

Noble Energy, Inc.

HydroLoc/Drill Cutting Composting

E&P 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). HydroLoc, which is described in the proprietary blend of the constituents disclosed in the HydroLoc Mix Materials Safety Data Sheet (attached), 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 oil and gas locations. The remediation factors of HydroLoc utilizes the moisture, natural bacteria, fungi and micro-organisms to achieve composting of the drill cuttings

HydroLoc will be mixed in with the drill cuttings after the cuttings come off the shaker at the generation source well site. The estimated ratio of drill cuttings to HydroLoc per well is 1:1. The drill cutting and HydroLoc 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 HydroLoc 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 stockpiled HydroLoc/drill cutting mixture is estimated at 11 feet wide X 350 feet long X 6 feet total height and 855 total cubic yards per windrow.

The HydroLoc mixture has been developed as a composting agent to bring Table 9-10 analytes to COGCC allowable concentration levels. Pre-incorporation sampling of each windrow will be done by a 3rd party consultant. Three discrete soil samples will be collected from the windrow following the estimated composting period of 45-60 days and prior to incorporation.

Per Rule 907.d (3), incorporation of the compost mixture will be applied no more than three inches prior to incorporation and will be incorporated into the soil within ten days of application. 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.

Upon incorporation of the beneficial compost and re-vegetation of native vegetation on an oil and gas location, 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, EC, pH, SAR, and Arsenic. If the initial windrow soil samples are within COGCC Table 9-10 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 HydroLoc 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. There will also be a 4-6 inch layer of HydroLoc at the base of each windrow to absorb any leachate materials before reaching the pad surface. These measures will ensure that native soils and groundwater are not impacted during the composting process. -

The present proposed operation is not intended as a commercial treatment of E&P waste, or Non-E&P waste streams. The proposed 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

- MSDS of HydroLoc
- USGS Arsenic Background Figure

MATERIAL SAFETY DATA SHEET

SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION

Manufacturers Name

A1 Organics
16350 WCR 76
Eaton, CO 80615
Fax (970) 454-3232

Emergency Phone Number

(970) 454-3492, (800) 776-1644

E-Mail: info@a1organics.com

Trade Name & Synonyms

HydroLoc Mix

Date of Publication: May 19, 2008

Date of Most Recent Update: January 16, 2013

Product Use

Soil Amendment

Chemical Family

Organic Matter - Solid

Composition: Stabilized compost made from combinations of brewers wastes, waste water biosolids, ground kiln dried wood and or ground green waste, foodwaste and water and other wetting agents.

SECTION 2 – PHYSICAL DATA

Appearance & Odor: Fine earthy material with a fiber like texture and an earthy odor.		
Boiling Point (Degrees Fahrenheit) N/A	Specific (Water = 1) N/A	Bulk Density (range) 900 to 1300 lbs/CY
Vapor Pressure (MM of Mercury) N/A	Percent Volatile (By Volume) N/A	
Vapor Density (Air = 1) N/A	Evaporation Rate (Butyl acetate = 1) N/A	
Solubility in Water – H₂O - Typically less than 1%.		

SECTION 3 – FIRE AND EXPLOSION HAZARD DATA

Flash Point (Specify Method/Degrees F) Not Applicable	Flammable Limits % by Volume	Lower N/A	Upper N/A
Fire Extinguishing Media: Compost is not normally considered a fire hazard due to its moisture content. In the event of a fire, employee procedures that smother or separating the fuel from the fire.			
Special Fire Fighting Procedures: No special fire fighting procedures are necessary.			

SECTION 4 – HEALTH HAZARD DATA & FIRST AID

Effects of Overexposure: *If allergic symptoms occur in 0 to 48 hours, seek medical attention.*

Emergency and First Aid Procedures:

If Swallowed: Single dose oral toxicity is low. No hazards anticipated from ingestion incidental due to industrial exposure. Rinse mouth and throat with water if injected.

If on Skin: Prolonged or repeated exposure is not likely to cause significant skin irritation. May cause more severe response if skin is abraded. Wash with soap and water with flowing water or shower.

If in Eyes: May cause slight transient (temporary) eye irritation. Irrigate immediately with plenty of water for at least 5 minutes to remove foreign matter.

If Inhaled: No adverse effects anticipated by this route of exposure incidental to [proper industrial handling.] Remove to fresh air.

Hygienic Practices: Wash hands with soap and water after handling, as well as any other affected skin areas. Avoid contact with food or food preparatory surfaces. If this occurs, wash the area thoroughly with suitable detergent and water.

SECTION 5 – REACTIVITY DATA

Stability	Unstable: NO	Conditions to Avoid N/A
	Stable: YES	
Incompatibility (Materials to Avoid): None Known		
Hazardous Decomposition Products: None Known		
Hazardous Polymerization	May Occur	Conditions to Avoid N/A
	Will not Occur X	

SECTION 6 – DISPOSAL CONSIDERATIONS

Disposal Method: This is an organic material that is used as is a soil amendment and or a growing media. It can be incorporated into surrounding soil in accordance with manufacturer's recommendations.

Where contaminated or unusable, dispose of the material in a sanitary landfill, which complies with all local, state and federal regulations.

SECTION 7 – SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify type): N/A	Mechanical (General): N/A
Ventilation: Use areas with adequate ventilation.	Local Exhaust: N/A
Protection Gloves: N/A	Eye Protection: Use safety glasses in dusty conditions
Other Protective Equipment: No special protective equipment is necessary. Observe normal hygiene practices when handling this material.	

SECTION 8 – SPECIAL PRECATTIONS

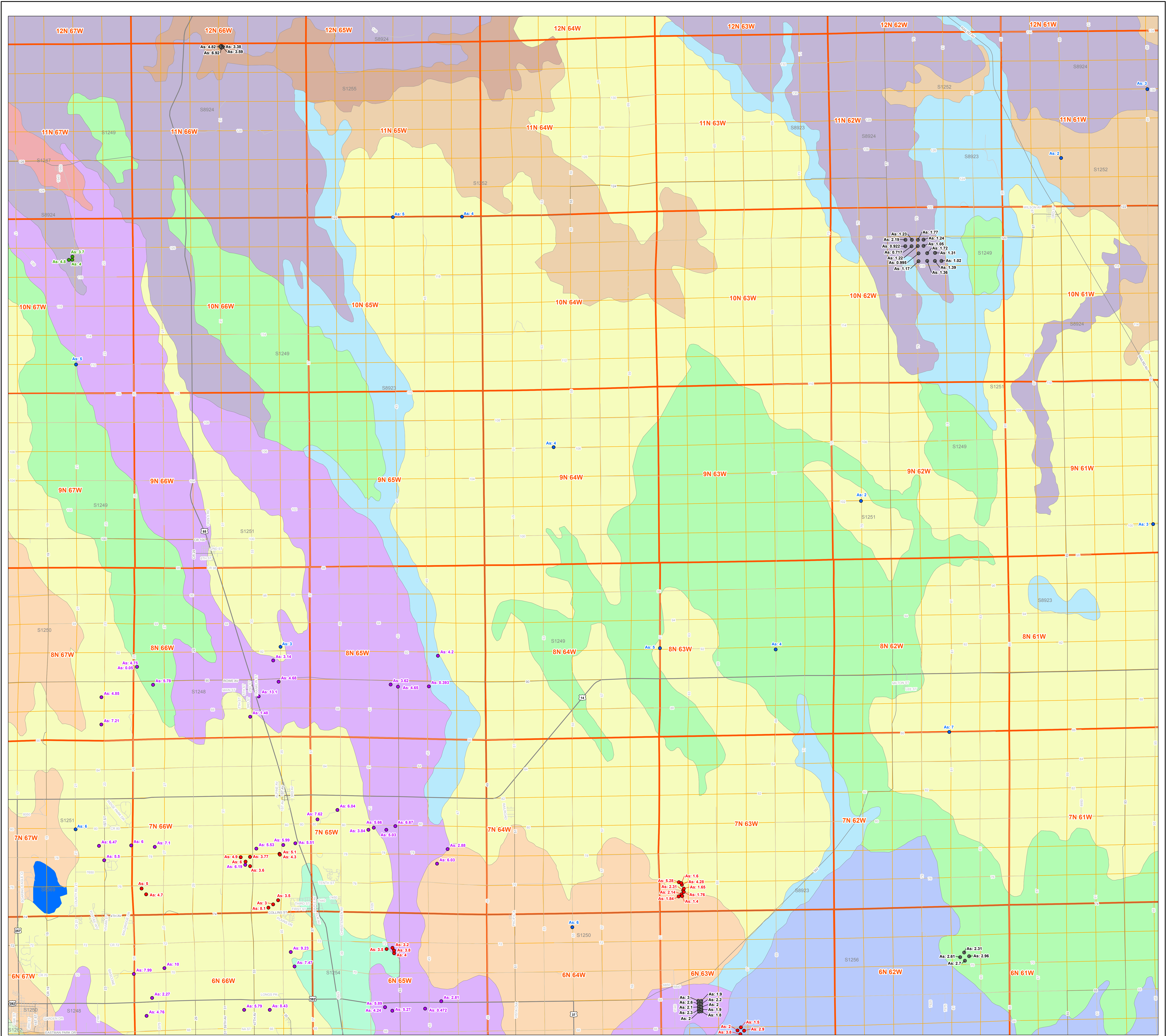
Precautions to be taken in handling and storing: This material can be stored outside, with no special handling. This material is organic in nature, is a soil amendment and or a growing media.

SECTION 9 – DOT INFORMATION

DOT Classification and Label: Not required by DOT

SECTION 10 – DISCLAIMER INFORMATION

As of the date of this document, the foregoing information is believed to be accurate and is provided in good faith to comply with applicable federal and state laws. However, no warranty, expressed or implied, or fitness or representation of law or fact with respect to such information is intended or given.



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)

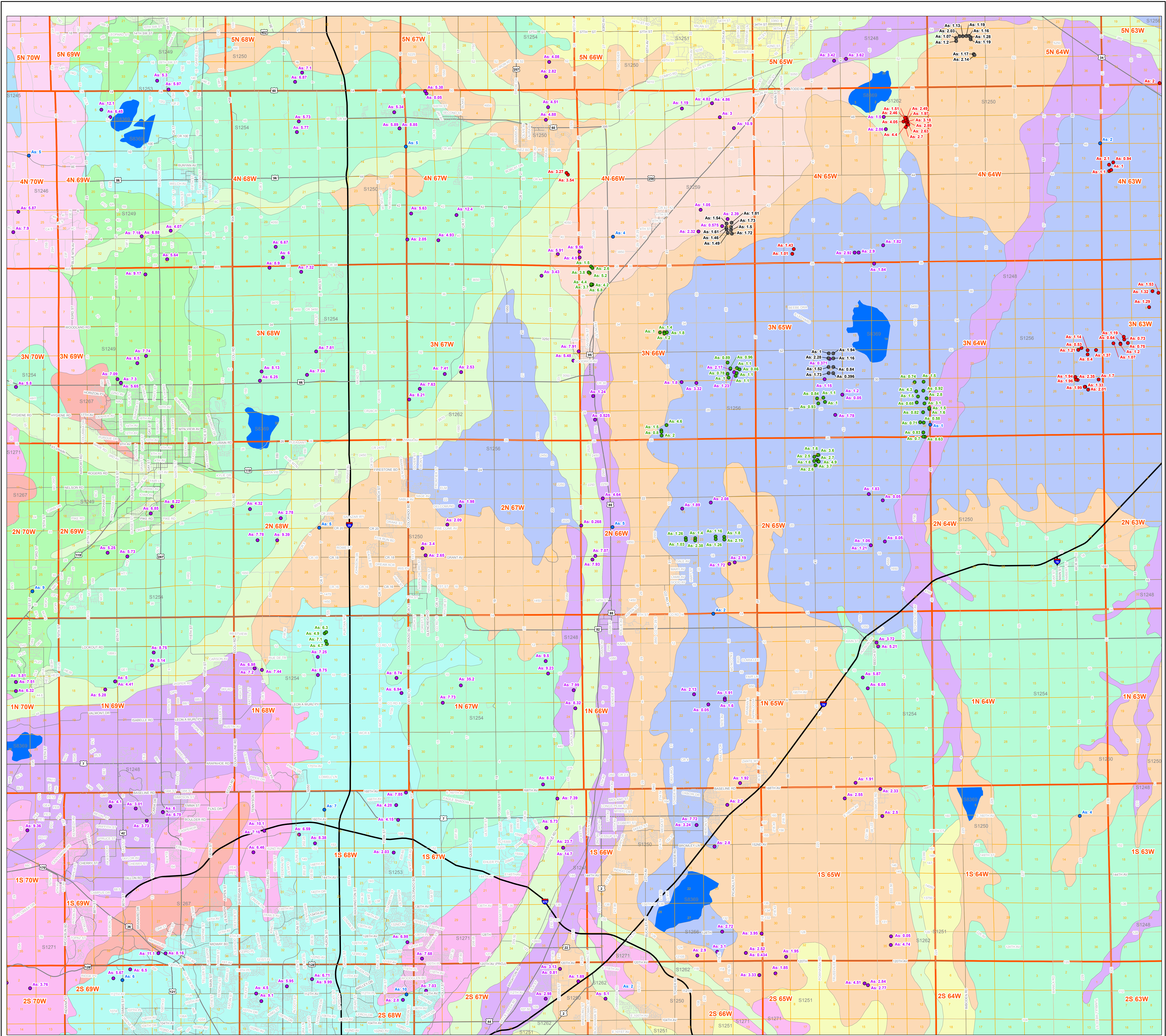
- UPSON-ROCK OUTCROP-NEWCOMB-MACFARLANE-LEIGHCAN (S1174)
- VALENT-JULESBURG (S1256)
- VALMONT-NUNN-NEDERLAND-LEYDEN-KUTCH-DENVER (S1271)
- VONA-MANTER-JULESBURG-HAXTUN (S1259)
- WELD-STONEHAM-PLATNER-OLNEY-NUNN-ASCALON (S1251)
- WETMORE-ROCK OUTCROP-RATAKE-MOEN-BOYLE (S1244)
- WETMORE-TRAG-ROCK OUTCROP-LININGER-BREECE-BOYLE-BONJEA-ALLENS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



FIGURE 1
BACKGROUND ARSENIC LEVELS
NORTH DJ BASIN
WELD COUNTY, COLORADO

LT ENVIRONMENTAL, INC.





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- WILEY-WELD-NORKA-COLBY-ADENA (S1254)
- WATER (S8369)



FIGURE 2
BACKGROUND ARSENIC LEVELS
SOUTH DJ BASIN
WELD COUNTY, COLORADO

LT ENVIRONMENTAL, INC.

