



State
of
Colorado

Kubeczko, Dave <dave.kubeczko@state.co.us>

Resend of Endeavour Operating Corporation, Wiley 23-3-97-1, SESE Sec 23 T3N R97W, Rio Blanco County, Form 2A#400332278; Revised COA 9 - Baseline Water Testing

Kubeczko, Dave <dave.kubeczko@state.co.us>
To: Dave Kubeczko <dave.kubeczko@state.co.us>

Wed, Nov 21, 2012 at 10:20 AM

Scan No 2106475 CORRESPONDENCE 2A#400332278

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From: kaulin@rockymountainpermitting.com <kaulin@rockymountainpermitting.com>

Date: Tue, Nov 20, 2012 at 4:03 PM

Subject: RE: Resend of Endeavour Operating Corporation, Wiley 23-3-97-1, SESE Sec 23 T3N R97W, Rio Blanco County, Form 2A#400332278; Revised COA 9 - Baseline Water Testing

To: "Kubeczko, Dave" <dave.kubeczko@state.co.us>

Cc: Terry Hoffman <terry@rockymountainpermitting.com>

Dave,

Endeavour has no questions or concerns regarding the COAs listed below.

Thank you,

Kaulin Waldner

From: Kubeczko, Dave [mailto:dave.kubeczko@state.co.us]

Sent: Monday, November 19, 2012 4:19 PM

To: kaulin@rockymountainpermitting.com

Subject: Resend of Endeavour Operating Corporation, Wiley 23-3-97-1, SESE Sec 23 T3N R97W, Rio Blanco County, Form 2A#400332278; Revised COA 9 - Baseline Water Testing

Kaulin,

Below is the revised **COA 9** - Baseline Water Testing that we discussed on Friday. Internet and the state server were down most of Friday so I could not send then. Revisions are shown in **orange highlight**. These revisions are based on the current proposed rule making for groundwater sampling (analytes, test methods, and procedures). I have also included the previous **COA 9**. If you have any questions, please do not hesitate to call me at (970)

309-2514 (cell), or email. Thanks.

Dave

David A. Kubeczko, PG

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From: **Kubeczko, Dave** <dave.kubeczko@state.co.us>

Date: Tue, Oct 23, 2012 at 1:31 PM

Subject: Endeavour Operating Corporation, Wiley 23-3-97-1, SESE Sec 23 T3N R97W, Rio Blanco County, Form 2A#400332278 Review

To: terry@rockymountainpermitting.com

Terry,

I have been reviewing the Wiley 23-3-97-1 Pad **Form 2A** (#400332278). COGCC will attach the following conditions of approval (COAs) based on the data Endeavour Operating Corporation has submitted on or attached to the Form 2A prior to passing the Oil and Gas Location Assessment (OGLA) review.

-

Water Resources (Section 14): Form 2A indicates the distance to the nearest surface water is 391 feet. COGCC guidelines require designating all locations with close proximity to surface water a **sensitive area** and

requiring the following conditions of approval (COAs):

COA 5 - Operator must implement best management practices to contain any unintentional release of fluids, including any fluids conveyed via temporary surface or buried pipelines.

COA 23 - Operator must ensure secondary containment for any volume of fluids contained at well site during drilling and completion operations (as shown on the Proposed BMPs attachment); 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 (at least every 14 days), and maintained in good condition.

Water Resources (Section 14): Form 2A indicates the depth to groundwater to be 100 feet bgs for a well located 303 feet away from the proposed pad. COGCC guidelines require designating all locations with with close proximity to a water well a **sensitive area** and requiring the following condition of approval (COA) will apply:

COA 1 - Location is in a sensitive area due to close proximity to a water well; therefore, either a closed loop system must be used (which operator has indicated on the Form 2A), or the drilling pit must be lined and constructed above the top of groundwater.

COA 9 - Baseline 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. Sampling and analysis shall be conducted in conformance with an accepted industry standard as described in Rule 910.b.(2).

Initial baseline testing shall include: pH, specific conductance, total dissolved solids (TDS), dissolved gases (methane, ethane, propane), alkalinity (total bicarbonate and carbonate as CaCO₃), major anions (bromide, chloride, fluoride, sulfate, nitrate and nitrite as N, phosphorus), major cations (calcium, iron, magnesium, manganese, potassium, sodium), other elements (barium, boron, selenium and strontium), presence of bacteria (iron related, sulfate reducing, slime and coliform), total petroleum hydrocarbons (TPH) and BTEX compounds (benzene, toluene, ethylbenzene and xylenes). Hydrogen sulfide shall also be measured using a field test method. Field observations such as pH, temperature, specific conductance, odor, water color, sediment, bubbles, and effervescence shall also be included. COGCC recommends that the latest version of EPA SW 846 analytical methods be used where possible and that analyses of samples be performed by laboratories that maintain state or national accreditation programs.

If free gas or a dissolved methane concentration greater than 1.0 milligram per liter (mg/l) is detected in a water well, gas compositional analysis and stable isotope analysis of the methane (carbon and hydrogen – ¹²C, ¹³C, ¹H and ²H) shall be performed to determine gas type. If test results indicated thermogenic or a mixture of thermogenic and biogenic gas. If the methane concentration increases by more than 5.0 mg/l between sampling periods, or increases to more than 10. mg/l, the operator shall notify the Director and the owner of the water well immediately.

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 the well is a non-producing well, then the one (1), three (3) and six (6) year samples will not be required. 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.

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.

Operator may conduct baseline groundwater sampling (if water wells are available for sampling) in accordance with the Colorado Oil and Gas Association (COGA) Voluntary Baseline Groundwater Quality Sampling Program (updated November 15, 2011).

Documented refusal to grant access by well owner or surface owner (for surface water and spring sampling) shall not constitute a violation of this COA.

Previous COA 9 - Baseline Groundwater Testing: Prior to drilling, operator shall sample the two (2) closest domestic water wells or springs within a one (1) mile radius of the proposed 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: field observations (turbidity, odor, sample location description); laboratory analyses will include pH; alkalinity; specific conductance; major cations/anions (chloride, fluoride, sulfate, sodium); total dissolved solids (TDS); nutrients (nitrates, nitrites); 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). 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 the well is a non-producing well, then the one (1), three (3) and six (6) year samples will not be required. 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.

Operator may conduct baseline groundwater sampling in accordance with the Colorado Oil and Gas Association (COGA) Voluntary Baseline Groundwater Quality Sampling Program (updated November 15, 2011).

General: The following conditions of approval (COAs) will also apply:

COA 91 - Notify the COGCC 48 hours prior to start of pad construction, rig mobilization, spud, and start of hydraulic stimulation operations using Form 42 (the appropriate COGCC individuals will automatically be email notified, including the LGD for hydraulic stimulation operations).

COA 38 - The moisture content of any 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 the drill cuttings are to be left onsite, they must also meet the applicable standards of table 910-1.

COA 25 - Flowback and stimulation fluids must be sent to tanks, separators, or other containment/filtering equipment before the fluids can be placed into any pipeline, storage vessel, or lined pit (only if an amended Form 2A has been submitted/approved and a Form 15 Earthen Pit Permitted has been submitted/approved) located on the well pad; 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 58 - Berms or other containment devices shall be constructed to be sufficiently impervious (preferably corrugated steel with poly liner) to contain any spilled or released material around crude oil, condensate, and produced water storage tanks.

COA 44 - The access road will be constructed to prevent sediment migration from the access road to nearby surface water or any drainages leading to other nearby surface waters or wetlands areas.

General: COGCC has determined that the slope at the proposed well pad is 13 percent and requests the following:

Rule 303.d.(3).H.: If the oil and gas location disturbance is to occur on lands with a slope ten percent (10%) or greater, or one (1) foot of elevation gain or more in ten (10) foot distance, then the following shall be required: i. Construction layout drawing (construction and operation); and ii. Location cross-section plot (construction and operation). Please provided Construction Layout Drawings that show the plan view and cross-section views.

COGCC would appreciate your concurrence with attaching these COAs to the Form 2A permit prior to passing the OGLA review. If you have any questions, please do not hesitate to call me at (970) 309-2514 (cell), or email. Thanks.

Dave

David A. Kubeczko, PG

Oil and Gas Location Assessment Specialist

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