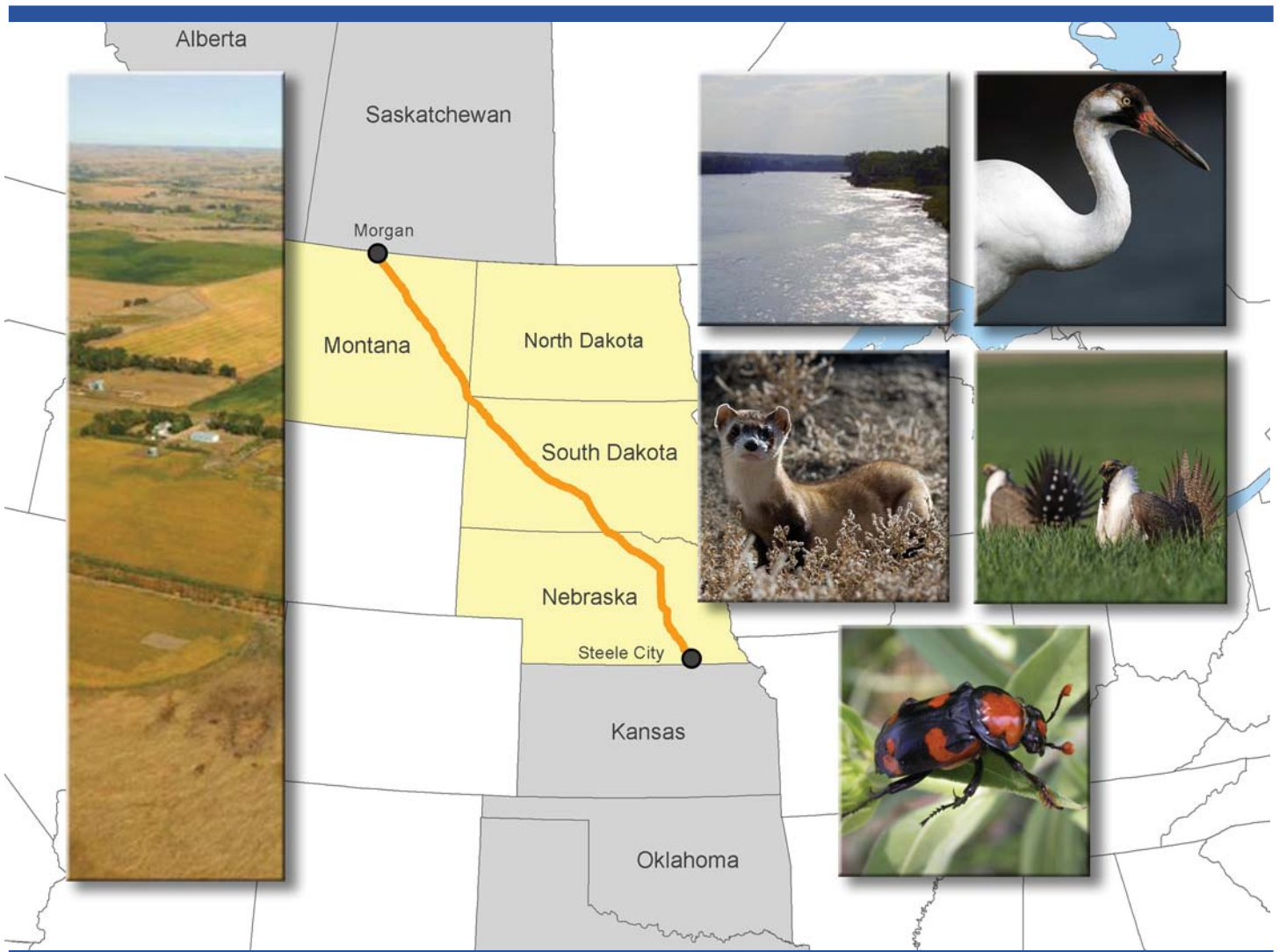




United States Department of State
Bureau of Oceans and International
Environmental and Scientific Affairs

Final Supplemental Environmental Impact Statement for the **Keystone XL Project** Volume IV - Chapters 5, 6, 7, and 8 January 2014

Applicant for Presidential Permit: TransCanada Keystone Pipeline, LP



Front cover photo sources in order of appearance top to bottom:

Whooping crane

Hagerty, Ryan. 2012. *Endangered Whooping Crane (Grus Americana)*. Photograph. U.S. Fish and Wildlife Service. 23 February 2012. Website: <http://www.flickr.com/photos/usfwshq/6777481034/>.

Black-footed ferret

U.S. Fish & Wildlife Service. 2012. *Black-footed ferret*. Photograph. USFWS Headquarters. 3 July 2012. Website: <http://www.flickr.com/photos/usfwshq/7013874797/in/photolist-9Z7MXd-bFMWBP-bsoAvk-9DoXKC-bZh2uu/>.

Sage grouse

Rush, Kenneth. No date. *Male Greater Sage Grouse Strutting at Hat Six Lek near Casper, Wyoming*. Photograph. Shutterstock, Image ID: 52631191. Website: <http://www.shutterstock.com/pic-52631191/stock-photo-male-greater-sage-grouse-strutting-at-hat-six-lek-near-casper-wyoming.html>.

American burying beetle

Backlund, Doug. No date. *Untitled [American Burying Beetle]*. Photograph. U.S Fish & Wildlife Service – South Dakota Field Office. Website: <http://www.fws.gov/southdakotafieldoffice/BEETLE.HTM>.

United States Department of State Final Supplemental Environmental Impact Statement

For the
KEYSTONE XL PROJECT

Applicant for Presidential Permit:
TransCanada Keystone Pipeline, LP

Volume IV



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Cooperating Agencies

U.S. Army Corps of Engineers (USACE)
U.S. Department of Agriculture—Farm Service Agency (FSA)
U.S. Department of Agriculture—Natural Resource Conservation Service (NRCS)
U.S. Department of Agriculture—Rural Utilities Service (RUS)
U.S. Department of Energy (DOE)
U.S. Department of Interior—Bureau of Land Management (BLM)
U.S. Department of Interior—National Park Service (NPS)
U.S. Department of Interior—U.S. Fish and Wildlife Service (USFWS)
U.S. Department of Transportation—Pipeline and Hazardous Materials Safety Administration,
Office of Pipeline Safety (PHMSA)
U.S. Environmental Protection Agency (USEPA)

Assisting Agencies

U.S. Department of the Interior, Bureau of Reclamation (BOR)
Nebraska Department of Environmental Quality (NDEQ)
Various State and Local Agencies in Montana, South Dakota, Nebraska, and Kansas

January 2014

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- 2.0 Description of the Proposed Project and Alternatives

Volume II

- 3.0 Affected Environment

Volume III

- 4.0 Environmental Consequences

Volume IV

- 5.0 Alternatives
- 6.0 List of Preparers
- 7.0 Distribution List—Final Supplemental EIS or Executive Summary
- 8.0 Index

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Comments and Responses (Part 1)

Volume VI

Comments and Responses (Part 2)

Volume VII

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- Appendix B Potential Releases and Pipeline Safety
- Appendix C Supplemental Information to Market Analysis
- Appendix D Waterbody Crossing Tables and Required Crossing Criteria for Reclamation Facilities
- Appendix E Amended Programmatic Agreement and Record of Consultation
- Appendix F Scoping Summary Report
- Appendix G Construction, Mitigation, and Reclamation Plan

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Volume IX

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- Appendix J Basin Electric Big Bend to Witten 230-kV Transmission Project Routing Report
- Appendix K Historical Pipeline Incident Analysis
- Appendix L Oil and Gas Wells within 1,320 ft of Proposed Right-of-Way
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Volume XI

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- Appendix S Pipeline Temperature Effects Study
- Appendix T Screening Level Oil Spill Modeling
- Appendix U Lifecycle Greenhouse Gas Emissions of Petroleum Products from WCSB Oil Sands Crudes Compared with Reference Crudes
- Appendix V Literature Review
- Appendix W Past, Present, and Reasonably Foreseeable Future Project Descriptions
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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius	ARPA	Archeological Resources Protection Act of 1979
°F	degrees Fahrenheit	ASME	American Society of Mechanical Engineers
%HA	percent highly annoyed	ASRWSS	Assiniboine and Sioux Rural Water Supply System
µg/m ³	microgram(s) per cubic meter	ATWS	additional temporary work space
/m	per meter	AUB	Alberta Utilities Commission
AA	alluvial aquifer	AWBP	Aransas-Wood Buffalo National Park
AAQS	Ambient Air Quality Standards	BA	Biological Assessment
AAR	American Association of Railroads	bbl	barrel
ABMI	Alberta Biodiversity Monitoring Institute	bcf	billion cubic feet
AC	alternating current	bcf/d	billion cubic feet/day
ACHP	Advisory Council on Historic Preservation	BEA	U.S. Bureau of Economic Analysis
ACS	American Community Survey	BEPC	Basin Electric Power Cooperative
ACVG	alternating current voltage gradient	BG	block group
AEO	Annual Energy Outlook	BGEPA	Bald and Golden Eagle Protection Act
AERI	Alberta Energy Research Institute	bgs	below ground surface
AEUB	Alberta Energy and Utilities Board	BIA	Bureau of Indian Affairs
AG	agriculture	BLM	Bureau of Land Management
AIRFA	American Indian Religious Freedom Act of 1978	BMP	best management practice
AITF	Alberta Innovates Technology Futures	BNSF	BNSF Railway Company
Al-Pac FMA	Alberta-Pacific Forest Industries Forest Management Area	boe	barrel(s) of oil equivalent
amsl	above mean sea level	BOR	U.S. Bureau of Reclamation
ANSI	American National Standards Institute	bpd	barrels per day
AOC	abnormal operating conditions	bpsd	barrels per stream day
AOPL	Association of Oil Pipelines	BS&W	basic sediment and water
APE	area of potential effects	BTEX	benzene, toluene, ethylbenzene, and xylene
API	American Petroleum Institute	BTL	biomass-to-liquids
APLIC	Avian Power Line Interaction Committee	Btu	British thermal unit
AQCR	Air Quality Control Regions	C2ES	Center for Climate and Energy Solutions
AqL	aquatic life	CAA	Clean Air Act
ARM	Administrative Rules Montana	CAAA	Clean Air Act Amendments
		CAFE	Corporate Average Fuel Economy

CAFO	concentrated animal feeding operation	CIF	cost, insurance, and freight
CALI	California National Historic Trail	CIS	close-interval survey
CAPEX	capital expenditure	CL	centerline
CAPP	Canadian Association of Petroleum Producers	CL ROW	centerline of the right-of-way
CARB	OPGEE California Air Resource Board Oil Production Greenhouse Gas Emissions Estimator	cm	centimeter(s)
CBOB	conventional blendstock for gasoline blending	CMIP	Coupled Model Intercomparison Project
CCAC	Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants	CMRP	Construction, Mitigation, and Reclamation Plan
CCPS	Center for Chemical Process Safety	CMZ	channel migration zone
CCS	carbon capture and storage	CN	Canadian National
CCSP	U.S. Climate Change Science Program	CNG	compressed natural gas
CDC	Centers for Disease Control and Prevention	CNRL	Canadian Natural Resources Limited
CDU	crude distillation units	CNW	Commercially Navigable Waterway
CE	carbon equivalents	CO	carbon monoxide
CEA	cumulative effects assessment	CO ₂	carbon dioxide
CEAA	Canadian Environmental Assessment Act	CO ₂ e	carbon dioxide equivalent
CEC	Commission for Environmental Cooperation	co-ops	cooperatives
CEMA	Cumulative Environmental Management Association	cP	centipoises
CEQ	Council on Environmental Quality	CP	cathodic protection
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	CPI	Consumer Price Index
CERI	Canadian Energy Research Institute	CPRS	Canadian Pacific Railway System
cfm	cubic feet per minute	CPS	contributory pipeline segment
CFR	Code of Federal Regulations	CRM	Control Room Management Rule
CH ₄	methane	CRP	Conservation Reserve Program
CHAAP	Cornhusker Army Ammunition Plant	CRW	letter code for Condensate Blend
CI	carbon intensity	CSA	Canadian Standards Association
CIA	Central Intelligence Agency	CSOR	cumulative steam-oil ratio
CIBC	Canadian Imperial Bank of Commerce	CSS	cyclic steam stimulation
		CT	census tract
		CLT	carbon to liquids
		CVA	Central Valley Agriculture
		CWA	Clean Water Act
		CY	contractor yard
		dBA	decibels on the A-weighted scale
		DC	direct current
		DCVG	direct current voltage gradient
		Department	U.S. Department of State
		dilbit	diluted bitumen

DME	Dakota, Minnesota, & Eastern Railroad	Final EIS	Final Environmental Impact Statement
DNAPL	dense non-aqueous phase liquid	FIRM	flood insurance rate map
DNRC	Department of Natural Resources and Conservation	FOB	free-on-board
DO	dissolved oxygen	FOIA	Freedom of Information Act
DOI	U.S. Department of the Interior	FPR	failure pressure ration
DOH	Department of Health	FR	Federal Register
DPHHS	Department of Public Health and Human Services	FRP	Facility Response Plan
DRU	diluent recovery units	FSA	Farm Service Agency
Dth/day	decatherm(s) per day	ft	feet
DW	drinking water	ft/d	feet per day
DWT	deadweight tonnage	FWCA	Fish and Wildlife Coordination Act
e-GRID	Emissions & Generation Resource Integrated Database	FWP	Farmable Wetlands Program
EC	Economic Corridor	g	gram(s)
EES	electrical equipment shelter	g/cm ³	gram(s) per cubic centimeter
EI	environmental inspector	g/hp-hr	gram(s) per horsepower-hour
EIA	U.S. Energy Information Administration	g/m ²	gram(s) per square meter
EIS	Environmental Impact Statement	g/ml	gram(s) per milliliter
EO	Executive Order	G+D	gasoline and diesel
EPP	Environmental Protection Plan	GAP	National Gap Analysis Program
EPRINC	Energy Policy Research Foundation Inc.	GDP	gross domestic product
ERCB	Energy Resources Conservation Board, Alberta	GHG	greenhouse gas
ERP	Emergency Response Plan	GHGRP	Greenhouse Gas Reporting Program
ESA	Endangered Species Act	GIS	Geographic Information System
ESR	Environmental Screening Report	GOR	Gas-oil ratio
ESRI	Environmental Systems Research Institute	GPA	Great Plains Aquifer
EUB	Energy and Utilities Board (Alberta, Canada)	gpm	gallons per minute
EUR	estimated ultimate recovery	GREET	Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation Model
FBE	fusion-bonded epoxy	GSP	gross state product
FEMA	Federal Emergency Management Agency	GTL	gas-to-liquids
FERC	Federal Energy Regulatory Commission	GWP	global-warming potential
FHWA	Federal Highway Administration	H-C	hydrogen to carbon ratio
		ha	hectare(s)
		H ₂ S	hydrogen sulfide
		HAP	hazardous air pollutant
		HC	hydrocarbons
		HCA	High Consequence Area
		HDD	horizontal directional drill

HFC	hydrofluorocarbon	kg/m ³	kilogram(s) per cubic meter
HFE	hydrofluorinated ether	kgCO ₂ e	kilogram(s) carbon dioxide equivalent
HHV	high heating value	km	kilometer(s)
hp	horsepower	km ²	square kilometer(s)
HPA	High Population Area	KMIGT	Kinder-Morgan Interstate Gas Transmission
HPRCC	High Plains Regional Climate Center	KOP	Keystone's Operating Procedures
HPSA	Health Professional Shortage Area	kPa	kilopascal
hr	hour(s)	KSDA	Kansas Department of Agriculture
hr/yr	hour(s) per year	kV	kilovolt(s)
HRSA	Health Resources and Services Administration	kW	kilowatt(s)
HSSM	Hydrocarbon Spill Screening Model	kWh	kilowatt-hour(s)
HVDC	high voltage direct current	LB	Legislative Bill
IBA	important bird area	lb/MMBtu	pounds per million British thermal units
IC	Incident Commander	LCA	lifecycle analysis
ICCT	International Council on Clean Transportation	LCFS	low carbon fuel standard
ICF	ICF International LLC	LCNHT	Lewis and Clark National Historic Trail
ICS	Incident Command System	Ldn	day-night sound level
IEA	International Energy Agency	LDS	leak detection system
IEO	International Energy Outlook	LDV	light-duty vehicle
IHS CERA	IHS Cambridge Energy Research Associates, Inc.	LECL	Lewis and Clark National Historic Trail
IIW	International Institute of Welding	LEPC	Local Emergency Planning Committee
ILI	inline inspection	Leq	equivalent continuous sound level
IMLV	intermediate mainline valve	Leq(24)	24-hour equivalent sound level
in	inch(es)	LFMM	Liquid Fuels Market Module
IPCC	Intergovernmental Panel on Climate Change	LHV	Lower heating value
IRR	internal rates of return	LLC	limited liability company
ISO	International Organization for Standardization	LLS	Light Louisiana Sweet
iSOR	instantaneous steam-oil ratio	Lmax	maximum sound pressure level
ITOPF	International Tanker Owners Pollution Federation Limited	LNAPL	light non-aqueous phase liquid
KDWPT	Kansas Department of Wildlife, Parks, and Tourism	LNG	liquefied natural gas
Keystone LP	TransCanada Keystone Pipeline, LP	LOOP	Louisiana Offshore Oil Port
kg	kilogram(s)	LPG	liquefied petroleum gas
		LRVC	long run variable cost
		LSHR	landscape hazard ranking system
		LTO	light tight oil

LVH	lower heating value	MMbbl/d	million barrels per day
Lw	sound power level	mmbpd	million barrels per day
LW	local/county noxious week	MMBtu	million British thermal units
m	meter(s)	MMcf/d	million cubic feet per day
m/d	meter(s) per day	MMDK	million decatherms
m ³	cubic meter(s)	mmhos/cm	millimho(s) per centimeter
MACT	Maximum Achievable Control Technology	MMTCO ₂ e	million metric tons of CO ₂ equivalents
MALAA	may affect, likely to adversely affect	MNHP	Montana Natural Heritage Program
MBCA	Migratory Bird Convention Act	MOP	maximum operating pressure
MBCB	Montana Building Code Bureau	MOPI	Mormon Pioneer National Historic Trail
MBOGC	Montana Board of Oil and Gas Conservation	MP	milepost
MBTA	Migratory Bird Treaty Act	MPDES	Montana Pollutant Discharge Elimination System
MCA	Montana Code Annotated	mpg	mile(s) per gallon
MCL	maximum contaminant level	mph	mile(s) per hour
MCR	micro carbon residue	MROW	Midwest Reliability Organization West
MDA	Montana Department of Agriculture	MSA	metropolitan statistical area
MDEQ	Montana Department of Environmental Quality	MSDS	Material Data Safety Sheet
MDNRC	Montana Department of Natural Resources and Conservation	MT	Montana
MDT	Montana Department of Transportation	MTCO ₂ e	metric ton(s) of CO ₂ equivalents
MDU	Montana-Dakota Utilities	MUA/P	Medically Underserved Areas/Populations
MEPA	Montana Environmental Policy Act	MVA	megavolt ampere(s)
MFSA	Major Facilities Siting Act	MW	megawatt(s)
MFWP	Montana Fish, Wildlife, and Parks	MWh/yr	megawatt-hour(s) per year
mg	milligram(s)	MWRWSS	Mni Wiconi Rural Water Supply System
mg/L	milligram(s) per liter	N ₂ O	nitrous oxide
mg KOH/g	milligram(s) of potassium hydroxide per gram	NO ₂	nitrogen dioxide
MGWPCS	Montana Ground Water Pollution Control System	NO _x	nitrogen oxides
mi ²	square mile(s)	NA	not applicable
MJ	megajoule(s)	na	not available
MLA	Mineral Leasing Act	NAAQS	National Ambient Air Quality Standards
MLV	mainline valve	NAC	Nebraska Administrative Code
MMA	Montreal, Maine and Atlantic Railway Corporation	NACE	National Association of Corrosion Engineers
		NAGPRA	Native America Graves Protection and Repatriation Act

NAIP	National Aerial Imagery Program	NHPAQ	Northern High Plains Aquifer
NAS	National Academy of Sciences	NHT	National Historic Trail
NCRC	Nebraska Central Railroad Company	NHTSA	National Highway Traffic Safety Administration
ND	no data	NID	National Interest Determination
n.d.	no date	NLAA	may affect, not likely to adversely affect
NDA	Nebraska Department of Agriculture	NLCD	National Land Cover Database
NDE	nondestructive examination	NMFS	National Marine Fisheries Service
NDEQ	Nebraska Department of Environmental Quality	NMHC	non-methane hydrocarbon
NDGFD	North Dakota Game and Fish Department	NNLP	Nebraska Natural Legacy Project
NDHHS	Nebraska Department of Health and Human Services	NNRC	Nebraska Northeastern Railway Company
NDOR	Nebraska Department of Roads	NO ₂	nitrogen dioxide
NDPA	North Dakota Pipeline Authority	NO _x	nitrogen oxides
NE SFM	Nebraska State Fire Marshal	NOA	Notice of Availability
NEAAQS	Nebraska Ambient Air Quality Standards	NOAA	National Oceanic and Atmospheric Administration
NEB	National Energy Board (Canada)	NOI	Notice of Intent
NEMS	National Energy Modeling System	NO _x	nitrogen oxide
NEPA	National Environmental Policy Act	NPDES	National Pollutant Discharge Elimination System
NESHAP	National Emissions Standards for Hazardous Air Pollutants	NPPD	Nebraska Public Power District
NETL	National Energy Technology Laboratory	NPR	National Public Radio
NF ₃	nitrogen trifluoride	NPS	National Park Service
NFO	Non-significant Fossil Occurrence	NPV	net present value
NGFC	Nebraska Game and Fish Commission	NRC	National Response Center
NGL	natural gas liquids	NRCS	Natural Resources Conservation Service
NGO	non-governmental organization	NRD	Natural Resources District
NGPAS	Northern Great Plains Aquifer System	NRDC	Natural Resources Defense Council
NGPC	Nebraska Game and Parks Commission	NRHP	National Register of Historic Places
NGPD	Nebraska Game and Parks Department	NRR	National Recreational River
NHD	National Hydrography Dataset	NSA	noise sensitive areas
NHP	Natural Heritage Program	NSPS	New Source Performance Standards
NHPA	National Historic Preservation Act of 1986	NSR	New Source Review
		NTSB	National Transportation Safety Board
		NW	noxious weed
		NWI	National Wetland Inventory
		NWP	Nationwide Permit

O ₂	oxygen gas	PM _{2.5}	particulate matter with aerodynamic diameter of 2.5 microns and less
O ₃	ozone		
OCC	Operations Control Center		
OECD	Organization for Economic Cooperation and Development	PMMP	Paleontological Monitoring and Mitigation Plan
OGJ	Oil & Gas Journal	PMP	Pipeline Maintenance Program
OGP	International Association of Oil and Gas Producers	POEX	Pony Express National Historic Trail
OPA	Other Populated Area	POTW	publically owned treatment works
OPA 90	Oil Pollution Act of 1990	PPA	Protection Priority Areas
OPEC	Organization of the Petroleum Exporting Countries	PPD	Public Power District
OPS	Office of Pipeline Safety	PPE	personal protective equipment
OREG	Oregon National Historic Trail	ppm	part(s) per million
OSDG	Oil Sands Developers Group	ppmw	part(s) per million by weight
OSLTF	Oil Spill Liability Trust Fund	PPR	Prairie Pothole Region
OSRIN	Sands Research and Information Network	Project	Keystone XL Project
OW	open water	PS	pump station
PA	Programmatic Agreement	PSD	Prevention of Significant Deterioration
PADD	Petroleum Administration for Defense District	psi	pound(s) per square inch
PAH	polycyclic aromatic hydrocarbon	psig	pound(s) per square inch gauge
Pb	lead	PSRP	Pipeline Spill Response Plan
PCIC	project cumulative impact corridor	PSS	palustrine scrub-shrub
PDVSA	Petróleos de Venezuela, S.A.	ptb	pounds per thousand barrels
PEM	palustrine emergent	PWS	public water supply
PFC	perfluorocarbon	py	pipeyard
PFO	palustrine forested	QC	quality control
PFYC	Potential Fossil Yield Classification	R	riverine wetlands
PHMSA	Pipeline and Hazardous Material Safety Administration	R-STRENG	remaining strength
PHRCC	Petroleum Human Resources Council of Canada	RAMP	Regional Aquatics Monitoring Program
PI	point of inflection (angle)	RBOB	reformulated blendstock for oxygenate blending
PM	particulate matter	RCNM	Roadway Construction Noise Model
PM ₁₀	particulate matter with aerodynamic diameter of 10 microns and less	Rec	recreation
		REX-W	Rockies Express-West
		RFI	radio frequency interference
		RFS	USEPA Renewable Fuel Standard
		RGGI	Regional Greenhouse Gas Initiative
		RH	relative humidity

riv-OW	riverine-open water	SF ₆	sulfur hexafluoride
RMWB	Regional Municipality of Wood Buffalo	SFL	Significant Fossil Localities
ROD	Record of Decision	SFM	Office of the State Fire Marshall
ROS	rest of state	SHPO	State Historic Preservation Office(er)
ROW	right-of-way	SIP	State Implementation Plan
RP	Recommended Practice	SLWC	Stillwater Central Railroad
RPMA	Recovery-Priority Management Area	SMP	Security Management Program
RPS	Renewable Portfolio Standard	SMS	Scenery Management System
RTT	refinery-to-tank	SMYS	specified minimum yield strength
RUS	Rural Utilities Service	SO ₂	sulfur dioxide
RV	recreational vehicle	SOR	steam-oil ratio
SAGD	steam-assisted gravity drainage	SO _x	sulfur oxides
SAR	Second Assessment Report	SPCC	Spill Prevention, Control, and Countermeasure
SARA	Species at Risk Act	SPSO	Southwest Power Pool South
SC	species of concern	STB	Surface Transportation Board
SCADA	Supervisory Control and Data Acquisition	SWPA	Source Water Protection Area
SCC	stress corrosion cracking	TAN	total acid number
SCO	synthetic crude oil	TAPS	Trans-Alaska Pipeline System
SD	South Dakota	TBD	to be determined
SD DOT	South Dakota Department of Transportation	TCE	trichloroethylene
SDA	South Dakota Department of Agriculture	TCEQ	Texas Commission on Environmental Quality
SDCL	South Dakota Common Law	TCP	traditional cultural properties
SDDENR	South Dakota Department of Environment and Natural Resources	TCR	The Climate Registry
SDGFP	South Dakota Game, Fish, and Parks	TDS	total dissolved solids
SDIWWG	South Dakota Interagency Wetlands Working Group	TEFC	The Ecological Framework of Canada
SDPUC	South Dakota Public Utilities Commission	THPO	Tribal Historic Preservation Officer
SDS	Safety Data Sheet	TK	traditional knowledge
SDSMT	South Dakota School of Mines and Technology	TKN	total Kjehldahl nitrogen
SDWA	Safe Drinking Water Act	TKWG	Traditional Knowledge Working Group
SER	Supplemental Environmental Report	TPG	The Perryman Group
		TPIC	third-party inspection company
		tpy	ton(s) per year
		TRB	Transportation Research Board
		TRR	technically recoverable resources
		TSA	Transportation Security Administration

TSB	Transportation Safety Board	WHSRN	Western Hemisphere Shorebird Reserve Network
TTW	Tank-to-wheels	Williston Basin	A large sedimentary basin in eastern Montana, western North and South Dakota, and southern Saskatchewan known for its rich deposits of crude oil
TWA	temporary workspace area	WIPA	Western Interior Plains Aquifer
UNFCCC	United Nations Framework Convention on Climate Change	WMA	wildlife management area
UP	Union Pacific Railroad Company	WMD	Wetland Management District
U.S.	United States	WNS	white-nose syndrome
USACE	U.S. Army Corps of Engineers	WORLD	World Oil Refining Logistics & Demand
USC	United States Code	WRCC	Western Regional Climate Center
USDA	U.S. Department of Agriculture	WRP	Wetlands Reserve Program
USDOE	U.S. Department of Energy	WSR	Wild and Scenic River
USDOT	U.S. Department of Transportation	WSRA	Wild and Scenic Rivers Act
USEPA	U.S. Environmental Protection Agency	wt%	weight percent
USFS	U.S. Forest Service	WTI	West Texas Intermediate
USFWS	U.S. Fish and Wildlife Service	WTR	well-to-refinery
USGC	U.S. Coast Guard	WTT	well-to-tank
USGCRP	U.S. Global Change Research Program	WTW	well-to-wheels
USGS	U.S. Geological Survey	WW	warmwater
USNABCI	U.S. North American Bird Conservation Initiative	WYGF	Wyoming Game and Fish Department
UST	underground storage tank	yr	year
VES	variable frequency drive equipment shelter		
VLCC	very large crude carrier		
VMT	vehicle miles travelled		
VOC	volatile organic compound		
vol%	percent volume		
VRM	visual resource management		
WCD	worst-case discharge		
WCI	Western Climate Initiative		
WCS	Western Canadian Select		
WCSB	Western Canadian Sedimentary Basin		
WEG	Wind Erodibility Group		
WEO	World Energy Outlook		
Western	Western Area Power Administration		
WHIP	Wildlife Habitat Incentive Program		
WHPA	wellhead protection area		

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