# Cumulative Impacts Plan

**for the**

**TEP Rocky Mountain LLC**
**Arco Deep 1-27**
**Oil and Gas Development Plan**

**Prepared by**

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## INTRODUCTION

Edge Environmental, Inc. (Edge) was asked by TEP Rocky Mountain LLC (TEP) to prepare a Cumulative Impacts Plan pursuant to Colorado Oil and Gas Commission's (COGCC's) Rule 304.c.(19). This plan documents how the Operator (TEP) would address cumulative impacts to resources identified pursuant to Rule 303.a.(5).

This Cumulative Impacts Plan for the Arco Deep 1-27 Oil and Gas Development Plan (OGDP) was prepared based on the preliminary Oil and Gas Location Assessment (Form 2A) and Cumulative Impacts Data Identification (Form 2B) documentation provided by TEP. The Arco Deep 1-27 pad (COGCC Location ID #322539) is an existing Oil and Gas Location on private land owned by Allen Kelton, which overlies private minerals. The existing Arco Deep 1-27 pad would be reconstructed and slightly expanded to accommodate the drilling, completion, and production of 16 proposed directional natural gas wells. The existing Arco Deep 1-27 pad is located within NE¼SW¼ of Section 27, Township 6 South, Range 97 West, 6th P.M., within Garfield County, Colorado. The Oil and Gas Location is approximately 8.68 miles northwest of the Town of Parachute, Colorado. The existing access road from Garfield County Road 215 would be used to access the existing oil and gas location. The existing access road is approximately 11.08 miles in length from Garfield County Road 215 to the oil and gas location. The 16 proposed wells would be directionally drilled into the underlying Fee lease. In support of the Arco Deep 1-27 pad development, TEP would utilize an existing oil and gas location, the MV 1-23 pad (COGCC Location ID #322524) as a remote support facility during well completion operations associated with the proposed wells on the Arco Deep 1-27 pad.

The existing MV 1-23 pad would be re-constructed within the current limits of disturbance to support temporary placement and operations of well completion equipment and Minion Tanks (aka Modular Large Volume Tanks). The MV 1-23 pad is located on private surface, owned by Puckett Land Company, in the NW¼NW¼ of Section 23, Township 6 South, Range 97 West, 6th P.M.

To support production operations on the Arco Deep 1-27 pad, TEP would install one 8-inch steel natural gas pipeline (approximately 8,513 feet in length) from the proposed separators on the Arco Deep 1-27 pad to the existing 8-inch natural gas pipeline tie-in point, operated by TEP, located in the SW¼NW¼ of Section 23, Township 6 South, Range 97 West, 6th P.M. In addition, TEP would install one 6-inch FlexSteel or Coreline produced water pipeline (approximately 8,180 feet in length) from the proposed produced water pump on the Arco Deep 1-27 pad to the existing water pipeline tie-in point, located in the SW¼NW¼ of Section 23, Township 6 South, Range 97 West, 6th P.M. TEP would install several on-location pipelines to support onsite production operations.

Well completion operations associated with the proposed wells on the Arco Deep 1-27 pad would be conducted from the existing MV 1-23 pad. Water would be transported to the MV 1-23 pad via existing water pipelines operated and maintained by TEP and two 10-inch temporary surface water pipelines (approximately 1,638 feet in length each). TEP would install five 4.5-inch steel temporary surface frac lines (approximately 10,189 feet in length each) from the MV 1-23 pad to the Arco Deep 1-27 pad to support remote frac and flowback operations. Recycled produced water would be pumped from existing TEP operated water management facilities to the Arco Deep 1-27 pad during well completion operations.

Construction activities for the Arco Deep 1-27 pad and the associated support facilities are scheduled to begin in May 2023 and are expected to take approximately 60 days to complete. Construction of the cross-country portion of the pipeline would not occur until after July 15. Drilling operations for the 16 proposed directional wells would begin in July 2023. Drilling operations are expected to take approximately 108 days and should be completed in October 2023. Well completion operations are expected to take approximately 170 days and should be completed in April 2024. Interim reclamation of the Arco Deep 1-27 pad would start in July 2024 and be completed in August 2024, within 6 months following completion of well construction and stimulation activities. Site reclamation is dependent on weather conditions and project scheduling. Development may be accelerated or delayed based on market conditions and company constraints.

## SUMMARY OF RESOURCE IMPACTS

### Air Resources

Air emissions produced during the pre-production and production phases of development have been evaluated based on the scale and scope of the proposed Arco Deep 1-27 OGDP for the following pollutants: oxides of nitrogen (NOx), carbon monoxide (CO), volatile organic compounds (VOCs), methane ($CH_4$), ethane ($C_2H_6$), carbon dioxide ($CO_2$), and nitrous oxide ($N_2O$).

A quantitative evaluation of the incremental increase in pollutants has been estimated for the entire proposed Arco Deep 1-27 OGDP. The emissions estimate includes both stationary and mobile sources of emissions during all pre-production activities (see Table 1) and both stationary and mobile sources of emissions for the first year of production based on all proposed wells and equipment (see Table 2). Pre-production activities are expected to occur from May 2023 through April 2024 and production would occur beginning in year 2024. Diesel vehicle miles for various project activities have also been estimated (see Table 3).

**Table 1**
**Pre-Production Pollutant Emissions (tons) for the Arco Deep 1-27 OGDP**

| Component | NOx | CO | VOCs | $CH_4$ | $C_2H_6$ | $CO_2$ | $N_2O$ |
|---|---|---|---|---|---|---|---|
| Process Heaters or Boilers | 1.23 | 1.03 | 0.07 | 0.03 | 0.04 | 1,476.59 | 0.03 |
| Storage Tanks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.04 | 0.00 |
| Venting or Blowdowns | - | - | - | - | - | - | - |
| Combustion Control Devices | - | - | - | - | - | - | - |
| Non-road Internal Combustion Engines | 163.56 | 138.88 | 6.53 | 40.25 | 3.28 | 14,318.06 | 0.00 |
| Drill Mud | - | - | 1.47 | -- | - | - | - |
| Flowback or Completions | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Loadout | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total Emissions** | 164.79 | 139.91 | 8.07 | 40.28 | 3.32 | 15,795.69 | 0.03 |

**Table 2**
**One Year Production Pollutant Emissions (tons) for the Arco Deep 1-27 OGDP**

| Component | NOx | CO | VOCs | $CH_4$ | $C_2H_6$ | $CO_2$ | $N_2O$ |
|---|---|---|---|---|---|---|---|
| Stationary Engines or Turbines | - | - | - | - | - | - | - |
| Process Heaters or Boilers | 1.07 | 0.90 | 0.06 | 0.02 | 0.03 | 1,288.24 | 0.00 |
| Storage Tanks | 0.40 | 1.81 | 1.98 | 1.85 | 0.90 | 500.55 | 0.01 |
| Dehydration Units | - | - | - | - | - | - | - |
| Pneumatic Pumps | - | - | - | - | - | - | - |
| Pneumatic Controllers | - | - | - | - | - | - | - |
| Separators | - | - | - | - | - | - | - |
| Fugitives | - | - | 0.13 | 0.88 | 0.12 | 0.00 | - |
| Venting or Blowdown | - | - | - | - | - | - | - |
| Combustion Control Devices | - | - | - | - | - | - | - |
| Non-Road Internal Combustion Engines | - | - | - | - | - | - | - |
| Loadout | 0.01 | 0.06 | 0.05 | 0.04 | 0.02 | 15.08 | 0.00 |
| Well Bradenhead | - | - | - | - | - | - | - |
| Well Maintenance | - | - | 0.43 | 2.84 | 0.39 | 0.01 | - |
| **Total Emissions** | 1.48 | 2.77 | 2.65 | 5.63 | 1.46 | 1,803.88 | 0.01 |

**Table 3**
**Diesel Vehicle Miles for the Arco Deep 1-27 OGDP**

| Activity | Miles |
|---|---|
| Construction | 4,073 |
| Drilling | 19,665 |
| Completion | 10,371 |
| Interim reclamation | 383 |
| Production (1st year only) | 2,610 |
| **Total** | **37,102** |

The maximum total criteria pollutant emissions (NOx, CO, and VOCs) for the Arco Deep 1-27 OGDP pre-production and production activities are estimated as: 166.3, 142.7, 10.7 tons per year (tpy), respectively. These total emissions conservatively assume that all pre-production emissions could occur in a one-year period. Project emissions of the greenhouse gases $CO_2$, $CH_4$, and $N_2O$ from pre-production and production activities are quantified in terms of $CO_2$ equivalents ($CO_2e$). Greenhouse gases (GHGs) have various capacities to trap heat in the atmosphere, which are known as global warming potentials (GWPs). GWPs are related to different time intervals to fully account for the gases' ability to absorb infrared radiation (heat) over their atmospheric lifetimes. Carbon dioxide has a GWP of 1, so for the purposes of the analysis, a GHG GWP is generally standardized to a $CO_2e$, or the equivalent amount of $CO_2$ mass the GHG would represent. Methane has a current estimated GWP between 28 (gas alone) and 36 (with climate feedbacks). $N_2O$ has a GWP of 298. The total pre-production and production GHG emissions (sum of $CH_4$, $CO_2$, and $N_2O$ emissions reported as $CO_2e$ in units of million metric tons [MMT]) are estimated as 0.02 MMT.

The Bureau of Land Management (BLM) developed an Environmental Assessment (EA) for the Upper Beaver Creek Project (BLM, 2022a). As part of the air quality assessment performed for the EA, an air emissions inventory was compiled that included the proposed development of 18 wells on the nearby Honea 19-05 well pad, and 21 wells on the nearby South Leverich 13-09 well pad. The emissions inventory includes criteria pollutant emissions (NOx, CO, and VOCs) and greenhouse emissions ($CO_2$, $CH_4$, and $N_2O$) from pre-production and production activities. Air quality modeling was performed using project NOx emissions to estimate 1-hour $NO_2$ concentrations at nearby residences in the vicinity of the well pads. Model impacts were estimated to be below the National Ambient Air Quality Standards (NAAQS) and Colorado Ambient Air Quality Standards (CAAQS). Also, as part of the air assessment, the Colorado Air Resource Management Modeling Study – version 2.0 (CARMMS) (BLM, 2017a) was used to estimate reasonably foreseeable future near-field air quality conditions for the area surrounding the proposed project. The CARMMS analysis included cumulative air emissions for year 2015 and future year emissions of NOx and VOCs from increased total (Federal and non-Federal) oil and gas development/operations through year 2025 (post-2015) in the area surrounding the proposed project, which includes the Arco Deep 1-27 OGDP NOx and VOC emissions.

CARMMS analysis predicted that the contributions of cumulative air quality from Federal and non-Federal project-specific maximum potential annual emissions (full development plus one full year of production occurring in the same year) would be below the applicable NAAQS and CAAQS for 1-hour ozone and 1-hour $NO_2$ concentrations.

In addition, as part of air quality assessment performed for a BLM EA of a similar nearby TEP project for the Proposed Balzac Gulch – Phase I Oil and Gas Master Development Plan Project (Balzac Gulch EA) (BLM 2017b), CO and NOx emissions from pre-production and production operations were quantified. The total CO and NOx emissions, 92.3 and 131.2 tpy respectively, are of similar magnitude to the level of project emissions presented above (CO – 142.7 tpy and NOx – 166.3 tpy).

Air quality modeling was performed to estimate near-field impacts of CO and $NO_2$ concentrations from project activities. Predicted CO and $NO_2$ concentrations were estimated to be below the applicable NAAQS and CAAQS.

Therefore, based on the analyses performed for the Upper Beaver Creek and Balzac Gulch projects, it is estimated that the CO and NOx emissions resulting from the reconstruction and expansion of the Arco Deep 1-27 pad and the drilling of 16 natural gas wells from the well pad would not cause or contribute to any exceedance of the CO and $NO_2$ ambient air quality standards.

Cumulative Impacts

The BLM Colorado State Office air resource specialists prepared an Annual Report (Version 2.0) as a comprehensive assessment tool to assist in the preparation of project level NEPA for oil and gas development projects (BLM 2022b). The Annual Report 2.0 provides up-to-date information on oil and gas development (current regulations, rates for drilling and production, emission inventories, etc.) and the state of the atmosphere (air pollutant concentration trends, air quality related values, etc.) for each applicable Colorado field office or planning area. The report also places this information in the context of the CARMMS, which provides cumulative analyses for multiple projected oil and gas development scenarios in Colorado through year 2025 for CARMMS 2.0 (BLM 2017a).

Section 4.1 of the BLM Annual Report presents data for cumulative emissions from new Federal and non-Federal oil and gas development within the BLM Colorado River Valley Field Office (CRFVO) as compared to the emissions scenarios analyzed by CARMMS and qualitatively scales the CARMMS projected impacts to the cumulative report year emissions (year 2020) to provide a context for the current cumulative impacts. This section is referenced to set the context for the project's current cumulative impacts at field office scales. As described in the BLM Annual Report, CRFVO specific contributions to cumulative air quality concentrations and air quality related values (visibility, deposition, etc.) for sensitive areas around the region (with the exception of the Eagles Nest and Flat Tops Wilderness Areas) are predicted to be minimal and insignificant with respect to accepted impact thresholds for new foreseeable Federal and non-Federal oil and gas development post-2015 through year 2025. However, the report year (2020) data indicates that the nitrogen deposition impacts are exceeding the project level deposition analysis threshold (DAT) (0.005 kilogram per hectare per year [kg/ha-yr]) at the Eagles Nest Wilderness, and also, at the Flat Tops Wilderness Area (0.008 kg/ha-yr).

No adverse project impacts to air resources are anticipated as a result of construction (short-term) and production (long-term) operations for the Arco Deep 1-27 OGDP. Adverse cumulative impacts are not expected as a result of project implementation.

Specific Measures Taken to Avoid or Minimize Cumulative Adverse Impacts

Implementation of BMPs and the Dust Mitigation Plan provided in the Form 2A, as well as the implementation of an Air Monitoring Program as required by CDPHE avoids and minimizes project impacts to air resources and therefore, no adverse cumulative impacts are expected.

Measures to Mitigate or Offset Cumulative Adverse Impacts

As mentioned above, no project or cumulative adverse impacts to air resources are anticipated from the implementation of the Arco Deep 1-27 OGDP and therefore, no mitigation or offsets are proposed.

**Public Health**

A quantitative evaluation of the incremental increase in total hazardous air pollutant (HAPs) emissions (benzene, toluene, ethylbenzene, xylene, 2,2,4-trimethylpentane, hydrogen sulfide, formaldehyde, and methanol) and for specific HAPs emissions with known health impacts were estimated for the entire proposed Arco Deep 1-27 OGDP. The emissions estimate includes both stationary and mobile sources of emissions during all pre-production activities (see Table 4) and both stationary and mobile sources of emissions for the first year of production based on all proposed wells and equipment (see Table 5). The estimated number of vehicle trips is listed in Table 6.

**Table 4**
**Pre-Production Hazardous Air Pollutants Emissions (lbs) for the Arco Deep 1-27 OGDP**

| Component | Benzene | Toluene | Ethyl benzene | Xylenes | n-Hexane | 2,2,4-Trimethylpentane | Hydrogen sulfide | Formaldehyde | Methanol | Total HAPs |
|---|---|---|---|---|---|---|---|---|---|---|
| Process Heaters or Boilers | - | - | - | - | - | - | - | 1.85 | - | 1.85 |
| Storage Tanks | 0.08 | - | - | - | 0.09 | - | - | - | - | 0.17 |
| Venting or Blowdowns | - | - | - | - | - | - | - | - | - | - |
| Combustion Control Devices | - | - | - | - | - | - | - | - | - | - |
| Non-road Internal Combustion Engines | 248 | 116 | 7 | 55 | 71 | - | - | 3,710 | - | 4,207 |
| Drill Mud | - | 107 | 145 | 6 | 107 | - | - | - | 107 | 472 |
| Flowback or Completions | - | - | - | - | - | - | - | - | - | - |
| Loadout | - | - | - | - | - | - | - | - | - | - |
| **Total Emissions** | **248.08** | **223.00** | **152.00** | **61.00** | **178.09** | **0** | **0** | **3,711.85** | **107.00** | **4,681.02** |

**Table 5**
**One Year Production Hazardous Air Pollutants Emissions (lbs) for the Arco Deep 1-27 OGDP**

| Component | Benzene | Toluene | Ethyl benzene | Xylenes | n-Hexane | 2,2,4-Trimethylpentane | Hydrogen sulfide | Formaldehyde | Methanol | Total HAPs |
|---|---|---|---|---|---|---|---|---|---|---|
| Stationary Engines or Turbines | - | - | - | - | - | - | - | - | - | - |
| Process Heaters or Boilers | - | - | - | - | - | - | - | 2 | - | 2 |
| Condensate Tanks | 19 | - | - | - | 80 | - | - | | | 99 |
| Produced Water Tanks | 2 | - | - | - | 3 | - | - | | | 5 |
| Dehydration Units | - | - | - | - | - | - | - | - | - | - |
| Pneumatic Pumps | - | - | - | - | - | - | - | | - | - |
| Pneumatic Controllers | - | - | - | - | - | - | - | - | - | - |
| Separators | - | - | - | - | - | - | - | | | - |
| Fugitives | 1 | | | | 4 | | | | | 5 |
| Venting or Blowdowns | - | - | - | -- | - | - | - | - | - | - |
| Combustion Control Devices | - | - | - | - | - | - | - | - | - | - |
| Non-Road Internal Combustion Engines | - | - | - | - | - | - | - | - | - | - |
| Loadout | 1 | - | - | - | 2 | - | - | - | - | 3 |
| Well Bradenhead | - | - | - | - | - | - | - | - | - | - |
| Well Maintenance | 4 | 7 | | 3 | 28 | 3 | - | - | - | 45 |
| **Total Emissions** | **27.00** | **7.00** | **0** | **3.00** | **117.00** | **3.00** | **0** | **2.00** | **0** | **159.00** |

**Table 6**
**Estimate Number of Vehicle Trips for the Arco Deep 1-27 OGDP**

| Activity | Vehicle Trips (monthly) | Vehicle Trips (annually) |
|---|---|---|
| Construction | 211 | 421 |
| Drilling | 843 | 3,034 |
| Completion | 381 | 2,161 |
| Interim reclamation | 77 | 77 |
| Production | 39 | 466 |

Qualitative Evaluation of Potential Acute or Chronic, Short- or Long-Term Incremental Impacts

*Pre-Production*. As part of an air quality assessment performed for the Balzac Gulch EA (BLM 2017b), individual HAP emissions from pre-production operations were quantified. The total HAPs emissions, 0.20 tpy include benzene, toluene, ethylbenzene, xylenes, n-hexane, and formaldehyde emissions of 0.08, 0.04, 0.0005, 0.02, 0.04, and 0.007 tpy, respectively. These HAP emissions are of similar magnitude to the level of Arco Deep 1-27 OGDP pre-production HAP emissions (benzene, toluene, ethylbenzene, xylenes, n-hexane, and formaldehyde) presented above (0.12, 0.11, 0.08, 0.03, 0.09, and 1.86 tpy, respectively).

Impacts from pre-production HAP emissions were not estimated or analyzed as part of the Balzac Gulch EA (BLM 2017b) given that the emissions from pre-production activities are from short-term activities and do not occur over the lifetime of the project. Also, these HAP emissions are less than those which could occur from production activities. As part of the Balzac Gulch EA (BLM 2017b) impacts from production HAP (benzene, toluene, ethylbenzene, xylenes, n-hexane, and formaldehyde) emissions in the vicinity of the well pads were analyzed and the potential maximum acute (short-term; 1-hour) and long-term (annual) HAP concentrations were estimated to be well below applicable health thresholds for these HAPs. Therefore, it is estimated the HAP emissions resulting from the reconstruction of the Arco Deep 1-27 well pad and drilling of 16 natural gas wells would not cause or contribute to any potential acute or chronic, short-or long-term incremental impacts to public health.

2,2,4-trimethylpentane, hydrogen sulfide, and methanol HAP emissions from pre-production activities were estimated and are shown in Table 4. These emissions are estimated as 0.0, 0.0, and 0.05 tpy, respectively. Although these HAPs were not specifically modeled in the Balzac Gulch EA (BLM 2017b), the emissions levels are less than the project benzene emissions (which were modeled). Given that the applicable short-term; 1-hour) and long-term (annual) health thresholds for these HAPs are above the levels applicable to benzene it is estimated the short-term and long-term concentrations for these HAPs would be well below applicable health thresholds.

*Production*. As part of an air quality assessment performed for the Balzac Gulch EA (BLM 2017b), individual HAP emissions from production operations were quantified. The total HAPs emissions, 1.01 tpy include benzene, toluene, ethylbenzene, xylenes, n-hexane, and formaldehyde emissions of 0.16, 0.23, 0.01, 0.09, 0.48, and 0.04 tpy, respectively. These HAP emissions are of similar magnitude to the level of project production HAP emissions (benzene, toluene, ethylbenzene, xylenes, n-hexane, and formaldehyde) presented above (0.01, 0.0004, 0.0, 0.002, 0.1, and 0.001 tpy, respectively).

As part of the Balzac Gulch EA (BLM 2017b), impacts from production HAP emissions (benzene, toluene, ethylbenzene, xylenes, n-hexane, and formaldehyde) in the vicinity of the well pads were analyzed and the potential maximum acute (short-term; 1-hour) and long-term (annual) HAP concentrations were estimated to be well below applicable health thresholds for these HAPs. In addition, long-term exposures to emissions of suspected carcinogens (benzene, ethylbenzene, and formaldehyde) were evaluated based on estimates of the increased latent cancer risk over a 70-year lifetime. The estimated cancer risk from these HAPs was shown to be below acceptable cancer risk levels. Therefore, it is estimated the HAP emission resulting from the production activities from 16 natural gas wells on the Arco Deep 1-27 pad would not cause or contribute to any potential acute or chronic, short-or long-term incremental impacts to public health.

2,2,4-trimethylpentane, hydrogen sulfide, and methanol HAP emissions from production activities were estimated and are shown in Table 5. These emissions are estimated as 0.002, 0.0, and 0.0 tpy, respectively. Although these HAPs were not specifically modeled in the Balzac Gulch EA (BLM 2017b), the emissions levels are less than the project benzene emissions (which were modeled). Given that the applicable short-term (1-hour) and long-term (annual) health thresholds for these HAPs are above the levels applicable to benzene, it is estimated that the short-term and long-term concentrations for these HAPs would be well below applicable health thresholds.

Cumulative Impacts

No applicable cumulative (regional) HAP modeling analyses are available for the area to estimate cumulative HAP impacts. However, as described above, the HAP emissions for the Balzac Gulch EA (BLM 2017b) are comparable to the Arco Deep 1-27 OGDP HAP emissions. Impacts from the Balzac Gulch HAP emissions (benzene, toluene, ethylbenzene, xylenes, n-hexane, and formaldehyde) in the vicinity of the well pads were analyzed and the potential maximum acute (short-term; 1-hour) and long-term (annual) HAP concentrations were estimated to be well below applicable health thresholds for these HAPs. In addition, long-term exposures to emissions of suspected carcinogens (benzene, ethylbenzene, and formaldehyde) were evaluated based on estimates of the increased latent cancer risk over a 70-year lifetime. The estimated cancer risk from these HAPs was shown to be below acceptable cancer risk levels.

Therefore, no adverse project impacts to public health are anticipated as a result of construction (short-term) and production (long-term) operations for the Arco Deep 1-27 OGDP. Adverse cumulative impacts are not expected as a result of project implementation.

Specific Measures Taken to Avoid or Minimize Cumulative Adverse Impacts

Implementation of BMPs included in the Form 2A and the Dust Mitigation Plan attached to the Form 2A, as well as the implementation of an Air Monitoring Program as required by CDPHE avoids and minimizes project impacts to public health and therefore, no adverse cumulative impacts are expected.

Measures to Mitigate or Offset Cumulative Adverse Impacts

As mentioned above, no project or cumulative adverse impacts to public health are anticipated from implementation of the Arco Deep 1-27 OGDP and therefore, no mitigation or offsets are proposed.

**Water Resources**

The total planned on-location storage volumes of oil, condensate, produced water, and other hydrocarbons, chemicals, and waste fluids are listed in Table 7. TEP would follow measures described in the Waste Management Plan attached to the Form 2A, such as identification and cleanup of localized spills and excavation of any impacted soils to avoid and minimize impacts resulting from spills.

**Table 7**
**Planned On-Location Storage Volumes for the Arco Deep 1-27 OGDP**

| Material Stored | Number of Tanks | Individual Capacity (barrels) | Total Capacity (barrels) |
|---|---|---|---|
| Oil | 0 | -- | 0 |
| Condensate | 2 | 500 | 1,000 |
| Produced water | 6 | 400 | 2,400 |
| Gun Barrel | 1 | 500 | 500 |
| Blowdown/vent tank | 0 | -- | 0 |
| Knockout tank | 0 | -- | 0 |
| Methanol tank | 0 | -- | 0 |
| Chemicals | 4 | 12 | 48 |
| **Total** | **13** | **--** | **3,948** |

The Hydrology Map, attached to the Form 2A, shows the presence and distance to surface water and groundwater features (see Table 8). The Arco Deep 1-27 well pad is in proximity (within 0.25 mile) of six intermittent drainages (only three of the drainages are down gradient of the well pad) and therefore, this pad location is designated as a sensitive area for water resources (see Sensitive Area Determination, attached to the Form 2A for a detailed summary of this classification). The three intermittent drainages are located 230 feet to the south, 305 feet to the northwest, and 739 feet to the east of the well pad. The two nearest intermittent drainages bracket the outer flanks of the potential flow path oriented southeast of the well pad. Potential spill release from the pad does not have a defined pathway to these drainages located within 0.25 mile of the site due to potential fluid flow being diffused by vegetation, soil, and rocks. The remaining three hydrologic features are unnamed drainages and are located 1,399 feet north, 1,945 feet south, and 2,239 feet west of the well pad. These three unnamed drainages are located outside the potential flow path of the well pad and distant enough to not receive flow from a potential site release. Intermittent drainages discharge to East Fork, a perennial stream, in the bottom of Bakers Gulch located approximately 0.9 to 1.3 miles south of the well pad and eventually to Conn Creek and the Colorado River. Site grading would provide control measures minimizing potential fluid migration off site.

The nearest spring is located 3,048 feet east of the Arco Deep 1-27 pad. No wetlands were identified within the immediate vicinity of the Arco Deep 1-27 pad. Best Management Practices (BMPs) would be installed during site construction which would eliminate preferential pathways for offsite depression flow using earthen berms and diversion ditches. All newly constructed BMPs would be closely monitored and maintained to ensure complete on-site containment of a potential release. This includes measures taken by TEP to route the proposed pipeline away from surface water features.

**Table 8**
**Distance to Nearest Downgradient Surface Waters**
**and Public Water Systems for the Arco Deep 1-27 OGDP**

| Description | Distance (feet) | Direction | Baseline Condition |
|---|---|---|---|
| Riparian Corridor | >2,640 | S | Perennial Stream |
| Wetlands | >2,640 | SW | Perennial Stream |
| Surface Waters of the State | 230 | S | Intermittent Stream |
| Public Water System Intake | >2,640 | S | No PWS intakes within 1-mile of the working pad surface (WPS) |
| **Additional Information** | | | |
| Sensitive Area | Yes | | |
| Estimated Depth to Groundwater | >50 feet | | |
| Evaluation of the potential impacts to the Public Water System Intake within 5,280 feet of the WPS | None, No PWS intakes within 1 -mile of WPS. | | |

TEP has implemented and maintains a Spill Prevention, Control and Countermeasure Plan (SPCC), which is a basin wide emergency spill response plan as required by Title 40, Code of Federal Regulations, Part 112 (40 CFR 112) as administered by the EPA. This plan describes measures implemented by TEP to prevent discharges from occurring and also, describes response measures to mitigate the impacts of a potential discharge. TEP has also implemented and maintains a Drilling and Workover Facilities Integrated Spill Prevention, Control, and Countermeasures Plan, as required by 40 CFR Part 112.10, which describes measures to prevent spills and releases during drilling, completions, and workover operations.

The working pad surface (WPS) of the Arco Deep 1-27 pad is not within 2,640 feet of a Groundwater Under the Direct Influence of Surface Water (GUDI) well, a Type III Well as defined by Rule 411.b.(1).B and 411.b.(1).D, or a surface water feature segment that is 15 miles or less upstream from a Public Water System intake. TEP overlaid the available GUDI well and Type III Well data from the COGCC to determine if the proposed operations would be within 2,640 feet of these wells. Additionally, TEP identified the Public Water System intake locations downstream of the Arco Deep 1-27 pad and determined that all proposed operations would not fall within 15 stream miles of an active Public Water System intake.

Colorado State Engineers Office and U.S. Geological Survey (USGS) records were reviewed indicating only one permitted stock well (permit no. 233234) located 9,775 feet northeast of the Arco Deep 1-27 pad. The hand-dug stock well is a developed, shallow spring approximately 2 feet deep plumbed to a cabin approximately 1,280 feet downgradient of the spring. Static depth to groundwater was not provided in the State well records search. Dominant upland vegetation indicates unsaturated soil conditions without hydric indicators of shallow groundwater conditions. Hydrogeological indicators do not support the occurrence of shallow groundwater at the site, and depth to groundwater is greater than 50 feet and possibly greater than 100 feet. The greater than 50 feet depth to groundwater was determined during well pad construction where the maximum well pad cut and completed pit was dug to 50 feet without encountering groundwater. Potential impact to groundwater resources is deemed to be low based on the site hydrogeology.

The use of fresh water would be limited to that used for drilling and for dust control. Water use would be reduced by recycling produced water for completion operations. It is estimated that 3,000 barrels of fresh water would be required for dust control during construction, 4,000 barrels of fresh water would be required to drill a single well (64,000 barrels for 16 wells), and 500 barrels

of fresh water per well would be required for dust control (8,000 barrels for 16 wells) for a total of 75,000 barrels of fresh water. In addition, 132,000 barrels of water (recycled produced water) would be required for completion of a single well (2,112,000 barrels for 16 wells). Fresh water required for drilling operations (surface, intermediate, and production casing) and dust control, would be transported by truck from the Parachute Creek Fresh Water Takeout. The Parachute Creek Fresh Water Takeout is located on Parachute Creek on TEP property west of County Road 215. Water trucks would utilize existing county roads and lease roads and would follow existing truck routes where applicable. Water for well completion would be sourced from recycled produced water. Estimated water usage is listed in Table 9. A total of 96 percent of the total water used for drilling and completion would be recycled.

**Table 9**
**Drilling and Completion**
**Estimated Water Usage for the Arco Deep 1-27 OGDP**

| Type | Volume (barrels) |
|---|---|
| Surface water | 75,000 |
| Groundwater | 0 |
| Recycled water (produced water) | 2,112,000 |
| Recycled water (non-produced water) | 0 |
| Unspecified source | 0 |
| **Total** | 2,187,000 |
| **Percentage recycled** | **96** |

Based on the project design and implementation of the measures described above, potential impacts to surface water and groundwater are deemed to be low.

Cumulative Impacts

No adverse impacts to water resources are anticipated as a result of construction (short-term) and production (long-term) operations for the Arco Deep 1-27 OGDP. Adverse cumulative impacts are not expected as a result of project implementation.

Specific Measures Taken to Avoid or Minimize Cumulative Adverse Impacts

Implementation of the measures described above and those included in the Stormwater Management Plan (attached to the Form 2A) to avoid and minimize project impacts to water resources would also avoid and minimize cumulative impacts and therefore, no adverse cumulative impacts are expected.

Measures to Mitigate or Offset Cumulative Adverse Impacts

As mentioned above, no project or cumulative adverse impacts to water resources are anticipated from the development of the Arco Deep 1-27 OGDP and therefore, no mitigation or offsets are proposed.

**Terrestrial and Aquatic Wildlife Resources and Ecosystems**

The Arco Deep 1-27 pad is located within High Priority Habitat (HPH) designated as greater sage-grouse General Habitat Management Area and is located 475 feet west of greater sage-grouse Priority Habitat Management Area. In addition, Aquatic Sportfish Management Waters are located

within 1 mile of the Arco Deep 1-27 WPS (see Table 10 and Wildlife Habitat Drawing attached to the Form 2A). The proposed pipeline corridor would be located within greater sage-grouse General Habitat Management Area and Priority Habitat Management Area.

**Table 10**
**High Priority Habitats within 1 Mile of the Arco Deep 1-27 Working Pad Surface**

| Type | Distance (feet) from WPS | HPH Disturbed (acres) |
|---|---|---|
| Aquatic Sportfish Management Waters | 3,403 | 0 |
| Greater Sage Grouse Priority Habitat Management Area | 475 | 0 |
| Greater Sage Grouse General Habitat Management Area | 0 | 6.45 |

COGCC Rule 309.e.(2).A states that consultation is required if a "proposed Oil and Gas Location or associated new access road, utility, or pipeline corridor falls within High Priority Habitat…". TEP held a pre-application consultation meeting with Colorado Parks & Wildlife (CPW) on August 16, 2022, to discuss potential impacts to sensitive wildlife in the area. The pre-application consultation meeting with CPW was necessary to ensure TEP's planned operation would be protective of wildlife and to discuss BMPs that TEP would implement to avoid and/or minimize impacts to wildlife (see Appendix A of the Wildlife Plan attached to the Form 2A for a detailed summary of CPW consultation). TEP's Wildlife Plan addresses the implementation of the operational requirements outlined under COGCC Rule 1202.a. It provides an assessment of wildlife impacts from the proposed oil and gas activities, compliance with the applicable operating requirements under Rule 1202, CPW consultation, and BMPs that would be implemented to avoid, minimize, and mitigate impacts to wildlife from the proposed oil and gas activities.

The recommended greater sage-grouse timing limitation for activities within greater sage-grouse General Habitat Management Area is March 1 through July 15 annually. Based on the proposed timing described, operations would be occurring during this timing limitation. The primary lekking period is from March 1 through April 30 annually. TEP provided two additional alternative schedules, one with construction activities starting in July 2023 with continuous operation through July 2024, and one with construction activities starting July 2023 with drilling operations completing in December 2023 and completion operations postponed until July 2024. CPW stated that because the Arco Deep 1-27 pad is over 5-miles from the nearest active lek site, potential impacts to greater sage-grouse would be minimal during the timing limitation. CPW also stated that the preference would be to conduct continuous operations to minimize the overall duration of activities. If the proposed activities were located within close proximity to an active lek site, the timing limitation would likely be enforced. CPW agreed that the proposed timing for operations from May 2023 through April 2024 would be acceptable. However, CPW recommended completing construction of the cross-country section of the pipeline corridor through greater sage-grouse General Habitat Management Area and Priority Habitat Management Area outside the recommended timing limitation (March 1 – July 15). TEP agreed to schedule construction of the cross-country section of the pipeline corridor outside the timing limitation (after July 15). Any changes to the proposed schedule would be communicated to CPW in advance of proposed operations and concerns would be addressed.

The Arco Deep 1-27 primary access road crosses through the 1-mile lek buffer; however, due to the significant elevation change between the existing access road and the lek site (located above cliffs), there would be no impacts to greater sage-grouse from vehicular traffic. There has not

been any recent activity at the lek site in several years. The primary access route crosses through greater sage-grouse General Habitat Management Area and Priority Habitat Management Area. Only minor road maintenance actions would occur in these areas. CPW did not express any issues with the primary access road. The secondary access route would be from MTW road north of the Arco Deep 1-27 pad. This access road would only be utilized for the rig move or initial setup of the completion crew in the event the rig or completion crew was located in the northwest region of Colorado prior to moving to the Arco Deep 1-27 pad. This access road would only be used for these activities if outside the March 1 to April 30 lekking season.

The Arco Deep 1-27 pad is located within Non-Crop Land – Rangeland. When applying a 1-mile buffer to the proposed Oil and Gas Location there are approximately 2,296 acres of existing rangeland. A quantitative vegetative assessment (WestWater 2022) was conducted for the project area during July 2022 following the methodology described in the National Park Service Fire Monitoring Handbook (USDI National Park Service 2003) and Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Volume I: Core Methods (Herrick et al 2015) to assist with interim and final reclamation.

After well development is complete, TEP would reclaim the area surrounding the wellhead and production facilities not required for long-term production operations. The area would be reclaimed using species and methods described in TEP's Reclamation Plan, which is attached to the Form 2A. Reclamation would comply with State, and local reclamation standards and would occur within 6 months following completion of well construction. Composition of species used for reclamation would also consider the vegetative assessment (WestWater 2022). Construction and Interim Reclamation disturbance acreages are show in Table 11.

**Table 11**
**Disturbance by Component for the Arco Deep 1-27 OGDP**

| Component | Total Short-Term (acres) | Total Long-Term (acres) |
|---|---|---|
| Arco Deep 1-27 pad | 6.451 [1] | 1.269 |
| Access Road | 4.336 [2,3] | 1.623 [3] |
| 8-inch gas pipeline | 6.078 [4] | 0.00 |
| 6-inch water pipeline | | |
| **Total** | **16.865** | **2.892** |

[1] Includes 4.759 acres of existing disturbance, 0.029 acre of re-disturbance, and 1.663 acres of new disturbance.
[2] Includes 1.195 acres of existing disturbance, 0.512 acres of re-disturbance, and 2.629 acres of new disturbance.
[3] Excludes section of existing road not requiring upgrades.
[4] Includes 0.008 acre of existing disturbance, 0.377 acre of re-disturbance, and 5.693 acres of new disturbance.

The loss of mature mountain shrubs would be long-term, but these species are common throughout the region, and the loss would be negligible at both a project and regional level. Gradual re-establishment of a portion of the affected shrubland is likely following reclamation.

TEP has designed the project to incorporate existing infrastructure to minimize impact to the ecosystem and wildlife that rely on available habitats in the vicinity surrounding the existing Arco Deep 1-27 pad to be re-constructed. As a result of incorporating existing infrastructure into the development plan, impacts to existing wildlife habitat would be minimal and impacts on wildlife would be reduced compared to less developed or undeveloped areas because some habituation

of the animals to oil and gas operation and other human activities would be expected (see Wildlife Plan attached to the Form 2A for detailed BMPs proposed to minimize impacts to wildlife).

Hydraulic fracturing operations would use recycled produced water pumped through an existing buried water collection system avoiding use of truck traffic to deliver water for well completions and avoiding potential wildlife impacts. TEP would also install five temporary surface steel frac lines to support remote frac and flowback operations for the 16 wells on the Arco Deep 1-27 pad. The temporary surface frac lines would be installed following the existing access roads and existing/proposed pipeline rights-of-ways minimizing short-term disturbance to wildlife during hydraulic fracturing.

To minimize traffic during operations, TEP would install buried natural gas and produced water pipelines. As mentioned above, disturbance associated with pipeline construction would be promptly revegetated with native species consistent with CPW's recommended seed mix when the pipeline is completed (see Reclamation Plan attached to the Form 2A). TEP would utilize remote telemetry equipment to minimize well site visitation reducing the vehicles traveling on dirt/gravel roads. To minimize the potential for wildlife related traffic accidents, TEP would implement speed restrictions for all roads and would require that all TEP employees and contractors adhere to posted speed limits.

TEP has scheduled reconstruction of the Arco Deep 1-27 pad, access road, and installation of a portion of the pipeline infrastructure during May 2023 (a portion of the pipeline infrastructure would be installed in July 2023), which is within the nesting season for migratory birds (April 1 to August 31). If vegetation removal occurs during the nesting season, TEP would implement hazing or other exclusionary measures prior to April 1 to avoid take of migratory birds. Alternatively, TEP may conduct a migratory bird survey prior to vegetation removal as required by COGCC Rule 1202.a.(8) to avoid take of migratory birds. Additionally, TEP would conduct raptor surveys within 0.25 mile or 0.5 mile of proposed well development activities prior to construction and implement appropriate buffers around active nests during the species' nesting seasons to avoid impacts.

To minimize the potential spread and infestation of invasive, non-native plants within areas used for expansion of the Arco Deep 1-27 pad and installation of infrastructure that could degrade wildlife habitat and out-compete native vegetation, TEP would implement a weed management program. This includes control or reduction of invasive weeds and non-native populations that have been established in the Arco Deep 1-27 OGDP prior to development, as well invasive plant species that may be introduced during project development and reclamation activities. Interim and final reclamation of disturbed areas would use seed mixes that are certified to be weed-free. Reclamation would be monitored annually until reclamation is successful. These measures would minimize impacts on existing vegetation communities within the Project area as well as maintain native vegetation for the continued use of wildlife in the Project area.

Cumulative Impacts

No adverse impacts to terrestrial and aquatic wildlife resources and ecosystems are anticipated as a result of construction (short-term) and production (long-term) operations for the Arco Deep 1-27 OGDP. Adverse cumulative impacts are not expected as a result of project implementation.

Specific Measures Taken to Avoid or Minimize Cumulative Adverse Impacts

Implementation of the measures described above and those included in the Wildlife Plan (attached to the Form 2A) and the Reclamation Plan (attached to the Form 2A) to avoid and

minimize project impacts to terrestrial and aquatic wildlife resources and ecosystems would also avoid and minimize cumulative impacts and therefore, no adverse cumulative impacts are expected.

Measures to Mitigate or Offset Cumulative Adverse Impacts

As mentioned above, no project or cumulative adverse impacts to terrestrial and aquatic wildlife resources and ecosystems are anticipated from implementation of the Arco Deep 1-27 OGDP and therefore, no mitigation or offsets are proposed.

**Soil Resources**

Reconstruction of the Arco Deep 1-27 pad would require 6.451 acres of Parachute-Rhone loams, 5 to 30 percent slopes. Of the 6.451 acres of disturbance 4.759 acres is existing disturbance, 0.029 acre would be re-disturbance, and 1.663 acres would be new disturbance. After drilling and completion, 5.182 acres would be reclaimed leaving 1.269 acres disturbed during long-term production. The Arco Deep 1-27 OGDP has been designed to disturb the minimum area possible while maintaining safety standards. In addition to 1.203 acres of existing disturbance, 0.889 acres would be re-disturbed, and 8.322 acres would be new disturbance in various soil types to support utilities (including pipelines and roads) for a total of 10.414 acres (see Table 12). After utility installation and road construction is complete, 8.791 acres would be reclaimed leaving 1.623 acres disturbed during long-term production (excluding areas of the existing road that will not require upgrades).

**Table 12**
**Soil Types Disturbed by Construction of the Arco Deep 1-27 OGDP**

| Map Unit Number | Soil Type | Arco Deep 1-27 Pad (acres) | Access/Utilities (acres) | Total (acres) |
|---|---|---|---|---|
| 57 | Parachute-Rhone loams, 5 to 30 percent slopes | 6.451 | 9.359 | 15.810 |
| 52 | Northwater-Adel complex, 5 to 50 percent slopes | 0.00 | 0.176 | 0.176 |
| 56 | Parachute-Irigul-Rhone association, 25 to 50 percent slopes MLRA 48A | 0.00 | 0.879 | 0.879 |
| | **Total** | **6.451** | **10.414** | **16.865** |

TEP has prepared and would follow their Topsoil Protection Plan (attached to the Form 2A) to address compliance with State and local requirements regarding topsoil management and preservation. TEP has also prepared and would follow a Reclamation Plan (attached to the Form 2A). Proper management of topsoil during initial site construction would ensure topsoil is preserved for site reclamation following construction and to ensure adequate organic material is available for re-establishment of desirable vegetation at reclamation. During reconstruction of the Arco Deep 1-27 pad and construction of the proposed pipeline infrastructure and access road, topsoil stripped during initial construction of these project components would be managed according to use and duration of development. Prior to separation and storage of the topsoil horizon, or top 6 inches, from the well pad, pipeline corridor, and access road, woody vegetation would be mulched and stormwater control measures properly installed to control erosion and sedimentation during precipitation events (see Stormwater Management Plan attached to the Form 2A). When separating soil horizons, TEP would segregate each horizon based upon noted changes in physical characteristics, such as organic content, color, texture, density, or consistency. To the extent feasible, stockpiled soils would be protected from degradation due to

contamination, compaction, and from wind and water erosion during drilling and production operations. Surface roughening, temporary seeding and mulching, erosion control blankets, or soil binders would be used as needed, and BMPs implemented, to prevent weed establishment and to maintain soil microbial activity.

During reconstruction of the Arco Deep 1-27 well pad, the topsoil horizon would be stripped between the top of cut and toe of fill and the soil would be stockpiled northeast of the existing wells. The topsoil volume disturbed for the reconstructed well pad/road reroute is estimated at 4,660 cubic yards. Topsoil would be segregated from all other subsurface materials. Wattles would be placed around the base of the topsoil stockpile to control sedimentation and a metal sign would be placed on the north/northwest (access roadside) of the stockpile area. Upon completion of well pad construction activities, hydro-seed/mulch would be applied to topsoil stockpiles to stabilize the soils and promote the growth of desirable plants until interim reclamation can be completed.

During construction of the pipeline infrastructure, the topsoil horizon would be stripped within the 50-foot construction right-of-way width and placed along the east/uphill side. During construction of the access road, the topsoil horizon would be stripped within the 20-foot construction right-of-way width and placed along the east/uphill side. Topsoil would be segregated from subsurface materials during pipeline installation and stockpiled upslope of the trench. When construction is complete and the pipeline right-of-way and road right-of-way have been re-contoured to pre-construction slopes, stripped topsoil would be uniformly replaced across the disturbance. It is estimated that approximately 10,583 cubic yards would be disturbed for pipeline installation and access road construction.

Cumulative Impacts

No adverse impacts to soil resources are anticipated as a result of construction (short-term) and production (long-term) operations for the Arco Deep 1-27 OGDP. Adverse cumulative impacts to soil resources are not expected as a result of project implementation.

Specific Measures Taken to Avoid or Minimize Cumulative Adverse Impacts

Implementation of the measures described above, and the measures included in the Topsoil Protection Plan (attached to the Form 2A) and Reclamation Plan (attached to the Form 2A) to avoid and minimize project impacts to soil resources would also avoid and minimize cumulative impacts and therefore, no adverse cumulative impacts are expected.

Measures to Mitigate or Offset Cumulative Adverse Impacts

As mentioned above, no project or cumulative adverse impacts to soil resources are anticipated from implementation of the Arco Deep 1-27 OGDP and therefore, no mitigation or offsets are proposed.

**Public Welfare**

This section considers a qualitative evaluation of incremental adverse impacts to public welfare (noise, light, odor, dust, and recreation and scenic values) as a result of pre-production operations (short-term) and production operations (long-term) of the Arco Deep 1-27 OGDP. Pre-production activities associated with reconstruction of the Arco Deep 1-27 pad include construction, drilling, and completion operations and installation of pipeline infrastructure and access road. Production

activities associated with the expanded Arco Deep 1-27 pad include standard well and facility maintenance operations and inspection activities.

During initial site planning of the Oil and Gas Location, TEP evaluated receptors for noise, light, and odor where members of the public or wildlife resources may be located and impacted from the proposed activities. These receptors include public roads, railroads, building units, residential building units, high occupancy building units, school property or facilities, designated outdoor activity areas, childcare centers, disproportionately impacted communities, trails, and wildlife habitat.

As provided in the Cultural Distance section of the Form 2A and in Table 13 below, there are no residential or other building units within 1 mile of the proposed Arco Deep 1-27 WPS.

**Table 13**
**Building Units from the Edge of the Arco Deep 1-27 Working Pad Surface**

| Type | Number |
|---|---|
| Residential building units (0 to 2,000 feet) | 0 |
| Residential building units (2,001 to 5,280 feet) | 0 |
| Non-school and non-childcare center high occupancy building units (0 to 2,000 feet) | 0 |
| Non-school and non-childcare center high occupancy building units (2,000 to 5,280 feet) | 0 |
| School facilities (0 to 2,000 feet) | 0 |
| School facilities (2,000 to 5,280 feet) | 0 |
| Childcare centers (0 to 2,000 feet) | 0 |
| Childcare centers (2,000 to 5,280 feet) | 0 |

TEP reviewed HPH within 1 mile of the Arco Deep 1-27 pad and associated permanent pipelines and access road. The Arco Deep 1-27 pad is completely located within HPH designated as greater sage-grouse General Habitat Management Area. HPH identified within 1 mile of the Arco Deep 1-27 WPS includes Aquatic Sportfish Management Waters and greater sage-grouse Priority Habitat Management Area (see Wildlife Habitat Drawing attached to the Form 2A). After review of the HPH layers and discussions with CPW regarding the pad location, it is unlikely either pre-production or production operations would adversely affect wildlife resources.

*Noise.* Pre-production (short-term) activities are typically shorter in nature and emit a higher noise level than long-term production operations. Noise from these activities could have impacts on surrounding receptors if located within close proximity of the proposed WPS.

No residential or other building units are located within 2,000 feet of the Arco Deep 1-27 location (see Table 13); therefore, noise impacts to members of the public are expected to be minimal during pre-production operations (short-term) and production operations (long-term). The nearest residential building unit is located more than 1-mile from the WPS. Because no residential building units are present within 2,000 feet, it is unlikely for noise generated during pre-production or production operations to adversely impact members of the public (see Cultural Distance Map – Form 2A).

TEP reviewed HPH within 1 mile of the Arco Deep 1-27 pad. The pad is located within greater sage-grouse General Habitat Management Area and is located 475 feet west of greater sage-grouse Priority Habitat Management Area. During the pre-application consultation process, TEP and CPW discussed potential noise impacts to greater sage-grouse. TEP stated that the pad would be reconstructed with a 25-foot depth of cut along the east side of the pad, which would

provide a physical barrier along the pad edge closest to greater sage-grouse Priority Habitat Management Area reducing the overall levels of noise in the easterly direction. Noise generated from activities on the pad would be greatest in the westerly direction away from greater sage-grouse habitat. TEP also stated that all planned operations would be compliant with applicable noise standards under COGCC Rule 423. CPW agreed that a noise mitigation plan would not be necessary for this location based on the siting condition, operational compliance with noise standards, and the low priority for habitat within the vicinity of this oil and gas location. CPW informed TEP that noise impacts are not anticipated for this oil and gas location.

Cumulative

Adverse cumulative noise impacts to members of the public and wildlife are not expected given that noise impacts from the project are expected to be nonexistent or minimal.

*Light*. Pre-production activities are typically shorter in nature and require sufficient lighting to ensure the safety of employees and contractors. All lighting used during the pre-production phase of development will be directed downward and inward towards operation to minimize light pollution in the vicinity of the location. Lighting from these activities could have minimal impacts on surrounding receptors if located within close proximity of the proposed WPS.

No residential or other building units are located within 2,000 feet of the Arco Deep 1-27 location (see Table 13); therefore, impacts from lighting to members of the public are expected to be minimal during pre-production operations (short-term). The nearest residential building unit is located more than 1-mile from the WPS. Because no residential building units are present within 2,000 feet, it is unlikely for lighting during pre-production operations to adversely impact members of the public (see Cultural Distance Map – Form 2A).

TEP reviewed HPH within 1 mile of the Arco Deep 1-27 pad. The pad is located within greater sage-grouse General Habitat Management Area and is located 475 feet west of greater sage-grouse Priority Habitat Management Area. During the pre-application consultation process, TEP and CPW discussed potential lighting impacts to greater sage-grouse. TEP stated that the pad would be reconstructed with a 25-foot depth of cut along the east side of the pad, which would provide a physical barrier along the pad edge closest to greater sage-grouse Priority Habitat Management Area reducing the overall amount of light in the easterly direction. TEP stated that all planned operations would be compliant with applicable lighting standards under COGCC Rule 424 and that all lighting fixtures would be directed downward and inward to minimize light pollution from planned activities. CPW agreed that a light mitigation plan would not be necessary for this location based on the siting condition, operational compliance with lighting standards, and the low priority for habitat within the vicinity of this oil and gas location. CPW informed TEP that lighting impacts are not anticipated for this oil and gas location.

TEP does not plan to install any on-site lighting during production operations (long-term) and does not anticipate conducting any nighttime well maintenance operations requiring temporary lights. Therefore, light impacts to members of the public and wildlife resources are expected to be nonexistent during production operations (long-term).

Cumulative

Adverse cumulative light impacts are not expected given that light impacts from the project are expected to be nonexistent or minimal.

*Odor.* Pre-production and production activities have the potential to generate odors. Potential sources of odors during drilling operations include drilling rig generators, third-party vehicles, drying shaker assembly and centrifuge solids, drill cuttings storage, water base/bentonitic drilling mud, and mud tanks. Potential sources of odors during completion operations include frac pumps, bender, and frac tanks. Potential sources of odors during flowback operations include separators and tanks, and during production operations include separators, tanks, emissions combustion devices, and natural gas generators.

No residential or other building units are located within 2,000 feet of the Arco Deep 1-27 location (see Table 13); therefore, impacts from odors to members of the public are expected to be minimal during pre-production operations (short-term) and production operations (long-term). The nearest residential building unit is located more than 1-mile from the WPS. Because no residential building units are present within 2,000 feet, it is unlikely for odor generated during pre-production operations (short-term) or production operations (long-term) to adversely impact members of the public (see Cultural Distance Map – Form 2A).

Cumulative

Adverse cumulative odor impacts are expected to be nonexistent or minimal given that odor impacts from the project are expected to be nonexistent or minimal.

*Dust.* TEP has prepared a Dust Mitigation Plan as required by COGCC Rule 304.c.(5) based on the requirements outlined in COGCC Rule 427. Fugitive dust is created during construction and from vehicular travel on dirt or gravel roads. Table 6 provides a list of the estimated vehicle trips during construction and operation. Fugitive dust can also be propagated from disturbed areas during high wind events. TEP would implement the BMPs outlined in the Dust Mitigation Plan including application of fresh water during construction, application of fresh water on road surfaces, and speed restriction.

With implementation of the measures outlined in the Dust Mitigation Plan and described above, no adverse impacts related to dust are anticipated as a result of construction (short-term) and operation (long-term) under the Arco Deep 1-27 OGDP.

Cumulative

The BMPs in the Dust Mitigation Plan would be applied to the proposed Oil and Gas Location and proposed pipeline corridor and access roads. Adverse cumulative dust related impacts are expected to be minimal and not adverse with proper implementation of the BMPs included in the Dust Mitigation Plan (attached to the Form 2A).

*Recreation and Scenic Values.* No State Parks, State Trust Lands, or State Wildlife Areas exist within 1 mile of the Arco Deep 1-27 pad. Additionally, there are no Designated Outdoor Activity Areas within 1 mile of the Arco Deep 1-27 location. There are no trails within 1 mile of the Arco Deep 1-27 pad.

No adverse impacts to Recreation and Scenic Values are anticipated as a result of construction (short-term) and operation (long-term) of the Arco Deep 1-27 OGDP.

Cumulative Impacts

No adverse project or cumulative impacts to recreation and scenic values are expected as a result of project implementation.

Specific Measures Taken to Avoid or Minimize Cumulative Adverse Impacts

Implementation of the measures described in TEP's Plan of Development and the Dust Mitigation Plan (attached to the Form 2A) to avoid and minimize project impacts to public welfare would also avoid and minimize cumulative impacts and therefore, no adverse cumulative impacts are expected.

Measures to Mitigate or Offset Cumulative Adverse Impacts

As mentioned above, no project or cumulative adverse impacts to public welfare are anticipated from the development of the Arco Deep 1-27 OGDP and therefore, no mitigation or offsets are proposed.

**SURROUNDING OIL AND GAS IMPACTS**

This section provides a baseline evaluation of the existing landscape level impacts within the area surrounding the existing Arco Deep 1-27 pad proposed for expansion. This information is required per COGCC Rule 303.a.(5).C and is necessary when evaluating cumulative impacts. The information provided below gives context to existing and proposed activities within the vicinity of the proposed Oil and Gas Location.

The existing Arco Deep 1-27 pad is located within the Piceance Basin and has existing Oil and Gas production operations. There are four active Oil and Gas Locations within 1 mile of the existing Arco Deep 1-27 WPS as listed in Table 14. The total disturbance acreage for the active Oil and Gas Locations not including the Arco Deep 1-27 pad is 29.0 acres. A breakdown of the acreage by facility is provided in Table 14. For non-TEP operated Oil and Gas Locations, TEP reviewed recent aerial photos to calculate the acreage of disturbance.

**Table 14**
**Existing Oil and Gas Locations within 1 Mile of the Arco Deep 1-27 Working Pad Surface**

| O&G Location Name | Operator | COGCC Location ID | Status | Disturbance Acreage | Source Information |
|---|---|---|---|---|---|
| Shell 0797-03B Pad | Laramie Energy LLC | 335482 | Active/Built | 6.8 | COGCC Permit |
| Shell 797-03A Pad | Laramie Energy LLC | 427315 | Active/Built | 4.2 | COGCC Permit |
| Mesa F26-697 | Caerus Piceance LLC | 448472 | Active/Built | 12.0 | COGCC Permit |
| Oxy 022 697 | Caerus Piceance LLC | 416503 | Active/Final Reclaim Ongoing | 6.0 | COGCC Permit |
| | | | **Total** | **29.0** | |

There are a total of 66 active producing oil and natural gas wells within 1 mile of the Arco Deep 1-27 WPS as shown in Table 15. TEP reviewed the COGCC database to compile a list of the

existing and/or permitted wells within 1 mile of the Arco Deep 1-27 pad. The wells proposed on the Arco Deep 1-27 pad are not listed in Table 15.

**Table 15**
**Existing/Proposed Wells within 1 Mile**
**of the Arco Deep 1-27 Working Pad Surface**

| Well Status | Count |
|---|---|
| Active oil and gas wells | 66 |
| Permitted but not drilled | 0 |
| Proposed | 0 |
| Plugged and abandoned | 0 |
| **Total** | **66** |

TEP reviewed COGCC location files and permitting documents to determine the permitted storage capacity of each Oil and Gas Location within 1-mile of the Arco Deep 1-27 OGDP (Table 16). TEP also reviewed available aerial imagery and facility diagrams prepared following recent site visits to determine the existing storage capacity for each Oil and Gas location within 1-mile of the Arco Deep 1-27 OGDP (Table 16).

**Table 16**
**Permitted/Existing Storage Capacity within 1 Mile**
**of the Arco Deep 1-27 Working Pad Surface**

| Storage | Count | Source of Count |
|---|---|---|
| Permitted storage capacity (oil) | 1 | COGCC |
| Permitted storage capacity (condensate) | 9 | COGCC |
| Permitted storage capacity (water) | 8 | COGCC |
| Permitted storage capacity (pits) | 2 | COGCC |
| Existing storage capacity (oil) | 0 | FO/Inspection |
| Existing storage capacity (condensate) | 15 | FO/Inspection |
| Existing storage capacity (water) | 9 | FO/Inspection |
| Existing storage capacity (pits) | 1 | FO/Inspection |
| COGCC=Colorado Oil & Gas Commission - Records/Permits<br>FO=Field Observation | | |

As described above, there are existing landscape level impacts associated with oil and gas development (i.e., existing Oil and Gas Locations, wells, and fluid storage facilities) present on the landscape within the vicinity of the proposed Arco Deep 1-27 pad expansion. Furthermore, there are existing access roads and pipeline infrastructure supporting oil and gas operations for these locations and facilities in the vicinity of the Arco Deep 1-27 OGDP. No adverse impacts to resources are expected from expansion of the Arco Deep 1-27 pad.

## OTHER INDUSTRIAL IMPACTS

Per COGCC Rule 303.a.(5).D, the operator is required to identify existing industrial facilities within 1 mile of the proposed Oil and Gas Location. During review of this location no industrial facilities were identified within 1 mile of the pad location. The Arco Deep 1-27 pad is in a remote area of Garfield County, Colorado with oil and gas development and grazing activities.

## BENEFICIAL IMPACTS

The Arco Deep 1-27 OGDP does not include any proposed direct incremental beneficial impacts associated with the development of the proposed wells on the Arco Deep 1-27 pad, as summarized in Table 17, Beneficial Impacts List (Form 2B). However, there are indirect beneficial impacts associated with the development the proposed location which include broader benefits to the community and the environment. A qualitative evaluation of beneficial impacts to the local community and to the environment is provided below.

**Table 17**
**Beneficial Impacts List for the Arco Deep 1-27 OGDP (Form 2B)**

| | | | |
|---|---|---|---|
| Total number of existing wells that are planned to be plugged and abandoned as part of this Oil and Gas Development Plan (OGDP). | 0 | Estimated number of truck trips that are planned to be avoided from the above-mentioned facility closures and equipment upgrades (on an annual basis). | 0 |
| Total number of existing locations that are planned to be closed and undergo final reclamation as part of this OGDP. | 0 | Total number of **Oil Tanks** planned to be removed from existing locations through the approval of this OGDP. | 0 |
| Total number of acres that are planned to be reclaimed through the closing of existing locations. | 0 | Total number of **Condensate Tanks** planned to be removed from existing locations through the approval of this OGDP. | 0 |
| Total number of existing pits that are planned to be closed and undergo final reclamation as part of this OGDP. | 0 | Total number of **Produced Water Tanks** planned to be removed from existing locations through the approval of this OGDP: | 0 |

### Beneficial Impacts to Surrounding Community

The communities of Rifle, Colorado and Parachute, Colorado would benefit most notably from the employment and tax revenues generated by the proposed development plan. In addition to the direct jobs created by the project, the development plan would support jobs in local businesses that support the project and its employees, including retail trade, lodging and eating establishments, construction, real estate, and other services.

Taxes paid by TEP on production would support infrastructure and community services in Rifle and across the county. In Garfield County ad valorem (property) taxes on production fund local governments; education and health care facilities; and fire protection, water conservation, and sanitation services including the City of Rifle, Garfield School District No. Re-2, Rifle Downtown Development District, Grand River Hospital, West Divide Water Conservancy District, Rifle Branch of the Garfield County Public Library District, and Colorado River Fire Rescue.

In addition to ad valorem taxes, Rifle and other Garfield County residents would receive a portion of state severance taxes and federal mineral royalties paid on production in the OGDP through services provided. Severance tax on oil and gas production in Colorado is progressive, starting at 2% and increasing with sales volume. Half of severance taxes paid to the state is returned to local governments impacted by oil, gas, and mineral production. Nearly half (49%) of federal mineral royalties, which are generally 12.5% of production value, are returned to Colorado, a portion of which is allocated to local governments and school districts impacted my mineral development.

While production-based taxes would produce the greatest benefits to local governments, Garfield County and the City of Rifle would also receive tax revenues from property taxes paid on physical assets and sales and use taxes paid on equipment purchases associated with the development plan.

**Beneficial Impacts to Surrounding Wildlife and Ecosystems**

A detailed discussion of the benefits to surrounding wildlife and ecosystem is included above under the section titled "Terrestrial and Aquatic Wildlife Resources and Ecosystems." As discussed above, TEP would minimize impacts to wildlife and surrounding ecosystems by using existing infrastructure, recycling produced water thereby reducing truck trips, installation of buried pipelines, coordination with CPW, ground clearing outside of migratory bird habitat restrictions, and implementation of a weed management program. If vegetation removal must be scheduled between April 1 to August 31, hazing or other exclusion measures would be implemented prior to April 1 to avoid take of migratory birds or a pre-construction nesting migratory bird surveys would be conducted prior to vegetation removal during the nesting season and if active nests are located, work zone buffers would be provided around active nests. Construction of the cross-country portion of the pipeline would not occur within the greater sage-grouse timing limitation (March 1 to July 15).

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