Kerr-McGee Oil & Gas Onshore LP

Cumulative Impacts Plan

Sprout OGDP

Weld County, CO

September 2023

Table of Contents

INTRODUCTION

To reflect the overall anticipated impacts, this Cumulative Impacts Plan evaluates the total impacts from the development of the following locations:

- Alfalfa 8-20HZ 2A Document: 403278400
- Clover 2-29HZ 2A Document: 403278417
- Rademacher 14-30HZ 2A Document: 403278425

The Cumulative impacts outlined in this plan are in the Sprout OGDP 2B Document number 403364201

WATER RESOURCES:

ANTICIPATED IMPACTS:

Although water will be used for operations there are no anticipated impacts to the quality of either surface or subsurface water. A mixture of non-potable surface water, groundwater and recycled water will be used for completions operations.

DETAILS:

Water Use

KMOG intends to use a total of 21,713,620 BBLs of water during drilling and completions activities on these locations. 74.5% (16,170,953 BBLs) will be sourced from non-potable surface water and 25% (5,434,861 BBLs) will be sourced from groundwater. 107,806 BBLs (0.5%) will be from recycled sources. The pad specific volumes of water are shown in the chart below.

		Construction Water		**Completions Water**		**Drilling Water**		**Total Water Usage - by Source**
		%	BBLS	%	BBLS	%	BBLS	**BBLS**
Alfalfa 8-20 HZ	***Total Water Usage by Phase:***		***19,250***		***6,624,805***		***28,600***	***6,672,655***
	Surface Water	0%	0	75%	4,968,604	0%	0	**4,968,604**
	Ground Water	100%	19,250	24.5%	1,623,077	100%	28,600	**1,670,927**
	Recycled Water (produced water)	0%	0	0.50%	33,124	0%	0	**33,124**
	Recycled water (non produced water)	0%	0	0%	0	0%	0	**0**
	Unspecified Sources	0%	0	0%	0	0%	0	**0**
Clover 2-29 HZ	***Total Water Usage by Phase:***		***19,250***		***5,758,475***		***26,400***	***5,804,125***
	Surface Water	0%	0	75%	4,318,856	0%	0	**4,318,856**
	Ground Water	100%	19,250	24.5%	1,410,826	100%	26,400	**1,456,476**
	Recycled Water (produced water)	0%	0	0.50%	28,792	0%	0	**28,792**
	Recycled water (non produced water)	0%	0	0%	0	0%	0	**0**
	Unspecified Sources	0%	0	0%	0	0%	0	**0**
Rademacher 14-30 HZ	***Total Water Usage by Phase:***		***19,250***		***9,177,990***		***39,600***	***9,236,840***
	Surface Water	0%	0	75%	6,883,493	0%	0	**6,883,493**
	Ground Water	100%	19,250	24.5%	2,248,608	100%	39,600	**2,307,458**
	Recycled Water (produced water)	0%	0	0.50%	45,890	0%	0	**45,890**
	Recycled water (non produced water)	0%	0	0%	0	0%	0	**0**
	Unspecified Sources	0%	0	0%	0	0%	0	**0**

MITIGATION MEASURES:

KMOG protects water resources by carefully choosing the location, utilizing drainage control measures, and proper grading techniques. KMOG segregates topsoil to protect soil resources. Enhanced soil compaction minimizes absorption and downward migration of fluids in the event of an incidental spill.

KMOG will adhere to rule 309.3.(5).D by containing flowback and stimulation fluids in tanks, constructing lined berms or other lined containment devices pursuant to Rule 603.o. around any new crude oil, condensate, and produced water storage tanks, maintaining adequate spill response equipment at the Oil and Gas Location during drilling and completion operations; and not constructing or utilizing any pits.

Both prior to, and after drilling and completion operations, KMOG contracts with a third-party professional to perform water sampling from water wells near the location. The baseline sampling helps establish existing conditions, and the post-development samples verify KMOG's operations are safe.

To prevent fluid leaks, temporary produced water storage tanks are designed, constructed, and maintained in accordance with the following portions of the National Fire Protection Association (NFPA) Code 30 (2008 version):

- Tanks are built to engineering standards using noncombustible materials, with relief device sizing based on API 2000 standards.
- Tanks are inspected and maintained while in use.
- The only pipes within the containment are related to the temporary tanks (i.e. no external piping is co-located within the containment), and firefighting equipment is, likewise, not stored within the containment area.

The temporary produced water storage tanks are staged on a geosynthetic liner and surrounded by an earthen berm. The berms enclose an area sufficient to provide secondary containment for 150% of the volume of the largest single tank and are sufficiently impervious to contain spilled or released material. The berms and the liner are inspected at the same time as stormwater inspections. While the site is under construction, site inspections will occur every 14 days. During completions operations, all fluid containing equipment is inspected daily. When the location is on production, site inspections will occur every month.

Automation technology will be utilized at these facilities. This technology includes the use of fluid level monitoring for the tanks and produced water sumps, high-level shut offs, and electronic sensors to monitor the interstitial space of double-walled produced water sumps. All automation is monitored by Kerr-McGee's Integrated Operations Center (IOC), which is manned 24 hours per day, 7 days per week.

Two wetlands are 10 and 15 feet from the Rademacher location's southwestern edge. Temporary staging of production chemicals is proposed within approximately 300 feet of the nearest wetland; therefore, KMOG requested and was granted a CPW waiver of Series Rule 1202.a.(3) restrictions against the staging of "refueling, or chemical storage areas" within 500 feet of wetlands. These wetlands were determined by the US Army Corp of Engineers to not meet the definition of jurisdictional wetland under the definition of the Waters of the United States. This detail can be found attached to the wildlife mitigation plan. The stormwater management plan has been designed with sediment traps and flow will be restricted to leaving location at historic rates.

ECOSYSTEM AND WILDLIFE RESOURCES

ANTICIPATED IMPACTS:

KMOG will avoid impacts to wildlife at the Alfalfa and Clover Locations because of their position outside of HPH. Portions of the Rademacher Location fall within HPH.

DETAILS:

The locations were surveyed by a third-party biological contractor prior to permit submittal. The area out to 2,640 feet from the edge of the disturbance area was surveyed for Migratory Bird Treaty Act (MBTA) species. The biological surveys check for all species and environmental conditions outlined in the ECMC rules using accepted scientific survey practices. Where surface access is granted by the surface owner these surveys are conducted on the ground. If access is not possible, surveys are conducted from public ROW to the best of the contractor's ability.

Alfalfa 8-20HZ

Following a review of sensitive resources with the potential to be affected by proposed pad construction and drilling operations at the Alfalfa 8-20HZ pad by KMOG, potential adverse impacts to the ecosystem are anticipated to be minimal. Five raptor nests were identified within 1/2 mile of the Site, including one occupied Great Horned Owl nest, one occupied Red-tailed Hawk, and three unoccupied nests (See Wildlife Protection Plan for more detail). KMOG will perform pre-construction surveys to determine nearby nest statuses. CPW-recommended protocol for Burrowing Owl broadcast callback surveys were not performed at this Site, but potentially suitable habitat is present and mapped within 1/4 mile of the location. The beginning of construction is during the Burrowing Owl nesting season. CPW protocol-level surveys will be performed prior to construction. If active Burrowing Owl burrows are identified within 1/4 mile of the Site, KMOG will proceed with CPW consultation. No additional HPH or sensitive wildlife resources have been identified.

Clover 2-29HZ

Following a review of sensitive resources with the potential to be affected by proposed pad construction and drilling operations at the Clover 2-29HZ pad by KMOG, potential adverse impacts to the ecosystem are anticipated to be minimal. Five raptor nests were identified within $^{1}/_{2}$ mile of the Site, including one occupied Great Horned Owl nest and four unoccupied nests (See Wildlife Protection Plan for more detail). During a site visit on 4/13/2023, one active burrowing owl burrow was identified $^{1}/_{4}$ mile east the Clover Location with suitable habitat present and mapped within ¼ mile of the location.

Rademacher 14-30HZ

The Rademacher location was reviewed for sensitive resources and a consultation was held at the location with Colorado Parks and Wildlife (CPW) on February 8, 2023. The southeastern portion of the location overlaps mule deer Severe Winter Range and Migration Corridor 1202.d HPHs.

The proposed Rademacher pad and access road are approximately 1,600 feet from the St. Vrain Creek Native Aquatic Species Conservation Water. The nearest ordinary high water mark (OHWM) within St. Vrain Creek is greater than 500 feet from the Location; therefore, restrictions associated with Series Rule 1202.c.(1).R do not apply. And, because the Location is greater than 1,000 feet from the St. Vrain Creek HPH, restrictions associated with Series Rule 1202.a.(10) do not apply.

MITIGATION MEASURES:

Alfalfa 8-20HZ

If construction coincides with the raptor nesting season, KMOG will perform pre-construction surveys to determine nearby nest statuses. If construction occurs during the Burrowing Owl nesting season, CPW protocol-level surveys will be performed prior to construction. If active Burrowing Owl burrows are identified within 1/4 mile of the Site, KMOG will proceed with CPW consultation.

Clover 2-29HZ

If construction coincides with the raptor nesting season. KMOG will perform pre-construction surveys to determine nearby nest statuses. If construction occurs during the Burrowing Owl nesting season, CPW protocol-level surveys will be performed prior to construction. If active Burrowing Owl burrows are identified within 1/4 mile of the Site, KMOG will proceed with CPW consultation.

Rademacher 14-30HZ

KMOG will survey for nesting raptors if project activities start between February 1 and August 15. For ground disturbances beginning between March 15 and August 31, 2023, the full three-survey CPW-protocol will be completed no more than 7 days prior to the start of work. KMOG has agreed to comply with seasonal stipulations associated with severe winter range, therefore pre-production activities will not occur between December 1 and May 1. Migration Corridor impacts are based on surface density limitations of one pad per square mile and less than one linear mile of routes per square mile. CPW recommends an indirect impacts mitigation fee if this cannot be achieved. Associated with the Rademacher development, KMOG will reclaim 15.75 more acres than it disturbs in the area by reclaiming 49 wells and 10 facilities therefore no mitigation fees are required, and the development will lead to habitat de-fragmentation in the area.

General Mitigation

Avian protection will be installed on openings larger than two inches. Approximately two weeks prior to construction start, the approved locations will be surveyed by third party biological contractor for nests. A site-specific spill prevention, control, and countermeasure plan compliant with EPA rule 40 CFR 112 has been created and submitted with the 2A for these locations. Automated emergency response systems and emergency shutdown systems will be installed. Remote monitoring systems will be utilized at these locations. Periodic inspections for nests and of avian protection will occur throughout the life of the project. Training is provided to employees and contractors on wildlife conservation practices, including no harassment, feeding of wildlife, or illegal hunting.

KMOG maintains a Standard Operating Procedure (SOP) for water suction hoses and transportation Tanks that meets 1202.a.(2).A requirements with 3rd party contractors when moving equipment from locations. The contractor will use a CPW-approved disinfectant solution capable of destroying whirling disease spores and other aquatic nuisance species defined by CPW.
KMOG does not use drilling pits, production pits or any other pits at oil and gas locations in the Denver-Julesburg Basin.

Reclamation

KMOG will plug and abandon 94 wells and 23 associated facility locations and reclaim 39.1 acres of previously created pads after wells in this OGDP are in the production phase. Associated with the reclamation of this locations 54 oil tanks and 27 water tanks will be removed. The reduction of 23 facilities will eliminate an estimated 1,572 annual truck trips. The Sprout OGDP locations will disturb 37 acres for pre-production activities and be reclaimed to approximately 12.2 acres. The net reclamation of this OGDP exceeds the disturbance created, with nearly 27 more acres being reclaimed than are permanently

disturbed. This will also reduce habitat fragmentation. The area will be surveyed on multiple occasions to ensure that animals or their nests are not present. If animals are discovered the proper actions will be followed to ensure the safety of the animals. The tables below indicate the 94 wells that will be plugged and abandoned associated with this OGDP.

	Construction Phase	Interim Reclamation	P&A Reclamations	TOTAL
Alfalfa 8-20HZ	12.5	4.13	-10.33	-6.20
Clover 2-29HZ	11.71	3.8	-9.08	-5.29
Rademacher 14-30HZ	12.77	4.25	-16.05	-11.80
Other	0	0	-3.60	-3.60
TOTAL	**36.98**	**12.17**	**-39.06**	**-26.89**

Wells Associated with Alfalfa 8-20HZ

Offset Well Name	API #	ECMC Status	Location	ECMC Facility ID
FIRESTONE V 20-18D	0512330296	SI	NENW 20 2N67W 6	336269
FIRESTONE V 20-04D	0512330236	SI	NENW 20 2N67W 6	410172
20-03 FIRESTONE V	0512326463	SI	NENW 20 2N67W 6	336269
20-29D FIRESTONE	0512330083	SI	NENW 20 2N67W 6	410172
FIRESTONE V 20-08D	0512330521	TA	NENE 20 2N67W 6	318734
19-5JI ROCKY MTN FUEL V	0512320217	SI	SENW 19 2N67W 6	336132
19-6JI ROCKY MOUNTAIN FUEL V	0512319583	SI	SENW 19 2N67W 6	333024
FARNSWORTH #9-18A	0512320616	PR	NESE 18 2N 67W	331397
HSR-OWEN #15-18A	0512320544	PR	NWSE 18 2N 67W	336409
BRETT #4	0512316429	PR	NWSE 18 2N 67W	336409
ROCKY MOUNTAIN FUEL V #19-6JI	0512319583	SI	SENW 19 2N 67W	333024
ROCKY MTN FUEL V #19-5JI	0512320217	SI	SENW 19 2N 67W	336132
FIRESTONE V #20-03	0512326463	SI	NENW 20 2N 67W	336269
FIRESTONE #20-29D	0512330083	SI	NENW 20 2N 67W	410172
FIRESTONE V #20-04D	0512330236	SI	NENW 20 2N 67W	410172
FIRESTONE V #20-18D	0512330296	SI	NENW 30 2N 67W	336269
Total	**16**			**6 Facilities**

Wells Associated with Clover 2-29HZ

Offset Well Name	API #	ECMC Status	Location	ECMC Facility ID
HIDDEN CREEK 13-29X	0512335019	SI	NWSW 29 2N67W 6	318214
HIDDEN CREEK 12-29	0512335050	SI	NWSW 29 2N67W 6	318214
HIDDEN CREEK 19-29	0512335024	SI	NWSW 29 2N67W 6	318214

HIDDEN CREEK 22-29	0512335022	SI	NWSW 29 2N67W 6	318214
HIDDEN CREEK 25-29	0512335025	SI	NWSW 29 2N67W 6	318214
14-29 HIDDEN CREEK	0512335055	SI	NWSW 29 2N67W 6	318214
35-29 HIDDEN CREEK	0512335018	SI	NWSW 29 2N67W 6	318214
3-29A HSR-TEETS	0512320363	SI	NENW 29 2N67W 6	331239
SADDLEBACK 6-29X	0512335031	SI	NWNW 29 2N67W 6	319478
SADDLEBACK 4-29	0512335032	SI	NWNW 29 2N67W 6	319478
SADDLEBACK 21-29	0512335027	SI	NWNW 29 2N67W 6	319478
29-29 SADDLEBACK	0512335035	SI	NWNW 29 2N67W 6	319478
SADDLEBACK 30-29	0512335030	SI	NWNW 29 2N67W 6	319478
31-29 SADDLEBACK	0512335029	SI	NWNW 29 2N67W 6	319478
1 TOM L RUSSELL UNIT	0512315183	TA	NESE 25 2N68W 6	327812
OVERLOOK #21-30	0512334151	PR	NENE 30 2N 67W	311278
OVERLOOK #7-30	0512334153	PR	NENE 30 2N 67W	311278
OVERLOOK #28-30	0512334158	PR	NENE 30 2N 67W	311278
Total	**18**			**3 Facilities**

Wells Associated with Rademacher 14-30HZ

Offset Well Name	API #	ECMC Status	Location	ECMC Facility ID
CARMA 24-25	0512328021	SI	SWNE 25 3N68W 6	336185
7-25 CARMA	0512325066	SI	SWNE 25 3N68W 6	336185
21-25 WAGNER	0512323648	SI	SWNE 25 3N68W 6	336185
2-25 WAGNER	0512323647	TA	SWNE 25 3N68W 6	336185
10-25 RADEMACHER	0512327092	TA	SWSE 25 3N68W 6	336185
P27-3 DAVIS	0512315588	SI	NENW 27 3N67W 6	333152
P27-6 DAVIS	0512315589	SI	SENW 27 3N67W 6	333149
6-10 NELSON RED V	0512317542	SI	NWSE 6 2N67W 6	329571
39-24 LDS	0512324355	SI	SESE 24 3N68W 6	336280
16-24 LDS	0512321847	SI	SESE 24 3N68W 6	336280
1 PRESIDING BISHOP UNIT	0512315262	TA	SWSE 24 3N68W 6	327871
9-36A HSR-PELICAN SHORES	0512320255	SI	NESE 36 3N68W 6	331167
5-30X PEPPLER	0512321991	SI	SWNW 30 3N67W 6	409773
RADEMACHER LOUIS J GU 2	0512310004	SI	NWNW 30 3N67W 6	318816
31-30 PEPPLER	0512324101	SI	NWNW 30 3N67W 6	336336
RADEMACHER 36-30	0512324701	SI	SESW 30 3N67W 6	336118
23-30 RADEMACHER	0512327387	SI	NESW 30 3N67W 6	302229
RADEMACHER 32-30	0512327336	SI	NWSW 30 3N67W 6	336313
10-30 HSR-LOUIS	0512317661	SI	NWSE 30 3N67W 6	336361

28-09 NIX P	0512333510	SI	NESE 28 3N67W 6	423144
VARRA 41-32	0512330930	SI	SENE 32 3N67W 6	331387
VARRA 24-32	0512330934	SI	SENE 32 3N67W 6	331387
8-32A HSR-HEINTZELMAN	0512320603	SI	SENE 32 3N67W 6	331387
VARRA P 31-3JI	0512322402	SI	NWNW 31 3N67W 6	336460
VARRA P 31-4JI	0512322392	SI	NWNW 31 3N67W 7	336461
VOGL 26-6	0512331195	SI	NWNW 5 2N67W 6	415871
VOGL 31-5	0512331199	SI	NWNW 5 2N67W 6	415871
21-5X VOGL	0512331203	SI	NWNW 5 2N67W 6	415871
5-5 VOGL	0512322664	SI	SWNW 5 2N67W 6	305216
4-5A VOGL	0512321554	SI	NWNW 5 2N67W 6	331911
3-5A HSR-VOGL	0512320063	SI	NENW 5 2N67W 6	331041
MCHALE #2-5	0512323494	SI	NWNE 5 2N 67W	305798
CHENG #3-8A	0512320611	SI	SENW 8 2N 67W	336261
VOGL #5-8A	0512319870	SI	SWNW 8 2N 67W	330917
BURCH #3-1A	0512321120	SI	NENW 1 2N 68W	331682
ROBERT E BALDWIN UNIT #2	0512314801	SI	NWNW 4 2N 67W	327522
HOMESTEAD #4-4	0512322943	TA	NWNW 4 2N 67W	305418
HOMESTEAD #22-4	0512330636	SI	NWNW 4 2N 67W	305418
HOMESTEAD #31-4	0512330642	SI	NWNW 4 2N 67W	305418
HOMESTEAD #29-4	0512330643	SI	NWNW 4 2N 67W	305418
BABCOCK #14C-33HZ	0512343802	SI	SENW 4 2N 67W	330811
BABCOCK #33C-33HZ	0512343809	SI	SENW 4 2N 67W	330811
HAMLIN STATE #6-36	0512322636	SI	SENW 36 3N 68W	336220
CARMA #3-36	0512331257	SI	SENW 36 3N 68W	336220
CARMA #5-36	0512331282	SI	SENW 36 3N 68W	336220
CARMA #12-36	0512331287	SI	SENW 36 3N 68W	336220
CARMA #21-36	0512331710	SI	SENW 36 3N 68W	336220
CARMA #32-36	0512331714	SI	SENW 36 3N 68W	336220
KUGEL #V 18-4	0512317257	PR	NWNW 18 2N 67W	336464
KUGEL #12-18	0512314497	PR	SENW 18 2N 67W	333207
VICTORIA U #1-12JI	0512320192	SI	NWSW 1 2N 67W	331120
VICTORIA U #01-14JI	0512320202	PR	SESW 1 2N 67W	331128
BOOTH #7-1A	0512319574	PR	SENE 1 2N 67W	330759
Total	**53 wells**			**12 Facilities**

Additional Planned P&A Activity

Offset Well Name	API #	ECMC Status	Location	ECMC Facility ID
JUNCTION #12-2	0512327377	SI	NWSW 2 2N 68W	336314
ADAM FARM #27-4	0512330565	SI	SWNE 4 2N 68W	318150
ADAM FARM #28-4	0512330566	SI	SWNE 4 2N 68W	318150
ADAM FARM #21-4	0512330567	SI	SWNE 4 2N 68W	318150
ADAM FARM #1-4	0512330569	SI	SWNE 4 2N 68W	318150
CARMA #14-35	0512324914	SI	SWSW 35 3N 68W	336155
BLC #8-2A	0512321690	PR	SENE 2 2N 67W	331995
Total	**7 wells**			**2 Facilities**

Air Resources

ANTICIPATED IMPACTS:

Short-term impacts: During pre-production activities KMOG anticipates the release of 36,611 tons of emissions. KMOG expects 18,982 pounds of Hazardous Air Pollutants (HAP) during pre-production.

Long-term Impacts: During one year of production KMOG anticipates the release of 5,041 tons of emissions. KMOG expects 6,252 pounds of HAP during one year of production.

DETAILS:

To ensure the wellbeing of those working and living near operations, KMOG contracts with a third-party environmental air quality expert to perform continuous air monitoring during drilling and completions.

Pre-Production Emissions								
	NOx	CO	VOCs	Methane	Ethane	CO2	N2O	TOTAL
Alfalfa 8-20HZ	97.30	107.62	13.32	2.23	0.47	10,846.80	0.06	11,067.79
Clover 2-29HZ	89.90	99.35	12.32	2.08	0.44	10,025.67	0.06	10,229.82
Rademacher 14-30HZ	134.33	149.08	18.52	3.80	0.90	15,007.32	0.08	15,314.02
								36,611.64

Production Phase Emissions								
	NOx	CO	VOCs	Methane	Ethane	CO2	N2O	TOTAL
Alfalfa 8-20HZ	1.9831	8.8991	6.1235	7.0695	2.53	1,367.12	0.02	1,393.75
Clover 2-29HZ	1.7156	8.6760	5.6066	6.4791	2.31	1,056.68	0.02	1,081.48
Rademacher 14-30HZ	2.8900	10.0500	12.8427	16.7842	6.29	2,517.10	0.04	2,566.00
								5,041.23

Pre-Production HAP	Benzene	Toluene	Ethylbenzene	Xylenes	n-Hexane	2,2,4-TMP	H2S	Formaldehyde	Methanol	Total (HAP)
Alfalfa 8-20HZ	490.29	1,201.76	122.68	286.56	3,343.80	304.92	0.00	0.00	0.00	5,750.00
Clover 2-29HZ	453.69	1,112.05	113.53	265.17	3,094.19	282.16	0.00	0.00	0.00	5,320.79
Rademacher 14-30HZ	679.63	1,654.85	168.66	394.60	4,595.14	418.72	0.00	0.00	0.00	7,911.61

Pre-Production HAP	Benzene	Toluene	Ethylbenzene	Xylenes	n-Hexane	2,2,4-TMP	H2S	Formaldehyde	Methanol	Total (HAP)
Alfalfa 8-20HZ	133.19	323.13	33.72	88.25	905.85	82.79	0.00	1.39	0.00	1,568.32
Clover 2-29HZ	122.81	298.46	31.02	79.45	835.79	76.37	0.00	1.00	0.00	1,444.91
Rademacher 14-30HZ	354.51	667.95	63.70	171.61	1,828.96	149.96	0.00	2.51	0.00	3,239.20

MITIGATION MEASURES:

KMOG anticipates minimal impact to air resources from its operations. KMOG's continued efforts to reduce emissions from pre-production and production create a very low emission footprint. Based on the Colorado Regulation 7 Emission Inventory, KMOG has the lowest intensity of any oil and gas operator in the State of Colorado. As a result of KMOG's proactive approach to emissions, KMOG has already met the 2030 intensity targets set in the CDPHE's recently adopted Regulation 22. KMOG's calculated 2022 intensity is 2.93 mtCO2e/kBOE and the year 2030 Regulation 22 targets are set at 6.80mtCO2e/kBOE. Although, KMOG is well ahead of the efforts to reduce emissions, KMOG continues to strive to find and apply innovative opportunities for emissions reduction across all operations

Over 6,900 air samples have been collected and analyzed for benzene and other hazardous air pollutants following EPA methods during pre-production operations. Results of all validated samples have been below Health Guidance Values complied by CDPHE. See Section 11 of the attached Air Monitoring Program on how the monitoring results are compared to the health guidance values (HGVs).

KMOG will continuously monitor for volatile organic compounds (VOC) and benzene monitors during drilling, completions and the first six months of production facility operations following the CDPHE approved monitoring plan for these locations.

During Drilling: Rig power will be supplied by two natural gas engines with a battery energy storage system and an automated engine management system. As necessary, a diesel generator will be used to supplement additional power during the highest demand portions of the wells. KMOG uses an automated engine management system that preferentially uses natural gas engines over diesel for rig power.

During Completions: During completions KMOG uses a closed loop system. As a standard practice, KMOG has also implemented the pipelined Water on Demand (WOD) system which will eliminate approximately 393,676 truck trips at the Sprout OGDP locations during completions activities.

During Flowback: Fluids will flow through separation equipment where the gas will be collected through a gas gathering line instead of vented or burned.

During Production: KMOG uses production facilities that have been designed to eliminate most emission sources. Oil will not be stored on location where it could cause emissions but will be gathered and sent via pipeline to a stabilization facility. This gathering system also reduces the number of vehicles visiting the location. In the Sprout OGDP, piping oil will eliminate 137,252 truck trips. Additionally, KMOG uses air actuated pneumatic devices rather than natural gas actuated devices. There will be no flaring of associated sales gas. There will be no compressor engines on location. Produced water can contain entrained gas, KMOG equips water storage tanks with combustion devices with a 98% destruction efficiency. If the pilot for the combustor goes out the location will be remotely shut in.

There will be maintenance tanks at the Rademacher Location, that will only be used during maintenance operations. These tanks are identified as "condensate tanks" on the Sprout OGDP Form 2B. The maintenance tanks are not used as part of normal operation and are only used to manually flow to the tanks for activities such as equipment blowdowns for maintenance or well unloading. In the event the tanks are utilized, it is standard KMOG practice to empty maintenance tanks within 24 hours in order to minimize emissions. The maintenance tanks are equipped with monitoring devices that report data such as temperature, pressure and fluid level and can be monitored from KMOG's IOC in Platteville. The maintenance tanks are attached to the tank vapor recovery piping that goes to the Enclosed Combustion Device (ECD). If any vapors are recovered, then they are sent to the ECD and not released into the atmosphere. Maintenance activities that send fluids to the maintenance tanks are recorded and emissions are quantified, reported, and permitted according to requirements in CDPHE Regulation 3 and Regulation 7. The maintenance tank is required to safely perform maintenance activities when deemed necessary. These are infrequent and not part of the normal operation of the facility.

KMOG will have permanent water storage tanks on the Rademacher location. The tanks will be controlled with VOC combustors. Tank emissions monitoring systems will be in place, which means that tank pressures will be continuously recorded, and the location will be shut in if tank pressures start to approach the pressure at which relief devices would vent emissions to the atmosphere. Therefore, the possibility of venting from tanks is eliminated. The tank components and control device will be on preventative maintenance schedules to ensure device integrity and minimize the potential for leaks/failure. The tanks (and entire facility) will have Leak Detection and Repair (LDAR) surveys completed. KMOG has a dedicated emissions team that conducts the LDAR program. This team performs weekly audio visual and olfactory (AVO) inspections to make sure equipment is working per design and in a manner safe for the environment. The entire facility will be inspected to ensure that there are not any leaks that can be detected using hearing, sight, or smell. If a leak is found it is reported to the state, repaired and reinspected with a FLIR camera to confirm the repair has been completed. Facilities will also be inspected for gas leaks at least monthly using an infrared camera. KMOG maintains the IOC where facilities are monitored and can be shut in remotely if a leak is suspected. Produced water will be piped from the Alfalfa and Clover locations eliminating 17,823 truck trips over the lifetime of the wells.

The reduction of 94 wells and 23 facility locations will remove the following potential sources of emissions: 27 water tanks and 54 oil tanks. The omission of approximately 1,572 truck trips annually to visit those locations will also reduce emissions.

REDUCTION OF POLLUTANTS - TPY (tons per year)			
NOx	VOC	CO	BZ
17.35	56.24	16.32	0.83

PUBLIC HEALTH RESOURCES

ANTICIPATED IMPACTS:

KMOG does not anticipate any negative impacts to public health.

MITIGATION MEASURES:

KMOG does not anticipate any impact to public health by its operations. As a part of the CPRN (Colorado Preparedness Response Network) KMOG will work alongside other operators to facilitate training drills. These drills and the presence of oil and gas operations in the area has the potential to enhance the capabilities and the watchfulness of the emergency responders.

The IOC staffed 24 hours per day, seven days per week, will remotely monitor the wells and facility. This enables KMOG to deploy appropriate resources quickly, efficiently, and to collaborate with local emergency response agencies as necessary. This system also helps reduce traffic.

PUBLIC WELFARE: NOISE, LIGHT, DUST, ODOR, VIEW

ANTICIPATED IMPACTS:

During the short-term pre-production activities KMOG anticipates an increase in truck traffic, minimal to no increase in noise and light. There are no anticipated odor impacts. As a result of plugging and reclaiming multiple wells nearby the visual quality of the area will be improved. Trucks will only be required to visit three locations rather than the 17 that will be reclaimed because of this work.

DETAILS:

Noise

KMOG contracted a third party to model noise and create a noise mitigation plan. Site-specific noise models were used to predict the future noise impact of the proposed operations and determine what noise mitigation measures, if any, would be required to demonstrate compliance with the ECMC maximum permissible noise levels. Noise modeling results were calculated and include the effects of local topography, buildings, barriers, and ground cover. The models use the anticipated drilling rig, quiet completions fleet and production equipment. The results of the noise modeling can be found in the Noise Mitigation and Monitoring Plans. At the Rademacher location four A-weighted compliance points were used 350 feet from the location towards RBUs and four C-weighted compliance points at 25 feet from the location towards RBUs. The Alfalfa location compliance points included 1 A-weighted point at 350 feet from the location toward the closest BU and 1 C-weighted point at the BU. The Clover location modeling utilized 2 A-weighted points at 350 feet from the location toward the closest RBUs/BUs and 3 C-weighted compliance points at the RBUs/BUs.

Alfalfa 8-20HZ

Pre-production Phase:

Unmitigated drilling operations noise levels are anticipated to be above the C-weighted MPNL of 65 dBC. Unmitigated completions operations noise levels are expected to be above the A weighted MPNL of 60 dBA. To reach compliance KMOG will place 800 linear feet of 32-foot STC32 sound walls and 100 feet of 24-foot STC43 during drilling, completions and flowback on 3 sides of the location.

Production:

Unmitigated production operations noise levels are anticipated to be within allowable limits for both Weld County and ECMC requirements, therefore no mitigation is required.

Clover 2-29HZ

Pre-production Phase:

Unmitigated drilling operations noise levels are anticipated to be above the C-weighted MPNL of 65 dBC. Unmitigated completions operations noise levels are modeled to be above the A weighted MPNL of 60 dBA. To reach compliance KMOG will place 1,540 linear feet of 32-foot STC32 sound walls and 80 feet of 24-foot STC43 walls on all sides of the location during drilling, completions and flowback.

Production:

Unmitigated production operations noise levels are anticipated to be within allowable limits for both Weld County and ECMC requirements, therefore no mitigation is required.

Rademacher 14-30HZ

Pre-production Phase:

Unmitigated drilling operations noise levels are anticipated to be above the C-weighted MPNL of 65 dBC. Unmitigated completions operations noise levels are modeled to be above the A weighted MPNL of 60 dBA and the C-weighted limits of 65 dBC. To reach compliance KMOG will place 1,340 linear feet of 32-foot STC32 sound walls and 100 feet of 24-foot STC43 walls on the north, west and southern sides of the location during drilling, completions and flowback.

Production:

Unmitigated production operations noise levels are anticipated to be within allowable limits for both Weld County and ECMC requirements, therefore no mitigation is required.

Light

Site specific three-dimensional lighting models were developed for each of the phases of this development to determine their associated lighting impacts. The lighting fixtures used in the models were selected based on currently operated representative sites and research conducted into available vendor lighting systems. All calculated values fall well below the prescribed regulatory limits with all calculated light values falling below 1 lx. This light level is similar to a clear night with a full moon.

Alfalfa 8-20HZ

Calculated Lighting Impact Results Building Units				
Location Unit No.	Drilling	Completions	Production	Regulatory Limit
1	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
2	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
3	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
4	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
5	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
6	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
7	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
8	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
9	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
10	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
11	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
12	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
13	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
14	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
15	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
16	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
17	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
18	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
19	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
20	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
21	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux

Clover 2-29HZ

Calculated Lighting Impact Results Building Units				
Location Unit No.	Drilling	Completions	Production	Regulatory Limit
1	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
2	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
3	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
4	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
5	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
6	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
7	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
8	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
9	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
10	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
11	0.12 lux	0.26 lux	< 0.1 lux	4 lux
12	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
13	0.14 lux	0.12 lux	< 0.1 lux	4 lux
14	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
15	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
16	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
17	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
18	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
19	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
20	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
21	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
22	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux

Rademacher 14-30HZ

Calculated Lighting Impact Results Building Units				
Location Unit No.	Drilling	Completions	Production	Regulatory Limit
1	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
2	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
3	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
4	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
5	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
6	< 0.1 lux	0.12 lux	< 0.1 lux	4 lux
7	< 0.1 lux	0.1 lux	< 0.1 lux	4 lux
8	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
9	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
10	0.1 lux	0.24 lux	< 0.1 lux	4 lux
11	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
12	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
13	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
14	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux
15	0.32 lux	0.25 lux	< 0.1 lux	4 lux
16	< 0.1 lux	0.13 lux	< 0.1 lux	4 lux
17	0.15 lux	0.25 lux	< 0.1 lux	4 lux
18	< 0.1 lux	< 0.1 lux	< 0.1 lux	4 lux

Truck Traffic

KMOG anticipates at total of 116,700 (49,565 monthly) truck trips during the drilling and completions phase. When the locations reach production phase the truck traffic will be reduced to 968 annual (81 monthly) trips throughout the anticipated 25-year life of the facility.

MITIGATION MEASURES:

Noise:

Although operations are conducted 24/7, at night KMOG aims to minimize all non-essential work. In order to protect receptors KMOG will install sound reduction walls during pre-production operations at all Sprout OGDP Locations. KMOG will install sound walls on the north, west and portions of the southern sides of the location at the Rademacher 14-30HZ Location. Sound walls will be installed on the west, north and east sides of the Alfalfa Location and on all sides of the Clover location. KMOG has gone to considerable lengths to modify the rigs available to significantly reduce noise by not only using the quietest shale shaker model available, but also installing vibrating pads below shaker mounts. Extreme grade exhaust silencers are used on engines and drawworks traction motor. The generator house is fully enclosed with sound dampening louver boxes. KMOG utilizes quiet completion fleets whose engines are boxed to reduce noise pollution. Testing has shown that this equipment is substantially quieter than traditional models.

Light:

KMOG uses Light-emitting diode (LED) fixtures to the extent possible that are angled downward and inward toward the location and away from homes and businesses to reduce skyglow. LED lights not only use less energy and last longer, but they also emit light in a specific direction unlike incandescent and Compact Fluorescent lamps (CFL) bulbs which emit light in all directions. Lights are directed to task areas only and switched off when not needed. Light masts are automatically switched off/on based on lighting

sensors. Low power (63W) LED lights are used for the drill rig. Lighting within the Production area has been reduced to provide OSHA's minimum acceptable value for safe operations.

Truck Traffic:

To minimize truck traffic, KMOG utilizes a design that eliminates oil storage from location, reduces emissions, reduces the footprint of the pad and the number of truck trips to location. The condensate produced from this location will flow off-site through a pipeline, eliminating the need for trucks to transport oil. This system eliminates approximately 80% of KMOG's post-production traffic. KMOG transports the water used in hydraulic fracturing through the Water-On-Demand pipeline system. Since its inception in 2012, this technology has enabled KMOG to eliminate more than 25 million miles of truck traffic. At these locations this will eliminate 393,676 truck trips. During production, trucks will only visit two locations instead of 17 locations within the area, thereby reducing associated emissions, odors, dust, and noise.

Dust:

Sand boxes are used during hydraulic stimulation to reduce the risk of silica dust. Road dust will be controlled by implementing a strict 10 mph speed limit on the lease roads and 5 mph speed limit on location. If necessary KMOG will spray down the lease roads with water. KMOG will attempt to minimize the tracking of mud onto roads. Street sweepers will be utilized if mud tracking becomes an issue. Access roads and Vehicle Tracking Control will receive maintenance as needed throughout operations. KMOG will respond quickly and work with the jurisdiction responsible to address any concerns related to county road damages.

Odor:

Although no odor impacts are anticipated, KMOG will suppress odors using closed loop systems and Group III mud. KMOG will address any citizen concerns regarding odor within 24 hours.

Scenic Value:

The scenery in the area will be changed both during pre-production and production phases. The plugging of 94 older wells will eliminate 23 facilities locations in the area, older equipment will be removed from those locations, including 27 water tanks and 54 oil tanks.