



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8**

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Ref: SEMD - RSA

Dan Harrington
Asset Development Lead
Civitas Resources
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via email

Re: Revised Crestone Peak (Civitas) Resources Lowry Ranch Comprehensive Area Plan (CAP), Potential Oil and Gas Lease near Lowry Landfill Superfund Site in Arapahoe County, Colorado

Dear Dan Harrington:

In preparation for our June meeting, this letter provides information on the Lowry Landfill Superfund Site and the U.S. Environmental Protection Agency (EPA)'s concerns about proposed oil and gas surface activities and hydraulic fracturing in the area surrounding and underneath the Lowry Landfill Superfund Site (Site). The EPA is concerned that hydraulic fracturing surrounding and underneath the Site could lead to a significant unintended release of hazardous substances from the Site.

Background on the Lowry Landfill Superfund Site

Added to the National Priorities List in 1984, the Site is located on 507 acres east of the City of Aurora in unincorporated Arapahoe County, Colorado, on former Lowry Bombing Range property. From the mid-1960s until 1980, the City and County of Denver operated co-disposal landfill at the site, accepting liquid and solid municipal and industrial wastes, including sewage sludge disposed of in unlined pits or land application. Prior to 1980 the landfill accepted liquid and solid municipal and industrial wastes.

The EPA estimates about 138 million gallons of industrial wastes were disposed of at the landfill. The types of wastes disposed of at the Lowry Site until 1980 include acid and alkaline sludges; asbestos; caustic liquids and solids; brines including plating wastes and other water-based sludges; laboratory wastes; organics including petroleum-based oils, grease, chlorinated solvents, and sludges; waste solvents, chemicals, and oil; biomedical wastes; low-level radioactive medical wastes; pesticides and garden chemicals; water-soluble oils; sewage sludge; paint and varnish waste, sludge and thinners; photographic chemicals and industrial solvents;

construction waste; municipal refuse; household hazardous waste; appliances; tires; and metallic wastes.

The liquids were placed into 78 unlined trenches over about 200 acres. Solids such as soil, old tires and household refuse were then added to the trenches to absorb the liquids. Landfilling operations contaminated soil, groundwater, surface water and sediment with hazardous chemicals. Additionally, gases from buried wastes contaminated the air space in subsurface soils. Contaminants of concern at the site include volatile organic compounds, semivolatile organic compounds, metals, pesticides, polychlorinated biphenyls, methane, and other landfill gases.

Lowry Landfill Superfund Site Remedy

In 1994, the EPA selected a remedy, which primarily relied on containing the waste in place. In 2005, the EPA entered a consent decree with the City and County of Denver and Waste Management, Inc. (Work Settling Defendants or WSDs) whereby the WSDs implemented the EPA's selected remedy. To date, all components of the remedy have been completed and an extensive monitoring network is in place to continuously monitor their effectiveness. The remedy has been in place for several decades and is operating as intended as confirmed in the EPA's most recent [Five-Year Review](#).

The remedy for groundwater addresses potential Site risks through containment, collection, monitoring and water treatment. A combination of slurry walls, groundwater collection trenches and extraction wells act to prevent migration of contamination beyond the compliance boundary. *The vertical extent, below ground surface, of the contamination is held in place by a bedrock layer which could, under certain conditions, be subject to microfractures from fracking.*

EPA Concern

Should Civitas Resources proceed with fracking under the Site, the EPA is concerned that the bedrock layer confining the bottom of the landfill could be subject to microfractures that could lead to a catastrophic release of hazardous substances into the nearby groundwater. Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Civitas Resources may incur liability to address any releases of hazardous substances it causes or contributes to.

Due to these potential impacts on the ability of the Site remedy to contain contamination, in March the EPA requested that the Bureau of Land Management consider:

1. Adding a No Surface Occupancy provision to any lease/sale of mineral rights under the Site and nearby areas, and
2. Taking final agency action to prohibit nominations of federal mineral rights sales/auctions/leases under the Site.

The EPA anticipates filing similar comments on the CAP once it is available for public comment.

The EPA and the WSDs have developed extensive information about the subsurface conditions at the Site. Included as an attachment to this letter are additional resources and links to site information, recent investigations, and modeling.

I am looking forward to further discussion in June.

Sincerely,

LINDA KIEFER Digitally signed by LINDA
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Enclosures:
Site Additional Resources and Information
Map of Site Location

cc: Shaun Cwick, Colorado Department of Public Health and the Environment
Dave Wilmoth, City and County of Denver
Steve Richtel, Waste Management

Lowry Landfill Superfund Site Additional Information and Resources

Since the Site's listing in 1984, hundreds of millions of dollars been spent characterizing shallow contamination, constructing remedy components, and operating and maintaining the Superfund site. Annual operating and maintenance costs to operate the site remedial components and maintain protectiveness average several million dollars. The remedial operations will continue in perpetuity.

The upkeep of this complex Site requires extensive effort and labor. There is an operating water treatment plant. Groundwater samples and level measurements are taken daily – the groundwater monitoring network consists of over 500 monitoring wells – per the [Updated Groundwater Monitoring Plan Revision 2](#) dated September 6, 2018. The site's monitoring is ongoing and is documented in the biannual site status reports. The most recent is the March 2023 [Remedial Action and Operations and Maintenance Status Report](#).

In recent years, new evaluations and modeling were conducted to establish an updated baseline for the nature and extent of shallow contamination and to determine the effectiveness of the containment remedy.

- The comprehensive conceptual site model was updated.
 - [Updated Conceptual Site Model](#) October 12, 2021
- Effectiveness evaluations on remedy components were completed
 - [North Boundary Barrier Wall Effectiveness Evaluation](#) September 21, 2021
 - [Effectiveness Evaluation for MW38 Area, North Toe Extraction System, and North End Response Actions](#) January 22, 2021
 - [Effectiveness Evaluation for the Perimeter Barrier Wall](#) January 22, 2021
 - [Containment System Evaluation Plan for North Boundary Barrier Wall](#) October 16, 2020
- Three-Dimensional Characterization of Contamination was modeled based on previously collected data.
 - [Development of Calibrated Numerical Three-Dimensional Finite-Element Groundwater Simulation Model](#), June 1, 2020
 - [Technical Memorandum Documentation of Three-Dimensional Data Visualization and Analysis – Revision 3](#), June 1, 2020
 - [Development of Calibrated Numerical Three-Dimensional Finite-Element Groundwater Simulation Model](#) December 9, 2019
- An off-site shallow plume of 1,4-dioxane is present north and downgradient from the site.
 - [Risk Assessment - 1,4-dioxane risk summary - North End sampling, Lowry Landfill Superfund Site](#), September 2, 2020
 - [North End Investigation Report - 1,4-dioxane plume map and north end conceptual model](#) September 2, 2020
 - [North End Monitoring Plan Update 2](#) October 16, 2020

These and other site documents can be found at www.epa.gov/superfund/lowry-landfill under Site Documents and then [Publicly Available Documents](#).

Unincorporated
Arapahoe County,
Colorado ●



Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community, DeLorme, AND, Tele Atlas, First American, UNEP-WCMC and the 2017 Five-Year Review.

Legend
 Approximate Site Boundary
 X = Section #



Lowry Landfill Superfund Site
 Unincorporated Arapahoe County, Colorado