

Noble Energy, Inc.

Organic Material/Drill Cutting

E&P Beneficial Waste Reuse Management Plan

Noble Energy Inc. (Noble) will recycle and reuse E&P drill cutting waste per Colorado Oil and Gas Conservation Commission Rule (COGCC) 907a(3). An organic material will be utilized as a composting agent that is mixed with the drill cuttings in order to reuse the material as a beneficial amendment for reclamation of COGCC regulated oil and gas locations, reclamation of ground disturbances associated with oil and gas production (i.e. oil, natural gas, produced and fresh water pipelines), and used on agricultural locations with landowner approvals. The remediation factors of the organic material utilizes the moisture, natural bacteria, fungi and micro-organisms to achieve composting of the drill cuttings

The organic material will be mixed in with the drill cuttings after the cuttings come off the shaker at the generation source well site. The drill cutting and organic mixture will be composted on an approved form 2A well pad location. A tracking sheet will be utilized to determine where the composted piles are located and will be provided to the COGCC upon request. A form 4 sundry will be submitted to the COGCC as a notification for each composting location. The pad area which will contain the organic and drill cutting mixture will have an outer perimeter stormwater control around the pad to protect from any stormwater runoff and each individual compost pile will be contained with a best management control to prevent runoff and enclose the pile.

The drill cutting/organic mixture has been developed as a composting agent to bring Table 910-1 analytes to COGCC allowable concentration levels. Pre-incorporation sampling of each windrow will be done by a 3<sup>rd</sup> party consultant. Sample numbers and locations will be determined on a per windrow basis, following the estimated composting period of 45-60 days and prior to incorporation. The samples will be analyzed for TPH-DRO, TPH-GRO, BTEX, Napthalene, Arsenic, EC, pH, and SAR.

The organic material will be incorporated into a disturbed location within 10 days of delivery. Written authorization from the surface owner will be implemented prior to composting and incorporation into the land surface. Noble will follow the operator obligations and track, document, and provide all information to the COGCC within five business days upon request.

The loading rates of the organic material on the disturbed area are site specific. Noble Energy takes into account arsenic levels, SAR, Ec, pH, and other organic parameters in order to apply the organic material at a rate that is consistent as a beneficial soil amendment.

Once post incorporation of the beneficial soil amendment occurs on Noble Energy oil and gas disturbance, a multipoint composite soil sample will be collected within the tilled incorporated area estimated from ground surface to eight inches below ground surface. The composite soil locations will be mixed, sampled, and submitted for lab analysis of TPH-DRO, TPH-GRO, BTEX, Napthalene, Arsenic, EC, pH, and SAR. If the initial windrow soil samples are within COGCC

Table 910-1 allowable levels the post incorporation samples may not be collected. The site location, background arsenic analytical, and pre and post incorporation lab analytical will be available to the COGCC upon request for each site.

Background arsenic soil samples will be collected immediately outside of the oil and gas location and compared with post incorporation arsenic levels on the oil and gas site location where the composted mixture is tilled into. Noble Energy, Inc. may utilize the United States Geological Survey (USGS) arsenic study in Colorado, overlaid with the National Resource Conservation Service (NRCS) soil classifications to determine appropriate background levels of arsenic within each soil classification in the Denver-Julesburg Basin (DJ Basin) (see attached figure). If the arsenic geometric mean of the windrow pile is within acceptable background levels, post incorporation arsenic samples may not be collected.

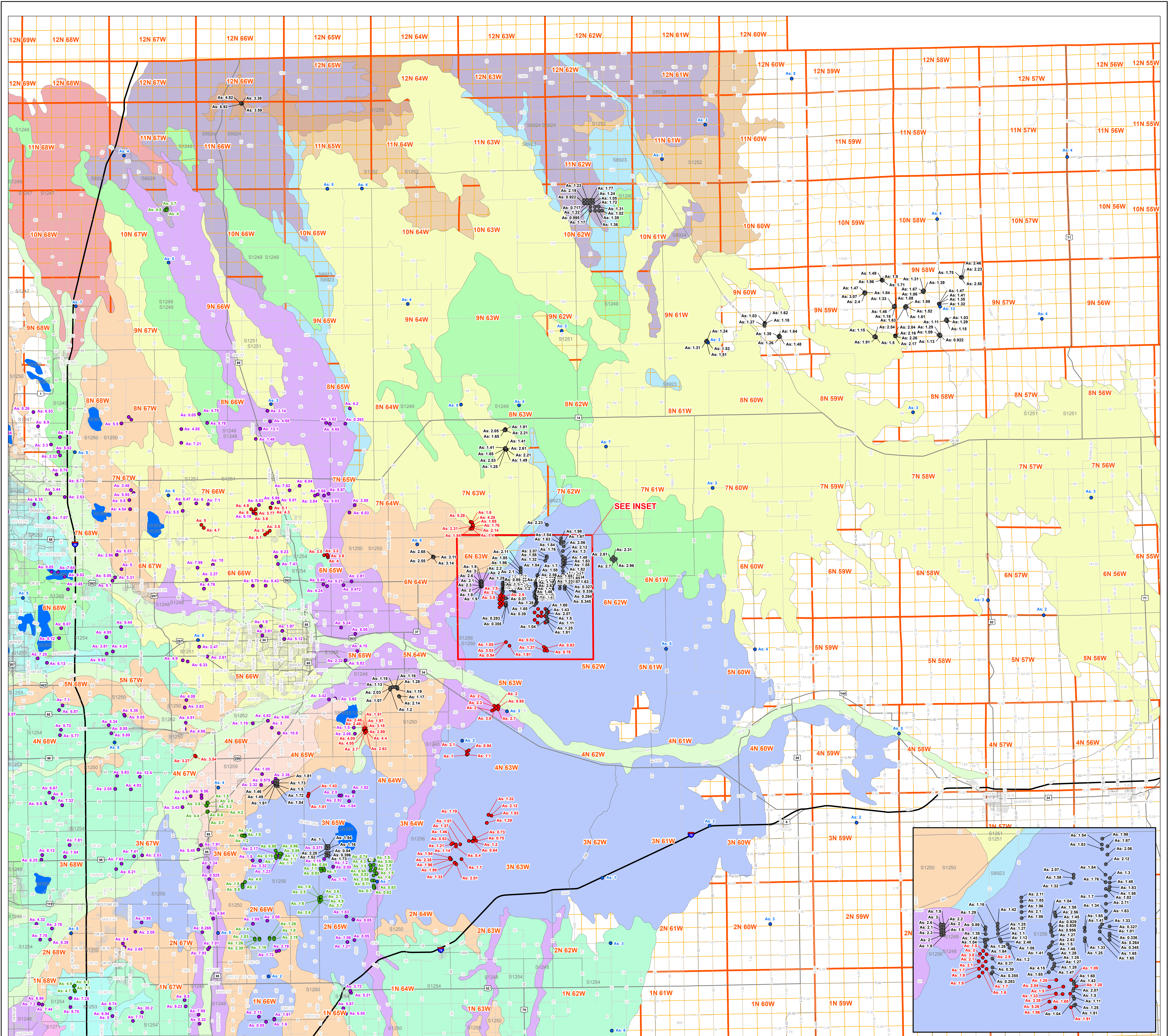
The well pad that the mixture of organic material and drill cuttings are composted on is developed to have no percolation through the 6 inch to 1 foot compacted clay layer at the base of the constructed well pad. There is also a 6 inch to 1 foot compacted class six road base material on the surface of the pad. These measures will ensure that native soils and groundwater are not impacted during the composting process.

The operation is not intended as a commercial treatment of E&P waste, or Non-E&P waste streams. The operation is Noble Energy Inc. specific only, and only material generated by Noble will be allowed on location. The timeframe for composting on site is normally 40-60 days. This would exempt Noble from having to obtain a Centralized Facility ID. There will also be no expansion of the oil and gas pad that the composting will take place on. Once a composting event is over the centralized pad will be re-graded, restored, and reclaimed to previous natural conditions per COGCC 1000 series rules.

## ATTACHMENTS

USGS/NRCS/Noble Arsenic Figure





LEGEND

- ANADARKO ARSENIC SAMPLE (PPM)
  - NOBLE ARSENIC SAMPLE (PPM)
  - PDC ARSENIC SAMPLE (PPM)
  - USGS As BACKGROUND (PPM)
  - USGS As GEOCHEMICAL SOIL DATA (PPM)
- USGS: UNITED STATES GEOLOGIC SURVEY  
As: ARSENIC  
PPM: PARTS PER MILLION

- HIGHWAY
- INTERSTATE
- TOWNSHIP
- SECTION

ASSOCIATION SOIL TYPE

- FLUVAQUENTS-BANKARD-ALDA (S1262)
- NUNN-HAVERSON-DACONO-ALTVAN (S1248)
- OTERO-HAVERSON-BAYARD-BANKARD-AVAR (S8923)

- PEETZ-BUSHMAN-ASCALON-ALTVAN (S8924)
- RAZOR-MIDWAY-MANZANOLA-HELDT (S1267)
- SIXMILE-PURNER-KIRTLEY-CONNERTON-BARNUM-BALLER (S1245)
- SIXMILE-ROCK OUTCROP-RENOHILL-MIDWAY-CARNERO-BALLER (S1246)
- STONEHAM-NUCLA-MITCHELL-KIM-EPPING-BAYARD (S1252)
- TERRY-TASSEL-SHINGLE-RENOHILL-ASCALON (S1249)
- THEDALUND-TERRY-OTERO-OLNEY-KIM-HAVERSON (S1250)
- THEDALUND-STONEHAM-LARIMER-ALTVAN (S1247)
- TREON-TERRY-ROCK OUTCROP-MITCHELL-ALTVAN-ABERONE (S1255)
- ULM-NUNN-ENGLEWOOD (S1253)

- UPSON-ROCK OUTCROP-NEWCOMB-MACFARLANE-LEIGHCAN (S1174)
- VALENT-JULESBURG (S1256)
- VALMONT-NUNN-NEDERLAND-LEYDEN-KUTCH-DENVER (S1271)
- VONA-MANTER-JULESBURG-HAXTUN (S1259)
- WELD-STONEHAM-PLATNER-OLNEY-NUNN-ASCALON (S1251)
- WETMORE-ROCK OUTCROP-RATAKE-MOEN-BOYLE (S1244)
- WETMORE-TRAG-ROCK OUTCROP-LININGER-BREECE-BOYLE-BONJEA-ALLENS PARK (S9004)
- WILEY-WELD-NORKA-COLBY-ADENA (S1254)
- WATER (S8369)

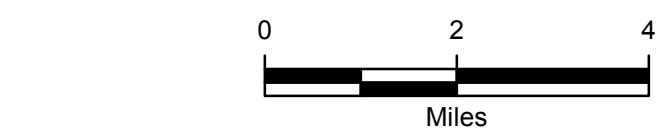


FIGURE 2  
BACKGROUND ARSENIC LEVELS  
DJ BASIN  
WELD COUNTY, COLORADO

LT ENVIRONMENTAL, INC.

