

# LINN Energy

Linn Operating, Inc.

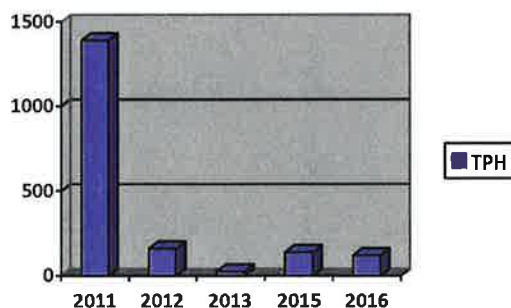
Piceance Asset

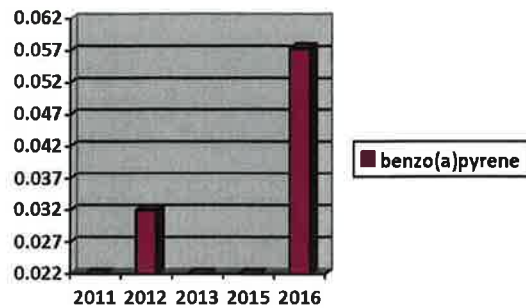
Parachute, Colorado

May 15, 2017

## O29 596 Landfarming Plan – Facility ID #448249

- History
  - Eight wells were drilled on this well pad in 2008. One well was abandoned and one well has been converted to a water injection well. Six wells are producing. These wells were drilled with the use of diesel based drilling mud. Drill cuttings were blended with clean soil and stockpiled on location.
- Current Status
  - Approximately 9,632 cubic yards of spoil material that is being treated adjacent to the wellpad by land farming is from drilling and completions operations. Samples of this spoil were taken in 2011, 2012, and 2013. Analysis of these samples indicated that all COGCC Table 910-1 standards were achieved and sampling was discontinued. A composite sample was taken and tested on October 8, 2015. This material passed the COGCC Table 910-1. Discrete samples from the same stockpile were taken on May 12, 2016. Four of the six samples failed for benzo(a)pyrene (lowest was 0.0234; highest was 0.0574). On November 2, 2016, the stockpile was moved, spread out to a height of approximately 18" and landfarm treatment began consisting of tilling the spoil and adding phosphorus fertilizer to address the benzo(a)pyrene.
  - In 2017, the landfarmed material has been tilled twice with a Kubota farm tractor pulling a chisel point plow. Based on soil nutrient analysis, fulvic acid is the only amendment that was recommended to apply during tilling operations. Tilling and adding amendments will continue once every 10-14 days until the 910-1 standards are met or until weather prohibits activity.





- Treatment - 2017
  - Spoil will be turned over by Kubota tractor pulling a chisel point plow 10 to 12 times (depending on weather and snow conditions) during the warm months in 2017. The soil will be turned over with the frequency established in the plan as a minimum or with a higher frequency if possible. The soil has been spread out to increase exposure to the atmosphere and sunlight as much as possible on land adjacent to the production pad.
  - Pre-treatment samples were taken in early spring to determine the amount of amendments that will be added to the spoil based on an analysis of nutrients present in the spoils. A copy of the lab report is attached to the Form 27.
  - Amendments
    - Based on analysis, only fulvic acid will be added to the spoils. Dave Nicholson's recommendation is attached to the Form 27.
- Samples and lab tests
  - Phase I - Composite sample will be taken from 8 locations on the spoil pile in early summer and analyzed.
    - If composite sample passes, discrete samples will be taken to confirm the composite samples.
      - If discrete samples pass, spoil will be buried per COGCC rules.
      - If discrete samples fail, landfarming will continue.
    - If composite sample fails, landfarming will continue.
  - Phase II - Composite sample will be taken from 8 locations on the spoil pile in late fall and analyzed.
    - Procedure will be the same as Phase I.
- Continuation
  - Process will continue into 2018 until spoil passes COGCC Table 910-1, specifically benzo(a)pyrene.