear	0.003	0.004	0.037	0.001	0.000	6.231
Pounds per day - Grading/Excavation	2.872	3.779	34.023	0.604	0.258	5664.128
Tons per const. Period - Grading/Excavation	0.002	0.003	0.025	0.000	0.000	4.154
Pounds per day - Drainage/Utilities/Sub-Grade	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Drain/Util/Sub-Grade	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Paving	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Paving	0.000	0.000	0.000	0.000	0.000	0.000
tons per construction period	0.005	0.007	0.062	0.001	0.000	10.384

Water truck default values can be overriden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Miles Traveled/Day	Default Values Miles Traveled/Day
Grubbing/Land Clearing - Exhaust	1.00	0	120.00	0
Grading/Excavation - Exhaust		0		0
Drainage/Utilities/Subgrade		0		0

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.40	11.32	1.78	0.35	0.26	1716.84
Emission rate - Grading/Excavation (grams/mile)	0.40	11.32	1.78	0.35	0.26	1716.84
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grubbing/Land Clearing	0.11	2.99	0.47	0.09	0.07	453.79
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00	0.00	0.33
Pound per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Pound per day - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing		0	0.0	0.0	0.0	0.0
Fugitive Dust - Grading/Excavation		0	0.0	0.0	0.0	0.0
Fugitive Dust - Drainage/Utilities/Subgrade		0	0.0	0.0	0.0	0.0

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Forklifts	0.07	0.23	0.57	0.05	0.04	41.37
2.00		Generator Sets	12.14	47.11	160.25	4.55	4.19	22231.29
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Other Construction Equipment	3.35	34.14	50.37	1.67	1.54	6210.85
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Pumps	16.92	59.54	217.01	6.02	5.54	22231.29
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Tractors/Loaders/Backhoes	0.04	0.37	0.34	0.02	0.01	78.02
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing	pounds per day	32.5	141.4	428.5	12.3	11.3	50792.8
	Grubbing/Land Clearing	tons per phase	0.0	0.2	0.5	0.0	0.0	55.9

Grading/Excavation	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
1.00	0	Cranes	0.96	4.82	12.03	0.50	0.46	965.43
0.00	0	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Welders	0.08	0.23	0.41	0.02	0.02	45.06
	Grading/Excavation	pounds per day	1.0	5.1	12.4	0.5	0.5	1010.5
	Grading	tons per phase	0.0	0.0	0.0	0.0	0.0	0.7

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Drainage	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Drainage	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0

Paving	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Pavers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Paving	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Paving	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0
Total Emissions all Phases (tons per construction period) =>			0.0	0.2	0.5	0.0	0.0	56.6

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

Equipment		Default Values Horsepower		Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		106		8
Bore/Drill Rigs		206		8
Cement and Mortar Mixers		10		8
Concrete/Industrial Saws		64		8
Cranes	485.00	226	6.00	8
Crawler Tractors		208		8
Crushing/Proc. Equipment		142		8
Excavators		163		8
Forklifts		89	2.00	8
Generator Sets	500.00	66	24.00	8
Graders		175		8
Off-Highway Tractors		123		8
Off-Highway Trucks		400		8
Other Construction Equipment	540.00	172	24.00	8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		167		8
Pavers		126		8
Paving Equipment		131		8
Plate Compactors		8		8
Pressure Washers		26		8
Pumps	1000.00	53	24.00	8
Rollers		81		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		255		8
Rubber Tired Loaders		200		8
Scrapers		362		8
Signal Boards		20		8
Skid Steer Loaders		65		8
Surfacing Equipment		254		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes	91.00	98	2.00	8
Trenchers		81		8
Welders	20.00	45	4.00	8

2722

END OF DATA ENTRY SHEET

Attachment 3

Copies of Emission Reports and Input Data for Testing and Completion
Based on the Road Construction Model

Road Construction Emissions Model, Version 7.1.3

Emission Estimates for -> McDonald Anticline Testing & Completion Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)
Grubbing/Land Clearing	2.5	21.5	26.1	1.1	1.1	-	0.9	0.9	-	4,144.1
Grading/Excavation	1.2	10.9	8.7	0.4	0.4	-	0.3	0.3	-	2,256.5
Drainage/Utilities/Sub-Grade	-	-	-	-	-	-	-	-	-	-
Paving	-	-	-	-	-	-	-	-	-	-
Maximum (pounds/day)	2.5	21.5	26.1	1.1	1.1	-	0.9	0.9	-	4,144.1
Total (tons/construction project)	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	3.7

Notes: Project Start Year -> 2013
Project Length (months) -> 0
Total Project Area (acres) -> 1
Maximum Area Disturbed/Day (acres) -> 0
Total Soil Imported/Exported (yd^3/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> McDonald Anticline Testing & Completion Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)
Grubbing/Land Clearing	1.1	9.8	11.8	0.5	0.5	-	0.4	0.4	-	1,883.7
Grading/Excavation	0.6	4.9	4.0	0.2	0.2	-	0.1	0.1	-	1,025.7
Drainage/Utilities/Sub-Grade	-	-	-	-	-	-	-	-	-	-
Paving	-	-	-	-	-	-	-	-	-	-
Maximum (kilograms/day)	1.1	9.8	11.8	0.5	0.5	-	0.4	0.4	-	1,883.7
Total (megagrams/construction project)	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	3.4

Notes: Project Start Year -> 2013
Project Length (months) -> 0
Total Project Area (hectares) -> 0
Maximum Area Disturbed/Day (hectares) -> 0
Total Soil Imported/Exported ($meters^3$/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model
Data Entry Worksheet

Version 7.1.3

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells C10 through C25.

Input Type

Project Name	McDonald Anticline Site Preparation	
Construction Start Year	2013	Enter a Year between 2009 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	0.0	months
Predominant Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length		miles
Total Project Area	0.9	acres
Maximum Area Disturbed/Day	0.9	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	0.0	yd^3/day
Soil Exported	0.0	yd^3/day
Average Truck Capacity	20.0	yd^3 (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of Construction Months	Program Calculated Months	2005	%	2006	%	2007	%
Grubbing/Land Clearing	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation		0.02	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade		0.01	0.00	0.00	0.00	0.00	0.00	0.00
Paving		0.01	0.00	0.00	0.00	0.00	0.00	0.00
Totals	0.03	0.03						

Hauling emission default values can be overridden in cells C45 through C46.

Soil Hauling Emissions

User Input	User Override of Soil Hauling Defaults	Default Values
Miles/round trip	120.00	30
Round trips/day	2.00	0
Vehicle miles traveled/day (calculated)		240

Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
Tons per contruction period	0.00	0.00	0.00	0.00	0.00	0.00

Worker commute default values can be overridden in cells C60 through C65.

Worker Commute Emissions

	User Override of Worker Commute Default Values	Default Values
Miles/ one-way trip	60.00	20
One-way trips/day	2.00	2
No. of employees: Grubbing/Land Clearing	6.00	3
No. of employees: Grading/Excavation		15
No. of employees: Drainage/Utilities/Sub-Grade		13
No. of employees: Paving		9

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.204	0.283	2.490	0.047	0.020	443.262
Emission rate - Grading/Excavation (grams/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Paving (grams/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Grubbing/Land Clearing (grams/trip)	0.678	0.455	5.753	0.004	0.004	95.442
Emission rate - Grading/Excavation (grams/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Paving (grams/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Grubbing/Land Clearing	0.359	0.472	4.253	0.076	0.032	708.016
Tons per const. Period - Grub/Land Clear	0.000	0.000	0.002	0.000	0.000	0.260
Pounds per day - Grading/Excavation	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Grading/Excavation	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Drainage/Utilities/Sub-Grade	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Drain/Util/Sub-Grade	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Paving	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Paving	0.000	0.000	0.000	0.000	0.000	0.000
tons per construction period	0.000	0.000	0.002	0.000	0.000	0.260

Water truck default values can be overriden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Miles Traveled/Day	Default Values Miles Traveled/Day
Grubbing/Land Clearing - Exhaust	1.00	1	120.00	40
Grading/Excavation - Exhaust		1		40
Drainage/Utilities/Subgrade		1		40

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.40	11.32	1.78	0.35	0.26	1716.84
Emission rate - Grading/Excavation (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grubbing/Land Clearing	0.11	2.99	0.47	0.09	0.07	453.79
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00	0.00	0.07
Pound per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Pound per day - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing		0.9	9.0	0.0	1.9	0.0
Fugitive Dust - Grading/Excavation		0	0.0	0.0	0.0	0.0
Fugitive Dust - Drainage/Utilities/Subgrade		0	0.0	0.0	0.0	0.0

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Graders	0.60	5.19	7.08	0.27	0.25	999.59
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Tractors/Loaders/Backhoes	0.10	1.42	0.87	0.03	0.03	302.55
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing	pounds per day	0.7	6.6	8.0	0.3	0.3	1302.1
	Grubbing/Land Clearing	tons per phase	0.0	0.0	0.0	0.0	0.0	0.5

Grading/Excavation	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Grading	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Drainage	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Drainage	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0

Paving	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Pavers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Paving	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Paving	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0
Total Emissions all Phases (tons per construction period) =>			0.0	0.0	0.0	0.0	0.0	0.5

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

Equipment		Default Values Horsepower		Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		106		8
Bore/Drill Rigs		206		8
Cement and Mortar Mixers		10		8
Concrete/Industrial Saws		64		8
Cranes		226		8
Crawler Tractors		208		8
Crushing/Proc. Equipment		142		8
Excavators		163		8
Forklifts		89		8
Generator Sets		66		8
Graders	265.00	175		8
Off-Highway Tractors		123		8
Off-Highway Trucks		400		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		167		8
Pavers		126		8
Paving Equipment		131		8
Plate Compactors		8		8
Pressure Washers		26		8
Pumps		53		8
Rollers		81		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		255		8
Rubber Tired Loaders		200		8
Scrapers		362		8
Signal Boards		20		8
Skid Steer Loaders		65		8
Surfacing Equipment		254		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes	179.00	98	4.00	8
Trenchers		81		8
Welders		45		8

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END OF DATA ENTRY SHEET

Attachment 4

Copies of Emission Reports and Input Data for Equipment Installation
Based on the Road Construction Model

Road Construction Emissions Model, Version 7.1.3

Emission Estimates for -> McDonald Anticline Installation of Production Equipment Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)
Grubbing/Land Clearing	1.6	15.4	6.7	0.5	0.5	-	0.3	0.3	-	2,669.5
Grading/Excavation	1.7	16.6	16.0	0.7	0.7	-	0.5	0.5	-	4,238.3
Drainage/Utilities/Sub-Grade	-	-	-	-	-	-	-	-	-	-
Paving	-	-	-	-	-	-	-	-	-	-
Maximum (pounds/day)	1.7	16.6	16.0	0.7	0.7	-	0.5	0.5	-	4,238.3
Total (tons/construction project)	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	3.5

Notes: Project Start Year -> 2013
Project Length (months) -> 0
Total Project Area (acres) -> 1
Maximum Area Disturbed/Day (acres) -> 0
Total Soil Imported/Exported (yd^3/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> McDonald Anticline Installation of Production Equipment Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)
Grubbing/Land Clearing	0.7	7.0	3.1	0.2	0.2	-	0.1	0.1	-	1,213.4
Grading/Excavation	0.8	7.5	7.3	0.3	0.3	-	0.2	0.2	-	1,926.5
Drainage/Utilities/Sub-Grade	-	-	-	-	-	-	-	-	-	-
Paving	-	-	-	-	-	-	-	-	-	-
Maximum (kilograms/day)	0.8	7.5	7.3	0.3	0.3	-	0.2	0.2	-	1,926.5
Total (megagrams/construction project)	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	3.2

Notes: Project Start Year -> 2013
Project Length (months) -> 0
Total Project Area (hectares) -> 0
Maximum Area Disturbed/Day (hectares) -> 0
Total Soil Imported/Exported ($meters^3$/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model
Data Entry Worksheet

Version 7.1.3

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a
yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells C10 through C25.

Input Type

Project Name	McDonald Anticline Installation	of Production Equipment
Construction Start Year	2013	Enter a Year between 2009 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	0.1	months
Predominant Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length		miles
Total Project Area	0.9	acres
Maximum Area Disturbed/Day	0.0	acres
Water Trucks Used?	2	1. Yes 2. No
Soil Imported	0.0	yd^3/day
Soil Exported	0.0	yd^3/day
Average Truck Capacity	20.0	yd^3 (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of Construction Months	Program Calculated Months	2005	%	2006	%	2007	%
Grubbing/Land Clearing	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade		0.02	0.00	0.00	0.00	0.00	0.00	0.00
Paving		0.01	0.00	0.00	0.00	0.00	0.00	0.00
Totals	0.10	0.07						

Please note: You have entered a different number of months than the project length shown in cell C13.

Hauling emission default values can be overridden in cells C45 through C46.

Soil Hauling Emissions

User Input	User Override of Soil Hauling Defaults	Default Values
Miles/round trip	120.00	30
Round trips/day	4.00	0
Vehicle miles traveled/day (calculated)		480

Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate (grams/mile)	0.40	11.32	1.78	0.35	0.26	1716.84
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day	0.4	12.0	1.9	0.4	0.3	1815.2
Tons per contruction period	0.00	0.00	0.00	0.00	0.00	0.67

Worker commute default values can be overridden in cells C60 through C65.

Worker Commute Emissions

	User Override of Worker Commute Default Values	Default Values
Miles/ one-way trip	60.00	20
One-way trips/day	6.00	2
No. of employees: Grubbing/Land Clearing	6.00	0
No. of employees: Grading/Excavation		0
No. of employees: Drainage/Utilities/Sub-Grade		0
No. of employees: Paving		0

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.204	0.283	2.490	0.047	0.020	443.262
Emission rate - Grading/Excavation (grams/mile)	0.204	0.283	2.490	0.047	0.020	443.262
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Paving (grams/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Grubbing/Land Clearing (grams/trip)	0.678	0.455	5.753	0.004	0.004	95.442
Emission rate - Grading/Excavation (grams/trip)	0.678	0.455	5.753	0.004	0.004	95.442
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Paving (grams/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Grubbing/Land Clearing	1.077	1.417	12.759	0.227	0.097	2124.048
Tons per const. Period - Grub/Land Clear	0.001	0.001	0.009	0.000	0.000	1.558
Pounds per day - Grading/Excavation	1.077	1.417	12.759	0.227	0.097	2124.048
Tons per const. Period - Grading/Excavation	0.000	0.001	0.005	0.000	0.000	0.779
Pounds per day - Drainage/Utilities/Sub-Grade	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Drain/Util/Sub-Grade	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Paving	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Paving	0.000	0.000	0.000	0.000	0.000	0.000
tons per construction period	0.001	0.002	0.014	0.000	0.000	2.336

Water truck default values can be overriden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Miles Traveled/Day	Default Values Miles Traveled/Day
Grubbing/Land Clearing - Exhaust	0.00	0	0.00	0
Grading/Excavation - Exhaust		0		0
Drainage/Utilities/Subgrade		0		0

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.40	11.32	1.78	0.35	0.26	1716.84
Emission rate - Grading/Excavation (grams/mile)	0.40	11.32	1.78	0.35	0.26	1716.84
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00	0.00	0.00
Pound per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Pound per day - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing		0	0.0	0.0	0.0	0.0
Fugitive Dust - Grading/Excavation		0	0.0	0.0	0.0	0.0
Fugitive Dust - Drainage/Utilities/Subgrade		0	0.0	0.0	0.0	0.0

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Cranes	0.32	1.61	4.01	0.17	0.15	321.81
0.00	0	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Tractors/Loaders/Backhoes	0.07	0.73	0.68	0.03	0.03	156.04
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Welders	0.12	0.34	0.61	0.04	0.03	67.60
	Grubbing/Land Clearing	pounds per day	0.5	2.7	5.3	0.2	0.2	545.4
	Grubbing/Land Clearing	tons per phase	0.0	0.0	0.0	0.0	0.0	0.4

Grading/Excavation	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Skid Steer Loaders	0.19	1.91	2.56	0.10	0.09	299.09
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation	pounds per day	0.2	1.9	2.6	0.1	0.1	299.1
	Grading	tons per phase	0.0	0.0	0.0	0.0	0.0	0.1

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Drainage	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Drainage	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0

Paving	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Pavers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Paving	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Paving	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0
Total Emissions all Phases (tons per construction period) =>			0.0	0.0	0.0	0.0	0.0	0.5

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

Equipment		Default Values Horsepower		Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		106		8
Bore/Drill Rigs		206		8
Cement and Mortar Mixers		10		8
Concrete/Industrial Saws		64		8
Cranes	485.00	226	2.00	8
Crawler Tractors		208		8
Crushing/Proc. Equipment		142		8
Excavators		163		8
Forklifts		89		8
Generator Sets		66		8
Graders		175		8
Off-Highway Tractors		123		8
Off-Highway Trucks		400		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		167		8
Pavers		126		8
Paving Equipment		131		8
Plate Compactors		8		8
Pressure Washers		26		8
Pumps		53		8
Rollers		81		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		255		8
Rubber Tired Loaders		200		8
Scrapers		362		8
Signal Boards		20		8
Skid Steer Loaders	179.00	65	4.00	8
Surfacing Equipment		254		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes	91.00	98	4.00	8
Trenchers		81		8
Welders	20.00	45	6.00	8

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END OF DATA ENTRY SHEET

Attachment 5

Copies of Emission Reports and Input Data for Production
Based on the Road Construction Model

Road Construction Emissions Model, Version 7.1.3

Emission Estimates for -> McDonald Anticline Production Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)
Grubbing/Land Clearing	0.7	4.8	1.5	0.2	0.2	-	0.1	0.1	-	813.3
Grading/Excavation	-	-	-	-	-	-	-	-	-	-
Drainage/Utilities/Sub-Grade	-	-	-	-	-	-	-	-	-	-
Paving	-	-	-	-	-	-	-	-	-	-
Maximum (pounds/day)	0.7	4.8	1.5	0.2	0.2	-	0.1	0.1	-	813.3
Total (tons/construction project)	0.1	0.6	0.2	0.0	0.0	-	0.0	0.0	-	107.4

Notes: Project Start Year -> 2013
Project Length (months) -> 12
Total Project Area (acres) -> 0
Maximum Area Disturbed/Day (acres) -> 0
Total Soil Imported/Exported (yd^3/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> McDonald Anticline Production Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)
Grubbing/Land Clearing	0.3	2.2	0.7	0.1	0.1	-	0.1	0.1	-	369.7
Grading/Excavation	-	-	-	-	-	-	-	-	-	-
Drainage/Utilities/Sub-Grade	-	-	-	-	-	-	-	-	-	-
Paving	-	-	-	-	-	-	-	-	-	-
Maximum (kilograms/day)	0.3	2.2	0.7	0.1	0.1	-	0.1	0.1	-	369.7
Total (megagrams/construction project)	0.1	0.6	0.2	0.0	0.0	-	0.0	0.0	-	97.4

Notes: Project Start Year -> 2013
Project Length (months) -> 12
Total Project Area (hectares) -> 0
Maximum Area Disturbed/Day (hectares) -> 0
Total Soil Imported/Exported ($meters^3$/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model
Data Entry Worksheet

Version 7.1.3

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells C10 through C25.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	McDonald Anticline Production	
Construction Start Year	2013	Enter a Year between 2009 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	12.0	months
Predominant Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length		miles
Total Project Area	0.0	acres
Maximum Area Disturbed/Day	0.0	acres
Water Trucks Used?	2	1. Yes 2. No
Soil Imported	0.0	yd^3/day
Soil Exported	0.0	yd^3/day
Average Truck Capacity	20.0	yd^3 (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of Construction Months	Program Calculated Months	2005	%	2006	%	2007	%
Grubbing/Land Clearing	12.00	1.20	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation		5.40	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade		3.60	0.00	0.00	0.00	0.00	0.00	0.00
Paving		1.80	0.00	0.00	0.00	0.00	0.00	0.00
Totals	12.00	12.00						

Hauling emission default values can be overridden in cells C45 through C46.

Soil Hauling Emissions

User Input	User Override of Soil Hauling Defaults	Default Values
Miles/round trip	0.00	30
Round trips/day	0.00	0
Vehicle miles traveled/day (calculated)		0

Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
Tons per contruction period	0.00	0.00	0.00	0.00	0.00	0.00

Worker commute default values can be overridden in cells C60 through C65.

Worker Commute Emissions

	User Override of Worker Commute Default Values	Default Values
Miles/ one-way trip	60.00	20
One-way trips/day	2.00	2
No. of employees: Grubbing/Land Clearing	6.00	0
No. of employees: Grading/Excavation		0
No. of employees: Drainage/Utilities/Sub-Grade		0
No. of employees: Paving		0

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.204	0.283	2.490	0.047	0.020	443.262
Emission rate - Grading/Excavation (grams/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Paving (grams/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Grubbing/Land Clearing (grams/trip)	0.678	0.455	5.753	0.004	0.004	95.442
Emission rate - Grading/Excavation (grams/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Paving (grams/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Grubbing/Land Clearing	0.359	0.472	4.253	0.076	0.032	708.016
Tons per const. Period - Grub/Land Clear	0.047	0.062	0.561	0.010	0.004	93.458
Pounds per day - Grading/Excavation	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Grading/Excavation	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Drainage/Utilities/Sub-Grade	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Drain/Util/Sub-Grade	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Paving	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Paving	0.000	0.000	0.000	0.000	0.000	0.000
tons per construction period	0.047	0.062	0.561	0.010	0.004	93.458

Water truck default values can be overriden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Miles Traveled/Day	Default Values Miles Traveled/Day
Grubbing/Land Clearing - Exhaust	0.00	0	0.00	0
Grading/Excavation - Exhaust		0		0
Drainage/Utilities/Subgrade		0		0

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.40	11.32	1.78	0.35	0.26	1716.84
Emission rate - Grading/Excavation (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00	0.00	0.00
Pound per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Pound per day - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing		0	0.0	0.0	0.0	0.0
Fugitive Dust - Grading/Excavation		0	0.0	0.0	0.0	0.0
Fugitive Dust - Drainage/Utilities/Subgrade		0	0.0	0.0	0.0	0.0

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Other General Industrial Equipment	0.29	0.51	1.02	0.10	0.09	105.30
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing	pounds per day	0.3	0.5	1.0	0.1	0.1	105.3
	Grubbing/Land Clearing	tons per phase	0.0	0.1	0.1	0.0	0.0	13.9

Grading/Excavation	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
0.00		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Grading	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Drainage	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Drainage	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0

Paving	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Pavers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Paving	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Paving	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0
Total Emissions all Phases (tons per construction period) =>			0.0	0.1	0.1	0.0	0.0	13.9

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

Equipment		Default Values Horsepower		Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		106		8
Bore/Drill Rigs		206		8
Cement and Mortar Mixers		10		8
Concrete/Industrial Saws		64		8
Cranes		226		8
Crawler Tractors		208		8
Crushing/Proc. Equipment		142		8
Excavators		163		8
Forklifts		89		8
Generator Sets		66		8
Graders		175		8
Off-Highway Tractors		123		8
Off-Highway Trucks		400		8
Other Construction Equipment		172		8
Other General Industrial Equipment	10.00	88	24.00	8
Other Material Handling Equipment		167		8
Pavers		126		8
Paving Equipment		131		8
Plate Compactors		8		8
Pressure Washers		26		8
Pumps		53		8
Rollers		81		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		255		8
Rubber Tired Loaders		200		8
Scrapers		362		8
Signal Boards		20		8
Skid Steer Loaders		65		8
Surfacing Equipment		254		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		98		8
Trenchers		81		8
Welders		45		8

END OF DATA ENTRY SHEET

Attachment 6

Copies of Emission Reports and Input Data for Plugging & Abandonment
Based on the Road Construction Model

Road Construction Emissions Model, Version 7.1.3

Emission Estimates for -> McDonald Anticline Plugging & Abandonment Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)
Grubbing/Land Clearing	2.2	19.0	21.6	0.9	0.9	-	0.7	0.7	-	3,689.3
Grading/Excavation	-	-	-	-	-	-	-	-	-	-
Drainage/Utilities/Sub-Grade	-	-	-	-	-	-	-	-	-	-
Paving	-	-	-	-	-	-	-	-	-	-
Maximum (pounds/day)	2.2	19.0	21.6	0.9	0.9	-	0.7	0.7	-	3,689.3
Total (tons/construction project)	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	3.8

Notes: Project Start Year -> 2013
Project Length (months) -> 0
Total Project Area (acres) -> 1
Maximum Area Disturbed/Day (acres) -> 0
Total Soil Imported/Exported (yd^3/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> McDonald Anticline Plugging & Abandonment Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)
Grubbing/Land Clearing	1.0	8.6	9.8	0.4	0.4	-	0.3	0.3	-	1,676.9
Grading/Excavation	-	-	-	-	-	-	-	-	-	-
Drainage/Utilities/Sub-Grade	-	-	-	-	-	-	-	-	-	-
Paving	-	-	-	-	-	-	-	-	-	-
Maximum (kilograms/day)	1.0	8.6	9.8	0.4	0.4	-	0.3	0.3	-	1,676.9
Total (megagrams/construction project)	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	3.4

Notes: Project Start Year -> 2013
Project Length (months) -> 0
Total Project Area (hectares) -> 0
Maximum Area Disturbed/Day (hectares) -> 0
Total Soil Imported/Exported ($meters^3$/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model
Data Entry Worksheet

Version 7.1.3

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a
yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells C10 through C25.

Input Type

Project Name	McDonald Anticline Plugging &	Abandonment
Construction Start Year	2013	Enter a Year between 2009 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	0.1	months
Predominant Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length		miles
Total Project Area	0.9	acres
Maximum Area Disturbed/Day	0.0	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	0.0	yd^3/day
Soil Exported	0.0	yd^3/day
Average Truck Capacity	20.0	yd^3 (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of Construction Months	Program Calculated Months	2005	%	2006	%	2007	%
Grubbing/Land Clearing	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation		0.05	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade		0.03	0.00	0.00	0.00	0.00	0.00	0.00
Paving		0.02	0.00	0.00	0.00	0.00	0.00	0.00
Totals	0.10	0.10						

Hauling emission default values can be overridden in cells C45 through C46.

Soil Hauling Emissions

User Input	User Override of Soil Hauling Defaults	Default Values
Miles/round trip	120.00	30
Round trips/day	4.00	0
Vehicle miles traveled/day (calculated)		480

Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
Tons per contruction period	0.00	0.00	0.00	0.00	0.00	0.00

Worker commute default values can be overridden in cells C60 through C65.

Worker Commute Emissions

	User Override of Worker Commute Default Values	Default Values
Miles/ one-way trip	60.00	20
One-way trips/day	4.00	2
No. of employees: Grubbing/Land Clearing	6.00	0
No. of employees: Grading/Excavation		0
No. of employees: Drainage/Utilities/Sub-Grade		0
No. of employees: Paving		0

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.204	0.283	2.490	0.047	0.020	443.262
Emission rate - Grading/Excavation (grams/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Paving (grams/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Grubbing/Land Clearing (grams/trip)	0.678	0.455	5.753	0.004	0.004	95.442
Emission rate - Grading/Excavation (grams/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Paving (grams/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Grubbing/Land Clearing	0.718	0.945	8.506	0.151	0.065	1416.032
Tons per const. Period - Grub/Land Clear	0.001	0.001	0.009	0.000	0.000	1.558
Pounds per day - Grading/Excavation	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Grading/Excavation	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Drainage/Utilities/Sub-Grade	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Drain/Util/Sub-Grade	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Paving	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Paving	0.000	0.000	0.000	0.000	0.000	0.000
tons per construction period	0.001	0.001	0.009	0.000	0.000	1.558

Water truck default values can be overriden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Miles Traveled/Day	Default Values Miles Traveled/Day
Grubbing/Land Clearing - Exhaust	1.00	0	120.00	0
Grading/Excavation - Exhaust		0		0
Drainage/Utilities/Subgrade		0		0

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.40	11.32	1.78	0.35	0.26	1716.84
Emission rate - Grading/Excavation (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grubbing/Land Clearing	0.11	2.99	0.47	0.09	0.07	453.79
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00	0.00	0.22
Pound per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Pound per day - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing		0	0.0	0.0	0.0	0.0
Fugitive Dust - Grading/Excavation		0	0.0	0.0	0.0	0.0
Fugitive Dust - Drainage/Utilities/Subgrade		0	0.0	0.0	0.0	0.0

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Other Construction Equipment	1.33	10.00	17.69	0.67	0.61	1819.44
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing	pounds per day	1.3	10.0	17.7	0.7	0.6	1819.4
	Grubbing/Land Clearing	tons per phase	0.0	0.0	0.0	0.0	0.0	2.0

Grading/Excavation	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
0.00		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Grading	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Drainage	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Drainage	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0

Paving	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Pavers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Paving	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Paving	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0
Total Emissions all Phases (tons per construction period) =>			0.0	0.0	0.0	0.0	0.0	2.0

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

Equipment		Default Values Horsepower		Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		106		8
Bore/Drill Rigs		206		8
Cement and Mortar Mixers		10		8
Concrete/Industrial Saws		64		8
Cranes		226		8
Crawler Tractors		208		8
Crushing/Proc. Equipment		142		8
Excavators		163		8
Forklifts		89		8
Generator Sets		66		8
Graders		175		8
Off-Highway Tractors		123		8
Off-Highway Trucks		400		8
Other Construction Equipment	470.00	172	8.00	8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		167		8
Pavers		126		8
Paving Equipment		131		8
Plate Compactors		8		8
Pressure Washers		26		8
Pumps		53		8
Rollers		81		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		255		8
Rubber Tired Loaders		200		8
Scrapers		362		8
Signal Boards		20		8
Skid Steer Loaders		65		8
Surfacing Equipment		254		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		98		8
Trenchers		81		8
Welders		45		8

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END OF DATA ENTRY SHEET

Attachment

Copies of Emission Reports and Input Data for Long Term Risk Prioritization
Based on AB-2588 SJVAPCD Spreadsheets

	How Many?	VOCs EF *lbs/hr*		VOCs *lbs/yr*
Pumps	1	0.00113		9.8988
Flanges/Connectors	4	0.00000086		0.007534
		TOTAL	VOCs	9.906

VOC Fugitive Emission Factor (EF) for heavy crude based on EPA Document # EPA-453/R-95-017, Nov. 1995, pages 2-15.

1 Well

	EF *(lbs/ln VOCs)*	Emissions *(lbs/yr)*
1,2,4 Trimethylbenzene	5.16E-03	5.11E-02
Benzene	1.32E-02	1.31E-01
Cyclohexane	4.82E-04	4.77E-03
Ethylbenzene	8.45E-03	8.37E-02
n-Hexane	1.49E-02	1.48E-01
Toluene	1.25E-02	1.24E-01
Xylenes	1.21E-02	1.20E-01

Wells => 10

	EF *(lbs/ln VOCs)*	Emissions *(lbs/yr)*
1,2,4 Trimethylbenzene	5.16E-02	5.11E-01
Benzene	1.32E-01	1.31E+00
Cyclohexane	4.82E-03	4.77E-02
Ethylbenzene	8.45E-02	8.37E-01
n-Hexane	1.49E-01	1.48E+00
Toluene	1.25E-01	1.24E+00
Xylenes	1.21E-01	1.20E+00

Name

Air Toxics "Hot Spots" Information and Assessment Act of 1987 Facility Prioritization Scores Prioritization 2.0 SJVAPCD

Applicability Use this spreadsheet to generate a Prioritization when emission rates of HAPs are known. Entries required in yellow areas, output in grey areas.

Author or updater	R Kapahi	*Last Update*	August 29, 2013

Facility:	E&B McDonald Anticline Risk Prioritization Long Term
ID#:	Includes Fugitive Emissions - 10 Wells Operating At Same Time
Project #:	E&B McDonald Anticline Risk Prioritization Long Term
Data Entered by:	Ray Kapahi
Data Reviewed by:	
Location	

Inputs	Operating Hours hr/yr	Release Height (m)
	8760	5

Receptor Proximity & Proximity Factors (Meters)		Emissions Potency Method			Dispersion Adjustment Method			
		Carc Scores	**Non-Carc Scores**	**Facility Ranking**	**Carc Scores**	**Non-Carc Scores**	**Facility Ranking**	
0< R<100	**1.000**	0.07	0.00	**Low Priority**	0.06734	0.00048	**Low Priority**	**Low Priority**
100≤R<250	0.250	0.02	0.00	**Low Priority**	0.01683	0.00012	**Low Priority**	**Low Priority**
250≤R<500	0.040	0.00	0.00	**Low Priority**	0.00269	0.00002	**Low Priority**	**Low Priority**
500≤R<1000	0.011	0.00	0.00	**Low Priority**	0.00074	0.00001	**Low Priority**	**Low Priority**
1000≤R<1500	0.003	0.00	0.00	**Low Priority**	0.00020	0.00000	**Low Priority**	**Low Priority**
1500≤R<2000	0.002	0.00	0.00	**Low Priority**	0.00013	0.00000	**Low Priority**	**Low Priority**
2000<R	0.001	0.00	0.00	**Low Priority**	0.00007	0.00000	**Low Priority**	**Low Priority**

Height Adjustment		<100m	<250m	<500m	<1000m	<1500m	<2000m	>=2000m
<20m	60	1	0.25	0.04	0.011	0.003	0.002	0.001
20m<= <45m	9	1	0.85	0.22	0.064	0.018	0.009	0.006
=>45m	1	1	1	0.9	0.4	0.13	0.066	0.042

CAS#	Substance	Annual Emissions	Maximum Hourly	Average Hourly	Disp Adj Method Carc	EP Method Carc	EP Method Chronic	EP Method Acute	EP Max of Chronic and Acute
79345	1,1,2,2-Tetrachloroethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
79005	1,1,2-Trichloroethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75343	1,1-Dichloroethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	1,2,3,4,5,6,78-OctaD			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	1,2,3,4,5,6,78-OctaF			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
39001020	1,2,3,4,6,7,8,9-Octachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3268879	1,2,3,4,6,7,8,9-Octachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
67562394	1,2,3,4,6,7,8-Heptachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
35822469	1,2,3,4,6,7,8-Heptachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55673897	1,2,3,4,7,8,9-Heptachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
70648269	1,2,3,4,7,8-Hexachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
39227286	1,2,3,4,7,8-Hexachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57117449	1,2,3,6,7,8-Hexachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57653857	1,2,3,6,7,8-Hexachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
72918219	1,2,3,7,8,9-Hexachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
19408743	1,2,3,7,8,9-Hexachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57117416	1,2,3,7,8-Pentachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
40321764	1,2,3,7,8-Pentachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
96128	1,2-Dibromo-3-chloropropane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
78875	1,2-Dichloropropane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
122667	1,2-Diphenylhydrazine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106887	1,2-Epoxybutane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106990	1,3-Butadiene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
542756	1,3-Dichloropropene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1120714	1,3-Propane sultone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
123911	1,4-Dioxane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
42397648	1,6-Dinitropyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
42397659	1,8-Dinitropyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5522430	1-Nitropyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
39635319	2,3,3',4,4',5,5'-HEPTACHLORBIPHENYL (PCB 189)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
38380084	2,3,3',4,4',5-HEXACHLOROBIPHENYL (PCB 156)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

69782907	2,3,3',4,4',5'-HEXACHLOROBIPHENYL (PCB 157)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
32598144	2,3,3',4,4'-Pentachlorobiphenyl {PCB 105}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
52663726	2,3',4,4',5,5'-HEXACHLOROBIPHENYL (PCB 167)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
74472370	2,3,4,4',5-PENTACHLOBIPHENYL (PCB114)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
31508006	2,3',4,4',5-PENTACHLOROBIPHENYL (PCB 118)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
65510443	2,3',4,4',5'-PENTACHOROBIPHENYL (PCB 123)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
60851345	2,3,4,6,7,8-Hexachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57117314	2,3,4,7,8-Pentachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
51207319	2,3,7,8-Tetrachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1746016	2,3,7,8-Tetrachlorodibenzo-P-Dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
88062	2,4,6-Trichlorophenol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
615054	2,4-Diaminoanisole			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95807	2,4-Diaminotoluene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
121142	2,4-Dinitrotoluene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
53963	2-Acetylaminofluorene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
117793	2-Aminoanthraquinone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
607578	2-Nitrofluorene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
32774166	3,3',4,4',5,5'-HEXACHLOROBIPHENYL (PCB 169)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57465288	3,3',4,4',5-PENTACHLOROBIPHENYL (PCB 126)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
32598133	3,3',4,4'-TETRACHLORBIPHENYL (PCB77)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
91941	3,3'-Dichlorobenzidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
70362504	3,4,4',5-TETRACHLOROBIPHENYL (PCB 81)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
56495	3-Methylcholanthrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
101144	4,4'-Methylene bis(2 Chloroaniline) (MOCA)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
101779	4,4'-Methylenedianiline			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
92671	4-Aminobiphenyl			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

95830	4-Chloro-o-phenylenediamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
60117	4-Dimethylaminoazobenzene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57835924	4-Nitropyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3697243	5-Methylchrysene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
602879	5-Nitroacenaphthene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7496028	6-Nitrochrysene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57976	7,12-Dimethylbenz[a]anthracene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
194592	7H-Dibenzo[c,g]carbazole			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75070	Acetaldehyde			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
60355	Acetamide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107028	Acrolein			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
79061	Acrylamide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
79107	Acrylic acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107131	Acrylonitrile			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107051	Allyl chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
319846	alpha-Hexachlorocyclohexane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
61825	Amitrole			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7664417	Ammonia			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
62533	Aniline			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440382	Arsenic			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1016	Arsenic compounds (inorganic)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7784421	Arsine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1332214	Asbestos			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10294403	Barium chromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
56553	Benz[a]anthracene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
71432	Benzene	1.31E+00		1.50E-04	1.06E-03	6.46E-02	3.74E-04	0.00E+00	3.74E-04
92875	Benzidine (and its salts)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1020	Benzidine-based dyes			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
50328	Benzo[a]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
205992	Benzo[b]fluoranthene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
205823	Benzo[j]fluoranthene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
207089	Benzo[k]fluoranthene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
100447	Benzyl chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440417	Beryllium			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
319857	beta-Hexachlorocyclohexane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57578	beta-Propiolactone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111444	Bis(2-chloroethyl) ether {DCEE}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
542881	Bis(chloromethyl) ether			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440439	Cadmium			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13765190	Calcium chromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2425061	Captafol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
133062	Captan			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75150	Carbon disulfide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
630080	Carbon monoxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
56235	Carbon tetrachloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57749	Chlordane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108171262	Chlorinated paraffin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7782505	Chlorine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10049044	Chlorine dioxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

108907	Chlorobenzene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
510156	Chlorobenzilate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	Chlorodifluoromethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
67663	Chloroform			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107302	Chloromethyl methyl			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
76062	Chloropicrin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1333820	Chromium trioxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
18540299	Chromium, hexavalent			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
218019	Chrysene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1066	Coke oven emissions			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440508	Copper			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1319773	Cresols (mixtures of) {Cresylic acid}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
135206	Cupferron			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1073	Cyanide compounds			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57125	CYANIDE COMPOUNDS [Inorganic)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
117817	Di(2-ethylhexyl) phthalate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
226368	Dibenz[a,h]acridine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2263680	Dibenz[a,h]acridine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
53703	Dibenz[a,h]anthracene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
224420	Dibenz[a,j]acridine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
192645	Dibenzo[a,e]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
189640	Dibenzo[a,h]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
189559	Dibenzo[a,i]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
191300	Dibenzo[a,l]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1080	Dibenzofurans (chlorinated) {PCDFs} [Treated as 2378TCDD for HRA]			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	Dichlorodifluoromethene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
72559	Dichlorodiphenyldichloroethylene {DDE}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
73354	Dichloroethylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
62737	Dichlorovos {DDVP}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9901	Diesel engine exhaust, particulate matter (Diesel PM)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111422	Diethanolamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
79447	Dimethyl carbamoyl chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
68122	Dimethyl formamide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
124403	Dimethylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1086	Dioxins, total, w/o individ. isomers reported {PCDDs} [Treat as 2378TCDD for HRA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1937377	Direct Black 38			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2602462	Direct Blue 6			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
16071866	Direct Brown 95 (technical grade)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106898	Epichlorohydrin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
100414	Ethyl benzene	8.37E-01		9.55E-05	5.86E-05	3.56E-03	7.17E-06	0.00E+00	7.17E-06
75003	Ethyl chloride {Chlorethane}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

106934	Ethylene dibromide {EDB}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107062	Ethylene dichloride {EDC}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107211	Ethylene glycol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111762	Ethylene glycol monobutyl ethe			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
110805	Ethylene glycol monoethyl ethe			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111159	Ethylene glycol monoethyl ether acetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
109864	Ethylene glycol monomethyl ethe			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
110496	Ethylene glycol monomethyl ether acetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75218	Ethylene oxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
96457	Ethylene thiourea			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
151564	Ethyleneimine {Aziridine}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1101	Fluorides			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
50000	Formaldehyde			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111308	Glutaraldehyde			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
76448	Heptachlor			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
118741	Hexachlorobenzene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1120	Hexachlorocyclohexane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
608731	Hexachlorocyclohexanes (mixed or technical grade)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
67721	Hexachloroethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
110543	Hexane	1.48E+00		1.69E-04	0.00E+00	0.00E+00	3.62E-06	0.00E+00	3.62E-06
302012	Hydrazine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7647010	Hydrochloric acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
74908	Hydrocyanic acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7664393	Hydrogen fluoride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7783075	Hydrogen Selenide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7783075	HYDROGEN SELENIDE			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7783064	Hydrogen sulfide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
193395	Indeno[1,2,3-cd]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
78591	Isophorone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
67630	Isopropyl alcohol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7439921	Lead			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
301042	Lead acetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7758976	Lead chromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1128	Lead compounds (inorganic)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7446277	Lead phosphate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1335326	Lead subacetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
58899	Lindane {gamma-Hexachlorocyclohexane}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108316	Maleic anhydride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7439965	Manganese			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108394	m-Cresol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7487947	Mercuric chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7439976	Mercury			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
67561	Methanol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
74839	Methyl bromide {Bromomethane}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

71556	Methyl chloroform {1,1,1-Trichloroethane}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
78933	Methyl ethyl ketone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
624839	Methyl isocyanate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1634044	Methyl tert-butyl ether			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75092	Methylene chloride {Dichloromethane}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
101688	Methylene diphenyl diisocyanate {MDI}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
90948	Michler's ketone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108383	m-Xylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
91203	Naphthalene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440020	Nickel			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
373024	Nickel acetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3333673	Nickel carbonate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3333393	Nickel carbonate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13463393	Nickel carbonyl			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12054487	Nickel hydroxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1313991	Nickel oxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1146	Nickel refinery dust			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12035722	Nickel subsulfide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1271289	Nickelocene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7697372	Nitric acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
139139	Nitrilotriacetic acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10102440	NITROGEN DIOXIDE			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1116547	N-Nitrosodiethanolamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55185	N-Nitrosodiethylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
62759	N-Nitrosodimethylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
924163	N-Nitrosodi-n-butylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
621647	N-Nitrosodi-n-propylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
86306	N-Nitrosodiphenylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10595956	N-Nitrosomethylethylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
59892	N-Nitrosomorpholine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
684935	N-Nitroso-N-methylurea			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
100754	N-Nitrosopiperidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
930552	N-Nitrosopyrrolidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
90040	o-Anisidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95487	o-Cresol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8014957	OLEUM			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95534	o-Toluidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95476	o-Xylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10028156	OZONE			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1151	PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA]			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1336363	PCBs {Polychlorinated biphenyls}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95692	p-Chloro-o-toluidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
120718	p-Cresidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106445	p-Cresol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106467	p-Dichlorobenzene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

87865	Pentachlorophenol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
127184	Perchloroethylene {Tetrachloroethene}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108952	Phenol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75445	Phosgene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7803512	Phosphine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7664382	Phosphoric acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
85449	Phthalic anhydride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
156105	p-Nitrosodiphenylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7758012	Potassium bromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
115071	Propylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107982	Propylene glycol monomethyl ethe			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75569	Propylene oxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75569	Propylene oxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106423	p-Xylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
50555	Reserpine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7782492	Selenium			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7446346	Selenium sulfide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1175	Silica, crystalline			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7631869	Silica, crystalline			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10588019	Sodium dichromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1310732	Sodium hydroxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7789062	Strontium chromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
100425	Styrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9960	Sulfates			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9960	SULFATES			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7446095	Sulfur Dioxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7446719	Sulfur Trioxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7664939	Sulfuric acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	Tetrachlorophenols			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
62555	Thioacetamide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
62566	Thiourea			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108883	Toluene	1.24E+00		1.42E-04	0.00E+00	0.00E+00	7.08E-05	0.00E+00	7.08E-05
1204	Toluene diisocyanate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
26471625	TOLUENE DIISOCYANATE			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
584849	Toluene-2,4-diisocyanate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
91087	Toluene-2,6-diisocyanate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8001352	Toxaphene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
79016	Trichloroethylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	Trichlororfluormethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	Trichlorotrifluormethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
121448	Triethylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
51796	Urethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440622	Vanadium (fume or dust)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1314621	VANADIUM PENTOXIDE			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108054	Vinyl acetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75014	Vinyl chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75354	Vinylidene chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1330207	XYLENES (mixed xylenes)	1.20E+00		1.37E-04	0.00E+00	0.00E+00	2.94E-05	0.00E+00	2.94E-05

	How Many?	VOCs EF *lbs/hr*		VOCs *lbs/yr*
Pumps	1	0.00113		9.8988
Flanges/Connectors	4	0.00000086		0.007534
		TOTAL	VOCs	9.906

VOC Fugitive Emission Factor (EF) for heavy crude based on EPA Document # EPA-453/R-95-017, Nov. 1995, pages 2-15.

1 Well

	EF *(lbs/ln VOCs)*	Emissions *(lbs/yr)*
1,2,4 Trimethylbenzene	5.16E-03	5.11E-02
Benzene	1.32E-02	1.31E-01
Cyclohexane	4.82E-04	4.77E-03
Ethylbenzene	8.45E-03	8.37E-02
n-Hexane	1.49E-02	1.48E-01
Toluene	1.25E-02	1.24E-01
Xylenes	1.21E-02	1.20E-01

Wells => 10

	EF *(lbs/ln VOCs)*	Emissions *(lbs/yr)*
1,2,4 Trimethylbenzene	5.16E-02	5.11E-01
Benzene	1.32E-01	1.31E+00
Cyclohexane	4.82E-03	4.77E-02
Ethylbenzene	8.45E-02	8.37E-01
n-Hexane	1.49E-01	1.48E+00
Toluene	1.25E-01	1.24E+00
Xylenes	1.21E-01	1.20E+00

Name

Air Toxics "Hot Spots" Information and Assessment Act of 1987 Facility Prioritization Scores Prioritization 2.0 SJVAPCD

Applicability Use this spreadsheet to generate a Prioritization when emission rates of HAPs are known. Entries required in yellow areas, output in grey areas.

Author or updater	R Kapahi	*Last Update*	August 21, 2013

Facility:	Test Case of Risk - Fugitives Only
ID#:	
Project #:	Test Case of Risk - Fugitives Only
Data Entered by:	Ray Kapahi
Data Reviewed by:	
Location	

Inputs	Operating Hours hr/yr	Release Height (m)
	352	5

Receptor Proximity & Proximity Factors (Meters)		**Emissions Potency Method**			**Dispersion Adjustment Method**			
		Carc Scores	**Non-Carc Scores**	**Facility Ranking**	**Carc Scores**	**Non-Carc Scores**	**Facility Ranking**	
0< R<100	**1.000**	0.07	0.01	**Low Priority**	0.06734	0.01206	**Low Priority**	**Low Priority**
100≤R<250	0.250	0.02	0.00	**Low Priority**	0.01683	0.00302	**Low Priority**	**Low Priority**
250≤R<500	0.040	0.00	0.00	**Low Priority**	0.00269	0.00048	**Low Priority**	**Low Priority**
500≤R<1000	0.011	0.00	0.00	**Low Priority**	0.00074	0.00013	**Low Priority**	**Low Priority**
1000≤R<1500	0.003	0.00	0.00	**Low Priority**	0.00020	0.00004	**Low Priority**	**Low Priority**
1500≤R<2000	0.002	0.00	0.00	**Low Priority**	0.00013	0.00002	**Low Priority**	**Low Priority**
2000<R	0.001	0.00	0.00	**Low Priority**	0.00007	0.00001	**Low Priority**	**Low Priority**

Height Adjustment		<100m	<250m	<500m	<1000m	<1500m	<2000m	>=2000m
<20m	60	1	0.25	0.04	0.011	0.003	0.002	0.001
20m<= <45m	9	1	0.85	0.22	0.064	0.018	0.009	0.006
=>45m	1	1	1	0.9	0.4	0.13	0.066	0.042

CAS#	Substance	Annual Emissions	Maximum Hourly	Average Hourly	Disp Adj Method Carc	EP Method Carc	EP Method Chronic	EP Method Acute	EP Max of Chronic and Acute
79345	1,1,2,2-Tetrachloroethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
79005	1,1,2-Trichloroethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75343	1,1-Dichloroethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	1,2,3,4,5,6,78-OctaD			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	1,2,3,4,5,6,78-OctaF			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
39001020	1,2,3,4,6,7,8,9-Octachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3268879	1,2,3,4,6,7,8,9-Octachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
67562394	1,2,3,4,6,7,8-Heptachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
35822469	1,2,3,4,6,7,8-Heptachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55673897	1,2,3,4,7,8,9-Heptachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
70648269	1,2,3,4,7,8-Hexachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
39227286	1,2,3,4,7,8-Hexachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57117449	1,2,3,6,7,8-Hexachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57653857	1,2,3,6,7,8-Hexachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
72918219	1,2,3,7,8,9-Hexachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
19408743	1,2,3,7,8,9-Hexachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57117416	1,2,3,7,8-Pentachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
40321764	1,2,3,7,8-Pentachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
96128	1,2-Dibromo-3-chloropropane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
78875	1,2-Dichloropropane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
122667	1,2-Diphenylhydrazine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106887	1,2-Epoxybutane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106990	1,3-Butadiene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
542756	1,3-Dichloropropene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1120714	1,3-Propane sultone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
123911	1,4-Dioxane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
42397648	1,6-Dinitropyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
42397659	1,8-Dinitropyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5522430	1-Nitropyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
39635319	2,3,3',4,4',5,5'-HEPTACHLORBIPHENYL (PCB 189)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
38380084	2,3,3',4,4',5-HEXACHLOROBIPHENYL (PCB 156)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

69782907	2,3,3',4,4',5'-HEXACHLOROBIPHENYL (PCB 157)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
32598144	2,3,3',4,4'-Pentachlorobiphenyl {PCB 105}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
52663726	2,3',4,4',5,5'-HEXACHLOROBIPHENYL (PCB 167)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
74472370	2,3,4,4',5-PENTACHLOBIPHENYL (PCB114)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
31508006	2,3',4,4',5-PENTACHLOROBIPHENYL (PCB 118)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
65510443	2,3',4,4',5'-PENTACHOROBIPHENYL (PCB 123)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
60851345	2,3,4,6,7,8-Hexachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57117314	2,3,4,7,8-Pentachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
51207319	2,3,7,8-Tetrachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1746016	2,3,7,8-Tetrachlorodibenzo-P-Dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
88062	2,4,6-Trichlorophenol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
615054	2,4-Diaminoanisole			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95807	2,4-Diaminotoluene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
121142	2,4-Dinitrotoluene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
53963	2-Acetylaminofluorene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
117793	2-Aminoanthraquinone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
607578	2-Nitrofluorene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
32774166	3,3',4,4',5,5'-HEXACHLOROBIPHENYL (PCB 169)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57465288	3,3',4,4',5-PENTACHLOROBIPHENYL (PCB 126)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
32598133	3,3',4,4'-TETRACHLORBIPHENYL (PCB77)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
91941	3,3'-Dichlorobenzidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
70362504	3,4,4',5-TETRACHLOROBIPHENYL (PCB 81)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
56495	3-Methylcholanthrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
101144	4,4'-Methylene bis(2 Chloroaniline) (MOCA)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
101779	4,4'-Methylenedianiline			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
92671	4-Aminobiphenyl			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

95830	4-Chloro-o-phenylenediamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
60117	4-Dimethylaminoazobenzene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57835924	4-Nitropyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3697243	5-Methylchrysene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
602879	5-Nitroacenaphthene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7496028	6-Nitrochrysene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57976	7,12-Dimethylbenz[a]anthracene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
194592	7H-Dibenzo[c,g]carbazole			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75070	Acetaldehyde			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
60355	Acetamide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107028	Acrolein			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
79061	Acrylamide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
79107	Acrylic acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107131	Acrylonitrile			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107051	Allyl chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
319846	alpha-Hexachlorocyclohexane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
61825	Amitrole			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7664417	Ammonia			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
62533	Aniline			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440382	Arsenic			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1016	Arsenic compounds (inorganic)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7784421	Arsine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1332214	Asbestos			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10294403	Barium chromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
56553	Benz[a]anthracene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
71432	Benzene	1.31E+00		3.72E-03	1.06E-03	6.46E-02	9.30E-03	0.00E+00	9.30E-03
92875	Benzidine (and its salts)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1020	Benzidine-based dyes			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
50328	Benzo[a]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
205992	Benzo[b]fluoranthene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
205823	Benzo[j]fluoranthene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
207089	Benzo[k]fluoranthene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
100447	Benzyl chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440417	Beryllium			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
319857	beta-Hexachlorocyclohexane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57578	beta-Propiolactone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111444	Bis(2-chloroethyl) ether {DCEE}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
542881	Bis(chloromethyl) ether			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440439	Cadmium			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13765190	Calcium chromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2425061	Captafol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
133062	Captan			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75150	Carbon disulfide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
630080	Carbon monoxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
56235	Carbon tetrachloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57749	Chlordane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108171262	Chlorinated paraffin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7782505	Chlorine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10049044	Chlorine dioxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

108907	Chlorobenzene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
510156	Chlorobenzilate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	Chlorodifluoromethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
67663	Chloroform			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107302	Chloromethyl methyl			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
76062	Chloropicrin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1333820	Chromium trioxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
18540299	Chromium, hexavalent			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
218019	Chrysene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1066	Coke oven emissions			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440508	Copper			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1319773	Cresols (mixtures of) {Cresylic acid}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
135206	Cupferron			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1073	Cyanide compounds			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57125	CYANIDE COMPOUNDS [Inorganic)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
117817	Di(2-ethylhexyl) phthalate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
226368	Dibenz[a,h]acridine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2263680	Dibenz[a,h]acridine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
53703	Dibenz[a,h]anthracene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
224420	Dibenz[a,j]acridine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
192645	Dibenzo[a,e]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
189640	Dibenzo[a,h]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
189559	Dibenzo[a,i]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
191300	Dibenzo[a,l]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1080	Dibenzofurans (chlorinated) {PCDFs} [Treated as 2378TCDD for HRA]			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	Dichlorodifluoromethene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
72559	Dichlorodiphenyldichloroethylene {DDE}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
73354	Dichloroethylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
62737	Dichlorovos {DDVP}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9901	Diesel engine exhaust, particulate matter (Diesel PM)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111422	Diethanolamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
79447	Dimethyl carbamoyl chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
68122	Dimethyl formamide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
124403	Dimethylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1086	Dioxins, total, w/o individ. isomers reported {PCDDs} [Treat as 2378TCDD for HRA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1937377	Direct Black 38			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2602462	Direct Blue 6			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
16071866	Direct Brown 95 (technical grade)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106898	Epichlorohydrin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
100414	Ethyl benzene	8.37E-01		2.38E-03	5.86E-05	3.56E-03	1.78E-04	0.00E+00	1.78E-04
75003	Ethyl chloride {Chlorethane}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

106934	Ethylene dibromide {EDB}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107062	Ethylene dichloride {EDC}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107211	Ethylene glycol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111762	Ethylene glycol monobutyl ethe			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
110805	Ethylene glycol monoethyl ethe			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111159	Ethylene glycol monoethyl ether acetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
109864	Ethylene glycol monomethyl ethe			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
110496	Ethylene glycol monomethyl ether acetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75218	Ethylene oxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
96457	Ethylene thiourea			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
151564	Ethyleneimine {Aziridine}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1101	Fluorides			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
50000	Formaldehyde			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111308	Glutaraldehyde			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
76448	Heptachlor			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
118741	Hexachlorobenzene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1120	Hexachlorocyclohexane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
608731	Hexachlorocyclohexanes (mixed or technical grade)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
67721	Hexachloroethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
110543	Hexane	1.48E+00		4.20E-03	0.00E+00	0.00E+00	9.01E-05	0.00E+00	9.01E-05
302012	Hydrazine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7647010	Hydrochloric acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
74908	Hydrocyanic acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7664393	Hydrogen fluoride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7783075	Hydrogen Selenide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7783075	HYDROGEN SELENIDE			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7783064	Hydrogen sulfide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
193395	Indeno[1,2,3-cd]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
78591	Isophorone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
67630	Isopropyl alcohol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7439921	Lead			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
301042	Lead acetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7758976	Lead chromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1128	Lead compounds (inorganic)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7446277	Lead phosphate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1335326	Lead subacetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
58899	Lindane {gamma-Hexachlorocyclohexane}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108316	Maleic anhydride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7439965	Manganese			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108394	m-Cresol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7487947	Mercuric chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7439976	Mercury			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
67561	Methanol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
74839	Methyl bromide {Bromomethane}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

71556	Methyl chloroform {1,1,1-Trichloroethane}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
78933	Methyl ethyl ketone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
624839	Methyl isocyanate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1634044	Methyl tert-butyl ether			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75092	Methylene chloride {Dichloromethane}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
101688	Methylene diphenyl diisocyanate {MDI}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
90948	Michler's ketone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108383	m-Xylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
91203	Naphthalene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440020	Nickel			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
373024	Nickel acetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3333673	Nickel carbonate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3333393	Nickel carbonate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13463393	Nickel carbonyl			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12054487	Nickel hydroxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1313991	Nickel oxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1146	Nickel refinery dust			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12035722	Nickel subsulfide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1271289	Nickelocene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7697372	Nitric acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
139139	Nitrilotriacetic acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10102440	NITROGEN DIOXIDE			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1116547	N-Nitrosodiethanolamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55185	N-Nitrosodiethylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
62759	N-Nitrosodimethylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
924163	N-Nitrosodi-n-butylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
621647	N-Nitrosodi-n-propylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
86306	N-Nitrosodiphenylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10595956	N-Nitrosomethylethylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
59892	N-Nitrosomorpholine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
684935	N-Nitroso-N-methylurea			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
100754	N-Nitrosopiperidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
930552	N-Nitrosopyrrolidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
90040	o-Anisidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95487	o-Cresol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8014957	OLEUM			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95534	o-Toluidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95476	o-Xylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10028156	OZONE			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1151	PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA]			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1336363	PCBs {Polychlorinated biphenyls}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95692	p-Chloro-o-toluidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
120718	p-Cresidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106445	p-Cresol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106467	p-Dichlorobenzene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

87865	Pentachlorophenol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
127184	Perchloroethylene {Tetrachloroethene}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108952	Phenol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75445	Phosgene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7803512	Phosphine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7664382	Phosphoric acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
85449	Phthalic anhydride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
156105	p-Nitrosodiphenylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7758012	Potassium bromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
115071	Propylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107982	Propylene glycol monomethyl ethe			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75569	Propylene oxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75569	Propylene oxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106423	p-Xylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
50555	Reserpine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7782492	Selenium			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7446346	Selenium sulfide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1175	Silica, crystalline			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7631869	Silica, crystalline			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10588019	Sodium dichromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1310732	Sodium hydroxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7789062	Strontium chromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
100425	Styrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9960	Sulfates			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9960	SULFATES			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7446095	Sulfur Dioxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7446719	Sulfur Trioxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7664939	Sulfuric acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	Tetrachlorophenols			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
62555	Thioacetamide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
62566	Thiourea			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108883	Toluene	1.24E+00		3.52E-03	0.00E+00	0.00E+00	1.76E-03	0.00E+00	1.76E-03
1204	Toluene diisocyanate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
26471625	TOLUENE DIISOCYANATE			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
584849	Toluene-2,4-diisocyanate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
91087	Toluene-2,6-diisocyanate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8001352	Toxaphene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
79016	Trichloroethylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	Trichlororfluormethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	Trichlorotrifluormethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
121448	Triethylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
51796	Urethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440622	Vanadium (fume or dust)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1314621	VANADIUM PENTOXIDE			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108054	Vinyl acetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75014	Vinyl chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75354	Vinylidene chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1330207	XYLENES (mixed xylenes)	1.20E+00		3.41E-03	0.00E+00	0.00E+00	7.31E-04	0.00E+00	7.31E-04

ATTACHMENT C

BIOLOGICAL ASSESSMENT

Biological Assessment
E&B Natural Resources Management Corporation
McDonald Anticline Project
Kern County, California

Prepared for:

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April 2013

INTRODUCTION

E&B Natural Resources Management Corporation (E&B) proposes to construct 10 well pads and drill a single oil well from each of the proposed well sites, for a total of 10 wells. The proposed wells are: Theta 252C-20, Theta 253A-20, Theta 253D-20, Theta 262C-20, Theta 264C-20, E&B Fee #271B-20, E&B Fee #271D-20, E&B Fee #281C-20, E&B Fee #281D-20, and E&B Fee #282D-20. If the wells are determined to be productive, a three (3)-inch diameter flow line would be constructed from each well to the existing E&B production facility. The proposed well sites are located in western Kern County, California, in the McDonald Anticline Oil Field. E&B retained the services of Robert A. Booher Consulting (RAB Consulting) to conduct a biological survey and assessment of the proposed well sites, proposed flow line routes, and buffer areas for submittal to the State of California, Department of Conservation, Division of Oil, Gas and Geothermal Resources (Division).

RAB Consulting conducted biological surveys of the proposed well sites and buffer areas on November 9 and 13, 2012 to identify known or potential habitat for special-status wildlife and plant species. Biological surveys were completed on January 16 and 22, 2013 for the proposed flow lines and along existing access routes. Additional surveys were conducted February 25, 2013 and March 5, 2013 targeting special-status plant species and to detect special-status wildlife. This report presents the results of our biological surveys and includes recommendations for avoidance and minimization measures to be implemented during the proposed project to avoid or minimize potential impacts to sensitive wildlife, plants, and their habitats.

The term “well site” is used throughout this document to describe the area where a specific well is proposed. The term “project site” is used to further define the project footprint (i.e. proposed well pad, proposed access road, existing access routes, etc.). The term “buffer area” describes a 500-foot area surrounding each proposed well site that was included in the biological survey area. Representative photographs of the proposed well sites and existing access roads are presented in Appendix A.

PROJECT LOCATION AND ENVIRONMENTAL SETTING

The proposed project sites are located approximately 12.0 miles southwest of the community of Lost Hills in western Kern County, California (Figure 1). The proposed project is located in Section 20, Township 28 South, Range 20 East MDBM of the U.S. Geological Survey (USGS) Carneros Rocks 7.5-minute quadrangle map. The wells are proposed in the McDonald Anticline Oil Field. Existing dirt roads occur throughout the area that would provide access to each proposed well location; however, the construction of short access roads will be required to provide access to the proposed Theta 253A-20, and Theta 253D-20/Theta 262C-20 well sites (see Figure 2).

The wells are proposed in the Bacon Hills area. Topography is generally flat in the proposed project sites and to the north. Elevations in the proposed well sites are approximately 920 feet, while nearby peaks of the Bacon Hills to the east are just over 1000 feet in elevation. Carneros Rocks occur to the south, at the base of the hills. The Temblor Range is situated along the edge of the valley, to the south and west. Prominent features on the landscape include two intermittent streams, Santos Creek and Carneros Creek. Santos Creek, an intermittent stream bisects the Bacon Hills area, trends in a west to east direction through the project sites. Carneros Creek, an intermittent tributary to Santos Creek, occurs east of the existing E&B production facility. These streams were observed to be dry during biological surveys.

The proposed project is located in non-native annual grassland habitat. No valley saltbush scrub, wetland, stream, or other sensitive habitats are present within the boundaries of the proposed project sites. No irrigation/drainage ditches are present within the proposed project sites or buffer areas. Surrounding land uses include livestock grazing and oil/gas drilling and production activities.

Habitat Conservation and Natural Community Conservation Plans – The proposed project occurs within the boundary of the Draft Kern County Valley Floor Habitat Conservation Plan (VFHCP), which is currently in the planning stage. However, there are no adopted Habitat Conservation Plans, Natural Community Conservation Plans or other approved local, regional, or state habitat conservation plans in the project area.

PROJECT DESCRIPTION

E&B Natural Resources Management Corporation (E&B) is proposing drill ten (10) oil wells to depths not exceeding 1,400 feet subsurface. The proposed project is located in the McDonald Anticline Oil Field in Section 20, Township 28 South, Range 20 East MDBM of the U.S. Geological Survey (USGS) Carneros Rocks 7.5-minute quadrangle map. If economical quantities of oil are discovered in a well, E&B would install the necessary production equipment on that well site as described in this Project Description. No hydraulic fracturing is proposed as part of this project. The surface locations for the proposed Theta 252C-20, Theta 253A-20, Theta 253D-20, Theta 262C-20 and Theta 264C-20 wells would be on land owned by Aera Energy LLC and the surface locations for the proposed E&B Fee #271B-20, E&B Fee #271D-20, E&B Fee #281C-20, E&B Fee #281D-20 and E&B Fee #282D-20 wells would be on land owned by Theta Oil and Land Company. The proposed project is located 12 miles southwest of Lost Hills in Kern County, California (Figure 1). Specific locations of wells are listed in Table 1 and surface disturbance for each well are listed in Table 2.

The areas surrounding the proposed project sites consist of natural lands/non-native annual grasslands used for cattle grazing. Land uses within and adjacent to the proposed project sites include cattle grazing and oil and gas drilling and production activities. State Highway 33 provides the primary access to the project area. From State Highway 33 the project sites are accessed on existing private roads. Two of the proposed well sites (Theta 253A-20 and Theta 262C-20) would require a short extension of the existing access road to access the project site.

The proposed project sites are located on natural lands/non-native annual grassland. As shown in Figure 2: McDonald Anticline Project Location Map, dirt ranch access roads are located throughout the area and would be used to access the Theta 252C-20, Theta 253D-20, Theta 264C-20, E&B Fee #271B-20, E&B Fee #271D-20, E&B Fee #281C-20, E&B Fee #281D-20 and E&B Fee #282D-20. Access to the Theta 253A-20 site would require constructing a new access road, 20 feet by 315 feet (6,300 square feet or .14 acres), to extend access from an existing dirt road located east of the Theta 253A-20 project site. Access to the Theta 262C-20 site would require constructing a new access road, 20 feet by 75 feet (1,500 square feet or 0.03 acre) to extend access from an existing dirt road located east of the Theta 262C-20 project site. The proposed project would result in 5.91 acres of new surface disturbance to natural lands/non-native annual grassland as detailed in Table 2: Surface Disturbance.

Table 1
Site Specific Location

Well Name	Latitude	Longitude
Theta 252C-20	35.481181	-119.840213
Theta 253A-20	35.479947	-119.839880
Theta 253D-20	35.479100	-119.839569
Theta 262C-20	35.479656	-119.838758
Theta 264C-20	35.477732	-119.838759
E&B Fee #271B-20	35.484062	-119.835682
E&B Fee #271D-20	35.482791	-119.835422
E&B Fee #281C-20	35.483146	-119.833928
E&B Fee #281D-20	35.483292	-119.832984
E&B Fee #282D-20	35.481546	-119.833060

Table 2
Surface Disturbance

Well Name	Site Size	New Access Road	Total Acres of Land Disturbed
Theta 252C-20	85 feet by 210 feet	0	0.41 Acres
Theta 253A-20	150 feet by 160 feet	20 feet by 315 feet	0.55 Acres
Theta 253D-20	150 feet by 160 feet	0	0.55 Acres
Theta 262C-20	90 feet by 210 feet	20 feet by 75 feet	0.43 Acres
Theta 264C-20	120 feet by 265 feet	0	0.73 Acres
E&B Fee #271B-20	105 feet by 240 feet	0	0.58 Acres
E&B Fee #271D-20	100 feet by 200 feet	0	0.46 Acres
E&B Fee #281C-20	150 feet by 170 feet	0	0.59 Acres
E&B Fee #281D-20	150 feet by 160 feet	0	0.55 Acres
E&B Fee #282D-20	125 feet by 310 feet	0	0.89 Acres
Total Surface Disturbance		**0.17 Acres**	**5.74 Acres**

The objective of the proposed project is to locate untapped oil sources with potential for development. E&B will fully comply with all application of federal, state, regional and local laws, regulations and requirements.

Site preparation activities for the proposed project sites would include clearing, grading, and compaction of soil. Once a proposed project site has been cleared, it would be graded, watered and compacted to establish a level and solid foundation for the drilling rig. Written notification shall be given to the San Joaquin Valley Air Pollution Control District (SJVAPCD) at least 48 hours prior to beginning earthmoving operations. Typical equipment used for this project (in and beyond the site preparation phase) may include diesel drill rig, bulldozer, grader, loader, compacter, heavy-duty trucks, baker tanks, air compressors, pumps, and generators. Personnel will be notified prior to ground disturbing activities of the possibility of buried prehistoric or historic cultural deposits. Earthmoving activities at any of the proposed project sites will not exceed either the project limit of 5.0 acres nor involve movement, depositing, or relocation of more than 2,500 cubic yards per day of bulk materials on any three or more days.

Unless shallow ground water is encountered, a reserve pit will be excavated during site preparation for storage and handling of drilling mud and cuttings during the drilling process within the boundaries the proposed project site. If shallow ground water is encountered, drilling mud and cuttings shall be contained in above ground tanks. Soil will be stockpiled on site and used as backfill upon completion of drilling. If constructed, the reserve pit will be 75 feet long by 25 feet wide by six (6) feet deep. The reserve pit will hold 84,150 gallons with a two-foot freeboard. Reserve pits would be constructed by mechanical compaction. Compaction of the surface, combined with the deposition of bentonite drilling mud during drilling operations, would give the pit a bentonite seal with a maximum permeability of approximately 10^{-6} cm/sec (International Journal of the Physical Sciences Vol. 5(11) pp. 1647-1659, 18 Sept 2012). Groundwater in the project area occurs at a depth of approximately 135 to 150 below ground surface (California Department of Water Resources Water Data Library 2013). Based on evaluation of subsurface conditions by Division, the McDonald Anticline Field contains no fresh water. Completing the site preparation and proposed access road construction would require approximately one (1) day for each site.

Drilling equipment, including a 100-foot high drilling rig (double drill rig, or equivalent) will be mobilized to the site and temporary facilities, equipment and materials necessary for the drilling operation will be set up and stored on site (i.e., drilling mud supplies, water, drilling materials and casing, crew support trailers, pumps and piping, portable generators, fuels and lubricants, etc.). During rig mobilization/demobilization, when drilling equipment is moved on and off site, the maximum number of daily vehicle trips will be 58 one-way trips. The 58 vehicle one way trips will include 38 heavy truck/semi one way trips, 16 car / pickup truck one way trips,

two (2) crane and two (2) water truck one way trips. Night lighting will be required and required only during the drilling phase. However, to the greatest extent possible night lighting will be directed inward and down to minimize off site impacts without compromising safety.

The drilling of each well will require the use of approximately 500 barrels of water. Therefore, approximately 21,000 gallons of water would be used during the drilling phase of each well.

All hazardous materials such as diesel fuel will be stored according to applicable federal, state and local regulations. Portable tanks and mud pits will be used for mixing and storing drilling fluids. All fluids will be disposed of in accordance with the requirements of the Central Valley Regional Water Quality Control Board (RWQCB). If a reserve pit/sump is used, the use and closure of the reserve pit/sump will be handled in accordance with Title 27, CCR, Section 20090(g), and Regional Board Waiver Resolution No. R5-2008-0182. The solids that accumulate in the mud pits/tanks will be reused if demonstrated to be nonhazardous. If any wastes test positive for hazardous material they will be disposed of at the Clean Harbors Buttonwillow, LLC, located at 2500 West Lokern Road, Buttonwillow, CA, 93206 with a permitted capacity of 10,482 tons/day. The Clean Harbors Buttonwillow facility is located approximately 13.8 miles to the southeast of the proposed project sites.

Surface casing would be set, cemented, and blowout prevention equipment installed at each wellhead and tested. The amount of surface casing used depends upon factors such as expected well pressures, the depth of fresh water, and the competence of the strata in which the well casing will be cemented. Blowout prevention equipment is bolted to the surface casing. All successive drilling occurs through the blowout prevention equipment, which can be operated to control well pressures at any time. Blowout prevention equipment will be regulated by the Division. Division engineers will be notified for required tests and other operations (blowout prevention, surface casing integrity).

Well casing is designed to protect underground and surface waters suitable for irrigation or domestic purposes. The Division's well construction standards have the fundamental purpose to ensure zonal isolation. Zonal isolation means that oil coming up a well from the productive, underground geologic zone will not escape the well and migrate into other geologic zones, including zones that might contain fresh water. Zonal isolation also means that the fluids that are put down a well for any purpose will stay in that zone and not migrate to another zone. To achieve zonal isolation, Division regulations require that a cement barrier be placed between the well and surrounding geologic strata or stratum. The cement bonds to the surrounding rock and well casing and forms a barrier against fluid migration. Cement barriers must meet certain standards for strength and integrity. If these cement barriers do not meet the standards, the Division requires the oil operator to remediate the cement barrier. Metal casings, which can be several layers depending on the depth of a well, also separate the fluids going up and down a well bore from the surrounding geology. If the integrity of a well is compromised by ground movement or other mechanisms, the well operator must remediate the well to ensure zonal isolation. Well casing standards are prescribed in Title 14 CCR, Division 2, Chapter 4, Subchapter 1, Article 3, Sections 1722.2 – 1722.4. Groundwater in the project area occurs at a depth of approximately 135 to 150 below ground surface. Based on evaluation of subsurface conditions by the Division, the McDonald Anticline Field contains no fresh water. Blowout prevention equipment is regulated by the Division. Sufficient weighted drilling fluid would be used to prevent any uncontrolled flow from each well and additional quantities of drilling fluid would be available at each site (Title 14, CCR Section 1722.6). Drilling would continue until target depth is reached. Equipment, personnel and supply deliveries would continue through the course of the drilling program.

Once target depth is reached for a given well, the well will be fully evaluated and either completed and produced or plugged and abandoned. E&B estimates that approximately three (3) days would be required for drilling and approximately two (2) days would be required for testing and completion operations for each of the proposed wells.

Equipment, personnel and supply deliveries would continue through the course of the drilling program. Drilling activities would operate 24 hours per day. Approximately 7 to 10 personnel would be on site at any given time during the drilling operations.

If economic quantities of oil are discovered, a given well will be completed and production equipment including a well head and API 10 hp electronic motor pumping unit will be installed on site. Flowlines will be installed aboveground adjacent to the existing and proposed access roads. The proposed flowlines will connect the proposed wells to the existing E&B production facility located west of the E&B Fee #271B-20, E&B Fee #271D-20, E&B Fee #281C-20, E&B Fee #281D-20 and E&B Fee #282D-20 project sites and east of the Theta 252C-20, Theta 253A-20, Theta 253D-20, Theta 262C-20 and Theta 264C-20 project sites. The E&B production facility is located within the McDonald Anticline Oil Field. E&B currently operates 8 wells within the McDonald Anticline Oil Field, in which 6 wells are active and 2 wells are classified as new wells. The proposed flowlines will measure approximately 6,167 feet in length (see Figure 2). E&B proposes to paint all production equipment in camouflage or an earthen tone to blend in with the environment and to prevent glare. E&B estimates that approximately two (2) days would be required for flow line installation activities for each well. E&B anticipates 15 barrels of oil and 15 barrels of production water will be produced daily from each well. The oil will be transported from the E&B production facility by truck and sold to Conoco Phillips Company located at 6601 Franco Western, McKittrick, California 93251, located approximately 15 miles to the southeast of the proposed project sites. Accordingly, assuming all ten (10) wells go into production, E&B estimates that 11 truck trips per week will be required to transport the oil to Conoco Phillips Company. The production water will be transported offsite from the existing E&B Production Facility by truck to the Central Valley Waste Water LLC Class II Disposal Well (SWCC-1) in the South Belridge Oil Field for disposal. The SWCC-1 disposal well is located 4 miles to the east of the proposed project sites. Accordingly, assuming all ten wells go into production, E&B estimates that 11 truck trips per week will be required to transport the production water from the existing E&B Production Facility to the SWCC-1 disposal well. Production site will be visited daily, which will result in a further daily pick-up truck round-trip.

Once a well stops producing, it will be plugged and abandoned in accordance with CCR Sections 1723 – 1723.8. In this case, a Notice of Intention to abandon the well will be submitted to the Division for review and approval. During a typical well abandonment, recoverable casing will be salvaged from the well and the hole will be plugged with cement. The wellhead (and any other equipment) will be removed, the casing cut off 6 feet below ground surface, capped with a welded plate and the cellar backfilled. This process will be completed in three (3) days. The land contours of each well site would be re-established to near grade conditions as present at the time of project initiation. After all equipment is removed, the site would be restored to its condition prior to construction of the well pad.

SURVEY METHODOLOGIES

A literature review was completed and field surveys were conducted to identify special-status plant and wildlife species, as well as sensitive habitats that could be potentially present within the proposed project sites and buffer areas. The following sections describe the survey methods that were used and the literature and databases that were reviewed.

Literature Review: We reviewed RAB Consulting data files, records from the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) (CDFW 2013), the United States Fish and Wildlife Service (USFWS) online electronic database of threatened and endangered species (USFWS 2013), and the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2013) for the proposed well sites, proposed flow lines, and buffer areas for special-status species that have potential to occur within the project sites. Special-status species that potentially occur within and/or adjacent to the proposed well sites, proposed flow lines, and buffer areas are identified in Table 3. Figure 3

illustrates the location of documented special-status plant and animal occurrences in proximity to the proposed project sites.

Each of the species identified in the database queries was evaluated in terms of its likelihood to occur within the proposed project sites and buffer areas (see Table 1). This evaluation considered the known distribution and habitat requirements of the species and the following findings were prepared:

- Known to Occur – species was observed within or adjacent to the project site(s) or buffer areas during biological surveys or has previously been documented within or immediately adjacent to the project sites or buffer areas.

- Potentially Present – species has not been documented within or immediately adjacent to the project sites or buffer areas, but should be expected in areas of suitable habitat on and near the project sites and buffer areas during the appropriate season and time of day.

- Low Potential – species has not been documented within or immediately adjacent to the project sites or buffer areas nor is it likely to occur on or near the project sites or buffer areas, but its presence cannot be completely discounted due to incomplete information on the taxon's distribution or habitat requirements.

- No Potential – species does not occur within or immediately adjacent to the project sites or buffer areas due to the lack of required habitat features for the species, or the known range of the species is well defined and does not include the project vicinity.

Sources consulted for information on distribution of special-status wildlife species, as well as local and regional sensitive fauna include Remsen 1978 [birds], Williams 1986 [mammals], Jennings and Hayes 1994 [reptiles and amphibians], and Moyle *et al*. 1989 [fish]. Background information for several listed wildlife and plant species (including biology, habitat requirements, reasons for decline, limiting factors, etc.) that have potential to occur within and/or adjacent to the proposed well sites, proposed flow lines, and buffer areas is found in the recovery plan for upland species of the San Joaquin Valley, California (Williams *et al*. 1998).

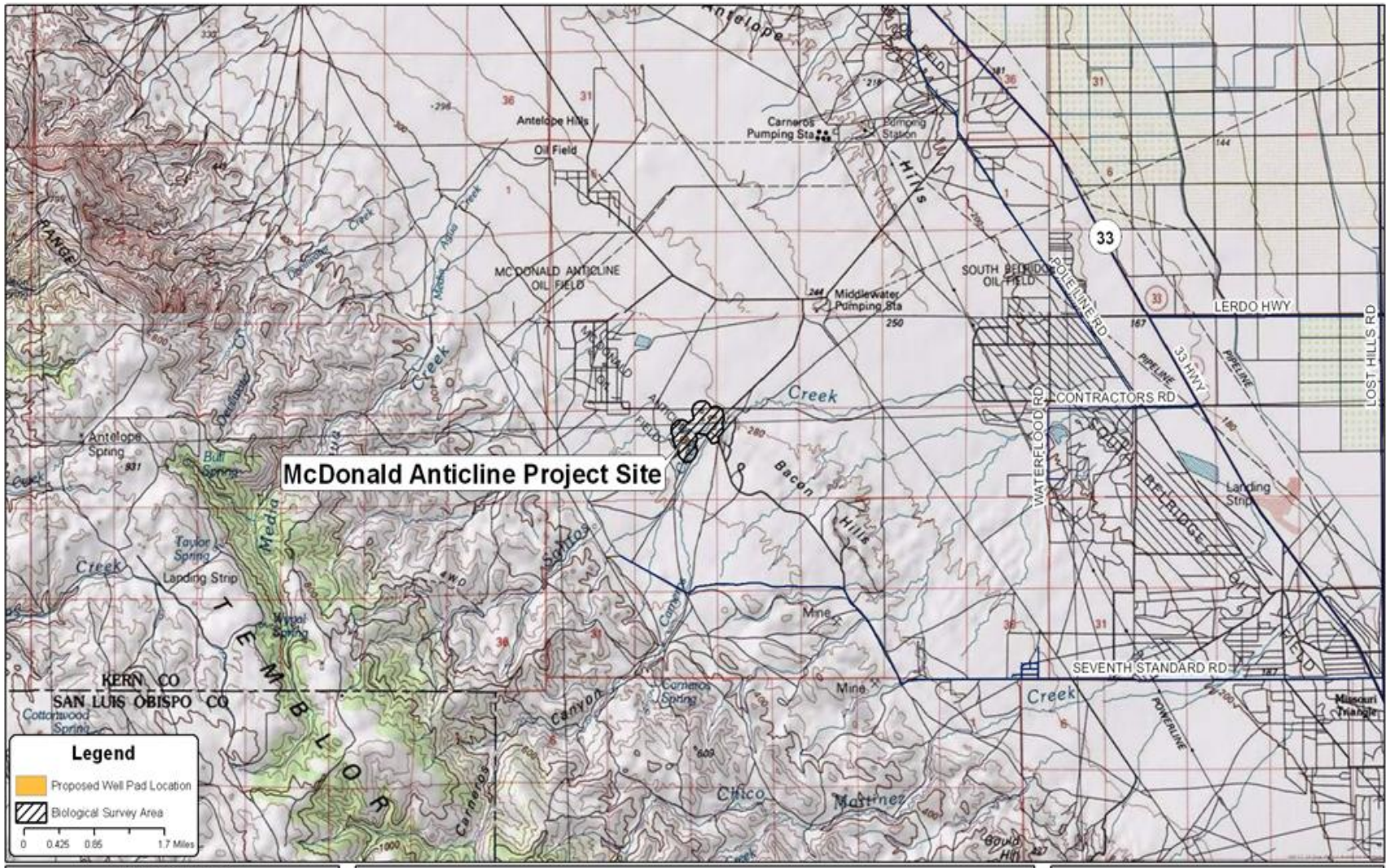
Special-Status Species - Special-status species are those taxa that are legally protected under the State or Federal Endangered Species Act (ESAs) or other regulations and considered sufficiently rare by the scientific community to qualify for such listing. Special-status plants and animals generally fall into one or more of the following categories:

- Plants or animals listed or proposed for listing as threatened or endangered under the federal ESA (50 Code of Federal Regulations [CFR] 17.12 [listed plants], 1711 [listed animal] and various notices in the Federal Register [FR][proposed species]);

- Plants or animals that are candidates for possible future listing as threatened or endangered under the federal ESA (61 FR 40, February 28, 1996);

- Plants or animals listed or proposed for listing by the State of California as threatened or endangered under the California ESA (14 California Code of Regulations [CCR] 670.5);

- Animal species of special concern to the CDFW (Remsen 1978 [birds], Williams 1986 [mammals], Jennings and Hayes 1994 [reptiles and amphibians], Moyle et al. 1989 [fish]);



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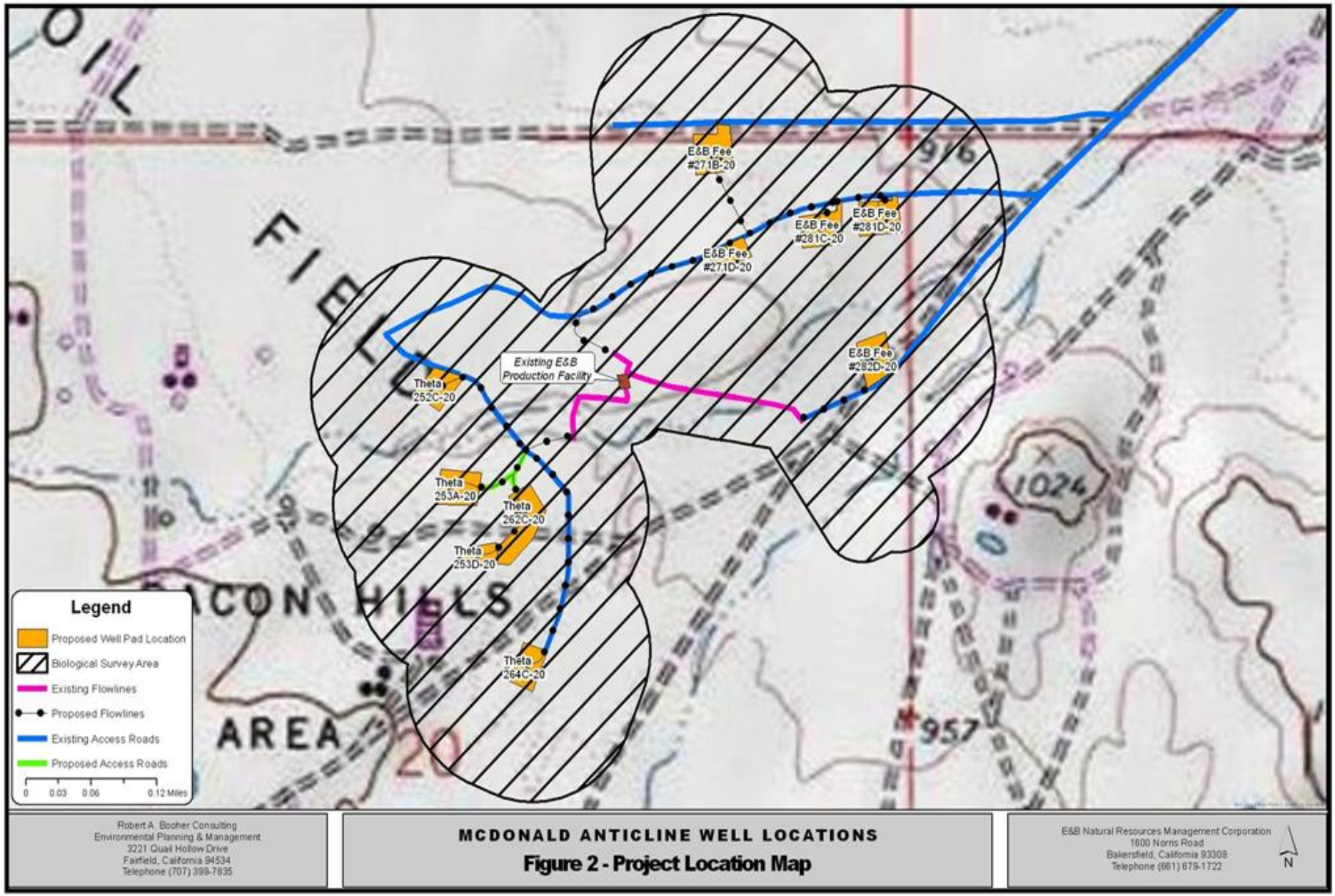
MCDONALD ANTICLINE WELL LOCATIONS

Figure 1 - Project Vicinity Map

E&B Natural Resources Management Corporation
1600 Norris Road
Bakersfield, California 93308
Telephone (661) 679-1722



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MCDONALD ANTICLINE WELL LOCATIONS

Figure 2 - Project Location Map

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- Animals fully protected in California (California Fish and Game Code, Sections 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians]);

- Plants listed as California Rare Plant Rank 1A (former CNPS List 1A) are presumed extinct in California (CNPS 2001, 2013 and Skinner and Pavlik, 1994);

- Plants listed as California Rare Plant Rank 1B (former CNPS List 1B) are considered rare, threatened, or endangered in California or elsewhere (CNPS 2001, 2013 and Skinner and Pavlik, 1994);

- Plants listed as California Rare Plant Rank 2 (former CNPS List 2) are considered rare or endangered in California, but more common elsewhere (CNPS 2001, 2013 and Skinner and Pavlik, 1994);

- Plants identified as California Rare Plant Rank 3 (former CNPS List 3) are those for which more information is needed; a review list (CNPS 2001, 2013 and Skinner and Pavlik, 1994); and

- Plants listed as California Rare Plant Rank 4 (former CNPS List 4) are of limited distribution; a watch list (CNPS 2001, 2013 and Skinner and Pavlik 1994) – these taxa may be included as special-status species on the basis of local significance or recent biological information.

SENSITIVE WILDLIFE SPECIES SURVEYS

We surveyed the proposed well sites and a 500-foot buffer area around each proposed project site for sensitive wildlife and special-status plant species, their habitats, and other sensitive habitats on November 9 and 12, 2012. Biological field surveys were conducted along existing access roads and the proposed flow line routes on January 16 and 22, 2013. Additional surveys were conducted in the proposed project sites and buffer areas on February 25, 2013 and March 5. 2013. Wildlife species that we observed are discussed in text format and are presented in Table 4. A list of plant species observed during our surveys is presented in Table 4.

We used portions of standard agency approved methods to survey for special-status wildlife species. These methods are identified in the following references: CNPS (CNPS 1991, 2001), CDFW (CDFG 1990, 1995, 2000, 2003, 2009, 2012, and CDFW 2013), Orloff (1987), Nelson (1987), The California Burrowing Owl Consortium (1993), Tollestrup (1976), and USFWS (1989, 1995, 1996b, 1999, 2000, and 2011). In addition, guidelines given in Section 402.12 of the Federal Register Vol. 51, No. 106, pp. 19960-19963 for Biological Assessments were used to prepare this report. Surveys were conducted to identify the following:

- Suitability of habitat(s) to support special-status wildlife species
- Presence of known and potential San Joaquin kit fox dens
- Presence of individual blunt-nosed leopard lizards (BNLL) and their habitat
- Sightings, burrows, and "sign" of sensitive small mammal species

- Sightings, burrows, and "sign" of western burrowing owls and other sensitive avian species
- Vegetation association, habitat types, and special-status plant species
- Dominant plant canopy and ground cover species
- Habitat condition and quality
- On-site, adjacent, and surrounding land uses.

We conducted surveys by walking parallel meandering transects spaced 30 to 50 feet apart to identify special-status wildlife species. Presence of these species was confirmed by direct observation or by identification of "sign" (e.g., tracks, scats, dens and/or burrows, etc.) unique to a particular species.

San Joaquin Kit Fox - We conducted diurnal surveys for San Joaquin kit fox dens and their "sign." Scats measuring 15 to 20 millimeter in diameter of appropriate canid shape are attributed to kit fox. No other vulpid is known to inhabit the area, and scats larger than 20 millimeter in diameter probably belong to coyote (*Canis latrans*) or domestic dog (*Canis familiaris*). Canid tracks up to 45 by 38 millimeter in size were attributed to kit fox. Tracks larger than this are probably attributable to coyote or domestic dog (Murie 1974).

We conducted surveys along transects spaced 30 to 50 feet apart following USFWS guidelines (USFWS 1989, 1995, 1999, and 2011) and CDFW Survey Methodologies for Sensitive Species (CDFG 1990). If San Joaquin kit fox "sign" and/or dens were identified, they were recorded using GPS and mapped on USGS topographic maps. In addition, we used knowledge gained from past experiences working with numerous kit fox dens and their "sign" (tracks, scats, etc.) during radio telemetry studies, and kit fox den identifications during other preactivity surveys. We classified underground dens according to the following USFWS kit fox den definitions (USFWS 2011):

> ***Known Den*:** Any existing natural den or manmade structure that <u>is used or has been used at any time in the past</u> by a San Joaquin kit fox. Evidence of use may include historical records, past or current radiotelemetry or spotlighting data, kit fox sign such as tracks, scat, and/or prey remains, or other reasonable proof that a given den is being or has been used by a kit fox. The Service discourages use of the terms "active" and "inactive" when referring to any kit fox den because a great percentage of occupied dens show no evidence of use, and because kit foxes change dens so often, with the result that the status of a given den may change frequently and abruptly.
>
> ***Potential Den*:** Any subterranean hole within the species' range that has entrances of appropriate dimensions for which available evidence is insufficient to conclude that it is being used or has been used by a kit fox. Potential dens shall include the following: (1) any suitable subterranean hole; or (2) any den or burrow of another species (e.g., coyote, badger, red fox, or ground squirrel) that otherwise has appropriate characteristics for kit fox use.
>
> ***Natal or Pupping Den***: Any den used by kit foxes to whelp and/or rear their pups. Natal/pupping dens may be larger with more numerous entrances than dens

occupied exclusively by adults. These dens typically have more kit fox tracks, scat, and prey remains in the vicinity of the den, and may have a broader apron of matted dirt and/or vegetation at one or more entrances. A natal den, defined as a den in which kit fox pups are actually whelped but not necessarily reared, is a more restrictive version of the pupping den. In practice, however, it is difficult to distinguish between the two, therefore, for purposed of this definition either term applies.

Atypical Den: Any manmade structure which has been or is being occupied by a San Joaquin kit fox den. Atypical dens may include pipes, culverts, and diggings beneath concrete slabs and buildings.

San Joaquin Antelope Squirrel - We surveyed for San Joaquin antelope squirrels, their scats and potential burrows while conducting surveys for other species (i.e., San Joaquin kit foxes, giant kangaroo rat, and blunt-nosed leopard lizard) (CDFG 1990). Transect surveys were walked, spaced at 30 to 50 foot intervals. Surveys were conducted using daytime line transects at 30 to 50 foot intervals covering the area in a systematic manner. While walking transects, biologists scanned the area (including using binoculars) looking for the species and listening for the species vocalizations. Although burrow entrance sizes overlap with other rodents, SJAS burrows can usually be distinguished by the presence of irregularly-sized scats (CDFG Date Unknown).

Blunt-Nosed Leopard Lizard - We surveyed for potential presence of blunt-nosed leopard lizard (BNLL) and to evaluate suitability of habitat to support this species by walking parallel transects spaced at 30 to 50 foot intervals (Tollestrup 1976, as modified by CDFG 1990 and 2004). Emphasis was placed on the identification of small mammal burrows that may serve as potential for this species. We identified all lizards observed with the aid of binoculars.

Other Sensitive Wildlife - We surveyed for evidence of giant kangaroo rat, western burrowing owl, prairie falcon, and other targeted species of concern (see Table 3) while conducting transect surveys. This consisted of recording sightings of the species, their sign (i.e., tracks, scat, prey remains, etc.), and habitat features (dens and/or burrows, roosts, etc.).

SPECIAL-STATUS PLANT SURVEYS

Literature Review: Prior to conducting field surveys, we reviewed information from published and unpublished sources to determine special-status plant species known, or that have potential to occur in the vicinity of the proposed project. Special-status plant species include species listed as Endangered, Threatened, or Rare by USFWS (USFWS 2013), or by CDFW (CDFW 2013), and species ranked by the CNPS (CNPS 2001 and 2013). Sources consulted for information on the distribution of special-status plant species include regional and local floras (Abrams 1923, 1944, 1951, Abrams and Ferris 1960, Hickman 1996, Twisselmann 1956, 1967, Moe 1995, Munz and Keck 1968). CNDDB occurrence records and maps (CDFW 2013), county and USGS quadrangle records in Smith and Berg (1988), CNPS (2001 and 2013), and occurrence records from previous surveys in the region were also used. In addition, we consulted Taylor (1987) and Taylor and Davilla (1986) for locations of endemic San Joaquin Valley listed plant species that have potential to occur within the area surrounding the proposed project sites.

Plant Species Surveys and Identification – Our plant surveys were conducted during the appropriate blooming period of four (4) of the five (5) targeted special-status plant species identified as potentially occurring within the proposed project sites and buffer areas (see Table 3). These surveys were floristic in nature and were conducted concurrent with surveys to detect sensitive wildlife species. Surveys were conducted in accordance with the USFWS *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants* (USFWS 2000) and the CDFW *Protocols for Surveying and evaluating impacts to special-status native plant populations and natural communities* (CDFG 2009). Rare plant surveys were also performed using demographic survey techniques derived from the CNPS rare plant monitoring guidelines (CNPS 2011). These guidelines include conducting floristically based surveys, identifying all plants encountered to the species level, or identifying to the level necessary to detect rare plants if present.

We surveyed 30 to 50 feet wide transects within the proposed well sites and a 500 foot buffer around each site. Additional surveys were conducted along existing access roads for proposed flow lines. We identified vascular plant species encountered in the surveys, which were in identifiable condition using standard manuals (Abrams 1923, 1944, 1951, Abrams and Ferris 1960, Hickman 1996, Moe 1995, Munz and Keck 1968 and Twisselmann 1956, 1967). Scientific nomenclature used for plant species in this report follows Hickman (1996), and we used modifications of Cheatham and Haller (1975) and Holland (1986) to describe habitat types found in the proposed project sites.

RESULTS AND DISCUSSION

Results of our biological surveys for the proposed project sites and buffer areas are presented below. The following discussion describes habitat types that occur in the project sites and focuses on special-status wildlife species that could potentially occur within the proposed project sites and buffer areas, based on historic observations and known occurrences. Those species identified in Table 3 as having no potential to occur in the project sites based on lack of habitat requirements (i.e., perennial water, roost sites, etc.) are not discussed further in this document.

Wildlife and plant species observed during biological surveys of the proposed well sites and buffer areas are presented in Table 4.

HABITAT TYPES

No perennial or intermittent streams, wetland, vernal pool, or other sensitive habitats were observed within the boundaries of the proposed well sites. Habitat types observed during our biological field surveys are briefly described below:

Non-Native Annual Grassland

The proposed project sites are located in non-native, annual grassland habitat. Common species found in this vegetative community were composed of introduced grasses and broadleaf weedy species. Plant species observed during field surveys included fiddleneck (*Amsinckia intermedia*),

Table 3
Special-Status Species Potentially Occurring in the Project Sites

Common Name	Scientific Name	Federal Status	State Status	Habitat/Observances	Potential to Occur in Project Sites
Mammals					
San Joaquin (Nelson's) antelope squirrel	*Ammospermophilus nelsoni*	-	CT	Found in the western San Joaquin Valley from 200 to 1,200 feet in elevation. Found on dry sparsely vegetated loam soils. This species digs burrows or uses kangaroo rat (or California ground squirrel) burrows. Requires widely scattered shrubs, forbs, and grasses in broken terrain with gullies and washes.	Known to Occur. Potential habitat (annual grassland) is present in the proposed project sites and buffer areas. No potential burrows that were of appropriate size for use by this species were observed within the boundaries of the proposed project sites, or within 50 feet of each well site. One (1) individual San Joaquin antelope squirrel was observed approximately 0.20 miles (1,060 feet) north of proposed well Theta 264C-20. This species has been historically recorded in proximity to the proposed project sites (in Section 20, T28S, R20E). San Joaquin antelope squirrels have also been documented approximately 1.2 miles east of the proposed project sites (CDFW 2013) (see Figure 3).
Pallid bat	*Antrozous pallidus*	-	SSC	Found in deserts, grasslands, shrublands, woodlands, and forests. Most common in dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Low Potential. Potential foraging habitat was observed in the project sites and buffer areas. However, no suitable roosting areas for this species were present in the proposed project sites and buffer areas.
Giant kangaroo rat	*Dipodomys ingens*	FE	CE	Prefer annual grassland on gentle slopes of generally less than 10°, with friable, sandy-loam soils. However, most remaining populations are found on poorer, marginal habitats which include shrub communities on a variety of soil types and on slopes up to about 22°. Giant kangaroo rats develop burrow systems with one to five or more separate openings. Utilize two types of burrow: 1) a vertical shaft with a circular opening and no dirt apron, and 2) a larger, more horizontally-opening shaft, usually wider than high with a well-worn path leading from the mouth.	Low Potential. Potential habitat (non-native annual grassland) was observed in the proposed project sites and buffer areas. No burrows suitable for use by this species were observed in the proposed project sites, or within 50 feet of each site. No sign of species presence (i.e., mowing, hay stacking, seed caching, vertical burrow entrances, etc.) was observed in the project sites or buffer areas. This species has not been documented in the project area (CDFW 2013).

Table 3
Special-Status Species Potentially Occurring in the Project Sites

Common Name	Scientific Name	Federal Status	State Status	Habitat/Observances	Potential to Occur in Project Sites
Hoary bat	*Lasiurus cinereus*	-	-	Prefers open habitats with access to tress for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Requires water and feeds primarily on moths.	No Potential. Although potential foraging habitat is present in the proposed project sites and buffer areas, no potential roosting habitat or surface water was observed in the proposed project sites or buffer areas.
San Joaquin kit fox	*Vulpes macrotis mutica*	FE	CT	Inhabit annual grasslands or grassy open stages with scattered shrubby vegetation. Require loose-textured sandy soils for burrowing, and a suitable prey base.	Potentially Present. Potential habitat is present in the project sites and buffer areas. No potential burrows suitable for use by this species were observed within the boundaries of the proposed project sites. However, two (2) potential burrows were observed approximately 130 feet southwest of proposed well E&B Fee #271D-20. No sign (i.e., scat, tracks, digging, prey remains, etc.) of kit fox activity was observed in the biological survey area. This species has been documented approximately 0.5 miles south of the existing E&B production facility, and approximately 1.2 miles to the east (CDFW 2013) (see Figure 3).
Birds					
Burrowing owl	*Athene cunicularia*	-	SSC	Open grasslands, prairies, farmlands, and deserts.	Known to Occur. Potential habitat for this species was observed within the proposed project sites and buffer areas. No potential burrows that were of appropriate size for use by this species were observed within the boundaries of the proposed project sites. However, two (2) potential burrows were observed approximately 130 feet southwest of proposed well E&B Fee #271D-20 during biological surveys in 2012. Sign (i.e., whitewash, castings, feathers, etc.) of the species presence and one (1) individual burrowing owl was observed at this location during biological surveys in 2013. This species has not been previously documented in the project sites or buffer areas (CDFW 2013).
Prairie falcon	*Falco mexicanus*	-	WL	Dry, open terrain in level or hilly areas. Breeding sites are located on cliffs. This species forages far afield, even to marshlands and ocean shores.	Known to Occur. Potential foraging habitat is present within the proposed project sites and buffer areas. No breeding/nesting sites (cliffs) suitable for use by this species were observed in the project sites, buffer areas, or the general project area. This species has been documented in

Table 3
Special-Status Species Potentially Occurring in the Project Sites

Common Name	Scientific Name	Federal Status	State Status	Habitat/Observances	Potential to Occur in Project Sites
					proximity to the proposed project sites (CDFW 2013) (see Figure 3).
California condor	*Gymnogyps californianus*	FE	CE, Fully protected	Found as a recently reintroduced species primarily in the mountains of Ventura, Santa Barbara, and Los Angeles Counties. However, individuals are known to be wide ranging and have even been seen soaring over the Tehachapi Mountains and southern Sierra Nevada. The species is strictly a scavenger and may travel up to 35 miles or more from roost sites in search of carrion. Most foraging occurs in open habitats that facilitate landings and takeoffs. Traditional roost sites are on cliffs or ledges, but snags and trees in old growth coniferous forest may also be used.	Low Potential. While California condor may occasionally fly over the proposed project sites and buffer areas, the proposed project sites are not favorable for landings and/or takeoffs. No suitable roost sites, or potential nesting habitat for this species was observed in the proposed project sites or buffer areas. No individual condors were observed during field surveys, and this species has not been documented in proximity to the proposed well sites (CDFW 2013).
Invertebrates					
Vernal pool fairy shrimp	*Branchinecta lynchii*	FT	-	Found in short-lived seasonal cool-water vernal pools with low to moderate dissolved solids.	No Potential. No suitable habitat (vernal pools) was observed within the proposed project sites or buffer areas.
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	FT	-	Occurs only in the Central Valley of California, in association with blue elderberry (*Sambucus mexicana*). Prefers to lay eggs in elderberries 2-8 inches in diameter; some preference shown for stressed elderberry shrubs.	No Potential. No suitable habitat (elderberry bushes) was observed within the proposed project sites or buffer areas.
Amphibians and Reptiles					
California red-legged frog	*Rana draytonii*	FT	CSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11 to 20 weeks of permanent water for larval development. Must have access to aestivation habitat, consisting of small mammal burrows and moist leaf litter.	No Potential. No suitable habitat was observed within the proposed project sites or buffer areas.

Table 3
Special-Status Species Potentially Occurring in the Project Sites

Common Name	Scientific Name	Federal Status	State Status	Habitat/Observances	Potential to Occur in Project Sites
Blunt-nosed leopard lizard	*Gambelia sila*	FE	CE, Fully Protected	Resident of sparsely vegetated alkali and desert scrub habitats, in areas of low topographic relief. Seeks cover in mammal burrows, under shrubs or structures such as fence posts. They do not excavate their own burrows.	Potentially Present. Potential habitat (annual grassland) was observed in the proposed project sites and buffer areas. No potential burrows that were of appropriate size for use by this species were observed within the boundaries of the proposed project sites, or within 50 feet of each well site. No individual blunt-nosed leopard lizards were observed during biological surveys. This species was noted in proximity to the proposed project sites (Section 20, T28S, R20E); this information was included in an observation record of San Joaquin antelope squirrel. Blunt nosed leopard lizards have also been documented approximately 2.0 miles and 2.6 miles east of the existing E&B production facility (CDFW 2013) (see Figure 3).
Giant garter snake	*Thamnophis gigas*	FT	CT	Prefers fresh water marsh and low gradient streams. Has adapted to drainage ditches and irrigation canals.	No Potential. No suitable habitat was observed within the proposed project sites or buffer areas.
Plants					
Oval-leaved snapdragon	*Antirrhinum ovatum*	-	Rank 4	Chaparral, cismontane woodland, pinyon and juniper woodland, valley and foothill grassland. Found on clay, gypsum, and alkaline soils. Elevation range: 200 to 1,000 meters. Blooming period: May through November.	Low Potential. Potential habitat (annual grassland) was observed in the proposed project sites and buffer areas. Floristic surveys were conducted during the blooming period of this species; however, no individuals were observed during biological field surveys. This species has not been documented within the proposed project sites or in vicinity to the McDonald Anticline Field (CDFW 2013).
Round-leaved filaree	*California macrophylla*	-	Rank 1B	Cismontane woodland, valley and foothill grassland. Found on clay soils. Elevational range: 15 to 1,200 meters. Blooming period: March through May.	Low Potential. Potential habitat (annual grassland) was observed in the proposed project sites and buffer areas. Floristic surveys were conducted during the blooming period of this species; however, no individuals were observed during biological field surveys. This species has not been documented within the proposed project sites or in vicinity to the McDonald Anticline Field (CDFW 2013).

Table 3
Special-Status Species Potentially Occurring in the Project Sites

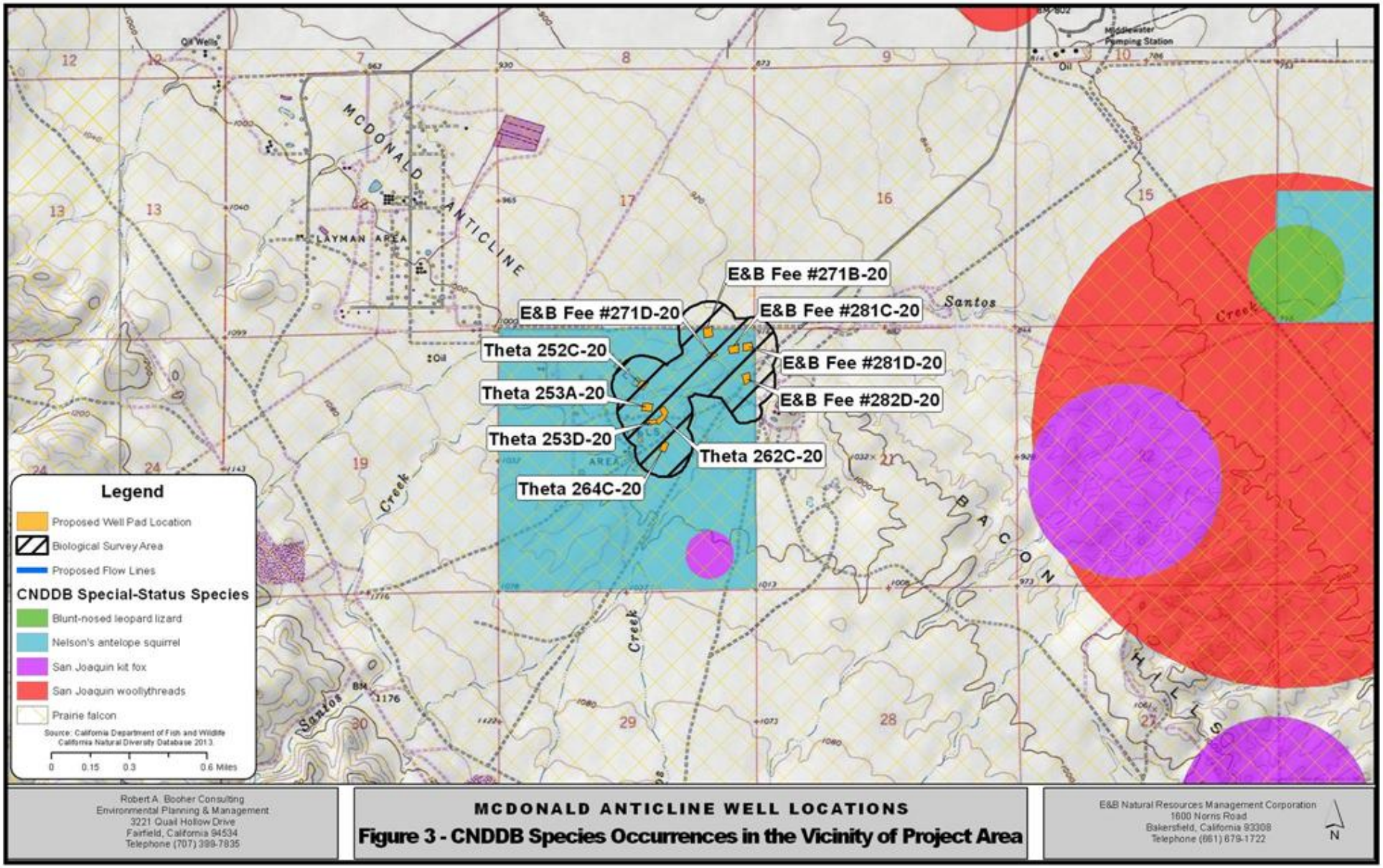
Common Name	Scientific Name	Federal Status	State Status	Habitat/Observances	Potential to Occur in Project Sites
Temblor buckwheat	*Eronum temblorense*	-	Rank 1B	Valley and foothill grassland. Often found on northeast and south facing slopes of steep, barren, white shale. Elevation range: 300 to 1,000 meters. Blooming period: April through September.	Low Potential. Potential habitat (annual grassland) was observed in the proposed project sites and buffer areas. However, the proposed project sites do not support steep slopes or shale soils. No individuals were observed in the proposed well sites or buffer areas during biological surveys. This species has not been documented within the proposed project sites or in vicinity to the McDonald Anticline Field (CDFW 2013).
Pale-yellow layia	*Layia heterotricha*	-	Rank 1B	Pinyon and juniper woodland, valley and foothill grassland, and cismontane woodland. Elevation range: 300 to 1,750 meters. Blooming period: March through June.	Low Potential. Potential habitat (annual grassland) was observed in the proposed project sites and buffer areas. Floristic surveys were conducted during the blooming period of this species; however, no individuals were observed during biological field surveys. This species has not been documented within the proposed project sites or in vicinity to the McDonald Anticline Field (CDFW 2013).
San Joaquin woollythreads	*Monolopia congdonii*	FE	Rank 1B	Chenopod scrub, valley and foothill grassland. Found on sandy soils. Elevation range: 60 to 800 meters. Blooming period: February through May.	Low Potential. Potential habitat (annual grassland) was observed in the proposed project sites and buffer areas. Floristic surveys were conducted during the blooming period of this species; however, no individuals were observed during biological field surveys. This species has been documented approximately 1.2 miles east and approximately 1.5 miles northeast of the existing E&B production facility (CDFW 2013) (see Figure 3).

Status Codes:

Federal	**State**
FE = Federally listed as Endangered	CE = California listed as Endangered
FT = Federally listed as Threatened	CT = California listed as Threatened
FC = Federal Candidate species	CR = California listed as Rare
	CFP = California Fully Protected
	SSC = Species of Special Concern
	WL = CDFW Watch List

California Rare Plant Rank (formerly known as CNPS Lists)
California Rare Plant Rank 1A = Plants presumed extinct in California
California Rare Plant Rank 1B = Plants rare, threatened, or endangered in California and elsewhere
California Rare Plant Rank 2 = Plants rare or endangered in California, but more common elsewhere
California Rare Plant Rank 3 = Plants about which we need more information; a review list
California Rare Plant Rank 4 = Plants of limited distribution; a watch list.

Status and habitat information from the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database RareFind 4 (CDFW 2013); California Native Plant Society, California Rare Plant Electronic Inventory (CNPS 2013); and USFWS Online Endangered Species Database (USFWS 2013).


E&B Fee #271B-20
E&B Fee #271D-20
E&B Fee #281C-20
E&B Fee #281D-20
E&B Fee #282D-20
Theta 252C-20
Theta 253A-20
Theta 253D-20
Theta 262C-20
Theta 264C-20
MCDONALD ANTICLINE
LAYMAN AREA
Santos
Creek
BACON HILLS
Legend
Proposed Well Pad Location
Biological Survey Area
Proposed Flow Lines
CNDDB Special-Status Species
Blunt-nosed leopard lizard
Nelson's antelope squirrel
San Joaquin kit fox
San Joaquin woollythreads
Prairie falcon
Source: California Department of Fish and Wildlife California Natural Diversity Database 2013.
0 0.15 0.3 0.6 Miles
Robert A. Booher Consulting
Environmental Planning & Management
3221 Quail Hollow Drive
Fairfield, California 94534
Telephone (707) 399-7835
MCDONALD ANTICLINE WELL LOCATIONS
Figure 3 - CNDDB Species Occurrences in the Vicinity of Project Area
E&B Natural Resources Management Corporation
1600 Norris Road
Bakersfield, California 93308
Telephone (661) 679-1722
N

red brome (*Bromus madritensis* ssp. *rubens*), saltgrass (*Distichlis spicata*), doveweed (*Croton setigerus*), redstem filaree (*Erodium cicutarium*), and alkali goldenbush (*Isocoma arcadenia*).

Wildlife species observed in this community during field surveys included Western burrowing owl (*Athene cunicularia*), common raven (*Corvus corax*), horned lark (*Eremophila alpestris*), California ground squirrel (*Spermophilus beecheyi*), common side-blotched lizard (*Uta stansburiana*), and mourning dove (*Zenaida macroura*).

Ruderal/Disturbed

This habitat type was observed in previously disturbed areas and along the edges of existing roads traveled throughout the McDonald Anticline Field. Common plant species found in this community were composed primarily of weedy non-native and native species. Vegetative species observed included fiddleneck (*Amsinckia intermedia*), red brome (*Bromus madritensis* ssp. *rubens*), doveweed (*Croton setigerus*), redstem filaree (*Erodium cicutarium*), Russian thistle (*Salsola tragus*), and yellow star-thistle (*Centaurea solstitialis*).

Wildlife use of this community is often limited due to the monocultural and weedy nature of plant species present. Although the diversity of wildlife is limited, species that do occur in the habitat type are often abundant and well adapted to the presence of humans and disturbance. Wildlife species observed in this community included San Joaquin antelope squirrel (*Ammospermophilus nelsoni*) and common raven (*Corvus corax*).

SPECIAL-STATUS WILDLIFE SPECIES

Through a literature review and an electronic search of the CNDDB, CNPS and USFWS databases, 13 special-status wildlife and invertebrate species and five (5) special-status plant species were identified as potentially occurring within the proposed project sites and buffer areas. Table 3 provides a list of these special-status species, and includes a brief analysis of their potential to occur in the project sites and buffer areas. Based on habitats present and the environmental conditions observed during biological surveys, RAB Consulting determined that four (4) special-status plant species and eight (8) wildlife species have the potential to occur in the proposed project sites. Only five (5) of these special-status species have been recorded by CNDDB in proximity to the proposed project sites and buffer areas (CDFW 2013). These species include San Joaquin (Nelson's) antelope squirrel, San Joaquin kit fox, blunt-nosed leopard lizard, prairie falcon, and San Joaquin woollythreads. The locations of the CNDDB documented sightings of special-status animal and plant species in proximity to the proposed E&B McDonald Anticline project are shown in Figure 3.

San Joaquin Kit Fox (*Vulpes macrotis mutica*) historically occurred throughout the southern portion of the San Joaquin Valley, along the eastern edge of the San Joaquin Valley, and in the dry interior valleys of the Coast Ranges. The species occurs in a variety of open grassland, oak savannah, and shrub vegetation communities. However, in the southern portion of its range it is generally found in sparse annual grassland and scrub communities (e.g., valley sink scrub, saltbush scrub). Den characteristics of the subspecies vary across its range. In the southern

portion of its range the taxon often creates dens with two entrances; natal/pupping dens typically have multiple entrances. Entrances range from 8 to 10 inches in diameter and are normally higher than wide, but kit foxes can utilize dens with entrances as small as four (4) inches in diameter. Kit foxes often change dens on a regular basis. Home ranges for the taxon have been reported by several authors to range from 1 to 12 square miles (USFWS 1998).

We observed potential habitat (annual grassland) for the San Joaquin kit fox within the proposed project sites and buffer areas during biological surveys. Two potential burrows were observed approximately 130 feet southwest of the proposed E&B Fee #271D-20 project site. In addition, several California ground squirrel burrows were observed along the banks of Santos Creek, approximately 600 feet southwest of the existing E&B Production Facility. However, no potential burrows that were of adequate size for use by San Joaquin kit foxes were observed within the boundaries of the proposed well sites. There were no "active signs" (i.e., scat, prey remains, tracks, digging, fur, etc.) of use by San Joaquin kit fox observed in the proposed project sites or buffer areas.

Historical CNDDB records suggest that the surrounding project vicinity does support this species. San Joaquin kit fox activity (scat) was documented in 1988, in the SE ¼ of Section 20, T28S, R20E, approximately 0.5 miles south of the existing E&B Production Facility (CDFW 2013). This species has also been documented approximately 1.2 miles east of the existing E&B Production Facility (CDFW 2013) (see Figure 3). This CNDDB observation record is of a den that was observed between 1972 and 1975, and is based on maps showing kit fox distribution and abundance in 1975. Although no denning was observed within the proposed project sites at the time of our field surveys, it is possible that the proposed well sites may accommodate the occasional foraging San Joaquin kit fox. However, forage would be limited in the project area based on a lack of small mammal burrows that would support a suitable prey base.

San Joaquin (Nelson's) Antelope Squirrel (*Ammospermophilus nelsoni*) historically occurred in the western and southern portions of the Tulare Basin, San Joaquin Valley, and contiguous areas to the west in the upper Cuyama Valley, and on the Carrizo and Elkhorn plains (Williams *et al*. 1998). However, the current distribution is extremely fragmented due to agricultural conversions that have occurred during the last century. Thus, substantial populations now occur only around Lokern and Elk Hills in western Kern County, and on the Carrizo and Elkhorn plains in southeastern San Luis Obispo County. Within its occupied range the species inhabits arid annual grassland and shrubland communities and is most numerous in areas with a sparse to moderate cover of shrubs. Occupied habitat also typically occurs on open, gentle slopes with friable soils. Areas with high water tables, steep slopes, or broken, rocky upland terrain appear to be avoided by the species (Williams *et al*. 1998). Habitats that are considered fair to good in quality typically support between 3 and 10 antelope squirrels per acre (Williams *et al*. 1998). The species is primarily diurnal and may be active throughout the day.

We observed potential habitat for San Joaquin antelope squirrels in annual grassland within the proposed project sites and buffer areas during biological surveys. We searched for burrows and scat of this species and were vigilant for sightings (and listened for vocalizations). No burrows appropriate for use by this species were observed within the boundaries of the proposed well sites, or within 50 feet of each site. No individual San Joaquin antelope squirrels were observed

within the boundaries of the proposed project sites during biological field surveys; however, one individual San Joaquin antelope squirrel was observed in the buffer area, approximately 0.2 miles (1,600 feet) north of proposed well Theta 264C-20. The squirrel was observed entering a small mammal burrow along the fence line of an active livestock grazing holding area.

San Joaquin antelope squirrels have been documented in the Bacon Hills area, in the southern portion of the McDonald Anticline Field, specifically in Section 20, T28S, R20E (CDFW 2013) (see Figure 3). This CNDDB observation record is dated 1987, and noted other species known from the area at that time included San Joaquin kit fox and BNLL. The observation record also indicates rodenticide use was possible, as rodent holes were extremely sparse in 1987. San Joaquin antelope squirrel have also been historically recorded approximately 2.0 miles east of the existing E&B Production Facility (CDFW 2013). An unknown number of San Joaquin antelope squirrels were observed in this location during 1988 California Energy Commission Southern San Joaquin Valley Habitat Preservation Program Sensitive Species Surveys.

Giant Kangaroo Rat (*Dipodomys ingens*) prefers annual grassland on gentle slopes of generally less than 10 percent with friable, sandy-loam soils. However, most remaining populations are on poorer, marginal habitats which include shrub communities on a variety of soil types and slopes up to 22 percent. The historical distribution of the species encompasses a narrow band of gently sloping ground along the western edge of the San Joaquin Valley, with occasional colonies on steeper slopes and ridgetops, from the base of the Tehachapi Mountains in Kern County along the western edge of the valley to near Los Banos in Merced County. The species' occupied range is currently fragmented into six major geographic units that include the Panoche Region in western Fresno and eastern San Benito counties; Kettleman Hills in Kings County; San Juan Creek Valley in San Luis Obispo County; western Kern County in the area of the Lokern, Elk Hills, and other uplands around McKittrick, Taft, and Maricopa; Carrizo Plain National Monument in eastern San Luis Obispo County; and Cuyama Valley in Santa Barbara and San Luis Obispo Counties.

Giant kangaroo rats are primarily seedeaters, but also eat green plants and insects. They cut the ripening heads of grasses and forbs and cure them in small surface pits located on the area over their burrow system (Shaw 1934, Williams *et al*. 1993). They also gather individual seeds scattered over the surface of the ground and mixed in the upper layer of soil. Surface pits are uniform in diameter and depth (about 1 inch), placed vertically in firm soil, and filled with seedpods. After placing seeds and seed heads in pits, the animal covers them with a layer of loose, dry dirt. Pits are filled with the contents of the cheek pouches after a single trip to harvest seeds. Before being moved underground, the seeds are sun-dried which prevents molding (Shaw 1934). Individuals in many populations also make large stacks of seed heads (i.e., haystacks) on the surface of their burrow systems (Hawbecker 1944, Williams *et al*. 1993). The material is cured and then stored underground. Amounts cached in haystacks may not correspond with annual herbaceous productivity.

Estimated home range size ranges from about 646 to 3,768 square feet (0.02 to 0.09 acres). There is no significant difference in size of home range between sexes. The core area of the territory, located over the burrow system (i.e., precinct) is the most intensely used location in the home range (Braun 1985). Grinnell (1932) and Shaw (1934) suggested that territories were

occupied by a single animal. More recent studies indicate that multiple individuals may live in a precinct. These individuals appear to be family groups of females and offspring of different ages (Randall 1997). Estimates of density, employing both trapping and counts of precincts, ranged from 1 to 44 individuals per acre (Grinnell 1932, Braun 1985, Williams 1992). Giant kangaroo rat burrow systems (precincts) are distinctive because of the size and orientation of the individual entrances and the presence of cleared vegetation in the vicinity of the system. Precincts may include one to several burrow openings and a colony may consist of two to thousands of precincts. Burrows of two types may be observed within the precincts. Horizontal burrow openings are typical in appearance compared to other kangaroo rats. However, these openings are usually quite large in comparison to the burrow openings of other species. Giant kangaroo rats also may construct vertical burrow openings. Other characteristics of giant kangaroo rat precincts include tracks from their distinctively large feet and tail drags, haystacks near the burrows, and large scat near the burrow entrances. Individual precincts are usually connected to other precincts by well-worn paths and are relatively easy to detect, even from a distance (Williams 1980).

We observed potential habitat (annual grassland) for giant kangaroo rat within the proposed project sites and buffer areas during biological surveys. No small mammal burrows suitable for potential use by giant kangaroo rats were observed within the proposed project sites, or within 50 feet of each proposed well site. We found no evidence (i.e., precinct mounds, vertical and pit cache holes, scats, tracks, tail drags, etc.) of giant kangaroo rats (recent and/or past use) within the proposed project sites or buffer areas during biological surveys. This species has not been documented in the proposed project area by CNDDB (CDFW 2013).

Pallid Bat (*Antrozous pallidus*) is a locally common species of low elevations in California. The species occurs throughout the State, except for the high Sierra Nevada from Shasta to Kern Counties (Zeiner *et al*., 1990). Pallid bats are year round occupants of grassland, shrubland, woodland, and forest habitats (CDFW 2013). These bats prefer rocky outcrops, cliffs, and crevices with access to open habitats for foraging. Unlike other bat species, pallid bats prey on the ground or in foliage, rather than in flight.

We observed potential foraging habitat for pallid bats in the proposed project sites and buffer areas. However, no potential roosting or breeding sites suitable for use by this species were observed in the project sites or buffer areas. No individuals were observed in the project sites or buffer areas during the course of biological surveys. Furthermore, this species has not been documented in the project area (CDFW 2013).

Blunt-Nosed Leopard Lizard (*Gambelia sila*) inhabits open, sparsely vegetated areas of low relief (particularly annual and perennial grasslands, alkali scrub, and saltbush scrub). It is absent from areas of steep slope, dense vegetation, or seasonal flooding. The current range of the species includes undeveloped parcels in the southern-most portion of the San Joaquin Valley (Tulare and Kings Counties south), San Joaquin Valley floor in the vicinity of western Madera County, and along the western edge of the San Joaquin Valley from Merced County south. Its range also extends into the Carrizo Plain and Cuyama Valley southwest of the San Joaquin Valley. Estimated densities in occupied habitat have varied from 0.1 to 8.5 lizards per acre (Uptain *et al*. 1985, Williams and Germano 1991, Williams *et al*. 1993, Germano *et al*. 1994).

Individuals use small rodent burrows for shelter from predators and temperature extremes. Their burrows are usually abandoned ground squirrel tunnels, or occupied or abandoned kangaroo rat tunnels (Montanucci 1965). Seasonal above-ground activity is correlated with weather conditions (primarily temperature). Optimal activity occurs when air temperatures are between 23.5 °C and 40 °C and ground temperatures are between 22 °C and 36 °C (USFWS 1985). Adults are active above ground in the spring months from March or April through June or July with the level of activity decreasing until approximately late June when most adults go underground and become inactive. At this latter time only subadult and hatchling individuals generally continue to be active. By August or September generally all adults have retreated to burrows to begin over-wintering. Hatchlings may be active until mid-October or November.

We observed potential habitat for the blunt-nosed leopard lizard within annual grassland habitat in the proposed project sites and buffer areas during biological surveys. No burrows suitable for use by blunt-nosed leopard lizards were observed within the boundaries of the proposed project sites, or within 50 feet of each proposed well site. As such, additional protocol level surveys were not conducted.

Although no specific location information is provided, A CNDDB observation record of San Joaquin antelope squirrel noted that BNLL (and San Joaquin kit fox) were additional species known to occur in the Bacon Hills area (Section 20, T28S, R20E) (CDFW 2013). This observation record indicated rodenticide use was possible, as small mammal burrows were extremely sparse when the observation was documented in 1987. This species has been historically recorded approximately 2.0 miles and 2.6 miles east of the existing E&B production facility (CDFW 2013) (see Figure 3). BNLL were documented at these locations on and north of Santos Creek, approximately 1.2 miles and 1.6 miles southeast of the Middle Water Pumping Station. This CNDDB observation record was made in 1987.

Western Burrowing Owl (*Athene cunicularia*) is a ground dwelling owl that occurs in grassland habitats. Burrowing owls typically uses burrows of small mammals and large rodents, particularly California ground squirrels, for shelter and breeding. The species is listed by the CDFW as a species of special concern

We observed potential habitat for western burrowing owls within the proposed project sites and buffer areas during biological surveys. No potential burrows that were of appropriate size for use by this species (i.e., California ground squirrel burrows) were observed during surveys within the proposed project sites. However, two (2) potential burrows were observed approximately 130 feet southwest of proposed E&B Fee #271D-20 project site during biological surveys in conducted in 2012. Sign (i.e., whitewash, castings, feathers, etc.) of the species presence and one (1) individual burrowing owl was observed at this location during biological surveys in 2013. Burrowing owls have not been previously documented in the project sites or buffer areas (CDFW 2013).

Prairie Falcon (*Falco mexicanus*) occurs as an uncommon nesting species throughout the Sierra Nevada foothills, Coast Ranges, Modoc Plateau and adjacent mountains, Great Basin mountains, and southern California desert and mountains. Nests are typically located on a sheltered ledge of a cliff overlooking a large, open area (generally supporting grassland, rangeland, savannah, or

desert scrub). However, the species sometimes utilizes old nests of other cliff-nesting species (e.g., great-horned owl, common raven, golden eagle, etc.). Although southeast-facing nest sites are preferred, orientation is secondary to the nature of the ledge. Nesting occurs from mid-February through mid-September with a peak during April to early August (Zeiner *et al*. 1990). Home range and nest territory size varies with availability of suitable nesting habitat and adjacent foraging habitat (Craighead and Craighead 1956).

We observed potential foraging habitat for prairie falcon within the proposed project sites and buffer areas during biological surveys. This species may forage intermittently throughout the project area, but is not expected to nest in the project area or vicinity. No known roosts or potential breeding sites (cliffs) were identified in the project sites or buffer areas. No individual prairie falcons were observed during biological surveys. Although location information is suppressed based on sensitivity, prairie falcons have been historically documented in vicinity to the proposed project sites (CDFW 2013) (see Figure 3). These CNDDB observation records are dated 1979 and are based on CDFW Swainson's hawk and prairie falcon nest records compiled by the CDFW Wildlife Branch in 1981.

California Condor (*Gymnogyps californianus*) typically nest in chaparral, conifer forest, or oak woodland communities. Historically, condors nested on bare ground in caves and crevices, behind rock slabs, or on large ledges or potholes on high sandstone cliffs in isolated, extremely steep, rugged areas. Cavities in giant sequoia (*Sequoiadendron giganteum*) and redwood (*Sequoia sempervirens*) have also been documented. Nest sites are often surrounded by dense brush. Nest sites also have the following requirements:

- Entrances large enough for the adults to fit through;
- Ceiling height of at least 14.8 inches at the egg position;
- Floors fairly level with some loose surface substrate;
- Nest space unconstricted for incubating adults; and
- A nearby landing point (Zeiner et al. 1990).

Most foraging occurs in open terrain of foothills, grasslands, potreros with chaparral areas, or oak savannah habitats. Historically, foraging also occurred on beaches and large rivers along the Pacific coast. Water is required for drinking and bathing (Zeiner et al. 1990).

California condors are opportunistic scavengers, feeding exclusively on the carcasses of dead animals. Typical foraging behavior includes long-distance reconnaissance flights, lengthy circling flights over a carcass, and hours of waiting at a roost or on the ground near a carcass. California condors travel up to 150 miles in a single day in search of food. They typically fly at a height of approximately 600 feet while in search of carrion. However, they have been recorded at heights of 15,000 feet while in flight (Zeiner et al. 1990).

The last wild California condors were captured in 1987 and taken into captivity due to the precipitous decline in the species (fewer than 20 remaining individuals). Captivity-produced condors, as well as some of the originally captured condors, have been reintroduced into the wild since 1992. The reintroductions in California have been focused in northeastern Ventura County (including the Sespe Condor Sanctuary), Big Sur mountains and coast, and Pinnacles National

Monument. This species, which is considered a permanent resident of the semi-arid, rugged mountain ranges surrounding the southern San Joaquin Valley (i.e., Coast Range from Santa Clara County south to Los Angeles County, Transverse Ranges, Tehachapi Mountains, and southern Sierra Nevada), travels over a wide area when foraging. The species is known to regularly fly 35 miles or more from roost sites and occasionally travels even greater distances. Individuals that normally confine their activities to Ventura and Santa Barbara counties have occasionally been observed over the southern Sierra Nevada. The species roosts on cliffs and in large trees and snags in remote areas. Nest sites historically were sited in caves, crevices, behind rock slabs, or on large ledges on high sandstone cliffs. The first California condors produced in the wild in more than 20 years have hatched during the last five years. However, only one of the 10 chicks produced in the wild during this time has survived and is now two year old. The low survivorship is likely related to the inexperience of the nesting pairs. In addition, one nestling was found to have died from the ingestion of broken glass, bottle tops, and other man-made items that were left littered in the nest site.

Potential foraging habitat for California condors was observed in the proposed project sites and buffer areas during biological surveys. This species may forage intermittently throughout the area, but is not expected to land in the project sites. No known roosts or potential nesting sites (cliffs at higher elevations or old growth forest) were identified in the project sites or buffer areas. No individual California condors were observed during biological surveys. Since the species is wide-ranging, and the buffer area provides potential foraging habitat the species has some potential to occur on site. The species is not expected to nest in the project area based on a lack of suitable nesting sites. No condor sightings have been documented in the immediate area of the proposed project site by CNDDB (CDFW 2013) and no individual condors were observed during field surveys.

Incidental Wildlife – Wildlife species that we recorded during our focused surveys for special-status species are listed in Table 4 below. A few avian species protected under the Federal Migratory Bird Treaty Act were observed foraging during field surveys (see Table 4). Common raven may construct nests on power poles that occur along existing access roads, north of proposed E&B Fee #271B-20 project site and east of the proposed E&B Fee #281D-20 project site. Species such as horned lark and mourning dove nest on the open ground; as such, potential nesting habitat (annual grassland) for common bird species that use ground nests was observed in the proposed project sites and buffer areas.

SPECIAL-STATUS PLANT SPECIES

Based on literature and database review, RAB Consulting determined that four (4) special-status plants have the potential to occur in the proposed project sites and buffer areas. Surveys were conducted during the appropriate blooming period of four (4) of the five (5) targeted special-status plant species identified in Table 3 as potentially occurring within the proposed project sites and buffer areas. These species include oval-leaved snapdragon (*Antirrhinum ovatum*), round-leaved filaree (*California macrophylla*), pale-yellow layia (*Layia heterotricha*), and San Joaquin woollythreads (*Monolopia congdonii*). Surveys were not conducted during the blooming period of Temblor buckwheat (*Eriogonum temblorense*); however, the proposed project sites and buffer

areas do not support steep slopes or shale soils which the species is often associated with (CNPS 2013).

Oval-leaved snapdragon (*Antirrhinum ovatum*) is an annual herb that occurs in chaparral, cismontane woodland, pinyon juniper woodland, and valley and foothill grassland habitats. This species is known from a total of 16 occurrences and may appear only in favorable years (CNPS 2013). This species has not been recorded in the project sites or buffer areas (CDFW 2013) and no individuals or evidence of this species was observed during focused surveys.

Round-leaved filaree (*California macrophylla*) is known to occur in California, Oregon, and Baja California. In California, it is known from scattered occurrences in the Sacramento and San Joaquin Valleys, southern North Coast Ranges, San Francisco Bay Area, South Coast Ranges, Channel Islands, Transverse Ranges, and Peninsular Ranges (Hickman 1996, CDFG 2011). Most of the recently documented occurrences are in the interior foothills of the South Coast Ranges (Gillespie 2003). The species occurs in clay soils in cismontane woodland, valley and foothill grassland. Though the species occurs in grasslands on friable clay soils (CNPS 2001, CDFW 2013), it may historically have been common on other soil types (Gillespie 2003). It has been found in non-native grassland on clay soils with a relatively low cover of annual grasses (Jones & Stokes 2002 and 2003). It most often occurs in foothill locations at elevations between 200 and 2,000 feet, but it has been collected from elevations as low as 30 feet and as high as 4,000 feet. Round-leaved filaree is an annual herb that blooms between March and May (CNPS 2013). This species has not been recorded in the project sites or vicinity (CDFW 2013). No individuals or evidence of this species was observed during focused surveys.

Pale-yellow layia (*Layia heterotricha*) has been reported from about 58 occurrences in the inner South Coast Ranges, eastern and western edges of the San Joaquin Valley, western Transverse Ranges, and Tehachapi Mountains (Hickman 1996, Calflora 2002, CDFW 2013). Many of these occurrences were derived from collections made prior to the 1950s. In 1988, attempts to locate historical occurrences were largely unsuccessful (Baldwin and Bainbridge 1992), but subsequent efforts have resulted in the documentation of at least 25 extant occurrences in Santa Barbara and Ventura counties. Pale-yellow layia blooms from March to June and then rapidly senesces after seed set. It occurs in grasslands and open areas in oak woodland, pinyon-juniper woodland, and sagebrush scrub below 5,200 feet elevation (CDFW 2013). The species grows on fragile soils variously described as sandy, calcareous, gypseous clay, decomposed shale, ultra-fine friable (dry bog) clay, clay vertisols, or alkaline clay (Hoover 1970, Twisselmann 1995, Lewis 1997, Stephenson and Calcarone 1999, CDFW 2013). On the Los Padres National Forest, it is most often associated with calcareous potreros and Lockwood clays. Baldwin (1994) noted that it often occurs on sites with "below-average exotic vegetative cover." Documenting trends in population abundance is complicated by the large natural variance in population numbers that occurs in response to yearly changes in annual rainfall. Wet years tend to favor the expression of pale-yellow layia populations, while in dry years few if any seeds germinate or the plants do not produce flowers. No individuals or evidence of the species was observed during focused surveys.

San Joaquin woolly-threads (*Monolopia congdonii*) historically occurred primarily in the San Joaquin Valley, with a few occurrences in the hills to the west and in the Cuyama Valley of San

Luis Obispo and Santa Barbara counties. Many new occurrences of San Joaquin woollythreads have been discovered since 1986, primarily in the hills and plateaus west of the San Joaquin Valley. The largest extant population occurs on the Carrizo Plain Natural Area in San Luis Obispo County. Much smaller populations are found in Kern County near Lost Hills, in the Kettleman Hills of Fresno and Kings Counties, and in the Jacalitos Hills of Fresno County. The isolated occurrences are known from the Panoche Hills in Fresno and San Benito counties, the Bakersfield vicinity in Kern County, and the Cuyama Valley. However, the majority of occurrences in the San Joaquin and Cuyama Valleys were extirpated by intensive agriculture. In addition, several sites in and around Bakersfield were eliminated by urban and intensive oilfield development.

The phenology of San Joaquin woolly-threads varies with weather and site conditions. In years of below-average precipitation, few seeds of this species germinate, and those that do typically produce tiny plants. Seed germination may begin as early as November, but usually occurs in December and January. San Joaquin woolly-threads typically flowers between late February and early April, but flowering may continue into early May if conditions are optimal. Furthermore, populations in the northern part of the range tend to flower earlier than those in the south. Each plant may have from 1 to more than 400 flower heads. Seed production depends on plant size and the number of flower heads. The seeds are shed immediately upon maturity, and all trace of the plant disappears after senescence in April or May. Seed dormancy mechanisms apparently allow the formation of a substantial seed bank in the soil.

San Joaquin woolly-threads occur in non-native grassland, valley saltbush scrub, and other arid scrubs. This species typically occupies microhabitats with less than 10 percent shrub cover, although herbaceous cover may be either sparse or dense. Plant species that often occur with San Joaquin woolly-threads include red brome, red-stemmed filaree, goldfields (*Lasthenia* spp.), Arabian grass (*Schismus* spp.), and mouse-tail fescue (*Vulpia myuros*). The species occurs on sandy, sandy loam, or silty soils with neutral to subalkaline pH. No individuals or evidence of the species was found during focused surveys.

Based on CNDDB records, San Joaquin woollythreads (*Monolopia congdonii*) has been historically documented approximately 1.2 miles east and approximately 1.5 miles northeast of the proposed project sites. These CNDDB observations were recorded south of the Middle Water Pumping Station, and the locations are known from 1952 and 1954 Twissellmann plant collections. These CNDDB records indicate these locations may have been extirpated, as the vegetation was noted as degraded in 1989 (CDFW 2013).

Temblor buckwheat (*Eriogonum temblorense*) is an annual herb that occurs in valley and foothill grassland. This species is found on barren clay or sandstone substrates, in outcrop areas with little vegetation (CDFW 2013). Temblor buckwheat is often associated with steep slopes and/or shale soils (CNPS 2013). This species has not been documented in the project area (CDFW 2013). No individuals or evidence of this species was observed during surveys in the proposed project sites or buffer areas.

No special-status plants have been recorded in the project sites or buffer areas (CDFW 2013) (see Figure 3). No special-status plant species were identified during biological surveys within

the proposed project sites or buffer areas. Although no sensitive plants were observed during biological surveys, they may potentially occur under favorable conditions in annual grassland habitat.

Table 4

List of Animal and Plant Species Observed During Biological Surveys

Scientific name	Common name
Animals	
Ammospermophilus nelsoni	San Joaquin antelope squirrel
Athene cunicularia	Western burrowing owl
Corvus corax	Common raven
Eremophila alpestris	Horned lark
Spermophilus beecheyi	California ground squirrel
Uta stansburiana	Common side-blotched lizard
Zenaida macroura	Mourning dove
Plants	
Amsinckia intermedia	Fiddleneck
Bromus madritensis ssp. *rubens*	Red brome
Centaurea solstitialis	Yellow star-thistle
Croton setigerus	Doveweed
Distichlis spicata	Saltgrass
Erodium cicutarium	Redstem filaree
Isocoma arcadenia	Alkali goldenbush
Salsola tragus	Russian thistle

ANALYSIS OF POTENTIAL IMPACTS

The biological assessment conducted for the project found that no special-status animal or plant species were present within the boundaries of the proposed project sites. No riparian, wetland, stream, vernal pool, or other sensitive community types were observed within the proposed well sites during our biological surveys and assessment. Santos Creek, an intermittent stream bisects the Bacon Hills area, trending in a west to east direction through the project area. Carneros Creek, an intermittent tributary to Santos Creek occurs east of the existing E&B McDonald Anticline production facility. These streams were observed to be dry during biological surveys. No construction activities are proposed in or along Santos Creek or Carneros Creek; therefore no impacts to these intermittent streams are expected to result from proposed project activities.

Direct mortality or injury to common wildlife and plant populations could occur during ground disturbance activities associated with implementation of the project. Small vertebrate, invertebrate, and plant species are particularly prone to impact during project implementation because they are much less to non-mobile, and cannot easily move out of the path of project activities. Other more mobile wildlife species, such as most birds and larger mammals, can avoid project-related activities by moving to other adjacent areas temporarily. Increased human activity and vehicle traffic in the vicinity may disturb some wildlife species. However, common wildlife species have likely become acclimated to on-going agricultural (livestock grazing) and oil and gas drilling and production activities. Because common wildlife species found in the project area are locally and regionally common, potential impacts to these resources are considered less than significant. Therefore, no avoidance or minimization measures are proposed at this time.

Implementation of the proposed project could potentially impact individual San Joaquin kit fox or their dens, should they become established within the proposed project sites or buffer areas prior to project implementation. Impacts to kit fox could occur through crushing by construction equipment during project activities. This species could also be affected due to noise and vibration from project activities if dens are located closer than 250 feet to the proposed well sites; project related noise and vibration could cause the abandonment of occupied den sites. Impacts to this species would be considered significant. Since two (2) burrows were observed approximately 130 feet southwest of proposed well E&B Fee #271D-20 that may serve as potential dens for this species, den monitoring prior to earth disturbing activities associated with well site preparation (i.e., grading and compacting) is recommended. Avoidance and minimization measures to protect this species from potential impacts are included and described further in the ***Proposed Avoidance and Minimization Measures*** section.

Implementation of the proposed project could potentially impact individual and nesting burrowing owls should they become established within the proposed project sites prior to project implementation. Impacts to this species could occur through crushing by construction and drilling equipment during implementation of project activities. Actively nesting burrowing owls could also be affected due to noise and vibration from project activities if nests are located closer than 250 feet to the proposed project sites; project related noise and vibration could cause the abandonment of active nest sites. Impacts to this species would be considered significant. Since two (2) burrows were observed approximately 130 feet southwest of proposed well E&B Fee #271D-20 that may serve as potential for this species, additional surveys are recommended to determine species presence and document use in the area. Furthermore, avoidance and minimization measures to protect this species from potential impacts are described further in the ***Proposed Avoidance and Minimization Measures*** section.

Implementation of the proposed project could potentially impact individual and nesting migratory bird species should they become established within the proposed project sites or buffer areas prior to project implementation. Impacts to migratory bird species could occur through crushing by construction and drilling equipment during implementation of project activities. Actively nesting birds could also be affected due to noise and vibration from project activities if nests are located closer than 250 feet to the proposed project sites; project related noise and vibration could cause the abandonment of active nest sites. Impacts to these species would be considered significant. In the event that nesting birds become established in the proposed project sites or buffer areas, avoidance and minimization measures to protect these species from potential impacts are described further in the ***Proposed Avoidance and Minimization Measures*** section.

Direct mortality or injury to sensitive animal populations could occur from earth-moving activities (i.e., grading and compacting), assuming that sensitive animal populations become established within the boundaries of the proposed project sites prior to or during project implementation. Avoidance and minimization measures to protect sensitive animal species from potential impacts are described further in the ***Proposed Avoidance and Minimization Measures*** section. Biological surveys are recommended prior to earth disturbing activities associated with well site preparation and access road construction. Preconstruction surveys are also

recommended prior to flow line construction and installation.

Although no special-status plant species were observed in the proposed project sites or buffer areas, there is potential, albeit low, for them to occur under more favorable conditions (CNPS 2013). Implementation of the proposed project could potentially impact individuals or populations of special-status plant species, should they become established within the proposed project sites prior to project implementation. Impacts to special-status plant species could occur through crushing by construction equipment, vehicles, or foot traffic during project activities. Avoidance and minimization measures to protect special-status plant species from potential impacts are described further in the ***Proposed Avoidance and Minimization Measures*** section. Pre-construction surveys are recommended prior to earth disturbing activities associated with well site preparation and access road construction (i.e., grading and compacting) to ensure no sensitive plants are present

If the proposed oil wells prove productive, construction of flow lines will be required to transport oil and/or water to the existing E&B production facility. Special-status plants or animal species could potentially be impacted during this phase of the project, should they become established within the proposed project sites prior to project implementation. Direct mortality, injury, or crushing could occur from vehicles or equipment used for flow line construction. Assuming a sensitive species or population becomes established in the project sites, similar impacts could result from sleeper placement or trampling (foot traffic) during flow line installation, Avoidance and minimization measures to protect sensitive and special-status plant and animals from potential impacts during this phase of the project are described further in the ***Proposed Avoidance and Minimization Measures*** section.

Traffic, consisting predominantly of ranching vehicles within the project area varies from sporadic to moderate. Additional traffic associated with oil and gas development and production occurs from ongoing activities in the project area, and on adjacent lands in vicinity to the proposed project area. A short-term increase in vehicle traffic is anticipated during project implementation and less so after project completion. This will result in a short-term increase in associated noise, which may cause temporary disturbance to common wildlife species. Increased vehicular traffic could cause direct mortality to these species or impede normal activities such as dispersal (Luckenbach 1975, Weinstein 1978). Species intolerant of human activities may use the proposed project site less when humans are regularly present in the area (Bushnel 1978, Lee and Griffith 1977). Those species observed at or near the proposed well site appear to have acclimated to ongoing livestock grazing activities.

The project would not interfere with movements of wildlife species or with established native resident or migratory wildlife corridors. Native resident and/or migratory fish and known native wildlife nursery sites are not present within the proposed project sites or buffer area.

PROPOSED AVOIDANCE AND MINIMIZATION MEASURES

Implementation of proposed avoidance and minimization measures included in this report are recommended to reduce potential impacts to wildlife and plants. Avoidance and minimization measures presented below are what can be expected for the project. These measures have been

adapted here from the programmatic biological opinion issued by the United States Fish and Wildlife for Oil and Gas Activities in Kern and Kings Counties, California (USFWS 2001). It should be noted that the project is not covered by the programmatic biological opinion, as the project is located on privately owned land. As such, these measures are only recommended:

1. As close to beginning of project activities as possible, but not more than 14 days prior to project activities, a qualified biologist shall conduct a final pre-construction survey of the proposed project sites to insure that no special-status wildlife species have recently occupied the project sites or buffer areas. A qualified biologist shall be present immediately prior to project activities that have potential to impact sensitive species to identify and protect potentially sensitive resources.

2. Site boundaries shall be clearly delineated by stakes and /or flagging to minimize inadvertent degradation or loss of adjacent habitat during project operations. Staff and/or its contractors shall post signs and/or place fence around the site to restrict access of vehicles and equipment unrelated to drilling operations.

3. An Environmental Awareness Program shall be conducted to orient all employees involved in project activities. The program shall consist of a brief presentation in which biologists knowledgeable of endangered species biology and legislative protection shall explain endangered species concerns. The program shall include a discussion of special-status plants and sensitive wildlife species. Species biology, habitat needs, status under the Endangered Species Act, and measures being taken for the protection of these species and their habitats as a part of the project shall be discussed.

4. A biological monitor is recommended during initial ground disturbance associated with proposed well site preparation, access road construction, and during sleeper placement for flow line installation.

5. If any suitable small animal burrows become established within the proposed project sites prior to project implementation, E&B will implement a 50 foot avoidance buffer from the burrow.

6. If San Joaquin kit foxes become established within the proposed project sites prior to project implementation, E&B will implement the following measures (4-9) contained in the USFWS's *Standardized Recommendations For Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (USFWS 2011). These measures also apply to potential dens observed within the buffer area:

    a) For kit fox dens within 200 feet of proposed construction area(s), exclusion zones shall be established prior to construction by a qualified biologist. Exclusion zones shall be roughly circular with a radius of the following distances measured outward from the entrance:

Potential den	50 feet
Atypical den	50 feet

Known den	100 feet
Natal/pupping den (occupied and unoccupied)	UWFWS must be contacted

b) Protective exclusion zones can be placed around all known and potential dens which occur outside the project footprint (conversely, the project boundary can be demarcated).

c) To ensure protection of known dens, exclusion zones will be demarcated by fencing that encircles each den at the appropriate distance and does not prevent access to the den by kit foxes. Acceptable fencing includes untreated wood particle-board, silt fencing, or orange construction fencing, as long as it has opening for kit fox ingress/egress and keeps humans and equipment out.

d) Exclusion zone barriers shall be maintained until all construction related or operational disturbances have been terminated. At that time all fencing shall be removed to avoid attracting subsequent attention to the dens.

e) For potential and/or atypical dens, placement of 4-5 flagged stakes 50 feet from the den entrance(s) will suffice to identify the den location; fencing will not be required, but the exclusion zone must be observed.

f) Only essential vehicle operation on existing roads and foot traffic will be permitted. Otherwise, all construction, vehicle operation, material storage, or any type of surface-disturbing activity will be prohibited or greatly restricted within the exclusion zones.

7. If a natal/pupping den is discovered within the project area or within 200-feet of the project boundary, the USFWS shall be immediately notified and under no circumstances will the den be disturbed or destroyed without prior authorization. If the preconstruction/preactivity survey reveals an active natal pupping den or new information, E&B should contact the USFWS immediately to obtain the necessary take authorization/permit.

8. Destruction of any known or natal/pupping kit fox den requires take authorization/permit from the USFWS. Limited destruction of kit fox dens may be allowed, if avoidance is not a reasonable alternative, provided the following procedures are observed:

   a. Known dens occurring within the footprint of the project must be monitored for three consecutive days with tracking medium or an infra-red camera beam to determine the current use. If no kit fox activity is observed during this period, the den should be destroyed immediately to preclude subsequent use.

   b. If kit fox activity is observed at the den during this period, the den should be monitored for at least five consecutive nights from the time of the observation to allow any resident animal to move to another den during its normal activity. Only when the den is determined unoccupied may the den be excavated.

c. Destruction of the den should be accomplished by careful excavation until it is certain that no kit foxes are inside. The den should be fully excavated, filled with dirt and compacted to ensure that kit foxes cannot reenter to use the den during the construction period. If at any point during excavation, a kit fox is discovered inside the de, the excavation activity shall cease immediately and monitoring the den as described above should resume. Destruction of the den may be completed when in the judgment of the biologist, the animal has escaped, without further disturbance, from the partially destroyed den.

9. Potential dens occurring within the footprint of the project or within 50 feet must be monitored for three consecutive days with tracking medium or an infra-red camera beam to determine the current use. If no kit fox activity is observed during this period, the den should be destroyed immediately to preclude subsequent use.

    a. Destruction of the den should be accomplished by careful excavation until it is certain that no kit foxes are inside. The den should be fully excavated, filled with dirt and compacted to ensure that kit foxes cannot reenter to use the den during the construction period. If at any point during excavation, a kit fox is discovered inside the de, the excavation activity shall cease immediately and monitoring the den as described above should resume. Destruction of the den may be completed when in the judgment of the biologist, the animal has escaped, without further disturbance, from the partially destroyed den.

10. If any den was considered to be a potential den, but is later determined during monitoring or destruction to be currently, or previously used by kit fox (e.g., if kit fox sign is found inside), then all construction activities shall cease and the USFWS shall be notified immediately.

11. Pre-construction nesting surveys shall be conducted for nesting migratory avian species in the project sites and buffer areas. Pre-construction surveys shall occur prior to the proposed project implementation, and during the appropriate survey periods for nesting activities. Surveys will follow required CDFW and USFWS protocols, where applicable. A qualified biologist will survey suitable habitat for the presence of these species. If a migratory avian species is observed and suspected to be nesting, a 250-foot buffer area will be established to avoid impacts to the active nest. If no nesting avian species are found, project activities may proceed and no further mitigation measures will be required. If active nesting sites are found, the following exclusion buffers will be established, and no project activities will occur within these buffer zones until young birds have fledged.

    a. If ground disturbing activities occur during breeding season (February through mid-September), surveys for active nests will be conducted by a qualified biologist no more than 10 days prior to start of activities. Minimum no disturbance of 250 feet around active nest of non-listed bird species and 250 foot no disturbance buffer around migratory birds; and 0.5-mile no disturbance buffer from listed species and fully protected species until breeding season has ended or

until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival.

12. The following measures included in the CDFW's *Staff Report on Burrowing Owl Mitigation* (CDFG 2012) shall be implemented by E&B for the proposed project:

    a. If preconstruction surveys determine that burrowing owls are present in the project sites and buffer areas, a burrowing owl mitigation plan shall be prepared by a qualified biologist describing recommended site specific shelter-in-place measures, worker training, and/or other measures to ensure that Project construction does not result in adverse impacts to the burrowing owls.

    b. Occupied burrows shall not be disturbed during the burrowing owl nesting season (February 1 through August 31) unless a qualified biologist approved by the CDFW verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

    c. Burrowing owls present in the project sites or within 500 feet (as identified during preconstruction surveys) shall be moved away from the disturbance area using passive relocation techniques. Prior to commencement of relocation, a management plan shall be prepared and approved by CDFW. Relocation shall be completed between September 1 and January 31 (outside of breeding season). A minimum of one or more weeks is required to relocate the owls and allow them to acclimate to alternate burrows. Passive relocation techniques will follow the CDFG Staff Report on Burrowing Owl Mitigation Guidelines (2012) and include the following measures:

        i. Install one-way doors in burrow entrances. Leave doors in place for 48 hours to ensure owls have left the burrow.

        ii. Allow one or more weeks for owls to acclimate to off-site burrows. Daily monitoring shall be required for the passive relocation period.

        iii. Once owls have relocated off-site, collapse existing burrows to prevent reoccupation. Prior to burrow excavation, flexible plastic pipe shall be inserted into the tunnels to allow escape of any remaining owls during excavation. Excavation shall be conducted by hand whenever possible.

        iv. Destruction of burrows shall occur only pursuant to a management plan approved by CDFW.

        v. As an alternative (if approved by CDFW), all occupied burrows identified off-site within 500 feet of construction activities outside of nesting season (September through January) and during nesting season (February 1 through

August 31) could be buffered by hay bales, fencing (e.g. sheltering in place) or as directed by a qualified biologist and the CDFW.

13. A project representative shall establish restrictions on project-related traffic to approved project areas, storage areas, staging and parking areas via signage. Off-road traffic outside of designated project areas shall be prohibited.

14. Project-related traffic shall observe a 20 mph speed limit in all project areas except on County roads and State and federal highways to avoid impacts to special-status and common wildlife species.

15. Project activities during the drilling phase of the proposed project shall be scheduled to avoid evening hours, as feasible, to avoid special-status wildlife species that are active in the nighttime.

16. All vehicle operators shall check under vehicles and equipment before moving them if they have remained parked and/or idle for 10 minutes or longer.

17. Hazardous materials, fuels, lubricants, and solvents that spill accidentally during project-related activities shall be cleaned up and removed from the project as soon as possible according to applicable federal, state and local regulations.

18. All equipment storage and parking during site development and operation shall be confined to the proposed project sites.

19. All excavated steep-walled holes or trenches in excess of three feet in depth shall be provided with one or more escape ramps constructed of earth fill to prevent entrapment of endangered species or other animals. Ramps shall be located at no greater than 1,000-foot intervals (for pipelines etc.) and at not less than 45-degree angles. Trenches shall be inspected for entrapped wildlife each morning prior to onset of project activities and immediately prior to the end of each working day. Before such holes or trenches are filled they shall be inspected thoroughly for entrapped animals. Any animals discovered shall be allowed to escape voluntarily without harassment before project activities related to the trench resume, or removed from the trench or hole by a qualified biologist and allowed to escape unimpeded.

20. All pipes, culverts, or similar structures stored at the proposed project site overnight having a diameter of four inches or greater shall be inspected thoroughly for wildlife species before being buried, capped, or otherwise used or moved in any way. Pipes laid in trenches overnight shall be capped. If during project implementation a wildlife species is discovered inside a pipe, that section of pipe shall not be moved or, if necessary, moved only once to remove it from the path of project activity, until the wildlife species has escaped.

21. Above ground flow lines shall be installed along existing access roads and/or existing pipeline routes. Concrete pipeline sleepers or supports shall be placed to avoid impacting all small mammal burrows.

22. All food-related trash items such as wrappers, cans, bottles or food scraps generated during project activities shall be disposed of only in closed containers and regularly removed from the proposed project site. Food items may attract wildlife species onto the proposed well site, consequently exposing such animals to increased risk of injury or mortality. No deliberate feeding of wildlife shall be allowed.

23. To prevent harassment or mortality of wildlife species via predation, or destruction of their dens or nests, no domestic pets shall be permitted on-site.

CONCLUSION

Non-native annual grassland habitat is present in the proposed project sites and buffer areas. Special-status species have been historically documented in proximity to the proposed project sites. No sensitive plant or wildlife species, or their sign were observed within the proposed project sites during biological surveys. However, an individual San Joaquin antelope squirrel and Western burrowing owl were observed in the buffer area. By implementing the proposed avoidance and minimization measures recommended for this project, impacts to sensitive and common wildlife and special-status plant species will be avoided.

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APPENDIX A
REPRESENTATIVE PHOTOGRAPHS

Photograph 1
View toward existing E&B McDonald Anticline Production Facility.
Photograph taken from Highway 33, looking west.

Photograph 2
Photograph of the proposed E&B Fee #271B-20 project site, view north.

Photograph 3
View south toward proposed E&B Fee #271D-20 project site.

Photograph 4
View north of existing access road from proposed E&B Fee #281C-20 project site.

Photograph 5
View east of proposed E&B Fee #281D-20 project site.

Photograph 6
View west toward proposed E&B Fee #282D-20 project site.

Photograph 7
Photograph of the proposed Theta 252C-20 project site, view south.

Photograph 8
View north from the proposed Theta 253A-20 project site.

Photograph 9
View north from the proposed Theta 253D-20 project site.

Photograph 10
View east/northeast from the proposed Theta 262C-20 project site.

Photograph 11
View south of existing access road and proposed Theta 264C-20 project site.

Photograph 12
Existing E&B Production Facility, view north from existing E&B well 263B-20

ATTACHMENT D

ARCHAEOLOGICAL SURVEY

PHASE I ARCHAEOLOGICAL SURVEY, 10 WELL PADS AND PIPELINES, MCDONALD ANTICLINE OIL FIELD, KERN COUNTY, CALIFORNIA

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MANAGEMENT SUMMARY

ASM Affiliates, Inc. (ASM) was retained by Robert A. Booher Consulting on behalf of E&B Natural Resources Management to conduct an intensive Phase I archaeological survey for 10 well pad locations, access roads, and approximately 3.2 km of pipelines situated within the McDonald Anticline Oil Field, Kern County, California. The well pads are designated Theta #252C-20, #253A-20, #253D-20, #262C-20 and #264C-20, and E&B Fee #271B-20, #271D-20, #281C-20, #281D-20, #282D-20. The study area is located within Sections 16, 17, 20 and 21, Township 28 South (T28S), Range 20 East (R20E), Mount Diablo Base Meridian (MDBM). This study was conducted by ASM Affiliates, Inc., with David S. Whitley, Ph.D., RPA, serving as principal investigator. Background studies and fieldwork for the survey were completed in January 2013. The study was undertaken to assist with California Environmental Quality Act (CEQA) compliance.

A records search of site files and maps was conducted at the Southern San Joaquin Valley Information Center (IC), California State University, Bakersfield, and the Native American Heritage Commission (NAHC) Sacred Lands File. These investigations determined that the well pads, pipeline routes and access road study areas had not been previously surveyed and that no sites or Native American resources had been recorded within or adjacent to project area.

The Phase I survey fieldwork was conducted on January 31st, 2013, with parallel transects spaced at 15-m intervals walked across the well pad study areas. The project's area of potential effect (APE) was defined as the limits of ground surface disturbance for the well pads including a 50-m buffer surrounding the pads totaling approximately 1 acre per pad or 10 acres for the study as a whole plus approximately 2 mi. of pipeline routes and access roads to the pads.

No significant historical resources were discovered in any portions of the APE. Based on these findings, the development or use of the well pad study areas, pipeline routes and access roads does not appear to have the potential to result in adverse impacts to significant historical resources.

1. INTRODUCTION AND REGULATORY CONTEXT

At the request of Robert A. Booher Consulting, on behalf of E&B Natural Resources, an intensive archaeological survey was conducted for 10 well pads and associated pipelines located in the McDonald Anticline Oil Field, Kern County, California (Figures 1 and 2). The well pads are designated Theta #252C-20, #253A-20, #253D-20, #262C-20 and #264C-20, and E&B Fee #271B-20, #271D-20, #281C-20, #281D-20, #282D-20. The APE was defined as the limits of ground surface disturbance for the well pads including 50-m buffers surrounding the well pads as well as 3.2 km of pipeline routes and access roads.

The purpose of this archaeological investigation was to assist with California Environmental Quality Act (CEQA) compliance, and to ensure significant impacts to historical resources do not occur as a result of development and use of the well pads, access roads and pipeline routes.

Significant impacts under CEQA occur when "historically significant" or "unique" cultural resources are adversely impacted. Historically significant cultural resources are defined by eligibility for or by listing in the California Register of Historical Resources (CRHR). Significant impacts are those that alter or destroy prehistoric or historical archaeological sites, features, and artifacts, and historical properties (e.g., buildings) that are themselves determined to be significant or unique.

Significant archaeological resources and historical properties are defined by CEQA as those that:

(A) are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

(B) are associated with the lives of persons important in our past;

(C) embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values; or

(D) have yielded, or may be likely to yield, information important in prehistory or history.

Unique resources under CEQA, in slight contrast, are those that represent:

> an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:
>
> (1) It contains information needed to answer important scientific research questions, and there is a demonstrable public interest in that information.
>
> (2) It has a special and particular quality such as being the oldest of its type or the best available example of its type.
>
> (3) It is directly associated with a scientifically recognized important prehistoric or historic event or person (PRC § 21083.2 (g)).

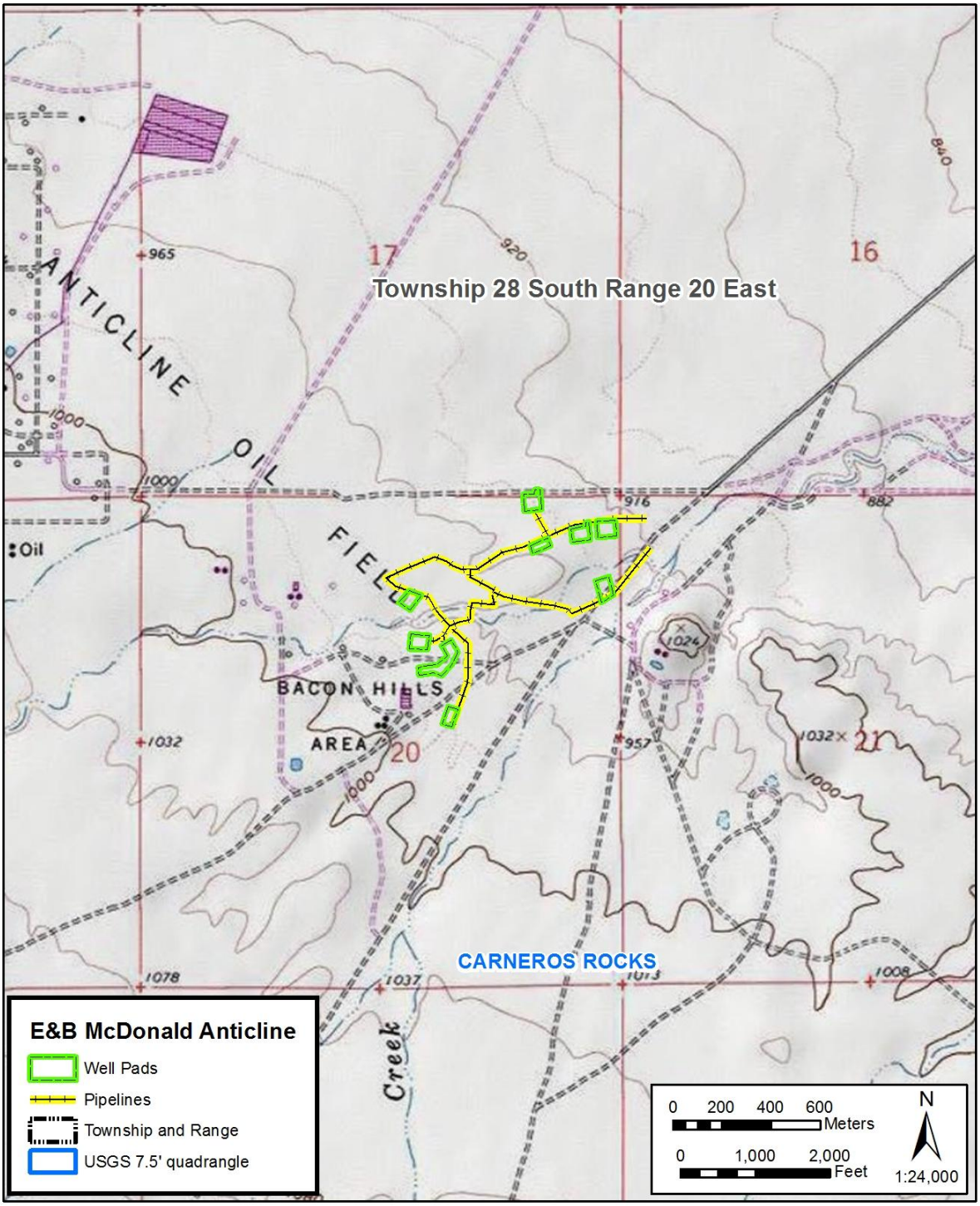

Figure 1. Project area overview, showing surveyed well pads, access roads and flowlines.

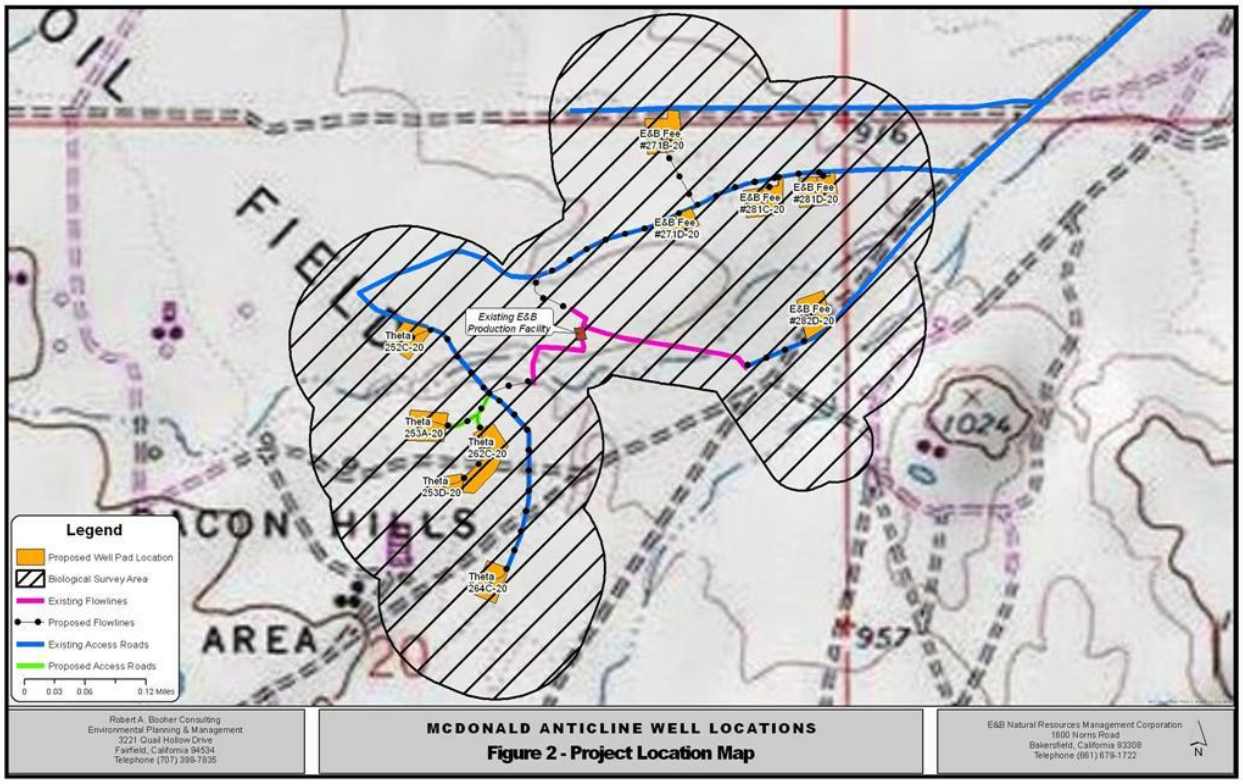

Figure 2. Project area overview, showing identified well pads.

This current investigation was intended to:

- provide a background records search and literature review to determine if any known archaeological sites were present in the project zone and whether the area had been previously and systematically studied by archaeologists;
- provide a search of the NAHC *Sacred Lands File* to determine if any traditional cultural places or cultural landscapes have been identified within the area;
- conduct an on-foot, intensive inventory of the study area to identify and record previously undiscovered cultural resources and to examine known sites; and
- to undertake a preliminary assessment of such resources, should any be found within the subject property.

This study was conducted by ASM Affiliates, Inc., Tehachapi, California, during January 2013. David S. Whitley, Ph.D., RPA, served as principal investigator, while Arran Bell and Colin Rambo, associate archaeologists conducted the fieldwork.

This manuscript constitutes a report on this Phase I survey. Subsequent sections provide background to the investigation, the findings of the archival records search, a summary of the

field surveying techniques employed, and the results of the fieldwork. We conclude with management recommendations for the well pad study area.

2. ENVIRONMENTAL AND CULTUAL BACKGROUND

LOCATION AND ENVIRONMENTAL BACKGROUND

The E&B Natural Resources well pad study area is located within the McDonald Anticline Oil Field northwest of the Bacon Hills and at the confluence of Carneros and Santos Creeks. Carneros Creek is a mainly westward flowing stream with its origins in the Temblor Range and its termination northwest of the Bacon Hills. Carneros Creek was also an important source of water along one of the earliest transportation routes through the San Joaquin Valley, the El Camino Viejo (Latta 1936). The well pad study area is within the 1982 United States Geological Survey Carneros Rocks 7.5 minute topographic quadrangle map, within Township 28 South, Range 20 East, in the southeast quarter of Section 17, the southwest quarter of Section 16, the northeast quarter of Section 20 and the northwest quarter of Section 21. Elevations within the study area range from 911 to 982 feet average mean sea level (ft. amsl).

At the time of the Phase I study, the E&B Natural Resources well pad study area lies within an area of nearly level to gently rolling hills cross cut by the currently dry Carneros and Santos Creeks and their tributaries. Currently the study area and the land in the surrounding vicinity are used for cattle ranching or are fallow. A few scattered oil wells are present, although the region appears to be less developed than other nearby fields such as the Lost Hills or the Belridge Oil Fields, located to the northeast.

The study area is within the McDonald Anticline Oil Field located approximately 50 miles west of Bakersfield. Situated along the western edge of the southern San Joaquin Valley, the region is characterized by a large, gently sloping alluvial fan at the footslopes of the Bacon Hills. It is bounded to the southeast by the Bacon Hills and to the west by the Temblor Range. Soils mapped in the area are dominated by Milham sandy loam with smaller pockets of Panoche clay loam and Kimberlina fine sandy loam (http://websoilsurvey.nrcs.usda.gov.) Milham sandy loam is a well drained alluvium derived from igneous and sedimentary rock. Depth to restrictive feature is more than 80 in. (2 m) (Chang 1988). Panoche clay loam is characterized as clay loam formed in alluvium derived from igneous and sedimentary rock. The soil is well drained with a depth to restrictive feature greater than 80 in. (2 m) (Chang 1988). Kimberlina fine sandy loam is derived from alluvium formed in igneous and sedimentary rock. Described as well drained, depth to restrictive feature is greater than 80 in. (2 m) (Chang 1988). Historical and recent land-use has changed the vegetation that was once present within and near the project area. Historically, it is likely the study area would have been within the valley saltbush scrub community, however no patches of this community, typified by saltbush shrubs (*Atriplex* spp.), were noted in the vicinity. The area appears to be mainly disturbed and inhabited by non-native grasses and forbs including Russian thistle (*Kali tragus*).

ETHNOGRAPHIC BACKGROUND

Penutian-speaking Yokuts tribal groups occupied the southern San Joaquin Valley region and much of the nearby Sierra Nevada. Ethnographic information about the Yokuts was collected primarily by Powers (1971, 1976 [originally 1877]), Kroeber (1925), Gayton (1930, 1948), Driver (1937), Latta (1977) and Harrington (n.d.). For a variety of historical reasons information emphasizes the central Yokuts tribes occupying the valley and particularly the foothills of the Sierra. The northernmost tribes suffered from the influx of Euro-Americans during the Gold Rush and were essentially extirpated by the time ethnographic study began in the early twentieth century. In contrast the southernmost tribes were partly removed by the Spanish to missions and eventually absorbed into multi-tribal communities on the Sebastian Indian Reservation (on Tejon Ranch), and later the Tule River Reservation and Santa Rosa Rancheria to the north. The result is a paucity of ethnographic detail on southern Valley tribes, especially relative to the rich information collected from the central foothills tribes where native speakers of the Yokuts dialects are still found. Regardless, the general details of indigenous life-ways were similar across the broad expanse of Yokuts territory where environment influenced subsistence and adaptation practices.

The paucity of specific detail is particularly apparent in terms of southern valley tribal group distribution. According to Kroeber (1925:478), the Tulamni occupied the edges of Buena Vista Lake and the southwestern end of the valley; the Hometwoli lived in and around Kern Lake to the east; the Tuhohi (or Chuxoxi) resided near the mouth of Kern River as it drained north into Tulare Lake; and Yauelmani territory comprised the southeastern side of the valley extending north into Bakersfield proper. The study area lies near the boundaries of these tribes, but its specific territorial affiliation is unclear.

Regardless of tribal affiliation, historical village distribution was similar across the region. Villages were typically located along lakeshores and major stream courses (as these existed circa AD 1850). The closest hydrographic feature to the study area is the mouth of Carneros Creek. However, given that the project area is near the termination of the creek, which was currently dry during the Phase I study, it is unlikely a historical village would have existed at this location. Additionally, none are known in the immediate surrounding area.

Most Yokuts groups, regardless of specific tribal affiliation, were organized as a recognized and distinct tribelet; a circumstance that almost certainly pertained to the tribal groups noted above. Tribelets were land-owning groups linked by shared territory and descent from a common ancestor. Organized around a central village, each tribelet shared a unique dialect giving Yokuts one third of the different speech forms found in California. The population of most tribelets ranged from about 150 to 500 peoples (Kroeber 1925).

The tribelet was headed by a chief who was assisted by a variety of assistants, the most important of whom was the winatum, a herald or messenger and assistant chief. A shaman also served as religious officer. While shamans did not have any direct political authority, as Gayton (1930) has illustrated, they maintained substantial influence within their tribelet.

Shamanism is a religious system common to most Native American tribes. It involves a direct and personal relationship between the individual and the supernatural world enacted by entering a trance or hallucinatory state (usually based on the ingestion of psychotropic plants, such as jimsonweed or more typically native tobacco). Shamans were considered individuals with an unusual degree of supernatural power, serving as healers or curers, diviners, and controllers of natural phenomena (such as rain or thunder). Shamans also produced the rock art of this region, depicting the visions experienced in vision quests, believed to represent spirit helpers and events in the supernatural realm (Whitley 1992, 2000).

The centrality of shamanism to the religious and spiritual life of the Yokuts was demonstrated by the role of shamans in the yearly ceremonial round. The ritual round, performed the same each year, started in the spring with the jimsonweed ceremony, followed by rattlesnake dance and (where appropriate) first salmon ceremony. After returning from seed camps, fall rituals began in the late summer with mourning ceremony, followed by first seed and acorn rites and then bear dance (Gayton 1930:379). In each case shamans served as ceremonial officials responsible for specific dances involving a display of their supernatural powers (Kroeber 1925).

Subsistence practices varied from tribelet to tribelet based on the environment of residence. Throughout Native California and Yokuts territory in general, the acorn was a primary dietary component along with a variety of gathered seeds. Valley tribes augmented this resource with lacustrine and riverine foods especially fish and wildfowl.

Although population estimates vary and population size was greatly affected by Euro-American introduced diseases and social disruption, the Yokuts were one of the largest, most successful groups in Native California. Cook (1978) estimates that the Yokuts region contained 27 percent of the aboriginal population in the state at the time of contact; other estimates are even higher.

ARCHAEOLOGICAL BACKGROUND

The southern San Joaquin Valley region has received minimal archaeological attention compared to other areas of the state. In part this is because the majority of California archaeological work has concentrated in the Sacramento Delta, Santa Barbara Channel and central Mojave Desert areas (see Moratto 1984). Although knowledge of the region's prehistory is limited in specific details, enough is known to determine the archaeological record is broadly similar to south-central and central California as a whole (see Gifford and Schenk 1926; Hewes 1941; Wedel 1941; Fenenga 1952; Elsasser 1962; Fredrickson and Grossman 1977; Schiffman and Garfinkel 1981). Based on these sources, the general prehistory of the region can be outlined as follows.

Initial occupation of the region occurred at least as early as the *Paleoindian Period*, or prior to about 10,000 YBP (years before present). Evidence of early use of the region is indicated by characteristic fluted and stemmed points found around the margin of Tulare Lake, in the foothills of the Sierra, and in the Mojave Desert proper. The closest of these, Tulare Lake, is more than 30 miles north of the project area.

Both fluted and stemmed points are particularly common around lake margins, suggesting a terminal Pleistocene/early Holocene lakeshore adaptation similar to that found throughout the far west; little else is known about these earliest peoples. Additional finds consist of a Clovis-like projectile point discovered in a flash-flood cut-bank near White Oak Lodge in 1953 on Tejon Ranch (Glennan 1987a, 1987b). More recently, a similar fluted point was found near Bakersfield (Zimmerman et al 1989), and a number are known from the Edwards Air Force Base and Boron area of the western Mojave Desert. Although human occupation of the state is well-established during the Late Pleistocene, relatively little can be inferred about the nature and distribution of this occupation with a few exceptions. First, little evidence exists to support the idea that these Paleo-Indians peoples were big-game hunters, similar to those found on the Great Plains. Second, the western Mojave Desert evidence suggests small, very mobile populations that left a minimal archaeological signature.

Substantial evidence for human occupation of California first occurs during the middle Holocene, roughly 7500 to 4000 YBP. This period is known as the *Early Horizon*, or alternatively as the Early Millingstone along the Santa Barbara Channel. In the south, populations concentrated along the coast with minimal visible use of inland areas. Adaptation emphasized hard seeds and nuts with tool-kits dominated by mullers and grindstones (manos and metates). Additionally, little evidence for Early Horizon occupation exists in most inland portions of the state, partly due to a severe cold and dry paleoclimatic period occurring at this time. Regardless of specifics, Early Horizon population density was low with a subsistence adaptation more likely tied to plant food gathering than hunting.

Environmental conditions improved dramatically after about 4000 YBP during the *Middle Horizon* (or Intermediate Period). This period known climatically as the Holocene Maximum (circa 3800 YBP) was characterized by significantly warmer and wetter conditions than previously experienced. Archaeologically it was marked by large population increase and radiation into new environments along coastal and interior south-central California and the Mojave Desert (Whitley 2000). In the Delta region to the north this same period of favorable environmental conditions was characterized by the appearance of the Windmiller culture which exhibited a high degree of ritual elaboration (especially in burial practices) and perhaps even rudimentary mound-building tradition (Meighan, personal communication, 1985). Along with ritual elaboration, Middle Horizon times experienced increasing subsistence specialization, perhaps correlating with the appearance of acorn processing technology. Penutian speaking peoples (including the Yokuts) are also posited to have entered the state roughly at the beginning of this period, perhaps bringing the technology with them (cf. Moratto 1984). Likewise it appears the so-called "Shoshonean Wedge" in southern California or the Takic speaking groups that include the Gabrielino/Fernandeño, Tataviam and Kitanemuk may have simultaneously moved into the region, rather than at about 1500 BP as first suggested by Kroeber (1925).

Evidence for Middle Horizon occupation of interior south-central California is substantial. For example, in northern Los Angeles County along the upper Santa Clara River the Agua Dulce village complex indicates occupation extending back to the Intermediate Period, when the population of the village may have been 50 or more people (King et al n.d.). Similarly, inhabitation of the Hathaway Ranch region near Lake Piru, and Newhall Ranch near Valencia, appear to date to the Intermediate Period (W & S Consultants 1994). To the west, little or no

evidence exists for pre-Middle Horizon occupation in the upper Sisquoc and Cuyama River drainages; populations first appear there at roughly 3500 YBP (Horne 1981). Additionally the Carrizo Plain experienced a major population expansion during the Middle Horizon (W & S Consultants 2004; Whitley et al. 2007) and recently collected data indicates the Tehachapi Mountains region was first significantly occupied during this period (W&S Consultants 2006). A parallel can be drawn to the inland Ventura County region where a similar pattern has been identified (Whitley and Beaudry 1991), as well as the western Mojave Desert (Sutton 1988a, 1988b), the southern Sierra Nevada (W & S Consultants 1999), and the Coso Range region (Whitley et al. 1988). In all of these areas a major expansion in settlement, the establishment of large site complexes and an increase in the range of environments exploited appear to have occurred sometime roughly around 4,000 years ago. Although, most efforts to explain this expansion have focused on local circumstances and events, it is increasingly apparent this was a major southern California-wide occurrence and any explanation must be sought at a larger level of analysis (Whitley 2000). Additionally, evidence from the Carrizo Plain suggests the origins of the tribelet level of political organization developed during this time (W & S Consultants 2004; Whitley et al. 2007). Whether this same demographic process holds for the southern San Joaquin Valley, including the study area is yet to be determined.

The beginning of the *Late Horizon* is set variously at 1500 and 800 YBP, with a consensus for the shorter chronology. Increasing evidence suggests the importance of the Middle-Late Horizons transition (AD 800 to 1200) in understanding south-central California. This corresponds with the so-called Medieval Climatic Anomaly, a period of climatic instability that included major droughts and resulted in demographic disturbances across much of the west (Jones et al. 1999). It is also believed to have resulted in major population decline and abandonments across south-central California, involving as much as 90 percent of the interior populations in some regions including the Carrizo Plain (Whitley et al. 2007). It is not clear whether site abandonment was accompanied by a true reduction in population or an agglomeration of the same numbers of peoples into fewer but larger villages. Regardless, Middle Period villages and settlements were widely dispersed across the landscape, many at locations that lack contemporary evidence of fresh water sources. Late Horizon sites, in contrast, are typically located where fresh water was available during the historical period, if not currently.

The subsequent Late Horizon can be best understood as a period of recovery from a major demographic collapse. One result is the development of regional archaeological cultures as precursors to ethnographic Native California; suggesting ethnographic life-ways recorded by anthropologists extend roughly 800 years into the past.

The position of southern San Joaquin Valley prehistory relative to patterns seen in surrounding areas is still somewhat unknown. The presence of large lake systems in the valley bottoms can be expected to have mediated some of the desiccation seen elsewhere. But, as the reconstruction of Soda Lake in the nearby Carrizo Plain demonstrates (see Whitley et al. 2007) environmental perturbations had serious impacts on lake systems too. Identifying prehistoric demographic trends for the southern San Joaquin Valley and determining how these trends (if present) correlate with those seen elsewhere is a current important research objective.

HISTORICAL BACKGROUND

The study area is currently used for ranching related activities and likely has been since the nineteenth century, however much of its historical importance derives from its place in the southern San Joaquin Valley petroleum industry. Natural petroleum in the region has been exploited since prehistoric times, when the Yokuts gathered asphaltum (pitch or "coal tar") from seeps and exposed oil sands on the west side of the valley near Taft and McKittrick to use for various adhesive and water-proofing purposes. By the 1860s, Euro-American settlers recognized the utility of asphaltum and oil that pooled on or near the ground surface in the region, using the first for water-proofing thatch roofs (with "brea") and the second as a lubricant for cart and coach wheels. The value of these materials increased during the Civil War when trade in illuminating oil was disrupted. Kerosene made from crude oil was recognized as a substitute. In response to demand, the Buena Vista Petroleum company established a still in 1864 near McKittrick. During this period, natural petroleum products were still obtained using hand-dug shafts and tunnels (Rintoul 1976).

The first oil well drilled in the southern San Joaquin Valley occurred in 1877 and the first wooden oil derrick was erected in 1887, both on the Valley's west side. Development of the petroleum industry in the region during the mid- to late-nineteenth century was impeded by the remoteness of the region and resulting difficulties in transporting the extracted resources to markets. A railroad line was extended to McKittrick in 1893 partly alleviating this difficulty, and the first pipeline carrying oil out of the oil fields was completed in 1909 (Bergman 1994). The first oil pipeline to Los Angeles was in operation by 1913 (Rintoul 1976) and by 1916 five pipelines had been built to three coastal ports (California State Council of Defense 1917:48). Combined with railroad access, this made the west side oil fields economically viable.

Three southern San Joaquin Valley oil fields were established by 1899: McKittrick and Midway-Sunset, both on the west side of the valley, and Kern River, northeast of the study area (Rintoul 1976). The Kern River Oil Field was discovered in 1899 as a result of a hand-dug well, precipitating the Kern County "oil boom." The turn of the century witnessed oil exploration throughout the west side of the valley. Claims were staked on a variety of properties, some entirely speculatively or illegally and others more seriously. This resulted in the identification and exploitation of a total of 92 fields in the region during the last century.

The McDonald Anticline Oil Field, covering approximately 1,956-acres, takes its name from a fold that forms part of the Temblor Range located one mile to the west. Initial exploration of the field was motivated by the high quality reservoir sands noted in exploratory wells drilled in the vicinity. Commercial development of the field didn't begin until 1945 when the "discovery well" was drilled on July 27th by the Williams Brothers Oil Company (Ritzius 1954), making it a relatively young field in the San Joaquin Valley petroleum industry. Development following the initial discovery well was unpromising as numerous dry wells were drilled in the following years and those that were completed were abandoned after only a year. By 1954, 99 wells had been drilled in the field with only 36 producing, 8 idle, 4 abandoned and 56 dry holes (Ritzius 1954).

Although the oil field has been in continuous if slow development since the 1940s, the land has been mainly used for cattle ranching activities. Following the discovery of gold in the hills east

of the San Joaquin Valley in 1851, numerous immigrants moved into the area, some of which began farming or ranching to supply the established miners. In 1852, John McCray was the first to bring between 150 to 200 pureblood cattle into the valley (URS 2004; Morgan 1914).

One of the earliest transportation routes through the San Joaquin Valley, known as the El Camino Viejo a Los Angeles, is located south of the project area. The path was initially established using Native American footpaths that followed along the base of the Coast Ranges, bypassing other routes with denser vegetation that meandered through numerous rivers and wetlands (Latta 1936). The nearest portion of the original El Camino Viejo lies approximately three miles to the southwest of the project area. Located adjacent to the path, and three miles southwest of the study area, was the water hole known as “el arroyo de los carneros,” an important source of water along the mainly dry route (Latta 1936). Translated from Spanish the name “el arroyo de los carneros” means “creek of the rams,” however, Latta translates the name as “Slaughter Pen” (1936). The watering hole is described as several springs situated within a small valley marked by the appearance of two large, perpendicular rocks on the hilltop above them (Latta 1936).

3. ARCHIVAL RECORDS SEARCH

An archival records search was conducted at the California State University, Bakersfield, Southern San Joaquin Valley Archaeological Information Center (IC), by ASM staff members to determine: (i) if prehistoric or historical archaeological sites had previously been recorded within the E&B Natural Resources well pad study area; (ii) if the project area had been systematically surveyed by archaeologists prior to the initiation of this field study; and/or (iii) whether the region of the field project was known to contain archaeological sites and to thereby be archaeologically sensitive. Additionally, a search of the NAHC *Sacred Lands File* was conducted in order to ascertain whether traditional cultural places or cultural landscapes had been identified within the APE. The results of this archival records search are summarized here.

The records search at the IC indicated that the study area had not been previously surveyed by archaeologists. No archaeological sites were known within the study area and, overall, the surrounding area exhibited little archaeological sensitivity. The NAHC *Sacred Lands File* did not have any cultural places recorded within the project area.

4. FIELD SURVEY METHODS AND RESULTS

The study area was examined with field crew walking parallel transects across the property spaced at 15 meter intervals, in order to identify surface artifacts, archaeological indicators (e.g., shellfish or animal bone), and/or archaeological deposits (e.g., organically enriched midden soil). Special attention was paid to rodent burrow back dirt piles, in the hope of identifying sub-surface soil conditions that might be indicative of archaeological features or remains. No cultural resources were collected during the survey.

INVENTORY RESULTS

The study area was surveyed by ASM Associate Archaeologists Arran Bell, M.A., and Colin Rambo on January 31st, 2013. Surface visibility was excellent. Soils throughout the study area, including the access roads, pads, pipelines connecting the pads, and buffers, proved to be sandy alluvium characterized by basalt pebbles and sandstone cobbles. As noted above, the well pads area is located within an area of cattle ranching activities. The area has been disturbed as a result of ongoing ranching activities located adjacent to and within the well pad areas.

Well pads Theta #252C-20, #253A-20, #253D-20 and #262C-20 are clustered in the western portion of the project area. Situated on a nearly level, undeveloped plain bisected by several existing dirt roads, vegetation in the area of these pads consisted of annual grasses and small Russian thistle shrubs. An existing, in use cattle pen is located to the southeast of the well pads.

Well pad Theta #264C-20 is located in the southern portion of the survey area. Located on a gently sloping alluvial fan with a southern aspect, vegetation is dominated by annual grasses. Evidence of livestock grazing and trampling is present throughout the well pad area.

Well pads E&B Fee #271B-20, #271D-20, #281C-20, #281D-20 and #282D-20 are located in the northeast portion of the study area in a zone that is bisected by numerous dirt access roads. Situated on flat to gently sloping alluvial fan, the Santos Creek drainage bisects through the area trending northeast/southwest (Figure 3). Vegetation at the time of the study consisted of annual grasses and some Russian thistle shrubs.

No cultural resources of any kind were identified within the well pads, buffers, pipeline routes or access road study areas.

Figure 3. Survey area overview with Santos Creek drainage in the foreground. View is southeast

5. SUMMARY AND RECOMMENDATIONS

An intensive Phase I archaeological survey was conducted for the E&B Natural Resources 10 well pads and pipelines study area, located in the McDonald Anticline Oil Field, Kern County, California. These well pads are designated Theta #252C-20, #253A-20, #253D-20, #262C-20 and #264C-20, and E&B Fee #271B-20, #271D-20, #281C-20, #281D-20, #282D-20. A records search of site files and maps was conducted at the Southern San Joaquin Valley IC, and a search of the NAHC *Sacred Lands File* was completed. These investigations determined that the study area had not been previously surveyed and that no sites or cultural resources had been identified within or immediately adjacent to them. Intensive Phase I survey of the well pad study area failed to result in the identification or recording of significant historical resources.

RECOMMENDATIONS

An archival records search, background studies, and an intensive, on-foot surface inventory of the E&B Natural Resources well pad project study area, Kern County, California, were conducted as part of a Phase I archaeological survey. No cultural resources of any kind were found to be present within the study area. Development of this study area therefore does not have the potential to result in adverse impacts to cultural resources, and no additional archaeological work is recommended for it. In the unlikely event that cultural resources are discovered during development or use of the study area, it is recommended that an archaeologist be contacted to evaluate the find.

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