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SCS ENGINEERS

Formerly Tracer Environmental Sciences & Technologies, Inc., now a part of SCS Engineers

August 15, 2017

SUBJECT: Line 901 & 903 Replacement Project- Air Quality Emissions Calculations

**SITE: 123.4- Mile Pipeline Corridor & Associated Facilities
Santa Barbara, San Luis Obispo, and Kern County, California**

SCS Engineers (SCS) and Air Permitting Specialists (APS), on behalf of Plains Pipeline, L.P. (Plains), prepared the attached air quality emissions calculations associated with the proposed replacement of the existing Line 901 and Line 903 pipelines (*Project*). The *Project* consists of the abandonment of the existing pipelines in place, the installation and operation of approximately 123.4 miles of new pipelines, as well as the installation and operation of supporting access roads, valves, and pump stations as described in further detail below. The majority, 109.7 out of 123.4 miles (89%), of the pipeline length and associated facilities are located within the South Central Coast Air Basin including the Los Flores, Gaviota, Sisquoc, and Russell Ranch Pump Stations. The remaining 13.7 miles of pipeline and Pentland Delivery Point lie within the San Joaquin Valley Air Basin. This memorandum includes a summary of air quality emissions for the entire *Project*, irrespective of air basin, from each applicable source (i.e. stationary facilities, mobile maintenance vehicles, construction equipment, etc.) as discussed in greater specificity below. Detailed emissions calculations have also been provided via digital transfer of Excel workbooks. Total long-term, *Project* emissions from both stationary and mobile sources have been summarized in Table 1 below.

Table 1- Summary of Estimated Increase in Air Quality Emissions

Source	Lbs./Day					Direct	Indirect
	NO _x	ROC	CO	SO _x	PM ₁₀	MTs/Yr CO ₂ e	MTs/Yr CO ₂ e
Proposed Stationary Source	24.55	30.15	203.02	6.66	3.81	9,298	8,300
Existing Stationary Source	3.94	8.24	24.11	0.04	0.07	0	2,924
Net Stationary Source Increase	20.61	21.91	170.34	6.62	3.69	9,298	5,376
Net Mobile Source Increase ¹	0.00	0.00	0.00	0.00	0.00	0	0
TOTAL PROJECT INCREASE	20.61	21.91	178.91	6.62	3.74	9,298	5,376
Stationary + Mobile Threshold	55.00	55.00	N/A	55.00	80.00	1,000	N/A
Mobile Only Threshold	25.00	25.00	800 PHTs ²	N/A	N/A	N/A	N/A
Exceeds Threshold?	No	No	No	No	No	Yes	N/A

¹ Long-term Mobile Source emissions from the existing baseline operations versus proposed operations are assumed to be essentially identical. If quantified in detail, the proposed *Project* would likely result in an incremental reduction in mobile source emissions based on the ever increasing fleet efficiencies achieved by California's increasingly stringent exhaust control and treatment regulations.

² PHTs: Peak Hour Trips

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In accordance with Santa Barbara County's adopted Thresholds of Significance, pursuant to the California Environmental Quality Act (CEQA), the Project is expected to have less than significant air quality impacts in all categories except Greenhouse Gas Emissions (GHGs). Santa Barbara County's threshold of significance for GHG emissions is 1,000 metric tonnes (MT) per year. The Project would produce approximately 9,298 MTs per year of GHGs. This impact could be mitigated to less than significant levels through the purchase of approved GHG offsets.

Proposed Stationary Source Development

The new pipeline system will have a proposed maximum daily throughput capacity of 40,000 bbls. The Project includes the installation, maintenance, and operation of the following mechanical components:

- A twelve (12) inch diameter steel pipeline, which is approximately 10.7 miles in length between the existing Santa Ynez Unit (SYU) facility in Las Flores Canyon and the existing pump station at the Gaviota Heating Oil Facility.
- A sixteen (16) inch diameter steel pipeline, which is approximately 38.6 miles in length between the existing Gaviota Heating Oil Facility and the existing Sisquoc Pump Station.
- A fourteen (14) inch diameter steel pipeline, which is approximately 74.1 miles in length between the existing Sisquoc Pump Station and the existing Pentland Pump Station.
- The operation of approximately forty-nine (49) pipeline control valves of varying types. All valve stations have various components capable of releasing fugitive emissions as well as diesel powered generators which are utilized for emergency back-up power only.
- Minor equipment modifications to (resizing of pumps, pig launchers/receivers, etc.) and continued operation of the Las Flores, Gaviota, and Pentland Pump Stations.
- Minor equipment modifications, site expansion, and continued operation of the Sisquoc Pump Station. The site and facility expansion includes the development of a new 120,000 barrel oil storage tank (floating roof), secondary containment area for the oil tank, one (1) primary 20 MMBtu/hr heater, one (1) back-up 20MMBtu/hr heater, a new fire water storage tank, and a foam fire suppression system.
- The construction and operation of a new Russell Ranch Pump Station located in the Cuyama Valley region of San Luis Obispo County, including electrically driven pumps, a pig launcher and pig receiver.
- Various pipeline-related safety equipment including but not limited to: markers, cathodic protection, fiber optic lines, SCADA systems, remote communication equipment, solar panels, etc.

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Emissions for the stationary sources would consist primarily of:

- Various fugitive leak points (valves, flanges, etc.) throughout all pump and valve stations and the large oil tank at the Sisquoc Pump Station.
- Emissions released during pigging operations.
- Typical combustion sources are limited to the daily operation of the primary 20 MMBtu/hr heater at the Sisquoc Pump Station. A secondary 20 MMBtu/hr heater will also be installed as a back-up in the event that the primary unit is down for maintenance or repair. The two heaters will not operate simultaneously.
- Diesel powered emergency generators are present at each pump and valve station so that SCADA systems and motor-operated valves (MOV's) can still be controlled throughout loss of electrical power from the utility grid.
- Indirect emissions from electrically driven pumps.

Air quality emissions from all stationary source facilities are summarized in Table 2 below.

Table 2- Summary of Stationary Source Emission

Equipment Category	NO _x	ROC	CO	SO _x	PM _{2.5}	CO ₂ e*
Sisquoc Oil Tank (1)						
lbs/day	0.00	16.50	0.00	0.00	0.00	0
tons/year	0.00	3.01	0.00	0.00	0.00	0
Sisquoc Heater						
lbs/day	5.76	2.59	142.56	6.57	3.60	56,169
tons/year	1.05	0.47	26.02	1.20	0.66	9,298
Pump Emergency Generators						
lbs/day	3.51	1.64	43.33	0.06	0.12	0
tons/year	0.01	0.00	0.11	0.00	0.00	0
Valve Emergency Generators						
lbs/day	15.28	0.93	17.13	0.03	0.09	0
tons/year	0.05	0.00	0.05	0.00	0.00	0
Pigging Operations						
lbs/day	0.00	3.14	0.00	0.00	0.00	0
tons/year	0.00	0.028	0.00	0.00	0.00	0
Fugitive Component Emissions						
lbs/day	0.00	5.35	0.00	0.00	0.00	0
tons/year	0.00	0.98	0.00	0.00	0.00	0
TOTAL- lbs/day	24.55	30.15	203.02	6.66	3.81	56,169
TOTAL- tons/year	1.11	4.50	26.18	1.20	0.66	9,298

*CO₂e is quantified in Metric tonnes

The proposed Project would produce indirect GHGs, primarily through the operation of electric pumps at multiple stations. Such indirect GHGs have been estimated in Table 3 below.

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Table 3- Summary of Proposed Indirect Greenhouse Gas (GHG) Emissions

Pump Station	Electric Utility	Average KW	Annual MW-Hrs.	GHG Intensity Factors (lbs./MWH)			CO ₂ (e) Emissions
				CO ₂	CH ₄	N ₂ O	Metric Tons
Las Flores	SCE	378	3,311	702.44	0.029	0.00617	1,059
Gaviota	SCE	666	5,834	702.44	0.029	0.00617	1,866
Sisquoc	PG&E	1,237	10,836	641.35	0.029	0.00617	3,165
Russell Ranch	PG&E	864	7,569	641.35	0.029	0.00617	2,211
TOTAL							8,301

Proposed Long-term Operational/Maintenance Mobile Sources

Once the new pipeline system is constructed and operational, the various facilities will be monitored on a daily basis by a crew of ten (10) operators and a fixed-wing aircraft will fly the length of the pipelines once per week to check for visual evidence of pipeline damage or malfunction. The pipeline system, valve stations, and pump stations will also undergo more intensive maintenance operations sporadically throughout the year. Therefore, long-term operational emissions would occur from the following vehicle/equipment fleet:

- Ten (10) ¾ ton or smaller trucks utilized by full-time operators travelling a maximum daily roundtrip distance of 300 miles per day.
- One (1) utility all-terrain vehicle (UTV) used to access portions of the pipeline right-of-way which cannot accommodate a full size truck.
- One (1) fixed-wing aircraft flying the pipeline on a weekly basis.
- One (1) 1-ton truck and one (1) vacuum truck which are utilized during pigging and similar maintenance events, travelling a maximum 150-mile roundtrip distance per day of use.
- One (1) flatbed tractor-trailer utilized to transport bull dozers, backhoes, and similar equipment to and from the pipeline maintenance area, travelling a maximum 150-mile roundtrip distance per day of use.
- One (1) bulldozer, two (2) backhoes, one (1) air compressor, one (1) generator, and two (2) welding trucks are operated at onsite repair locations.

The long-term operational emissions have been summarized in Table 4 below. For the purposes of this summary, "mobile" emissions generally include street legal vehicles which travel to and from the Project site under their own power; "equipment" emissions include air compressors, generators, etc. which operate onsite but have no mileage based emissions. The emission estimates are based on the use of OFFROAD 2007³ emissions database developed by the California Air Resources Board (CARB) and/or EMFAC 2011. This database provides emissions

³ Reference: OFFROAD Emissions Inventory Program. Information available at:
<https://www.arb.ca.gov/msei/offroad.htm>

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in terms of grams per horsepower-hour for specific equipment such as cranes, loaders, air compressors, etc.

Table 4- Summary of Long-term/Maintenance Emissions

Source	ROG (lbs/day)	NOx (lbs/day)	PM-10 (lbs/day)	PM-2.5 (lbs/day)	CO (lbs/day)	CO2 (MTs/yr)
Equipment Emissions	1.69	15.71	0.69	0.69	10.77	78.49
Mobile Emissions	5.95	21.16	0.71	0.40	203.71	412.69
TOTAL	7.64	36.87	1.4	1.09	214.48	491.18

Proposed Short-term Construction Mobile Sources

Construction of the replacement pipelines is expected to occur over a 12-18 month period, during which a fleet of construction and delivery vehicles/equipment would be deployed across the Project area. Where allowed, Project construction would occur up to six (6) days a week from 6:30 am to 7:30 pm. All equipment is assumed to operate an average of nine (9) hours per day; equipment is not operated during required employee breaks, daily safety briefings, etc. Table 5 below provides a list of onsite construction equipment which will predominantly stay within the right-of-way throughout construction. Table 6 provides a summary of mobile construction vehicles which are utilized to deliver employees, construction materials, dust control water, etc. to and from the Project site on a daily basis.

Table 5- Onsite Construction Fleet

Type of Equipment	No. of Units	Horsepower	Hrs/Day	Days/Yr
16 G Grader	4	250	9	312
D8 Dozer	13	350	9	312
336 Trackhoes	33	300	9	312
324 Trackhoes	3	160	9	312
329 Trackhoes	4	235	9	312
Rubber Tired Backhoe	2	100	9	312
Sidebooms	30	330	9	312
Padding Machines	2	50	9	312
1360 Trencher	7	440	9	312
Bending Machines	2	150	9	312
966 Loaders	4	170	9	312
Forklifts	4	150	9	312
HDD Machine	4	225	9	312
Boring Machine	4	260	9	312
Circulating Mud Pumps	8	200	9	312
30 Ton RT Crane	4	460	9	312
Air Compressors	16	175	9	312
Generators	16	175	9	312

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Table 6- Offsite/Mobile Construction Fleet

Vehicle Type	No. of Units	Hrs/Day	Days/Yr	Miles/Day	Trips/Day
Stringing Truck	10	9	312	30	10
Lowbed Trucks	8	9	312	30	8
Fuel Trucks	4	9	312	30	4
3/4 Ton Trucks	30	9	312	30	30
1 Ton Trucks	30	9	312	30	30
2 Ton Trucks	12	9	312	30	12
Water Trucks	20	9	312	30	20
Welding Trucks	40	9	312	30	40
Bus	4	9	312	30	4
Light Duty Trucks	400	9	312	30	400

Table 7 below provides a summary of air quality emissions from short-term construction vehicles and equipment. Although required to be quantified and disclosed during the CEQA process, the County of Santa Barbara does not have an adopted threshold of significance for construction related emissions. Instead, construction related emissions countywide are generally expected to be insignificant and sporadic relative to long-term emissions from permanent stationary source facilities. The emission estimates are based on the use of OFFROAD 2007 emissions database developed by the California Air Resources Board (CARB). This database provides emissions in terms of grams per horsepower-hour for specific equipment such as cranes, loaders, air compressors, etc.

Table 7- Summary of Short-term/Construction Emissions

Source	ROG	NOx	PM-10	PM-2.5	CO	CO ₂
	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(MTs/yr)
Equipment Emissions	41.82	433.74	18.47	5.20	74.60	164,368.55
Mobile Emissions	37.92	93.42	4.22	2.14	178.66	5,189.46
TOTAL	79.74	527.16	22.69	7.34	253.26	169,558.01

Existing/Baseline Facilities and Operations

The existing Line 901 and 903 pipeline system consists primarily of the following facilities and mechanical components:

- Various electrically driven pumps, gate valves, pig launchers, and pig receivers at the Las Flores Pump Station, Gaviota Pump Station, Sisquoc Pump Station, and Pentland Delivery Point.
- Six (6) stand-alone gate valve stations.
- Emergency generators at all existing pump and valve stations.

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- Approximately 122.9 miles of variable diameter pipeline whose joints are welded except at valve and pump stations.

Refer to permit application Attachment B.7 for a detailed list of all existing equipment. Between the years 2000 and 2016 the aforementioned pipeline system and facilities operated on a daily basis with an average of 43,189 barrels of crude oil transported per day. Estimated baseline criteria pollutant emissions and GHGs from stationary sources are provided in Table 8 below.

Table 8- Summary of Existing/Baseline Stationary Source Emissions

Equipment Category	NO _x	ROC	CO	SO _x	PM ₁₀	CO ₂ e*
Pump Emergency Generators						
lbs/day	1.76	0.82	21.66	0.03	0.06	0
tons/year	0.00	0.00	0.05	0.00	0.00	0
Valve Emergency Generators						
lbs/day	2.18	0.13	2.45	0.00	0.00	0
tons/year	0.01	0.00	0.01	0.00	0.00	0
Pigging Operations						
lbs/day	0.00	5.31	0.00	0.00	0.00	0
tons/year	0.00	0.05	0.00	0.00	0.00	0
Fugitive Component Emissions						
lbs/day	0.00	1.98	0.00	0.00	0.00	0
tons/year	0.00	0.36	0.00	0.00	0.00	0
TOTAL- lbs/day	3.94	8.24	24.11	0.04	0.07	0
TOTAL- tons/year	0.01	0.41	0.06	0.00	0.00	0

*CO₂e is quantified in Metric tonnes

The existing baseline emissions from mobile sources and mobile maintenance equipment is considered essentially identical to the proposed mobile sources described above. Since both the existing and newly proposed pipeline system is similar in length, location, and structure it is anticipated that approximately the same number of daily operators (10) would be required for routine functions along with the maintenance fleet.

The existing Line 901 and 903 pipeline system generated indirect GHGs primarily through the use of electrically driven pump systems. Such indirect GHGs have been estimated in Table 9 below. Baseline Indirect GHGs were calculated using actual average annual electrical usage as documented in utility bills spanning years 2010-2015.

Table 9- Summary of Indirect Greenhouse Gas (GHG) Emissions

Pump Station	Electric Utility	Annual MW-Hrs.	GHG Intensity Factors (lbs./MWH)			CO ₂ (e) Emissions
			CO ₂	CH ₄	N ₂ O	Metric Tons
Las Flores	SCE	4,044	702.44	0.029	0.00617	1,293
Gaviota	SCE	486	702.44	0.029	0.00617	155
Sisquoc	PG&E	5,051	641.35	0.029	0.00617	1,475
TOTAL						2,924

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Digital Attachments (Excel Workbooks):

- Line 901_903 Stationary Source Emissions
- Line 901_903 Indirect GHG Emissions
- Line 901_903 Maintenance Mobile Emissions
- Line 901_903 Construction Mobile Emissions
- Line 901_903 TANKS Emissions Results
- Line 901_903 Stationary Source Emissions- Existing/Baseline
- Line 901_903 Indirect GHG Emissions- Existing/Baseline

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