

3.12 AIR QUALITY AND NOISE

3.12.1 Air Quality

As described in Section 2.0, the Keystone Project consists of installation of pipeline and construction of pump stations and associated facilities. The proposed pump stations would be electrically driven, with electricity to be provided from existing local electric utilities. Backup power at each pump station would be provided by an uninterruptible power supply (UPS). A 5-kW gasoline-powered standby generator set would provide extended backup to each UPS for essential services. A small (200-gallon) gasoline storage tank would be located with each backup generator. No other stationary sources of air pollutants are proposed.

3.12.1.1 Environmental Setting

Regional climate and meteorological conditions can influence the transport and dispersion of air pollutants that affect air quality. The existing climate and ambient air quality in the Keystone Project area are described below.

Regional Climate

The proposed Keystone Project would be constructed in portions of North Dakota, South Dakota, Nebraska, Kansas, Missouri, Illinois, and Oklahoma. These areas are located within the humid continental climate, which is noted for its variable weather patterns and large temperature ranges that can exceed 82 °F. The project area lies in the boundary between many different air masses, principally polar and tropical. Polar-type air masses collide with tropical-type air masses, causing uplift of the less dense and moister tropical air and resulting in precipitation. Representative climate data for Grand Forks, North Dakota; Lincoln, Nebraska; Salisbury, Missouri; and Tulsa, Oklahoma are presented in Table 3.12.1-1.

Ambient Air Quality

Ambient air quality is regulated by federal, state, and local agencies. EPA has established national ambient air quality standards (NAAQS) for seven criteria pollutants: sulfur dioxide (SO₂), nitrogen dioxide (NO₂), particulate matter (PM₁₀ particulates and PM_{2.5} particulates), carbon monoxide (CO), ozone (O₃), and lead (Pb). The NAAQS were developed to protect human health (primary standards) and human welfare (secondary standards). State air quality standards cannot be less stringent than the NAAQS. South Dakota, Nebraska, Kansas, Missouri, Illinois, and Oklahoma have adopted ambient air quality standards that are the same as the NAAQS for all seven criteria pollutants, whereas North Dakota has more stringent standards for SO₂ (i.e., 0.023 ppm annual average, 0.099 ppm 24-hour average, and 0.273 ppm 1-hour average). Table 3.12.1-2 lists the NAAQS for the seven criteria pollutants.

**TABLE 3.12.1-1
Representative Climate Data in the Vicinity of the Keystone Pipeline**

Location/ Measurement (Average)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual
Grand Forks, North Dakota													
Maximum temperature (°F)	13.5	20.4	32.6	51.8	67.5	76.2	81.2	80.2	69.0	55.3	34.7	19.8	50.2
Minimum temperature (°F)	-5.5	1.1	14.6	30.7	42.1	52.2	56.6	54.3	44.5	33.3	18.0	2.5	28.7
Total precipitation (inches)	0.69	0.50	0.80	1.18	2.31	3.17	3.09	2.69	1.97	1.37	0.87	0.62	19.27
Total snowfall (inches)	10.0	5.2	7.1	2.8	0.2	0	0	0	0	1.0	6.8	7.9	41.1
Snow depth (inches)	7	7	4	0	0	0	0	0	0	0	1	4	2
Lincoln, Nebraska													
Maximum temperature (°F)	33.4	40.0	50.5	63.7	73.8	84.5	89.2	86.6	78.7	66.4	49.5	37.3	62.8
Minimum temperature (°F)	11.9	17.9	27.2	38.8	50.1	60.7	66.0	63.6	53.1	40.3	27.4	16.4	39.4
Total precipitation (inches)	0.72	0.86	2.04	2.87	4.25	3.75	3.42	3.36	2.92	1.88	1.56	0.76	28.39
Total snowfall (inches)	6.5	5.4	4.9	1.5	0	0	0	0	0	0.6	2.7	5.3	26.8
Snow depth (inches)	2	2	0	0	0	0	0	0	0	0	0	1	0
Salisbury, Missouri													
Maximum temperature (°F)	36.4	42.6	53.2	65.9	75.7	84.0	88.6	87.3	80.1	69.0	53.5	41.1	64.8
Minimum temperature (°F)	17.4	22.5	31.2	42.9	53.0	62.0	66.3	63.8	55.5	44.4	33.0	22.8	42.9
Total precipitation (inches)	1.63	1.68	2.75	3.57	4.92	4.84	4.29	3.84	4.22	3.31	2.50	1.95	39.51
Total snowfall (inches)	6.4	4.5	3.2	0.4	0	0	0	0	0	0	1.1	4.6	20.2
Snow depth (inches)	2	1	0	0	0	0	0	0	0	0	0	0	0
Tulsa, Oklahoma													
Maximum temperature (°F)	46.5	52.9	62.4	72.1	79.6	88.0	93.8	93.2	84.1	74.0	60.0	49.6	71.4
Minimum temperature (°F)	26.3	31.1	40.3	49.5	59.0	67.9	73.1	71.2	62.9	51.1	39.3	29.8	50.1
Total precipitation (inches)	1.60	1.95	3.57	3.95	6.11	4.72	2.96	2.85	4.76	4.05	3.47	2.43	42.42
Total snowfall (inches)	3.0	2.1	1.4	0	0	0	0	0	0	0	0.6	2.0	9.1
Snow depth (inches)	NA ^a	NA ^a	NA ^a	0	NA ^a	0	0	0	0	0	NA ^a	NA ^a	NA ^a

Notes:

°F = Degrees Fahrenheit.

All measurements in the table are averages.

^a Data for snow depths are not available.

Source: ENSR 2006a.

**TABLE 3.12.1-2
National Ambient Air Quality Standards**

Pollutant	Time Frame	Primary	Secondary
Particulate matter less than 10 microns in diameter	Annual ^a	Revoked	Revoked
	24-hour ^b	150 µg/m ³	150 µg/m ³
Particulate matter less than 2.5 microns in diameter	Annual ^c	15 µg/m ³	15 µg/m ³
	24-hour ^d	35 µg/m ³	NA
Sulfur dioxide	Annual	0.030 ppm (80 µg/m ³)	NA
	24-hour ^b	0.14 ppm (365 µg/m ³)	NA
	3-hour ^b	NA	0.5 ppm (1,300 µg/m ³)
Carbon monoxide	8-hour ^b	9 ppm (10,000 µg/m ³)	NA
	1-hour ^b	35 ppm (40,000 µg/m ³)	NA
Nitrogen dioxide	Annual	0.053 ppm (100 µg/m ³)	0.053 ppm (100 µg/m ³)
Ozone	8-hour ^e	0.08 ppm (157 µg/m ³)	0.08 ppm (157 µg/m ³)
	1-hour ^f	0.12 ppm (235 µg/m ³)	0.12 ppm (235 µg/m ³)
Lead	Quarterly	1.5 µg/m ³	1.5 µg/m ³

Notes:

- µg = Microgram(s).
- m³ = Cubic meter(s).
- NA = Not applicable.
- ppm = Part(s) per million.

- ^a Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the United States Environmental Protection Agency revoked the annual PM₁₀ standard in 2006 (effective December 17, 2006).
- ^b Not to be exceeded more than once per year.
- ^c To attain this standard, the 3-year average of the weighted annual mean particulate matter less than 2.5 microns in diameter concentrations from single- or multiple community-oriented monitors must not exceed 15.0 µg/m³.
- ^d To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m³ (effective December 17, 2006).
- ^e To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations, measured at each monitor within an area over each year, must not exceed 0.08 ppm.
- ^f The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1. As of June 15, 2005, EPA revoked the 1-hour ozone standard in all areas, except the fourteen 8-hour ozone nonattainment Early Action Compact Areas.

EPA has characterized all areas of the United States as attainment, unclassifiable, maintenance, or nonattainment. Areas where the ambient air concentration of a pollutant is less than the NAAQS are designated as attainment; areas where no ambient air quality data are available are designated as unclassifiable. Unclassifiable areas are treated as attainment areas for the purposes of permitting stationary sources. Areas are designated as nonattainment when a pollutant's ambient air concentration is greater than the NAAQS. If an area was designated as nonattainment and has since demonstrated compliance with the NAAQS, it is considered a maintenance area. While maintenance areas are treated as attainment areas for the purposes of permitting stationary sources, states may have specific provisions to ensure that the area will continue to comply with the NAAQS.

The Keystone Project would pass through nonattainment areas in Illinois and Missouri. Madison County, Illinois and St. Charles, Missouri are both designated as nonattainment for the 8-hour ozone and PM_{2.5} federal standards. Ozone is not emitted directly into the air but rather develops as inversion-layer ozone formed through photochemical reactions between atmospheric oxygen, oxides of nitrogen (NO_x), and volatile organic compounds (VOCs) in the presence of sunlight (ultraviolet light). The major sources of NO_x and VOC precursor emissions include motor vehicles, industrial facilities, electric utilities, gasoline storage facilities, chemical solvents, and biogenic sources. PM_{2.5} sources include direct emission from a wide variety of source types, including both mobile and stationary combustion sources. PM_{2.5} also results

from atmospheric particle formation from the reaction of gaseous air pollutants, including SO₂ and ammonia (NH₃). Because of this nonattainment designation, the Keystone Project would be subject to a General Conformity determination, as described further in Sections 3.12.1.2 and 3.12.1.3.

A network of ambient air quality monitoring stations has been established by EPA and state and local agencies to measure and track the background concentrations of criteria pollutants across the United States, and to assist in designation of nonattainment areas. To characterize the background air quality in the regions surrounding the proposed Keystone Project area, data from air quality monitoring stations were obtained. A summary of the available regional background air quality concentrations is presented in Table 3.12.1-3.

3.12.1.2 Regulatory Requirements

The Clean Air Act (CAA) and its implementing regulations (42 USC 7401 et seq., as amended in 1977 and 1990) are the basic federal statutes and regulations governing air pollution in the United States. The following federal requirements have been reviewed for applicability to the proposed Keystone Project:

- New Source Review (NSR) / Prevention of Significant Deterioration (PSD),
- Air Quality Control Regions (AQCRs),
- New Source Performance Standards (NSPS),
- National Emission Standards for Hazardous Air Pollutants (NESHAPs) / Maximum Achievable Control Technology (MACT),
- Chemical Accident Prevention Provisions,
- Title V Operating Permits, and
- General Conformity Rule.

New Source Review/Prevention of Significant Deterioration

The NSR permitting program was established as part of the 1977 Clean Air Act Amendments (CAAA). NSR is a preconstruction permitting program that ensures that air quality is not significantly degraded from the addition of new or modified major emissions sources.¹ In poor air quality areas, NSR ensures that new emissions do not inhibit progress toward cleaner air. In addition, the NSR program ensures that any large new or modified industrial source will be as clean as possible, and that the best available pollution control is utilized. The NSR permit establishes what construction is allowed, how the emission source is operated, and which emission limits must be met.

If construction or modification of a major stationary source located in an attainment area would result in emissions greater than the significance thresholds, the project must be reviewed in accordance with PSD regulations. Construction or modification of a major or, in some jurisdictions, non-major stationary source in a nonattainment or PSD maintenance (Section 175A) area requires that the project be reviewed in accordance with nonattainment NSR regulations.

¹ A major stationary pollutant source in a nonattainment area has the potential to emit more than 100 tons per year (tpy) of any criteria pollutant. In PSD areas, the threshold level may be either 100 or 250 tpy, depending on the source.

**TABLE 3.12.1-3
Regional Background Air Quality Concentrations for the Keystone Project**

Location	PM ₁₀ (µg/m ³)		PM _{2.5} (µg/m ³)		SO ₂ (ppm)		CO (ppm)		NO ₂ (ppm)		O ₃ (ppm)	
	24-Hr	Annual	24-Hr	Annual	24-Hr	3-Hr	8-Hr	1-Hr	Annual	8-Hr ^a	1-Hr	
Wood River, Madison County, Illinois	76	12.5	32	0.003	0.011	0.037	NA	NA	NA	0.077	0.105	
Highway 94, St. Charles County, Missouri	NA	11.9	31	NA	NA	NA	NA	NA	0.008	0.091	0.126	
Aberdeen, Brown Country, South Dakota	57	8.3	22	NA	NA	NA	NA	NA	NA	NA	NA	
Fargo, Cass County, North Dakota	73	8.4	24	0.000	0.002	0.003	NA	NA	0.006	0.065	0.071	
Lincoln, Lancaster County, Nebraska	NA	9.0	25	NA	NA	NA	NA	NA	NA	NA	NA	
Wichita, Sedgwick County, Kansas	71	9.0	26	NA	NA	NA	3.0	4.0	0.009	0.073	0.090	
Highway 77, Kay County, Oklahoma	115	9.8	27	0.001	0.004	0.009	0.06	2.5	NA	0.085	0.104	

Notes:

µg = Microgram(s).

CO = Carbon monoxide.

m³ = Cubic meter(s).

NA = Not applicable.

NO₂ = Nitrogen dioxide.O₃ = Ozone.

ppm = Part(s) per million.

PM₁₀ = Particulate matter less than 10 microns in diameter.PM_{2.5} = Particulate matter less than 2.5 microns in diameter.SO₂ = Sulfur dioxide.^a The 8-hour average ozone concentrations are the fourth-highest daily maximums.Source: EPA. 2006. Monitor Values Report. Available online at: <<http://www.epa.gov/air/data/reports.html>>.

The proposed Keystone Project would not include construction of significant stationary sources of air pollutants². In addition, mobile source emissions and fugitive emissions during the construction phase would be excluded from the determination of “potential to emit” for applicability purposes in accordance with the CAA. Therefore, the proposed Keystone Project would not trigger NSR or PSD review.

Air Quality Control Region

AQCRs are categorized as Class I, Class II, or Class III. Class I areas are designated specifically as pristine natural areas or areas of natural significance; these areas receive special protections under the CAA because of their good air quality. If a new source or major modification to an existing source is subject to the PSD program requirements and is within 62 miles (100 kilometers) of a Class I area, the facility is required to notify the appropriate federal officials and assess the impacts of the proposed project on the Class I area. Class III designations, intended for heavily industrialized zones, can be made only on request and must meet all requirements outlined in 40 CFR Part 51.166. The remainder of the United States is designated as Class II.

No Class I areas are within 62 miles (100 kilometers) of the Keystone Project ROW. The nearest Class I areas to the proposed project would be the Mingo National Wildlife Refuge near Puxico, Missouri (approximately 120 miles south of where the pipeline would cross into Illinois) and the Wichita Mountains Wildlife Refuge northwest of Lawton, Oklahoma (approximately 137 miles southwest of the Cushing Terminal). In addition, the proposed Keystone Project does not include construction or operation of significant stationary sources of air pollutants. Therefore, the Keystone Project would not trigger a federal Class I area impact assessment.

New Source Performance Standards

The NSPS, codified at 40 CFR Part 60, establish requirements for new, modified, or reconstructed units in specific source categories. NSPS-requirements include emission limits, monitoring, reporting, and record keeping.

Keystone’s 5-kW gasoline-fired generators would be subject to proposed 40 CFR 60 Subpart JJJJ for stationary spark ignition internal combustion engines. The pollutants to be regulated by the proposed rule are nitrogen oxides (NO_x), carbon monoxide (CO), and non-methane hydrocarbons (NMHC). In addition, a sulfur limit on gasoline is being proposed. Owners and operators of stationary engines subject to the requirements of the rule would be required to operate and maintain their stationary engines according to the manufacturer’s written instructions. Manufacturers of stationary engines would be required to certify that their engines meet the emission standards.

During construction, Keystone proposes to locate temporary fuel transfer stations at contractor yards. The stations would consist of two to three 10,000-gallon storage tanks for diesel fuel and one 10,000-gallon storage tank for gasoline. Details regarding the fuel transfer stations are provided in Section 2.1.1.3. Table 2.1-5 summarizes the maximum daily and annual throughput for each transfer station site. The regulatory applicability of 40 CFR 60 Subpart XX depends on the gasoline throughput of the transfer facility. As long as the throughput of Keystone’s transfer facilities are less than 75,700 liters per day (i.e., 19,998 gallons per day), they would be exempt from Subpart XX. The regulatory applicability of 40 CFR

² Keystone proposes to install one 5-kW backup gasoline-fired generator and one 200-gallon gasoline storage tank at each pump station. Although estimated operation of the generator would be 20 hours per year, full load operations at 8,760 hours per year would result in emissions of less than 10 tpy cumulative for all regulated pollutants.

60 Subpart Kb depends on the construction date, size, and vapor pressure of the storage vessel and its contents. As long as Keystone stores only diesel fuel in tanks larger than 75 cubic meters (19,813 gallons) and constructed after July 23, 1984, the Keystone Project would be exempt from Subpart Kb.

No other subparts would apply because the proposed Keystone Project does not include construction or operation of any specific source categories of air pollutants.

National Emission Standards for Hazardous Air Pollutants/ Maximum Achievable Control Technology

NESHAPs—codified in 40 CFR Parts 61 and 63—regulate hazardous air pollutant (HAP) emissions. Part 61 was promulgated prior to the 1990 CAAA and regulates only eight types of hazardous substances (asbestos, benzene, beryllium, coke oven emissions, inorganic arsenic, mercury, radionuclides, and vinyl chloride). The Keystone Project would not include facilities that fall under one of the source categories regulated by Part 61; therefore, the requirements of Part 61 are not applicable.

The 1990 CAAA established a list of 189 additional HAPs, resulting in the promulgation of Part 63. Also known as the MACT standards, Part 63 regulates HAP emissions from major sources of HAPs and specific source categories that emit HAPs. Part 63 considers any source with the potential to emit 10 tpy of any single HAP or 25 tpy of HAPs in aggregate as a major source of HAPs. None of the Keystone Project facilities would have the potential to emit HAP emissions greater than 10 tpy for a single HAP, nor would they have the potential to emit 25 tpy of multiple HAPs. Thus, the proposed Keystone Project facilities would not be considered a major source of HAP emissions and would not be subject to NESHAPs.

Chemical Accident Prevention Provisions

The chemical accident prevention provisions, codified in 40 CFR Part 68, are federal regulations designed to prevent the release of hazardous materials in the event of an accident and to minimize potential impacts if a release did occur. The regulations contain a list of substances and threshold quantities for determining applicability to stationary sources. If a stationary source stores, handles, or processes one or more substances on this list in a quantity equal to or greater than specified in the regulation, the facility must prepare and submit a Risk Management Plan. If a facility does not have a listed substance onsite, or if the quantity of a listed substance is below the applicability threshold, the facility does not need to prepare a Risk Management Plan. No hazardous materials subject to the Chemical Accident Prevention Provision/ Risk Management Plan (40 CFR Part 68) would be stored at any of the Keystone Project aboveground facilities (TransCanada 2007c).

Title V Operating Permits

Title V of the federal CAA requires individual states to establish an air operating permit program. The requirements of Title V are outlined in 40 CFR Parts 70 and 71, and the permits required by these regulations are often referred to as Part 70 or 71 permits. Because the proposed Keystone Project would not include operation of significant stationary sources of air pollutants, the Keystone Project would not trigger Title V permitting.

It is possible that, by triggering proposed 40 CFR 60 Subpart JJJJ for stationary spark ignition internal combustion engines, Title V permitting may be required. Although the proposed rule states that owners or operators of an area source subject to this proposed rule would be exempt from the obligation to obtain a permit under 40 CFR parts 70 or 71 (provided they are not subject to 40 CFR 70.3[a] or 40 CFR 71.3[a]), some state regulations may be more stringent. Keystone would be an area source and would

meet the federal exemption, but will need to consult with state permitting agencies to ensure that they follow the federal rule and Title V permitting would not be required.

General Conformity Rule

The General Conformity Rule was designed to require federal agencies to ensure that proposed projects conform to the applicable State Implementation Plan (SIP). General Conformity regulations apply to project-wide emissions of pollutants for which the project areas are designated as nonattainment (or, for ozone, its precursors NO_x and VOC) that are not subject to NSR and that are greater than the significance thresholds. Federal agencies are able to make a positive conformity determination for a proposed project if any of several criteria in the General Conformity Rule are met. These criteria include:

- Emissions from the project are specifically identified and accounted for in the SIP attainment or maintenance demonstration; or
- Emissions from the action are fully offset within the same area through a revision to the SIP, or a similarly enforceable measure that creates emissions reductions so that there is no net increase in emissions of that pollutant.

A General Conformity analysis is required for pollutant emissions that would occur in nonattainment areas not subject to NSR. For the Keystone Project, Madison County, Illinois and St. Charles, Missouri are both designated as nonattainment for the 8-hour federal ozone (precursors are NO_x and VOC) and PM_{2.5} standards. Therefore, emissions of NO_x, VOCs, and PM_{2.5} from project-related sources would be considered under the General Conformity Rule. The required evaluation of the proposed Keystone Project under General Conformity includes an applicability analysis via a comparison of potential emissions to applicability threshold levels, as well as a conformity determination if the emissions are greater than applicability threshold levels. Each federal agency is required to make a Conformity Determination before the action is taken. For more details on Keystone's General Conformity analysis, see Section 3.12.1.3.

3.12.1.3 Potential Impacts and Mitigation

Two types of impacts on air quality were considered for this analysis: temporary impacts resulting from emissions associated with construction activities and long-term or permanent impacts resulting from emissions generated from continued operation of a stationary source.

Construction Impacts

Air quality impacts associated with construction of the proposed Keystone Project would include emissions from fugitive dust, fossil-fueled construction equipment, open burning, and temporary fuel transfer systems and associated storage tanks.

Fugitive Dust

Fugitive dust is a source of respirable airborne particulate matter, including PM₁₀ and PM_{2.5}. Fugitive dust results from land clearing, grading, excavation, concrete work, blasting and dynamiting, and vehicle traffic on paved and unpaved roads. The amount of dust generated is a function of construction activities, silt, moisture content of the soil, wind speed, frequency of precipitation, vehicle traffic, vehicle types, and roadway characteristics. Emissions would be greater during drier summer and autumn months, and in fine-textured soils.

Emissions of particulate matter arising from fugitive dust are regulated by state and local agencies. Typically, the regulations require measures to prevent fugitive dust from becoming airborne and leaving the property boundary, such as application of dust suppressants. Specific requirements also can include development and approval of a fugitive dust control plan. The Keystone Project, including the Cushing Extension, would affect approximately 21,221 acres of land in seven states during the construction phase. The majority of pipeline construction activity would pass by a specific location within a 30-day period (completing approximately 14 to 22 miles per month), thereby resulting in short-term and temporary impacts at any one location during construction.

- As described in its CMR Plan (Appendix B), Keystone would implement proven dust-minimization practices to control fugitive dust emissions during construction, such as applying water sprays and surfactant chemicals, and stabilizing disturbed areas. Additional dust control measures may be required by state or local ordinances. Keystone would comply with all applicable state and local regulations with respect to truck transportation and fugitive dust emissions.

Fossil-Fueled Construction Equipment

Large earth-moving equipment, skip loaders, trucks, and other mobile sources may be powered by diesel or gasoline and are sources of combustion emissions, including NO_x, CO, VOCs, SO₂, PM₁₀, PM_{2.5}, and small amounts of HAPs. Gasoline and diesel engines must comply with the EPA mobile source regulations in 40 CFR Part 86 for on-road engines and 40 CFR Part 89 for non-road engines; these regulations are designed to minimize emissions. Furthermore, to implement the CAA, EPA has established rules to require that sulfur content in on-road and off-road diesel fuel be significantly reduced. On June 1, 2006, 80 percent of diesel fuel for on-road use produced by U.S. refineries was required to be reduced from 500 to 15 ppm sulfur. Additionally, on June 1, 2007 diesel fuel for non-road engines must be reduced from 5,000 to 500 ppm sulfur. On June 1, 2010 EPA will require that all on and off-road (non-road) diesel fuel meets a limit of 15 ppm sulfur.

Keystone proposes to use the construction equipment listed in Table 3.12.1-4 in a typical construction spread. Construction of the pipeline would proceed as shown in Figure 2.2-1. Keystone would construct the pipeline in 11 construction spreads or completed lengths, with eight spreads along the Mainline Project and three spreads along the Cushing Extension (Section 2.2.4). Construction would occur simultaneously on Spreads 1 and 2 in 2008 and on Spreads 3, 4, 5, 6, 7, and 8 in 2009. Each spread would require 6 months to complete.

Keystone would maintain all fossil-fueled construction equipment in accordance with manufacturer's recommendations to minimize construction-related emissions.

Open Burning

Open burning of land clearing materials from construction activities has the potential to affect air quality. All of the states along the route of the proposed Keystone Project regulate open burning through local permitting, approval, and notification processes. Keystone would obtain all necessary open burning permits, approvals, and notifications prior to conducting any open burning of land clearing materials. Keystone would follow all open burning regulations during such activities, including restrictions on burn location, material, and time, as well as consideration of local air quality.

TABLE 3.12.1-4 Construction Equipment per Spread for the Keystone Project	
Description of Equipment	Units per Spread
On-Road Equipment	
Automobiles	2
Bus	15
Pickup 4x4	235
Welding rig	85
Winch truck	2
Dump truck	2
Flatbed truck (one ton)	10
Fuel truck	2
Grease truck	2
Mechanic rig	10
Skid truck	2
Stringing truck and trailer	10
Lowboy (rig)	4
Off-Road Equipment	
Welding tractor D6	2
Angle dozer D6	4
Angle dozer D7	14
Angle dozer D8	8
Angle dozer LGP D6	4
Angle dozer LGP D7	2
Angle dozer with ripper D8	4
Backhoe 330	31
Backhoe 345	4
Backhoe rubber-tired	4
Bending machine 22-36	2
Crane LS-318 (60 ton)	4
Crane LS-98A (35 ton)	2
Farm tractor	6
Fork lift 980	2
Front-end loader 977	4
Motor grader 14G	3
Motor grader 16	1
Sideboom 571	6
Sideboom 572	24
Sideboom 583	16
Air compressor (1,750 cubic feet per minute)	2
Pressure pump	2
Water pump (4 inch)	4
Water pump (6 inch)	4
Fill pump	2

Source: TransCanada 2007b.

Temporary Fuel Transfer Systems and Associated Storage Tanks

Temporary fuel transfer systems and tanks have the potential to release VOC emissions. However, because Keystone would be storing mainly diesel fuel with a low vapor pressure, releases of VOCs would be minimal.

Connected Actions

Power Lines and Substations. Measures listed below would be implemented by servicing electric cooperatives or their contractors in the modification or construction of electric transmission lines:

- Western or its contractor would utilize such practicable methods and devices as are reasonably available to control, prevent, and otherwise minimize atmospheric emissions or discharges of air contaminants. Dust control watering of access roads and work areas would occur during the project when air quality is compromised by construction activities. Disturbed areas would be scarified to facilitate natural revegetation, provide for proper drainage, and prevent erosion.
- Equipment and vehicles that show excessive emissions of exhaust gases due to poor engine adjustments, or other inefficient operating conditions, would not be operated until repairs or adjustments are made.

Conclusion

Because pipeline construction moves through an area relatively quickly, air emissions typically would be localized, intermittent, and short term. Emissions from fugitive dust, construction equipment combustion, open burning, and temporary fuel transfer systems and associated tanks would be controlled to the extent required by state and local agencies as explained above. If Keystone complies with applicable regulations, the Keystone Project emissions from construction-related activities would not significantly affect local or regional air quality.

Operations Impacts

Keystone proposes that all pipeline pumps would be electrical, with a UPS serving as backup. A 5-kW gasoline generator and 200-gallon gasoline storage tank would serve as extended backup to each UPS for essential services. Consequently, there would be no long-term emissions from the proposed Keystone Project operations, except for very minimal emissions from the backup gasoline generator³ and small fugitive emissions from valves, tanks, and pumping equipment. Because operating emissions are minimal, no operational permits would be required. As a result, the Keystone Project would not cause or contribute to a violation of any federal, state, or local air quality standards.

Connected Actions

Wood River Refinery Expansion. ConocoPhillips operates the Wood River Refinery and Wood River Products Terminal located in Madison County, Illinois. The refinery underwent air quality permitting to authorize various changes. The refinery proposed to increase both the total crude processing and the percentage of heavier crude at the refinery because of the growing volumes of Canadian heavy crude (e.g., the Keystone Pipeline Project). The permitting accounts for the emissions increases related to the Wood River Products Terminal. The Illinois EPA considered the refinery project and changes to the terminal as a single project for the purpose of permitting and applicability to federal and state regulations. On July 19, 2007, the Illinois EPA issued the requisite permit to ConocoPhillips. Thereafter, a challenge to that permit was filed with the United States EPA's Environmental Appeals Board, where the matter remains pending. If the Appeals Board denies review of the Illinois EPA permit, litigation is possible.

³ Each 5-kW gasoline backup generator would result in emissions of less than 10 tpy cumulative for all regulated pollutants, assuming full load operations (operations are not expected to be full load).

Alternatively, if it grants review and agrees in part or in whole with the petitioners, the terms and conditions of the present permit may need to be altered.

The proposed project triggers the PSD and NSR permitting requirements due to potential CO and VOC emissions increases. There are net emission decreases of NO_x, SO₂, and particulate matter (PM₁₀ particulates and PM_{2.5} particulates) after accounting for credible contemporaneous emission increases and decreases. The new and modified units that would contribute to the increase in CO emissions would undergo a Best Available Control Technology (BACT) analysis as part of PSD. The new and modified units that will contribute to the increase in VOC emissions would undergo a Lowest Achievable Emission Rate (LAER) analysis as part of NSR because the area is nonattainment for 8-hour ozone (precursor compounds are NO_x and VOCs).

The emissions associated with a major project in a nonattainment area must not interfere with the state plan to achieve attainment of the NAAQS. To account for the emissions increase from a major project proposed in a nonattainment area, the applicant must provide compensating emission reductions from other sources that have not been relied on in the attainment plan. These emission reductions commonly are referred to as emission offsets. ConocoPhillips must obtain creditable emission decreases or offsets from the existing sources in the St. Louis/Metro-East ozone nonattainment area. Because this area is a moderate nonattainment area, emission offsets must be provided at a ratio of 1.15:1.0 (i.e., for each ton of VOC emissions from the project, 1.15 ton of offsets must be provided). At this ratio, ConocoPhillips is required to provide VOC emission offsets of 440.1 tpy to account for the project net emission increase of 407.0 tpy. Acquisition of the emission offsets is required to be completed 90 days after issuance of the permit or prior to commencement of construction, whichever occurs later. Because of these mandatory emission offset requirements, the proposed improvements to the ConocoPhillips facility are not expected to result in adverse air quality impacts.

Nevertheless, the pending challenge to the Illinois EPA-issued permit takes issue with the failure of the state agency to impose limits on greenhouse gases emitted by the facility as part of the BACT analysis. The United States EPA has stated that, for the present, the BACT process is not an appropriate vehicle for addressing climate change concerns. In the context of permitting a new coal-fired power plant in Utah, EPA stated that addressing these concerns in the context of local permitting was not appropriate. This issue, too, is now pending before the agency's Environmental Appeals Board.

General Conformity

Section 176(c) of the CAA prohibits federal actions in nonattainment or PSD maintenance areas that do not conform to the SIP for the attainment and maintenance of NAAQS. Therefore, the purpose of the General Conformity determination is to ensure: (1) that federal activities do not interfere with the budgets in the SIPs; (2) that actions do not cause or contribute to new violations; and (3) attainment and maintenance of the NAAQS. Conformity can be demonstrated by showing: (1) that emission increases are allowed in the SIP; (2) that the state agrees to include emission increases in the SIP; (3) that no new violations of NAAQS, or that no increase in the frequency or severity of violations would occur; (4) offsets; and (5) mitigation. Some actions that are excluded from the General Conformity determination include those already subject to NSR and those covered by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or other environmental laws.

The Keystone Project proposes to cross two regions that are designated as nonattainment for the federal ozone and PM_{2.5} standards. Therefore, emissions of PM_{2.5} and ozone precursor compounds (NO_x and VOCs) would be evaluated against the General Conformity applicability threshold levels. All Keystone Project emissions of PM_{2.5}, NO_x, and VOCs emitted during construction and operation would be evaluated because no emissions would be covered under air permit programs. In addition, those

emissions from construction (i.e., mobile sources) of the Wood River Refinery and Wood River Products Terminal upgrades also would need to be evaluated because they are not included in the NSR permitting.

Written approval of conformance with the SIP would not be necessary for the Keystone Project because estimated emissions are below the General Conformity applicability threshold levels. See Table 3.12.1-5 for estimated emissions.

3.12.2 Noise

3.12.2.1 Environmental Setting

The ambient sound level of a region is defined by the total noise generated within the specific environment and is usually comprised of sound emanating from natural and artificial sources. At any location, both the magnitude and frequency of environmental noise may vary considerably over the course of the day and throughout the week. This variation is caused in part by changing weather conditions and the effects of seasonal vegetative cover.

The proposed Keystone Project would be constructed in primarily rural agricultural areas of North Dakota, South Dakota, Nebraska, Kansas, Missouri, Illinois, and Oklahoma. It is estimated that the existing ambient noise level in the Keystone Project area is approximately 35 dBA. This is an assumed noise level. Areas similar to the Keystone sites have background noise levels in the 35-dBA range. Field studies would be conducted prior to construction to confirm the background noise levels (TransCanada 2007c).

Noise Receptors near the Pipeline ROW

Approximately 593 residences (465 for the Mainline Project and 128 for the Cushing Extension) and three commercial/public assembly places (three for the Mainline Project and 0 for the Cushing Extension) are within 500 feet of the proposed pipeline centerline (ENSR 2006a; TransCanada 2007d, Table 3.8-3). See additional discussion of buildings close to the ROW in Sections 3.9.3.5 and 3.9.4.5.

In addition, recreational and special interest areas would be crossed by the proposed route (ENSR 2006a; TransCanada 2007d, Table 3.8-4). Section 3.9.3 and Table 3.9.3-7 provide information on recreational and special interests lands intersected by the Mainline Project, the majority of which are privately owned. Section 3.9.4.7 and Table 3.9.4-7 provide information on the recreational and special interest land intersected by the Cushing Extension.

Sixty-seven USFWS wetland easements in North Dakota and South Dakota would be crossed by the Mainline Project (see Table 3.9.3-8). As described in Section 3.9.4.7, the proposed Cushing Extension facilities would not cross any wetland easements. No other national, state, or local parks or forests are within 500 feet of the proposed centerline, including wilderness or wilderness study areas.

**TABLE 3.12.1-5
Estimated Emissions from Activities in Nonattainment
Areas for the Keystone Project**

Emission Source	PM_{2.5} (tpy)	NO_x (tpy)	VOC (tpy)
Annual general conformity applicability threshold levels	100	100	50
St. Charles County, Missouri			
Construction emissions			
On-road equipment	<0.1	<0.1	<0.1
Off-road equipment	0.8	18.3	6.1
Open burning ^a	0	0	0
Fugitive dust	<0.1	0	0
Fugitive VOC	0	0	<1.0
Total construction emissions	<1.0	<18.4	<7.2
Below thresholds?	Yes	Yes	Yes
Operating emissions			
Pump station (PS-36)	<0.1	<0.2	<0.3
Total operating emissions	<0.1	<0.2	<0.3
Below thresholds?	Yes	Yes	Yes
Madison County, Illinois			
Construction emissions			
On-road equipment	<0.1	<0.1	<0.1
Off-road equipment	0.8	12.0	4.1
Open burning ^b	0	0	0
Fugitive dust	<0.1	0	0
Fugitive VOC	0	0	<1
Wood river refinery/terminal upgrade	3.0	31.0	2.0
Total construction emissions	<4.0	<43.1	<7.2
Below thresholds?	Yes	Yes	Yes
Operating emissions			
Pump station (PS-37)	<0.1	<0.2	<0.3
Total operating emissions	<0.1	<0.2	<0.3
Below thresholds?	Yes	Yes	Yes

Notes:

PM_{2.5} = Particulate matter less than 2.5 microns in diameter.

NA = Not available at the time of publication of the draft EIS.

NO_x = Oxides of nitrogen.

VOC = Volatile organic compounds.

tpy = Tons per year.

^a Open burning is not permitted during summer months in St. Charles County, Missouri. In the remaining months, a permit may be required for the type and volume of open burning planned.

^b Open burning is not permitted in Madison County, Illinois.

Source: TransCanada 2007c. J. White email dated Dec 13, 2007

Noise Receptors near Pump Stations

Table 3.12.2-1 summarizes the nearest noise-sensitive areas (NSAs) and the number of residences/structures within 1 mile and 0.5 mile of each proposed pump station. The proximity of the nearest NSAs ranges from 280 feet at pump station (PS-) 29 to 5,180 feet at PS-27. However, less than 200 residences are within 0.5 mile of all pumpstations for both the Mainline Project and Cushing Extension combined.

3.12.2.2 Regulatory Requirements

Two measurements used by federal agencies to relate the time-varying quality of environmental noise to its known effect on people are the 24-hour equivalent sound level (Leq(24)) and the day-night sound level (Ldn). The Leq(24) is the level of steady sound with the same total (equivalent) energy as the time-varying sound of interest, averaged over a 24-hour period. The Ldn is the Leq(24) with 10 decibels on the A-weighted decibel scale (dBA) added to nighttime sound levels between the hours of 10 p.m. and 7 a.m. to account for people's greater sensitivity to sound during nighttime hours.

In 1974, EPA published "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety." This document provides information for state and local agencies to use in developing their ambient noise standards. EPA identified outdoor and indoor noise levels to protect public health and welfare. An Leq(24) of 70 dB was identified as the level of environmental noise that would prevent any measurable hearing loss over a lifetime. An Ldn of 55 dBA outdoors and an Ldn of 45 dBA indoors were identified as noise thresholds that would prevent activity interference or annoyance. These levels are not "peak" levels but are 24-hour averages over several years. Occasional high levels of noise may occur. An Ldn of 55 dBA is equivalent to a continuous noise level of 48.6 dBA. Typical noise levels are as follows:

- Quiet room: 28–33 dBA
- Refrigerator: 40–43 dBA
- Computer: 47–35 dBA
- Forced hot air heating system: 42–52 dBA
- Microwave: 55–59 dBA
- Clothes dryer: 56–58 dBA

With regard to increases in decibels measured on the A-weighted noise level scale, the following relationships occur:

- A change of 1 dBA cannot be perceived by humans, except in carefully controlled laboratory environments;
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference by humans;

**TABLE 3.12.2-1
Structures within 1 Mile of Pump Stations for the Keystone Project**

State/ County	Pump Station	Milepost of Pump Station	Distance to Nearest Noise- Sensitive Area (feet)	Direction from Pump Station	Number of Structures within 1 Mile of Pump Station ^a	Number of Residences within 1 Mile of Pump Station	Number of Residences within 0.5 Mile of Pump Station
MAINLINE PROJECT							
North Dakota							
Walsh	PS-15	34.3	2,800	NW	23	4	0
Nelson	PS-16	76.0	4,350	S-SE	3	1	0
Steele	PS-17	123.6	4,600	S-SE	6	1	0
Ransom	PS-18	171.0	2,400	S-SW	13	1	1
Sargent	PS-19	216.6	400	E	4	1	1
South Dakota							
Day	PS-20	263.2	--	--	2	0	0
Beadle	PS-21	310.2	3,300	NE	57	16	0
Miner	PS-22	358.8	--	--	0	0	0
Hutchinson	PS-23	406.6	2,300	N-NE	54	7	1
Nebraska							
Cedar	PS-24	454.6	1,550	E	67	9	4
Stanton	PS-25	505.5	800	N-NW	38	5	3
Butler	PS-26	552.9	375	NW	75	10	2
Saline	PS-27	604.3	5,180	N-NW	23	2	0
Jefferson	PS-28	639.7	2,950	N	28	5	0
Kansas							
Nemaha	PS-29	691.6	280	NW	68	11	4
Doniphan	PS-30	741.8	1,750	NW	80	18	8
Missouri							
Clinton	PS-31	786.6	320	S	66	21	5
Carroll	PS-32	832.0	1,650	SE	43	9	2
Chariton	PS-33	867.6	850	NW	69	11	4
Audrain	PS-34	902.0	2,855	SE	26	7	0
Montgomery	PS-35	947.7	1,350	S-SE	59	20	1
St. Charles	PS-36	982.2	1,350	NE	92	39	10
Illinois							
Madison	PS-37	1026.8	1,950	E-NE	1,600 ^b	1,600 ^b	136
Fayette	PS-38	1053.6	620	S	59	18	5
CUSHING EXTENSION							
Kansas							
Dickinson	C-30	CE 94.4	3,775	SW	26	6	0
Cowley	C-32	CE186.6	2,910	N-NW	2	1	0
Oklahoma							
Kay	C-33	CE 240.9	1,300	E	39	14	6

Notes:

^a Indeterminate if structures are occupied or just sheds/storage/barns.

^b Residential subdivisions with numerous structures. Number of structures calculated using a structure density of five per acre.

Source: TransCanada 2007d.

- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness and can cause an adverse response.

None of the states that would be traversed by the proposed Keystone Project have a different regulatory noise limit (except Illinois, which has limits dependent on the land class and noise frequency as set out by Title 35 Subtitle H Chapter I of the Illinois Administrative Code), although many have local ordinances governing noise from construction or industrial activities.

3.12.2.3 Potential Impacts and Mitigation

Noise impacts for a pipeline project generally fall into two categories: temporary impacts resulting from operation of construction equipment, and long-term or permanent impacts resulting from operation of the facility.

Construction Impacts

Construction of the proposed Keystone Project would be similar to other pipeline projects in terms of schedule, equipment used, and types of activities. Construction would increase noise levels in the vicinity of project activities, and the noise levels would vary during the construction period, depending on the construction phase.

Pipeline construction generally proceeds at rates ranging from several hundred feet to 1 mile per day. However, due to the assembly-line method of construction, pipeline construction activities in any one area could last from 1 week to 30 days. Construction of aboveground facilities would take approximately 18 months to complete. Because the construction moves through an area relatively quickly, noise impacts typically would be localized, intermittent, and short term.

Residential, agricultural, and commercial areas within 500 feet of the Mainline Project and the Cushing Extension ROW would experience short-term inconvenience from the construction equipment noise. Although individuals and livestock in the immediate vicinity of the construction activities may be temporarily disturbed, the impact on the noise environment at any specific location along the proposed pipeline route would be short term. Similarly, noise associated with construction of the proposed aboveground facilities would be intermittent during the construction period, but the overall impact would be temporary and is not expected to be significant. Further, nighttime noise levels would normally be unaffected because most construction activities would be limited to daylight hours.

Noise impacts from construction would be mitigated in accordance with Keystone's CMR Plan (Appendix B) to minimize effects on individuals, sensitive areas, and livestock. During permitting activities for the project, Keystone would determine whether state, county or local noise regulations exist for a given location. If local noise regulations exist, Keystone would develop site-specific noise mitigation plans to comply with any specific regulations and would seek any applicable authorizations or variances. Noise mitigation plans would be provided to the construction contractors for implementation and would be enforced by construction inspectors using portable sound meters. Because preliminary research has not identified any applicable state or county noise ordinances along the pipeline route,

Keystone is not proposing any construction noise assessments or surveys at this time (TransCanada 2007c).

To ensure that residential and commercial areas within 500 feet of construction activities are not affected by noise levels, Keystone would give advanced notice to landowners prior to construction, limit the hours during which construction activities with high-decibel noise levels are conducted, coordinate work schedules, and ensure that construction proceeds quickly through such areas. In the event that the contractor expects noise levels to exceed regulated noise standards—based on the types of construction equipment used or construction procedures, notice would be given to Keystone so that immediate noise attenuation could be achieved. To further reduce noise impacts to residential and commercial areas Keystone will set up a toll-free telephone line for landowners to report any construction noise-related issues. It is understood that during occasional, short-term intervals, noise levels will exceed 55dBA. There are no regulations in rural areas along the pipeline route applicable to construction noise. In municipal areas, pipeline construction noise levels will comply with any applicable municipal regulations. In areas near residences and businesses where construction activities or noise levels may be considered disruptive, Keystone would coordinate work schedules to minimize disruption.

Operations Impacts

Noise impacts from operation of the pipeline would be from the pump stations. Material traveling through the buried pipeline would not emit audible noise above the surface or a perceptible level of vibration.

Concern has been expressed during both scoping and within comments on the DEIS relative to the potential for noise generation by proposed pump stations, particularly given the generally rural nature of the area within which the pump stations would be constructed and operated. During operation of the pipeline, the noise associated with the electrically driven pump stations would be limited to the vicinity of the facilities. Keystone prepared a preliminary noise assessment survey for a typical pump station, as illustrated in Table 3.12.2-2. The assessment assumed wind speeds of 8 miles per hour, a temperature of 75 °F, and three pumps operating at 3,000 kW cumulative.

Distance (feet)	Sound Level (dBA)
Background	35
300	55
700	49
1,000	46
1,300	43
1,600	42
2,000	41
2,300	40
2,600	39
3,000	38
3,300	38
3,600	38
3,900	37
4,200	37
4,600	37
5,000	37

Source: TransCanada 2007b.

Table 3.12.2-2 shows that sound levels would attenuate nearly to existing ambient noise levels (35 dBA) within 4,000 feet of the facility and would be considered minor. Although noise impacts from the electrically powered pump stations are projected to be minor, Keystone would perform a noise assessment survey during operations to confirm the level of noise at each listed noise-sensitive area. A Type I integrating sound level meter would be used to determine the sound levels near the proposed pump stations. The device can determine peak and average sound levels over specified time intervals and at various distances from the nearest noise sources to the nearest sensitive receptors (TransCanada 2007c).

If the noise attributable to operation of any pump station exceeds 55 dBA Ldn at any noise-sensitive area, Keystone would implement noise mitigation measures to ensure that regulation levels are not exceeded, as specified in its CMR Plan (Appendix B). Mitigation measures can include construction of berms around the facilities or planting vegetation screens. As such, Keystone would minimize noise impacts to ensure that project-related operations would not result in a significant effect on the noise environment.

3.12.3 References

EPA. See U.S. Environmental Protection Agency.

TransCanada. See TransCanada Keystone Pipeline, L.P.

TransCanada Keystone Pipeline, L.P. 2007b. Response to Data Request #1. Submitted to U.S. Department of State by TransCanada Keystone Pipeline, L.P. Application for Presidential Permit. January 29.

TransCanada Keystone Pipeline, L.P. 2007c. Response to Data Request #2. Submitted to U.S. Department of State by TransCanada Keystone Pipeline, L.P. Application for Presidential Permit. April 4.

TransCanada Keystone Pipeline, L.P. 2007d. Supplemental Filing #9. Submitted to U.S. Department of State by TransCanada Keystone Pipeline, L.P. Application for Presidential Permit. September 10.

U.S. Environmental Protection Agency. 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. (USEPA 550/9-74-004.) March.

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