3.11 NOISE AND VIBRATION

3.11 NOISE AND VIBRATION

SECTION SUMMARY

Construction of the pipeline is estimated to last between 10 and 15 months, during which time construction noise (including potential blasting noise and vibration) would be generated by construction crews and equipment. An additional two months is anticipated for pipeline and equipment testing, commissioning, and right-of-way clean-up, during which time noise would be generated. Routine maintenance of the pipeline would generate very little noise. After the Project life, the pipeline would be decommissioned in place, although above-ground facilities would be removed, thus resulting in minimal construction-like noise generation.

Ambient noise monitoring measurements were taken at the proposed on-site locations and nearest noise-sensitive receivers to those locations. Noise generated by daytime construction work is considered exempt in Fresno County because of its temporary nature. Monterey County, though not specifically exempting construction noise, does not apply specific noise level restrictions in the absence of sensitive receptors.

Maximum noise levels generated by construction activities would be at or below measured existing ambient conditions along the pipeline corridor during daytime hours. The potential blasting areas would experience minimal effects because of the controlled nature of the shots and distance between potential blasting areas and noise sensitive receivers. Pipeline maintenance operations will generate noise levels below applicable noise standards for both Fresno and Monterey Counties and the existing ambient noise levels at sensitive receptors. Noise from above-ground facilities is expected to be below applicable noise standards given the considerable distance between the facilities and nearest existing residences.

NOISE AND VIBRATION SECTION SUMMARY TABLE

Impacts and Mitigation Measures	Level of Significance	
	Before Mitigation	***After Mitigation***
Impact 3.11-1: Construction Work Would Cause Short-Term Noise along the Pipeline Corridor	PS	LTS
Mitigation Measure 3.11-1 Should nighttime construction be required along the Project corridor, minimum setbacks from existing residences of 1,000 feet shall be maintained for non-		

Impacts and Mitigation Measures	Level of Significance	
	Before Mitigation	***After Mitigation***
impulsive activities, and 2,000 feet for impulsive construction activities. The construction foreman shall be in possession of maps which indicate zones within 1,000 and 2,000 feet from residential structures, and shall ensure that no nighttime construction activities occur within those zones. Impulsive activities would include jack-hammering or pneumatic rock breaking type activities.		
Impact 3.11-2: Construction Blasting Vibration and Noise	PS	LTS
Mitigation Measure 3.11-2 CPL shall hire a blasting expert to develop a blasting program that provides for minimum off-site noise and vibration levels, in addition to conducting blasting during a recurring mid-day period. Advanced notification of proposed blasting activities shall be provided to all residences within 2,000 feet of such activities. Specifically, the blasting expert shall design the shots so as to maintain peak particle velocities of 0.1 inches per second or less at all residential uses. The blasting expert shall document that the blasting pattern has been designed to ensure the maintenance of this performance standard and shall monitor the velocity of blasts at residences located within 2,000 feet of blast shot sites.		
Impact 3.11-3: Ongoing Pipeline Maintenance Noise	LTS	LTS
None required.		
Impact 3.11-4: Facilities (San Ardo, Mid-Line Heater, KLM) Operations Noise	LTS	LTS
None required.		
Impact 3.11-5: Possible Noise from Spill Clean-Up Operations	LTS	LTS
None required.		

3.11.1 Introduction

This section describes the currently existing noise and vibration environment along and adjacent to the 57-plus-mile Chevron San Ardo to Coalinga Heated Oil Pipeline corridor, and examines Project-related noise and vibration impacts that would result from Project implementation. Mitigation measures to minimize these impacts are included at the end of the impact discussion.

As described in Section 2.0, Project Description, the Project would consist of construction, operation, maintenance, and decommissioning of a heated oil pipeline initiating at a facility located in the San Ardo Oil Field in Monterey County and terminating in the upper Salinas Valley at a facility designed to tie into the Kettleman-Los Medanos (KLM) Pipeline southeast of the City of Coalinga. The components of the Project would traverse parts of both Monterey and Fresno Counties.

The entire 57-plus miles of the heated oil pipeline would be buried below the existing land surface, but construction and operation of the pipeline would also include above-ground facilities and ancillary utility connections. Construction of the pipeline is estimated to last between 10 and 15 months, during which time construction noise would be generated by construction crews and equipment. An additional two months is anticipated for pipeline and equipment testing, commissioning, and right-of-way clean-up, during which time lesser levels of equipment and crew noise would be generated.

General construction activities include right-of-way staking, site preparation, clearing and grading, trenching, pipe stringing, bending and welding, pipe placement and backfilling, hydrostatic testing, management of hazardous materials, and clean up and restoration. The pipeline and associated facilities would remain in service for 30 years or longer, depending on economic conditions. Routine maintenance of the pipeline would generate very little noise audible to residences or other receptors along the Project corridor. After the Project life, the pipeline would be decommissioned in place, although above-ground facilities would be removed, thus resulting in minimal construction-like noise generation.

3.11.2 Affected Environment

3.11.2.1 Background and Terminology

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. When pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second, called Hertz (Hz). Section 8.1 of this document provides a glossary which includes acoustical terminology.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals of pressure), as a point of reference, defined as 0 dB. Other sound pressures are then compared to the reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in decibel levels correspond closely to human perception of relative loudness. Figure 3.11-1, Typical A-Weighted Sound Levels of Common Noise Sources, illustrates common noise levels associated with various sources.

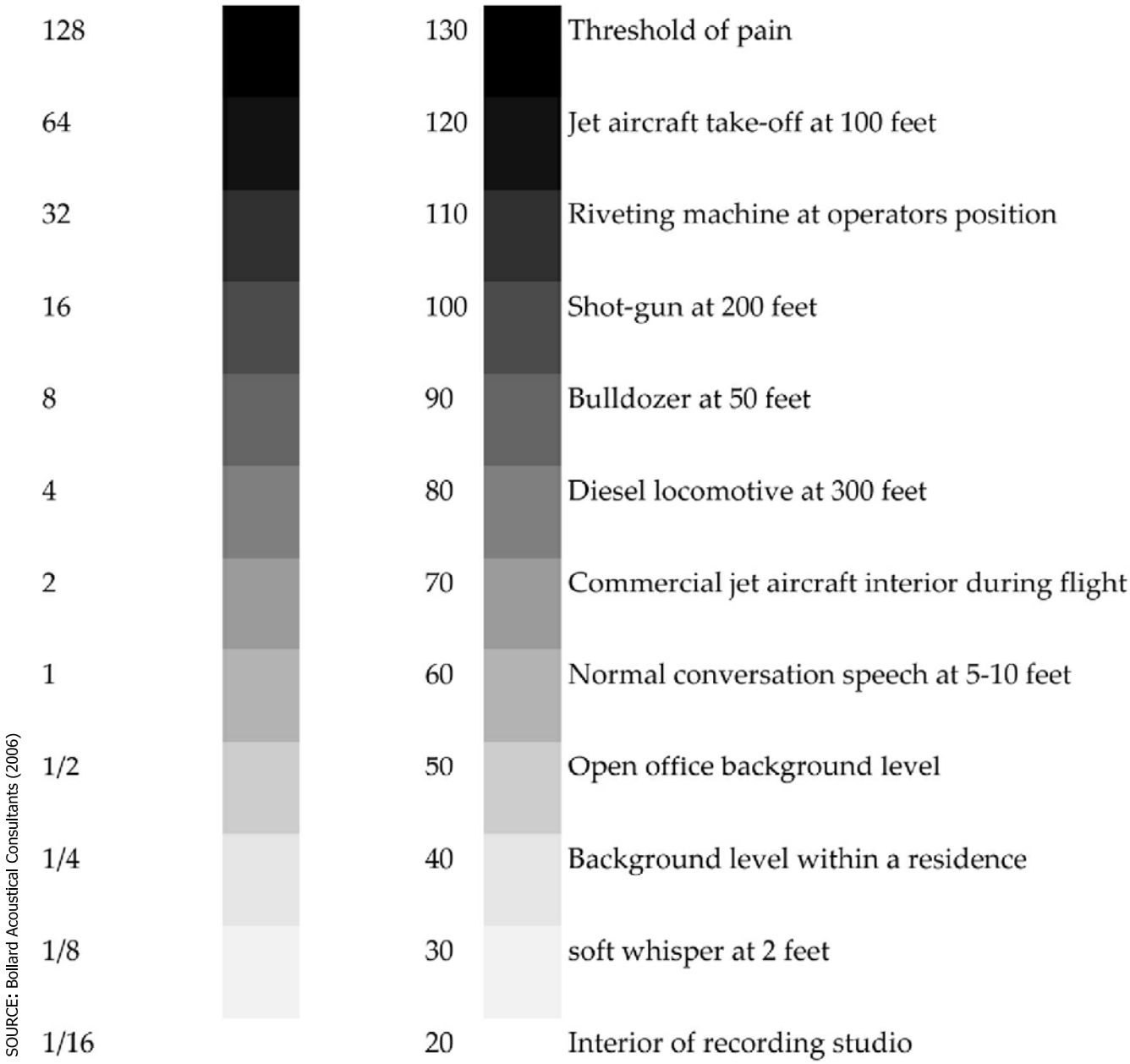
The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by weighing the frequency response of a sound level meter by means of the standardized A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}). The L_{eq} is the foundation of the day/night average noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day-night Average Level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures.

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Vibration can be described in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities in inches per second (in/sec). Standards pertaining to perception, as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities (ppv). For the Project, vibration would be a concern primarily during construction blasting (assuming blasting is needed). An assessment of construction-related vibration levels is contained within this section.



SOURCE: Bollard Acoustical Consultants (2006)

Figure 3.11-1
Typical A-Weighted Sound Levels of Common Noise Sources
CHEVRON
SAN ARDO TO COALINGA
HEATED OIL PIPELINE

RESOURCE DESIGN TECHNOLOGY, INC.

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3.11.2.2 Existing Ambient Noise Environment

The Project traverses through portions of both Monterey and Fresno Counties away from major cities and small towns, but occasionally near rural homes. These residences are considered noise-sensitive receivers.

To quantify the existing ambient noise environment in the immediate vicinity of the heated oil pipeline, short-term ambient noise monitoring was conducted at the nearest residences to the proposed above-ground facilities located at the start milepost (MP) (MP 0, San Ardo Pipeline Facility), middle (MP 29.6, Mid-Line Heating Station), and end (MP 57.7, KLM Pipeline Facility) of the pipeline route. These locations were selected because once construction is completed, there will be no continuous operational noise associated with the pipeline other than at these three above-ground facilities.

Noise level measurement surveys were conducted using Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters. The meters were calibrated before and after use with an LDL Model CA200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used in the noise level surveys meets all pertinent specifications of the American National Standards Institute (ANSI) for Type 1 sound level meters. The noise measurement locations and survey results are described separately for each of the alternate landing sites in the following paragraphs and tables.

Table 3.11-1, Ambient Noise Monitoring Results — From Selected Sites along the Proposed Chevron San Ardo to Coalinga Heated Oil Pipeline Alignment, shows the existing ambient noise levels measured at the proposed on-site locations, whereas Table 3.11-2, Ambient Noise Monitoring Results – Nearest Noise-Sensitive Receivers to Pipeline Alignment, shows the existing ambient noise at the nearest noise-sensitive receivers to those locations.

The ambient noise surveys were used to quantify the general acoustical background at the proposed above-ground facilities locations. These locations, along with locations of the nearest residents to the above-ground facilities, are shown on Figure 3.11-2, Nearest Noise Receptors to Permanent Noise-Generating Facilities. At Site A (San Ardo Oil Field), current oil extraction operations (e.g., pumps, tanker truck loadout, etc.) contribute to the general noise environment. Nearby homes currently have pumps located within 100 feet of their property line. At Site B, the proposed Mid-Line Heating Station will be substantially shielded from view from the nearest noise sensitive receiver by intervening topography. The hillside to the east of the Mid-Line Station is approximately 30 feet in height and will block the line of sight, as well as muffling noise. Traffic noise from Highway 198 is the dominant noise source at present, with approximately 12 semi-trucks per hour passing by.

The future KLM Pipeline Facility will be approximately 1 mile from the nearest noise-sensitive receiver, and will not likely contribute to the existing general ambient noise levels at that receiver location.

TABLE 3.11-1
AMBIENT NOISE MONITORING RESULTS - FROM SELECTED SITES ALONG THE PROPOSED CHEVRON SAN ARDO TO COALINGA HEATED OIL PIPELINE ALIGNMENT

			Measured Sound Level, dBA	
Site	**Location**	**County**	**Average (L_{eq})**	**Maximum (L_{max})**
A	San Ardo Facility	Monterey	41	49
B	Mid-Line Heating Station	Fresno	32	52
C	KLM Facility	Fresno	38	55

Source:
Bollard Acoustical Consultants, Inc., October 3-4, 2006

TABLE 3.11-2
AMBIENT NOISE MONITORING RESULTS - NEAREST NOISE-SENSITIVE RECEIVERS (RESIDENCES) TO PIPELINE ALIGNMENT

		Measured Sound Level, dBA	
Site	**Location**	**Average (L_{eq})**	**Maximum (L_{max})**
A	Residence Approx. 3,900 feet north of San Ardo Facility	40	54
B	Residence Approx. 400 feet east of Mid-Line Heating Station	49	69
C	Residence Approx. 7,300 feet southeast of KLM Facility	49	51

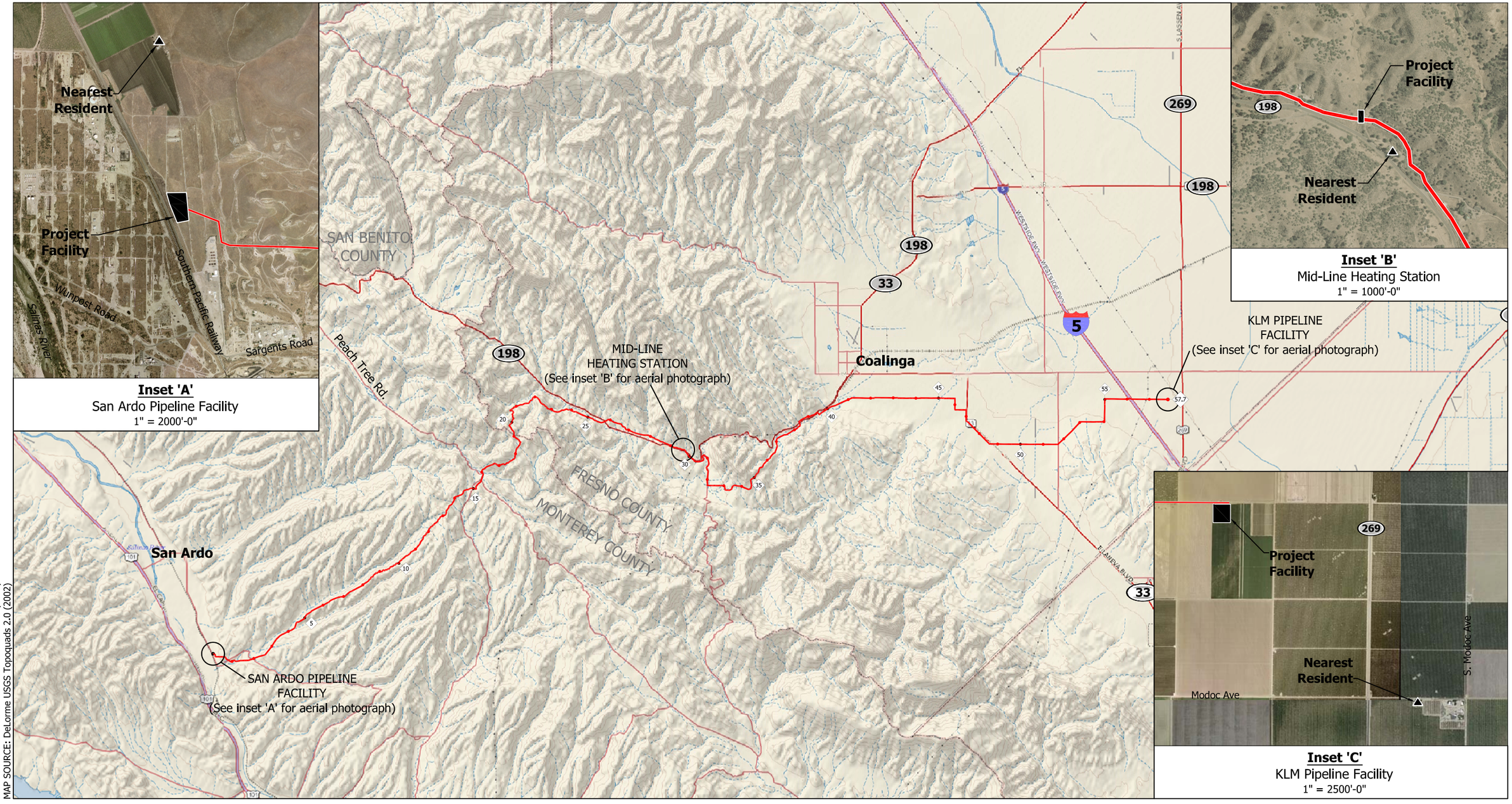
Source:
Bollard Acoustical Consultants, Inc., October 3-4, 2006

3.11.2.3 Existing Ambient Vibration Environment

Since no significant vibration sources or industrial operations were identified within the Project corridor, the ambient vibration environment is considered to be negligible, both within the corridor itself and at the nearest sensitive land uses.

Inset 'A'
San Ardo Pipeline Facility
1" = 2000'-0"

Inset 'B'
Mid-Line Heating Station
1" = 1000'-0"



Inset 'C'
KLM Pipeline Facility
1" = 2500'-0"

DATA SOURCE: Bollard Acoustical Consultants (2006)
MAP SOURCE: DeLorme USGS Topoquads 2.0 (2002)

N

0 5 miles

SCALE: 1" = 5 miles

Figure 3.11-2
Nearest Noise Receptors
to Permanent Noise-Generating Facilities
CHEVRON
SAN ARDO TO COALINGA
HEATED OIL PIPELINE

RESOURCE DESIGN
TECHNOLOGY, INC.

3.11.3 Regulatory Setting

3.11.3.1 California Environmental Quality Act (CEQA) Noise Guidelines

Criteria for determining the significance of noise impacts were developed based on information contained in the California Environmental Quality Act Guidelines (State CEQA Guidelines). According to those guidelines, a project may have a significant effect on the environment if it will satisfy the following conditions:

1. Exposure of persons 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;
2. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
3. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; and/or
4. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

3.11.3.2 State of California Model Noise Ordinance Criteria

The State of California Office of Noise Control (ONC) developed the Model Community Noise Control Ordinance to assist cities and counties in the development of appropriate noise standards for their jurisdictions. The ONC standards are recommended in terms of hourly levels, and include adjustments for the rural versus urban nature of the community, the time of day the noise occurs, the duration of the intrusive sound, the ambient conditions, and the characteristics of the noise (impulsive, tonal, speech or music, etc.). The ONC-recommended standards most applicable to this Project are shown in Table 3.11-3, State of California Model Noise Ordinance Recommended Standards. It should be noted that the Table 3.11-3 criteria are guidelines only, and are not adopted State standards. The State standards are included in this assessment because Monterey County does not exempt construction noise from the provisions of the Noise Element, and because the Monterey County Noise Element standards are provided in terms of L_{dn}, which is a 24-hour average of noise. Short-term descriptors, such as hourly median (L_{50}) and maximum (L_{max}) standards have been found to provide better correlation between noise from periodic noise sources, such as project construction, than 24-hour average descriptors such as L_{dn}.

TABLE 3.11-3
STATE OF CALIFORNIA MODEL NOISE ORDINANCE RECOMMENDED STANDARDS

Receiving Land Use	Duration of Intrusive Sound	Daytime Standard (7 a.m. - 10 p.m.)	Nighttime Standard (10 p.m. - 7 a.m.)
One & Two Family Residential	30 - 60 minutes per hour	55	45
	15 - 30 minutes per hour	60	50
	5 - 15 minutes per hour	65	55
	1 - 5 minutes per hour	70	60
	Less than 1 minute per hour	75	65

Notes:
If the offensive noise contains a steady, audible tone such as a whine, screech, or hum, or is a repetitive noise such as hammering, or riveting, or contains music or speech, the standard limits shown shall be reduced by 5 dB.

Source:
State of California Model Community Noise Control Ordinance (1977).

3.11.3.3 Monterey and Fresno County Noise Criteria

Local agencies that set noise criteria for new development are Monterey and Fresno Counties. The Monterey and Fresno County General Plan Noise Elements require land uses to be compatible with each other and with existing and future noise environments. Construction noise is typically exempt from Noise Element standards, but construction activities are generally subject to regulation by local planning and building departments. The Monterey and Fresno County Noise Element standards are provided below in Tables 3.11-4, Monterey County Noise Element Standards, and 3.11-5, Fresno County Noise Element Standards, respectively.

It should be noted that construction-related activities are exempt in Fresno County (Section 8.40.060C of Fresno County Code) provided such activities do not take place before 6:00 a.m. or after 9:00 p.m. on any day except Saturday and Sunday, or before 7:00 a.m. or after 5:00 p.m. on Saturday and Sunday. Although Monterey County does not have similar specific exemptions with respect to construction activities, it is common for construction related activities to be exempt from local criteria provided such activities are limited to daytime hours. The rationale for the exemption is two-fold (i.e., construction activities are recognized to be temporary in nature and the mobile nature of construction equipment does not lend itself to noise control).

TABLE 3.11-4
MONTEREY COUNTY NOISE ELEMENT STANDARDS

Receiving Land Use	Community Noise Exposure	L_{dn} or CNEL,
Residential	Normally Acceptable	< 60dB
	Conditionally Acceptable	55 - 70 dB
	Normally Unacceptable	70 - 75 dB
	Clearly Unacceptable	> 75 dB

Notes:
If the offensive noise contains a steady, audible tone such as a whine, screech, or hum, or is a repetitive noise such as hammering, or riveting, or contains music or speech, the standard limits shown shall be reduced by 5 dB.

Source:
Monterey County General Plan Update, August 2006

TABLE 3.11-5
FRESNO COUNTY NOISE ELEMENT STANDARDS

Receiving Land Use	Noise Level Standard Descriptor	Daytime Standard (7 a.m. - 10 p.m.)	Nighttime Standard (10 p.m. - 7 a.m.)
Residential	Hourly Average (L_{eq})	50 dB	45 dB
	Maximum Level (L_{max})	70 dB	65 dB

Notes:
If the offensive noise contains a steady, audible tone such as a whine, screech, or hum, or is a repetitive noise such as hammering, or riveting, or contains music or speech, the standard limits shown shall be reduced by 5 dB.

Source:
Fresno County General Plan Noise Element, September 2000

The Fresno County Ordinance Code has noise source exemptions under the Noise Control chapter. Ordinance 8.40.060 states that "The following activities shall be exempted from the provisions of this chapter" whereby Provision G follows: "Noise sources associated with work performed by private or public utilities in the maintenance or modification of its facilities."

3.11.3.4 Project-Related Noise Level Increase Criteria

For most projects, the significance of anticipated noise effects is based on a comparison between predicted noise levels and noise criteria defined by the local jurisdiction. The

potential increase in noise resulting from Project is also a factor in determining significance. Research into the human perception of changes in sound level indicates the following:

- + 3 dB change is barely perceptible;
- + 5 dB change is clearly perceptible; and
- + 10 dB change is perceived as being twice or half as loud.

These and other factors relating to the duration, frequency, and tonal content of Project-related noise should be considered when evaluating the significance of changes in sound levels.

3.11.3.5 Vibration Standards

Neither Monterey nor Fresno County has adopted specific policies pertaining to vibration levels. Because the Project includes blasting, the effects of blasting-induced vibration are considered in this analysis.

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 3.11-6, General Human and Structural Responses to Vibration Levels, indicates that the threshold for damage to structures ranges from 2 to 6 inches per second (in/sec) peak particle velocity (ppv). One-half this minimum threshold, or 1 in/sec ppv, is considered a criterion that would protect against significant architectural or structural damage. The general threshold at which human annoyance could occur is noted as one tenth of that level, or 0.1 in/sec ppv (ESA 1996).

TABLE 3.11-6
GENERAL HUMAN AND STRUCTURAL RESPONSES TO VIBRATION LEVELS

Effects on Structures & People	Peak Vibration Threshold (in/sec ppv)
Structural damage to commercial structures	6
Structural damage to residential buildings	2
Architectural damage to buildings (cracking, etc)	1.0
General threshold of human annoyance	0.1
General threshold of human perception	0.01

Sources:
CalTrans, 1976, *Survey of Earth-borne Vibrations due to Highway Construction and Highway Traffic*.
Orion Environmental Associates, 1990, *Final Environmental Impact Report: Richmond Transport Project*.
Wilson, Ihrigg & Associates, 1994, *Weekly Progress Report for Vibration Monitoring for Richmond Transport*.

3.11.4 Standards of Significance, Environmental Consequences, and Mitigation Measures

3.11.4.1 Standards of Significance

CEQA and NEPA guidelines, and the Monterey and Fresno County General Plan Noise Elements have been used to establish impact standards for this section. Implementation of the Project would result in significant noise impacts if the Project would result in any of the following:

- Exposure of persons to ongoing operational noise levels in excess of standards established in the Monterey County or Fresno County General Plan Noise Element;
- A substantial permanent increase in ambient noise levels associated with ongoing operation of the pipeline at noise-sensitive areas above levels existing without the Project;
- Nighttime construction-related noise levels in excess of measured ambient noise levels at existing noise-sensitive areas (residences); and
- Generation of blasting-induced vibration levels in excess of peak particle velocities of 0.1 inches/second at existing residences.

3.11.4.2 Impact Analysis and Methodology

GENERAL

A combination of existing literature, noise-level measurement data collected along the pipeline corridor, operational information provided by the Applicant, and application of accepted noise prediction and sound-propagation algorithms, were used to predict Project-related noise and vibration levels in the immediate vicinities of the Project corridor.

CONSTRUCTION COMPONENT — NOISE

Most, if not all, Project construction is proposed during daytime hours (6:00 a.m. to 7:00 p.m.). Noise generated by daytime construction work is considered exempt in Fresno County because of its temporary nature. Monterey County, though not specifically exempting construction noise, does not apply specific noise level restrictions in the absence of sensitive receptors.

Some nighttime construction activity may be required, as described in the Project Description (Section 2.0 of this Draft EIR). Nighttime noise is not exempt in Fresno County; Monterey County also considers nighttime noise to be more problematic to sensitive receptors (pers. comm., T. Kinison Brown, June 5, 2007). Much of the pipeline traverses remote rural areas where no residences or other sensitive receptors would be affected by nighttime construction, thus eliminating concern regarding nighttime construction noise. The purpose of this section is to generally define construction noise levels so that adequate setbacks can be maintained from existing residences when/if nighttime construction is required.

During the anticipated 10- to 15-month construction phase, noise would be generated by the construction spread crews as they proceed with their daily activities. On-site activities noise sources would include, but are not limited to, backhoes, excavators, loaders, cranes, drilling rigs, and compressors. Off-site noise sources would include vehicles commuting to and from the work sites as well as medium and heavy trucks transporting materials to work areas. Work crews would advance several hundred feet to a mile along the corridor each day. Construction activities could be located near a particular noise-sensitive receiver for several days at a time. Maximum noise levels associated with representative construction equipment are shown in Table 3.11- 7, Construction Equipment Noise; the predicted noise levels at the nearest noise-sensitive receivers are provided in Table 3.11- 8, Predicted Noise Levels of Construction Equipment at Nearest Residence. It should be noted that Tables 3.11-7 and 3.11-8 are intended to include representative types of construction equipment which would be used on this project, rather than an exhaustive list of every conceivable type of construction equipment that may be utilized.

TABLE 3.11-7
REPRESENTATIVE CONSTRUCTION EQUIPMENT NOISE

Type of Equipment	Maximum Level, dB at 50 feet
Dump Truck	88
Portable Air Compressor	81
Concrete Mixer	85
Jackhammer	88
Scraper, Dozer, Paver	88
Backhoe	85

Source:
Salter, 1998, *Acoustics*

TABLE 3.11- 8
PREDICTED NOISE LEVELS OF CONSTRUCTION EQUIPMENT AT NEAREST RESIDENCE

	Maximum Level, dB at Nearest Residence		
Type of Equipment	**San Ardo Facility**	**Mid-Line Station**	**KLM Facility**
Dump Truck	44	69	32
Portable Air Compressor	37	62	25
Concrete Mixer	41	66	29
Jackhammer	44	69	32
Scraper, Dozer, Paver	44	69	32
Backhoe	41	66	29

Source:
Salter, 1998, *Acoustics*

The data in Table 3.11-8 indicate that maximum noise levels generated by construction activities would be at or below measured existing ambient conditions along the pipeline corridor during daytime hours. However, based on a reference construction noise level of approximately 90 dB L_{max} at a distance of 50 feet, a setback of approximately 1,000 feet from any residence would be required to achieve satisfaction with both the Fresno County and recommended State of California 65 dB L_{max} noise standards should nighttime construction be proposed. If the construction activity were impulsive or tonal in nature, the setback would need to be doubled to 2,000 feet from any residence for nighttime construction activities.

CONSTRUCTION COMPONENT — BLASTING NOISE AND VIBRATION

Blasting may be required in areas where mechanical equipment cannot break up and loosen the bedrock, as discussed in Section 2.0, Project Description. Initial construction design analysis has identified potential blasting areas in the rugged hills above Sargent Canyon between MP 13 and 15 in Monterey County, in the San Andreas Rift zone between MP 16 and MP 18 in Monterey County, and between MP 20 and 22.5 in Fresno County. The drill-and-blast technique would be carried out using controlled blasting techniques to minimize overbreak and to prevent excessive loosening, damage, or deterioration of the rock mass outside the defined perimeter of the pipeline trench. If blasting is required, applicable federal, state, and local requirements would be observed, and any necessary permits and authorizations would be obtained. Measures would be taken to prevent damage to property and livestock during blasting operations, including the use of blasting mats, if warranted. Best Management Practices Guidelines developed by the Institute of Makers of Explosives (IME) would be implemented, as described in Section 2.0 and Section 3.9, Hydrology.

Noise sources associated with blasting consist of rock drills and the shot itself. The noise levels generated by the rock drills are dependent on drill type, but are predicted to be generally similar to the noise levels generated by excavation equipment, and are included in the levels described in the previous section pertaining to on-site noise sources. The number, frequency, and duration of shots required during Project construction cannot be determined until large rocks are encountered in the field, and the contractor's on-site blasting expert makes a determination as to the most effective mean of clearing the rock.

Noise generated by blasting shots is more variable, depending on the amount of charge-material used, number of holes, depth of those holes, timing delays, and other factors. Misconceptions regarding what a blast looks and sounds like are common, due in part to the types of explosions frequently seen in movies and other mass media entertainment sources. In reality, blasting shots are designed to transfer the energy of the shot into the ground, rather than venting it into the atmosphere with an accompanying spectacle of flying rocks and debris.

With respect to blast-induced vibration, the type, sizes, number, depth and timing delay sequence of the charges, as well as the geology of the surrounding area, are variables that would affect the transmission of vibration beyond the site of the blasting shot. Because of the controlled nature of any required blasting, charges required would likely be relatively small. The potential blasting areas identified above would likely experience minimal adverse effects given the controlled nature of the shots and the substantial distance (ranging from 1,600 to 6,000 feet) between the potential blasting areas and noise sensitive receivers (i.e., residences). Consequently, blasting noise and vibration levels are not predicted to significantly exceed background noise levels or Monterey or Fresno County standards. To ensure that noise levels and vibrations from blasting do not exceed background noise levels or Monterey or Fresno County standards, a blasting expert would need to be on-site during blasting operations to provide monitoring and enforcement.

OPERATIONAL COMPONENT

The three main above-ground stations (San Ardo and KLM Pipeline Facilities and the Mid-Line Heating Station) and five mainline valve stations located at strategic locations along the pipeline route would operate continuously during the approximate 30-year Project life. In addition to the operation of the above-ground stations and valves, noise associated with Project operations would include repair, maintenance, and routine inspections of the pipeline right-of-way, as well as, the daily operations of the above-ground stations. Repair and maintenance activity may occasionally include welding and crane operations which, though noise-generating, would be less than construction noise levels. Routine visual

inspections would be conducted on foot, by vehicle, or by low-flying aircraft 26 times each year (intervals not to exceed three weeks), thus generating only minimal noise.

On October 4, 2006, Bollard Acoustical Consultants (BAC) staff accompanied by Chevron Operations representatives observed an existing above-ground valve station on the SAPCO natural gas pipeline located 2.6 miles southeast of the Mid-Line Heating Station to collect reference data for use in predicting noise impacts resulting from valve station operations. No measurable noise radiated from the above-ground valve station, indicating that the similar valve stations associated with the proposed pipeline would produce little, if any, audible noise.

Noise measurements collected at a pipeline pump at the San Ardo Oil Field measured 63 dB L_{eq}. At a distance of 30 feet from the pump, the noise reading decreased to 66 dB L_{max}. Assuming similar pumping equipment is to be used at the proposed San Ardo, KLM, and Mid-Line Heating Station facilities to be constructed as part of this project (an assumption corroborated by Chevron representatives), operational noise levels at the nearest residences to these facilities (located between 3,900 and 7,300 feet away), would be approximately 20 to 25 dB due to spherical spreading of sound alone. After accounting for the additional noise attenuation that may result from shielding by topography or structures, actual noise levels would be expected to be even lower at the nearest sensitive receptors. Thus, ongoing operational noise levels generated by the Project can be predicted to be well below both applicable noise standards and existing ambient noise conditions.

3.11.4.3 Construction Impacts and Mitigation

Impact 3.11-1: Construction Work Would Cause Short-Term Noise along the Pipeline Corridor

Construction work could result in short-term noise levels that exceed background noise levels or noise standards set by Monterey or Fresno Counties. This impact is potentially significant.

During the construction and startup phases of the project, CPL and its subcontractors would perform their work in a manner that minimizes the effects of noise generated by construction activities. Pipeline construction is expected to be temporary in nature and is not anticipated to adversely affect existing noise-sensitive land uses (residences) during daytime hours. However, should nighttime construction be required for this Project, noise impacts could occur when such activities are being conducted in close proximity to existing residences.

Level of Significance Before Mitigation: Potentially Significant

Mitigation Measures: Mitigation Measure 3.11-1

Should nighttime construction be required along the Project corridor, minimum setbacks from existing residences of 1,000 feet shall be maintained for non-impulsive activities, and 2,000 feet for impulsive construction activities. The construction foreman shall be in possession of maps which indicate zones within 1,000 and 2,000 feet from residential structures, and shall ensure that no nighttime construction activities occur within those zones. Impulsive activities would include jack-hammering or pneumatic rock breaking type activities.

Level of Significance After Mitigation: Less than Significant

Impact 3.11-2: Construction Blasting Vibration and Noise

Blasting associated noise and vibration could result in noise levels that exceed background noise levels or noise standards set by Monterey or Fresno Counties. This impact is potentially significant.

Noise and vibration associated with blasting is dependant on several variables. Based on the data used to assess impacts for this Project, and the substantial distances between the area where the shots will occur and the nearest residences, blasting noise and vibration levels are not predicted to exceed background noise levels or noise standards set by Monterey or Fresno Counties. Nonetheless, because it is not possible to predict the exact size and location of the blasting shots prior to construction activities, the on-site blasting expert retained by CPL or its contractor should develop a blasting program that provides for minimum off-site noise and vibration levels, in addition to conducting blasting during a recurring mid-day period.

Level of Significance Before Mitigation: Potentially Significant

Mitigation Measures: Mitigation Measure 3.11-2

CPL shall hire a blasting expert to develop a blasting program that provides for minimum off-site noise and vibration levels, in addition to conducting blasting during a recurring mid-day period. Advanced notification of proposed blasting activities shall be provided to all residences within 2,000 feet of such activities. Specifically, the blasting expert shall design the shots so as to maintain peak particle velocities of 0.1 inches per second or less at all residential uses. The blasting expert shall document that the blasting pattern has been

designed to ensure the maintenance of this performance standard and shall monitor the velocity of blasts at residences located within 2,000 feet of blast shot sites.

Level of Significance After Mitigation: Less than Significant

3.11.4.4 Operational Impacts and Mitigation

Impact 3.11-3: Ongoing Pipeline Maintenance Noise

Noise from routine operational inspections and maintenance of the pipeline could exceed standards at nearby noise-sensitive areas. This impact is less than significant.

Pipeline maintenance operations are predicted to generate noise levels well below applicable noise standards for both Fresno and Monterey Counties, and well below existing ambient noise levels at existing residences. Routine Project maintenance would require periodic visual inspections by means of foot, vehicle, or plane, but these visits would be temporary and noise levels less than or equal to the existing ambient levels.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

Impact 3.11-4: Facilities (San Ardo, Mid-Line Heater, KLM) Operations Noise

Noise from the three above-ground facilities along the pipeline will be generated throughout the life of the pipeline.

Facilities operations will occur at three locations: the San Ardo Pipeline Facility, the Mid-Line Heating Station, and the KLM Pipeline Facility. The facilities at San Ardo and KLM would include control buildings, charge and shipping pumps, sump tanks and pumps, pig launcher/receiver, heaters, and crude tanks. The Mid-Line Heating Station would operate continuously, but has a small infrastructure with two circulating pumps, a heater, and a control room.

Given the considerable distance between the proposed above-ground facilities and the nearest existing residences, the noise to be generated is predicted to be well below applicable noise standards for both Fresno and Monterey Counties, and less than existing ambient noise levels at existing residences. In addition, the

intervening topography at the Mid-Line Heating Station will provide considerable additional acoustical shielding for the nearest noise sensitive receiver.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

Impact 3.11-5: Possible Noise from Spill Clean-Up Operations

Noise from equipment used to clean up a pipeline spill could exceed standards at nearby noise-sensitive receptors.

In the event of a spill, clean-up measures could generate noise at the nearby noise sensitive receptors. However, the noise associated with equipment and vehicles would be short-term and generally below construction noise levels. No conflict with Monterey or Fresno County noise standards is anticipated.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

3.11.4.5 Decommissioning Impacts and Mitigation

After the Project life the pipeline would be decommissioned in place. Above-ground facilities would be removed and the sites on which they stood would be recontoured and revegetated. The pipeline itself would be left in place, cleaned, sealed, and filled with inert gas or other inert material. Temporary, construction-like noise would be generated by these operations, but would be less than noise levels during peak construction activity for the pipeline. Thus, no significant impacts are expected and no mitigation is required.