

Water Resources Protection COAs:

COA WR1 - Operator must ensure 110 percent secondary containment for any volume of fluids contained at well site during drilling and completion operations; including, but not limited to, construction of a berm or diversion dike, diversion/collection trenches within and/or outside of berms/dikes, site grading, or other comparable measures (i.e., best management practices (BMPs) associated with stormwater management) sufficiently protective of nearby surface water. Any berm constructed at the well pad location will be stabilized, inspected at regular intervals, and maintained in good condition.

COA WR2 - Due to the steeper slopes to the south, this location is in an area of moderate to high run off/run on potential; therefore the pad shall be constructed as quickly as possible and appropriate BMPs need to be in place both during, after well pad construction completion, as well as during all drilling and well completion operations. Standard stormwater BMPs must be implemented at this location to insure compliance with CDPHE and COGCC requirements and to prevent any stormwater run-on and /or stormwater runoff.

COA WR3 - Operator must implement best management practices to contain any unintentional release of fluids, including any fluids conveyed via trucks, temporary surface pipelines, or buried permanent pipelines.

COA WR4 - Location is in a sensitive area due to shallow groundwater; therefore, a closed loop drilling system (which operator has indicated on the Form 2A) must be implemented.

COA WR5 - Location is in a sensitive area because shallow groundwater; therefore, no subgrade pits are permitted.

COA WR6 - To protect aquifers and ensure zonal fluids isolation at the wellbore face, operator will adhere to the following Well Design and Quality Assurance Measures (including but not limited to; placing a cement sheath that is followed by steel casing placed successively against and bonded to all exposed formations).

Conductor Casing: To prevent surface and shallow boulders from falling in and impeding drilling progress, sixteen inch (16") outside diameter conductor pipe will be set at depth of eighty (80) feet below ground surface (bgs).

Surface Casing: To protect shallow aquifers, a twelve and one quarter inch (12 ¼") diameter bit will be used to drill the surface casing hole to a depth of eleven hundred feet (1100') bgs. Nine and five eighths inch (9 5/8") outside diameter steel casing will then be placed in the wellbore from surface to a depth eleven hundred feet (1100'). To ensure the isolation of formation strata and its respective fluids, cement will be placed in the annular space found between the wellbore and casing from surface to a depth of eleven hundred feet (1100'). If the top of cement at the surface drops out of eyesight, a temperature survey will be run from a depth of eleven hundred (1100') all the way to surface to determine the depth to the top of the cement. Additional cement would then be placed behind the casing from the top of cement to surface to ensure the protection of shallow aquifers and prevent the wobbling of the casing while drilling the rest of the well. Shortly thereafter the surface casing and casing seat at the formation will be pressure tested for leaks.

Intermediate Casing: Should conditions require, operator may install intermediate casing, as necessary. Materials for intermediate casing string shall be secured such that they can be on location within 24-hours, per Form 2 Application for Permit to Drill.

Production Casing: A seven and seven eighths inch (7 7/8") outside diameter bit will then be run inside the surface casing and a new wellbore will be drilled another fifteen feet (15') past the base of the surface casing and will be pressure tested to ensure a good seal on the base of the surface casing. The rest of the well will be drilled to a total depth of sixty-six hundred feet (6600'). To ensure the isolation of deeper formation strata with their respective fluids from all shallow aquifers, five and one half inch (5½") outside diameter steel production casing will be run inside the well from surface to a total depth of sixty-six hundred feet (6600'). Cement will then be placed

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in the annular space found between the production casing and wellbore from total depth to approximately nine hundred feet (900') from surface or two hundred (200') above the base of the surface casing bottom. The operator will then run a radial cement bond log (CBL) to assess the quality of the cement job as well as determining the actual depth to the top of cement. Any significant insufficiencies in the cement job will be remediated with additional cementing.

COA WR7 - Provided sufficient water exists in the Classified RSO Segment, operator shall collect baseline and follow-up surface water data immediately downgradient of the oil and gas location consisting of a pre-drilling surface water sample and a follow-up surface water sample collected at the same location three (3) months after the conclusion of any drilling or completion activities. The sample parameters shall include: field observations (turbidity, odor, sample location description); pH; alkalinity; specific conductance; major cations/anions (chloride, fluoride, sulfate, sodium); total dissolved solids (TDS); benzene, toluene, ethylbenzene, total xylenes (BTEX); gasoline range organics (GRO); diesel range organics (DRO); total petroleum hydrocarbons (TPH); polyaromatic hydrocarbons (PAH's [including benzo(a)pyrene]); and metals (arsenic, barium, calcium, chromium, iron, magnesium, selenium).

COA WR8 - Copies of all test results, field parameters and field observations collected from nearby surface sampling water locations and sampled water wells shall be provided to the COGCC and the water well owner within three (3) months of collecting the samples (provided well-owner approval of disclosure is obtained) or Form 2A approval. All analytical data and surveyed well locations shall also be submitted to the COGCC in an electronic data deliverable format. The data shall be sent via email to the COGCC OGLA Specialist for Southern Colorado (Arthur Koepsell; email arthur.koepsell@state.co.us), with a copy provided to the COGCC Environmental Protection Specialist for Southwest Colorado (Karen Spray; email karen.spray@state.co.us).

COA WR9 - Water Testing: Prior to drilling, operator shall sample the two (2) closest domestic water wells, springs, or surface water features within a one (1) mile radius of the proposed oil and gas location. Testing preference shall be given to domestic water wells and springs over surface water. Testing of surface water features shall only be conducted if two (2) water wells or springs do not exist within a one (1) mile radius of the selected oil and gas location. If possible, the water wells or springs selected should be on opposite sides of the oil and gas location not exceeding a one (1) mile radius. If water wells or springs on opposite sides of the oil and gas location cannot be identified, then the two (2) closest wells or springs within a one (1) mile radius of the oil and gas location shall be sampled. The sample location shall be surveyed in accordance with Rule 215.

Initial baseline testing shall include laboratory analysis of all major cations and anions, total dissolved solids, iron and manganese, nutrients (nitrates, nitrites, selenium), dissolved methane, pH, specific conductance, and benzene, toluene, ethylbenzene, and xylenes ("BTEX"). Sampling shall be performed by qualified individuals using methods consistent with commonly accepted environmental sampling procedures. Field observations such as pH, temperature, specific conductance, odor, water color, sediment, bubbles, and effervescence shall also be included.

After 90 days, but less than 180 days of completion of the first proposed well a "post-completion" test shall be performed for the same analytical parameters listed above and repeated one (1), three (3) and six (6) years thereafter. If no significant changes from the baseline have been identified after the third test (i.e. the six-year test), no further testing shall be required. Additional "post-completion" test(s) may be required if changes in water quality are identified during follow-up testing. The Director may require further water well sampling at any time in response to complaints from water well owners.

If free gas or a methane concentration level greater than 1 mg/l is detected in a water quality testing well, gas compositional analysis, and stable isotopes of both the carbon and hydrogen isotopes of methane shall be performed to determine gas type (thermogenic, biogenic or a mixture).

Copies of all test results described above shall be provided to the Director and the landowner where the water quality testing well is located within three (3) months of collecting the samples used for the test. The analytical data and surveyed well locations shall also be submitted to the Director in an electronic data deliverable format.

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General Site Protection COAs:

COA GS1 - Notify the BLM, NFS, Rio Grande County, City of Del Norte, City of Monte Vista, the COGCC Oil and Gas Location Assessment (OGLA) Specialist for Western Colorado (Dave Kubeczko; email dave.kubeczko@state.co.us), the COGCC Environmental Protection Specialist for Southwest Colorado (Karen Spray; email karen.spray@state.co.us), and the COGCC Field Inspection Supervisor for Southern Colorado (Mike Leonard; email mike.leonard@state.co.us) 7 days prior to access road and well pad construction activities to set up an onsite pre-construction meeting to discuss details of the access road and well pad construction including, but not limited to, proposed schedule, pad layout, stormwater management, traffic plan, and emergency response plan.

COA GS2 - Notify the local emergency responders (Fire/Police), BLM, NFS, Rio Grande County, City of Del Norte, City of Monte Vista, the COGCC Oil and Gas Location Assessment (OGLA) Specialist for Western Colorado (Dave Kubeczko; email dave.kubeczko@state.co.us), the COGCC Engineer for Southwest Colorado (Mark Weems; email mark.weems@state.co.us), the COGCC Environmental Protection Specialist for Southwest Colorado (Karen Spray; email karen.spray@state.co.us), and the COGCC Field Inspection Supervisor for Southern Colorado (Mike Leonard; email mike.leonard@state.co.us) 7 days prior to well spud to set up an onsite pre-spud meeting to discuss details of the drilling program including, but not limited to, proposed schedule, water management, cementing, traffic plan, and emergency response plan. If operator schedule permits, this meeting may be concurrent with pre-construction meeting described above.

COA GS3 - Due to the possibility of encountering abundant water during drilling (based on another operator in the past encountering abundant water and having a massive loss of circulation), the operator will place approximately six (6) to eight (8) 500-barrel frac tanks on the well pad in an area with additional downgradient perimeter berming. The area where these tanks will be stored must be constructed to be sufficiently impervious to contain any spilled or released material. The tanks will be manifolded together and connected to the drill rig's closed loop mud circulation system/tanks. Any change in the well pad size will be documented with updated Construction Layout Drawings and Location Drawing and be submitted to the COGCC OGLA Specialist for Western Colorado (Dave Kubeczko; email dave.kubeczko@state.co.us) via a Form 4 Sundry Notice. Additional drilling mud will be available onsite, per Form 2, Application for Permit to Drill, and additional casing shall be available within 24-hours should intermediate casing be deemed necessary.

COA GS4 - A spill response trailer will be on location 24 hours a day, 7 days a week during construction, drilling, and completion operations to facilitate a timely response to any spills that may occur.

COA GS5 - Appropriate heavy equipment (e.g., a backhoe) will be staged at the location during all drilling and completion operations so that any emergency diversions or pits to contain spills can be built immediately upon discovery of a spill or release.

COA GS6 - If the well is to be completed; flowback and stimulation fluids must be sent to tanks, separators, or other containment/filtering equipment before the fluids can be placed into any pipeline or into tanker trucks for offsite disposal. The flowback and stimulation fluid tanks, separators, or other containment/filtering equipment must be placed on the well pad in an area with additional downgradient perimeter berming. The area where flowback fluids will be stored/reused must be constructed to be sufficiently impervious to contain any spilled or released material.

COA GS7 - If the well is to be completed; notify the COGCC Oil and Gas Location Assessment (OGLA) Specialist for Western Colorado (Dave Kubeczko; email dave.kubeczko@state.co.us) and the COGCC Field Inspection Supervisor for Southern Colorado (Mike Leonard; email mike.leonard@state.co.us) 48 hours prior to start of completion operations.

COA GS8 - The moisture content of any drill cuttings in a cuttings pit, trench, or pile shall be as low as practicable to prevent accumulation of liquids greater than de minimis amounts. At the time of closure, if drill cuttings are to remain/disposed of onsite, they must also meet the applicable standards of table 910-1.

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COA GS9 - Berms or other containment devices shall be constructed to be sufficiently impervious to contain any spilled or released material around crude oil, condensate, and/or produced water storage tanks, including temporary facilities.

COA GS10 - An emergency spill response program that includes employee training, safety, and maintenance provisions is required for this location. In the event of a spill or release, the operator shall immediately implement the emergency response procedures in the above-described emergency response program. If a spill or release impacts or threatens to impact an RSO stream, the operator shall notify the Colorado Department of Parks and Wildlife (CDPW) immediately following discovery of the release, and the spill or release shall be reported to the Commission in accordance with Rule 906.b.(3), and to the Environmental Release/Incident Report Hotline (1-877-518-5608) in accordance with Rule 906.b.(4).

COA GS11 - All personnel working at the location during all drilling and completion operations will receive training on spill response and reporting. Documentation of this training will be maintained in the operator's office/onsite trailer.

COA GS12 - At a minimum, weekly spill prevention meetings will be held identifying staff responsibilities in order to provide a quick and effective response to a spill. Appropriate documentation will be maintained in the operator's office/onsite trailer.

COA GS13 - Operator will conduct daily inspections of equipment for leaks and equipment problems with appropriate documentation retained in the operator's office/onsite trailer. All equipment deficiencies shall be corrected. Daily monitoring should end approximately 14 days after well completion and/or after production has been stabilized; however, timely inspections shall continue during the production phase.

COA GS14 - Operator will use adequately sized containment devices for all chemicals and/or hazardous materials stored or used on location.

COA GS15 - Operator will provide an increased testing frequency (at least every fourteen [14] days) of blowout prevention equipment (BOPE) during drilling operations.

Nearby Residential Area Protection COAs:

COA R1 - Prior to starting construction of the well pad and access road, operator will submit an air quality monitoring plan to COGCC for approval. This plan should include, at a minimum, one-time continuous air emissions monitoring at this well site such that among other things, the air monitoring effort is designed to adequately characterize the air emissions profile for the following stages of gas development: Prior to any drilling or completion activities; During drilling activities; During completion activities; and During normal production operations. Each of these air monitoring events will be designed at a minimum such that the air monitors are positioned at a distance not to exceed 500 feet from the San Francisco Creek #1 well site to collect the following information: 1) using a sample location downwind of the well site emission sources in the primary wind direction and 2) using a sample location in the direction of the nearest residence downwind of the well site emission sources; 3) monitor for non-methane organic compounds/volatile organic compounds (NMOCs/VOCs) using continuous monitors (to include total non-methane hydrocarbons and benzene, at a minimum); and 4) monitor for meteorological parameters, including wind speed, wind direction and temperature during each sampling event.

COA R2 - Operator will prepare a job specific Emergency Management/Response Plan that has been reviewed with the local emergency responders (Fire/Police). Operator will provide temporary engineering controls to prevent uncontrolled public access during drilling and completion activities. Site security shall include, but not be limited to, appointing a Health and Safety Officer that will insure the Emergency Management/Response Plan is adhered to and who is authorized to shut down operations at any time when health and safety risk is present.

COA R3 - Operator will review local governmental requirements for access from public roads. At a minimum the following traffic requirements will apply: (1) a traffic control plan will be in place; (2) additional signage on major and/or local roads will be employed to warn the public of increased truck traffic; (3) all oil and gas related construction, drilling, and operational traffic shall access the location from a single point; (4) designate haul routes to avoid school zones; (5) no oil and gas related traffic shall be permitted on neighborhood roads in the city of Del Norte; (5) schedule work to avoid peak traffic flow; (6) schedule heavy equipment movement to avoid local school and school bus operation hours; (7) provide and require safe driving training for employees and contractors; and (8) when using subdivision roads, reduced speed limits should be established.

COA R4 - Operator will implement sufficient public notification of proposed oil and gas activities, including: (1) provide 30-day notice and community awareness to neighborhood and meet with the neighborhood residents regarding schedule and activities, include local emergency response agencies (Fire/Police); (2) posting schedule changes at a location convenient to residents, as well as notifying local emergency response agencies (Fire/Police) of schedule changes; and (3) notify all homes within a ¼-mile radius and local emergency responders (Fire/Police) 7 days prior to mobilization in, rig up (MIRU).

COA R5 - Notify the local emergency responders (Fire/Police), BLM, NFS, Rio Grande County, City of Del Norte, City of Monte Vista, the COGCC Oil and Gas Location Assessment (OGLA) Specialist for Western Colorado (Dave Kubeczko; email dave.kubeczko@state.co.us), the COGCC Environmental Protection Specialist for Southwest Colorado (Karen Spray; email karen.spray@state.co.us), and the COGCC Field Inspection Supervisor for Southern Colorado (Mike Leonard; email mike.leonard@state.co.us) 48 hours prior to mobilization in, rig up (MIRU).

COA R6 - Temporary perimeter sound walls (consisting of a combination of earthen berms, stacked hay bales, and/or metal or wood sheeting, or other engineered sound-damping devices) shall be used on the west, north, and east perimeters of the well pad location during construction, drilling and completion activities to provide noise relief to nearby residents. Operator shall conduct noise monitoring as described in 802.c. at a minimum once during each phase of activity (pad construction, drilling, completion and production), and submit the results to the Director. The COGCC may require additional noise mitigation if measures taken are deemed insufficient.

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COA R7 - Operator will take aggressive action to establish vegetation on cut and fill slopes to prevent storm water erosion and the generation of fugitive dust. Operator shall install and maintain permanent vegetative visual buffering on the west, north, and east sides in conjunction with interim reclamation. Visual mitigation shall also include the use of low profile tanks. Interim reclamation will commence immediately upon conclusion of completion operations.

COA R8 - Lighting abatement measures beyond the requirements of Rule 803. shall be implemented, including the following, at a minimum: (1) rig oriented to direct light away from nearby residents; (2) install lighting shield devices on all of the more conspicuous lights; (3) low density sodium lighting; and (4) rig shrouded on the west and east sides.

COA R9 - Air quality and odor controls will be implemented and will include the following : (1) flowback stream to be routed from wellhead to a separator and then to a sealed flowback tank, with non-salable gas sent to a temporary flare or VOC combustor; (2) oil or condensate captured during separation process will be sent to a tank with emissions controls (see COA R10); (3) frac/flowback storage tank hatches should be closed and latched until the tanks are prepared to receive flowback water, then hatches should be closed but unlatched when receiving flowback fluids, and then operate with hydrocarbon absorbing blankets when full to control odors; (4) daily odor monitoring should be conducted during well completions using a Nasal Ranger to monitor compliance with detectable odor limits in Colorado Regulation 2, documentation of such monitoring shall be submitted to COGCC; and (5) maintain a portable meteorological weather station during well drilling and completion operations, that includes a data logger to archive wind speed/direction, temperature, and humidity with information provided to COGCC and CDPHE.

COA R10 - For purposes of reducing impacts to nearby residents, flares (such as a portable flare with high combustion rate, low noise, and low visibility flare) will be utilized.

COA R11 - Emissions from condensate, crude oil, and produced water tanks and from glycol dehydrators shall be controlled as described in Rule 805.b.(2), notwithstanding the exceptions for production facilities emitting less than five tons per year (TPY) of volatile organic compounds (VOC).

COA R12 - Access roads to well sites, completion staging sites and production facilities shall be constructed to meet the requirements of emergency responders, including all weather surface.

COA R13 - Land-farming of E&P waste is prohibited on the location. This shall not preclude onsite disposal of E&P waste in accordance with COGCC Rules and permit conditions.

COA R14 - Interim reclamation will commence immediately upon conclusion of completion operations.

COA R15 - Provide temporary engineering controls to prevent uncontrolled public and wildlife access during drilling and completion activities.

COA R16 - All drilling, completion, and production operations must also comply with the COGCC's **600-Series Rules, Safety Regulations and 800-Series Rules, Aesthetic and Noise Control Regulations.**

COA R17 - Fugitive dust emissions from the graveled portion of the County maintained access road from the edge of paving to the well pad access entrance will be controlled during drilling and completion operations. Such practices shall include but are not limited to the use of speed restrictions, regular road maintenance, and restriction of construction activity during high-wind days. Additional management practices such as road surfacing, wind breaks and barriers, dust suppression using water or other materials.