LOWRY LANDFILL SUPERFUND SITE CITIZENS ADVISORY GROUP
(LLSF Site CAG)
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March 30, 2022

By email

Executive Director Jill Ryan
Colorado Department of Public Health and the Environment
4300 Cherry Creek Drive
South Denver, CO 80246

Re: Agency action needed to address PFAS contamination

Dear Executive Director Ryan,

We write to alert you to the urgent possibility of groundwater contaminated with per- and polyfluoroalkyl substances (PFAS), toxic "forever chemicals" at the Lowry Landfill Superfund Site. Recent tests conducted by the Colorado Department of Public Health & Environment (CDPHE) have shown alarmingly high concentrations of PFAS in both leachate collection systems at the Denver Arapahoe Chemical Waste Processing Facility (DACWPF) which is located next to the 507 Acre Lowry Landfill Superfund Site (LLSF) within the Denver Arapahoe Disposal Site (DADS). Furthermore, Public Employees for Environmental Responsibility (PEER) recently received data produced by the U.S. Environmental Protection Agency (EPA) which reveals that the federal agency has classified the LLSF as a facility that "may be handling" PFAS.

The Lowry Landfill Superfund Site Citizens Advisory Group (CAG) and Public Employees for Environmental Responsibility (PEER) ask that CDPHE take the following steps to protect Colorado's residents and environment from exposure to PFAS:

1. Immediately develop and implement a plan to regularly test the LLSF for PFAS contamination;
2. Immediately develop and implement a plan to regularly test the 3-mile-long off-site plume (which is part of the DADS and found on off-site private property);
3. Immediately develop and implement a plan to regularly test the influent and effluent of the water treatment plant of LLSF;
4. Develop and implement a remediation plan for the storage of PFAS contaminated waste;

5. Issue a notice to the communities with drinking water that may be contaminated with PFAS from LLSF; and
6. Schedule a meeting with the undersigned staff to discuss the issue further.

Overview of PFAS & Health Effects

As CDPHE is aware, PFAS as a class, are highly persistent chemicals, which means they are inherently hazardous to human health and the environment. The high persistence of PFAS means that there is a high probability of widespread and long-lasting effects.[1] Highly persistent chemicals, with a consistent rate of emission, will attain higher concentrations in the environment, necessarily leading to "widespread, long-lasting, and increasing contamination."[2]

Aside from persistence, PFAS present additional hazards to human health and the environment. Although we have toxicity information on only a fraction of PFAS, some are likely carcinogens; others have been linked to growth, learning, and behavioral problems in infants and children; fertility and pregnancy problems, including pre-eclampsia; interference with natural human hormones; increased cholesterol; and immune system problems.[3] Specifically, links between PFOA and high cholesterol, thyroid disease, pregnancy-induced hypertension, ulcerative colitis, and kidney and testicular cancer are well established.[4]

PFAS Contamination in LLSF

In October 2021, PEER received a data set from the U.S. Environmental Protection Agency (EPA) through a Freedom of Information Act Request with information on some 120,000 facilities that "may be handling" PFAS.[5] Despite likely being an undercount, this figure is over three times higher than outside experts had previously estimated. Even though this shows a scale of potential PFAS contamination previously unheard of, EPA has still not regulated PFAS, leaving states with the burden of cleaning up these toxic chemicals. PEER's data shows the Lowry Landfill as a facility listed within EPA's data set that "may be handling" PFAS (see Figure 1).

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[1] Ian T. Cousins, et.al., *Why is high persistence alone a major cause of concern?*, DOI: 10.1039/C8EM00515J (Perspective) 21 ENVIRON. SCI.: PROCESSES IMPACTS 781-792 (2019), https://pubs.rsc.org/en/content/articlehtml/2019/em/c8em00515j.

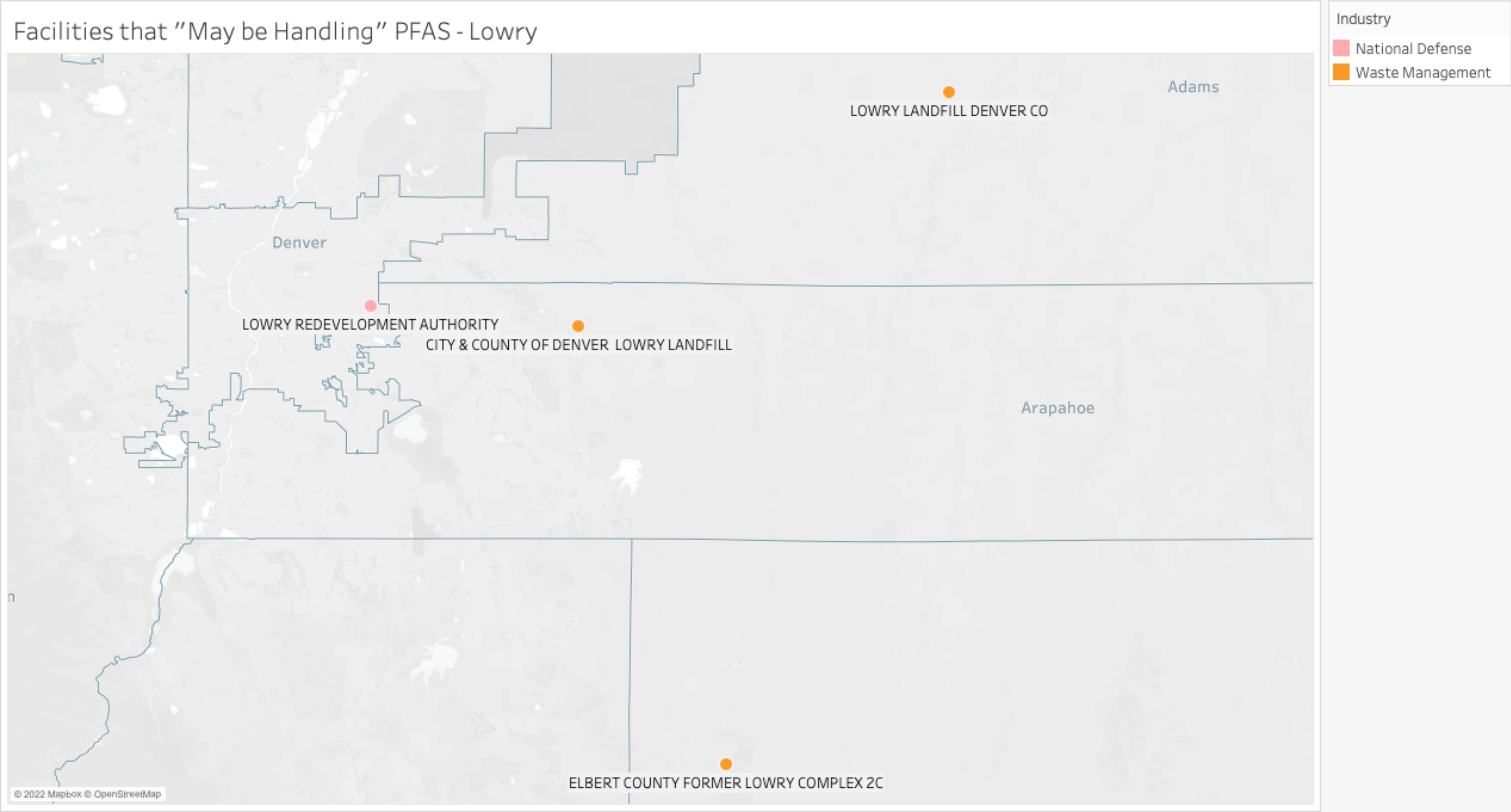
[2] *Id.*, *see also* Carol F. Kwiatkowski et. al., *Scientific Basis for Managing PFAS as a Chemical Class*, ACS PUBLICATIONS, (June 30, 2020) https://pubs.acs.org/doi/10.1021/acs.estlett.0c00255.

[3] U.S. DEPT. OF HEALTH AND HUMAN SERVICES, AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, TOXICOLOGICAL PROFILE FOR PERFLUOROALKYLS (May 2021), https://www.atsdr.cdc.gov/toxprofiles/tp200.pdf.

[4] Elsie M. Sunderland et. al., *A Review of the Pathways of Human Exposure to Poly- and Perfluoroalkyl Substances (PFASs) and Present Understanding of Health Effects*, 29 J. OF EXPOSURE SCIENCE AND ENVT'L EPIDEMIOLOGY no. 2, (2018), https://pubmed.ncbi.nlm.nih.gov/30470793/.

[5] PEER mapped the EPA data at: https://peer.org/areas-of-work/public-health/pfas/pfas-map-generation-disposal/ *See also*, Tim Whitehouse, *Revealed EPA Data on potential PFAS Sites*, PEER, (Oct. 17, 2021) https://peer.org/blog-revealed-epa-data-on-potential-pfas-sites/.

Figure 1



In December 2020, CDPHE tested both the primary sump and secondary sump of the DACWPF and discovered that it contains PFAS. Specifically, CDPHE's tests in the primary sump found 301 parts per trillion (ppt) of perfluorooctanoic acid (PFOA) and approximately 430 ppt of perfluorooctanesulfonic acid (PFOS), two of thousands of PFAS.[6] While in the secondary sump, PFOA was detected at 111 ppt and PFOS was detected at 61 ppt. The annual report also presented detections of PFOA and PFOS in the secondary leachate collection system. This was the first time the secondary sump was sampled for PFAS.

Similar to DACWPF, leachate from LLSF is likely to contain PFAS due to the fact that the waste that DACWPF received was similar to, if not the same as, the waste that was once received by LLSF. In October 1980, LLSF stopped accepting chemical waste that was then diverted to DACWPF. This means that the same chemical compounds that were being disposed of in LLSF were later accepted by DACWPF. So, if PFAS was detected within DACWPF, it is also likely to be found in LLSF.

[6] EPA's CompTox database claims there are 12,039 PFAS, and their National Testing Strategy states there are 6,504. Regardless of how PFAs are defined, there are thousands of chemicals in the class.

Landfill leachate containing PFAS is a major source of groundwater and surface water contamination.[7] It is an established problem that landfills place PFAS-laden leachate into local water treatment plants that have no way to effectively remove PFAS.[8] In fact, treatment at wastewater treatment plants can actually lead to additional PFAS in the effluent than the influent.[9] Regular testing is necessary to reveal the real dangers posed by PFAS in landfill leachate and wastewater effluent, which is continuously discharging PFAS to public waters.

CDPHE's Authority to Regulate PFAS in Drinking Water

CDPHE has the legal authority to protect residents and the environment from PFAS-contaminated groundwater by monitoring for PFAS and requiring compliance with state water quality standards. CDPHE's mission is to "advanc[e] Colorado's health and protect[ ] the places where we live, learn, work, and play."[10] In carrying out that mandate, it is the responsibility of the CDPHE to "administer and enforce the public health laws of the state of Colorado and the standards, orders, rules, and regulations established issues, or adopted by the board."[11] This includes that "[g]roundwater shall be free from pollutants not listed in the tables referred to in section 41.5(B), which alone or in combination with other substances, are in concentrations shown to be . . . [c]arcinogenic, mutagenic, teratogenic, or toxic to human beings, and/or, . . . [a] danger to the public health, safety, or welfare."[12]

CDPHE has already publicized information determining that the "[h]ealth effects from PFAS may include pregnancy complications, developmental effects, and liver and kidney effects."[13] As the Department knows, the EPA's Lifetime Health Advisory (LHA) levels for these two PFAS - PFOA and PFOS - are 70 ppt in drinking water. Moreover, EPA's updated risk assessments of PFOA and PFOS in November of 2021 indicate that upcoming regulatory limits will be much lower than the LHA.[14] PFOA and PFOS appeared in CDPHE's test of DACWPF at significantly higher concentrations than 70 ppt, and DACWPF is adjacent to LLSF and received the same type of waste that LLSF previously accepted. These concentrations highlight the risks that PFAS-contaminated landfill leachate poses to Colorado's residents and environment.

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[7] E.A. Crunden, *Toxic PFAS waste that lasts 'forever' poses financial, logistical challenges for landfills*, WASTEDIVE, (Oct. 19, 2020) https://www.wastedive.com/news/pfas-forever-chemicals-waste-disposal-landfill-leachate/587042/.

[8] *Id.*

[9] Swadhina Priyadarshini Lenka, Melanie Kah, Lokesh P. Padhye,
A review of the occurrence, transformation, and removal of poly- and perfluoroalkyl substances (PFAS) in wastewater treatment plants, Water Research, Volume 199, 2021, 117187, ISSN 0043-1354,
https://doi.org/10.1016/j.watres.2021.117187

[10] Jill Hunsaker Ryam, CO DEPT. OF PUB. HEALTH AND THE ENVT, *Strategic Plan 2019-2023 and Department Implementation Plan FY 2021-22*, https://drive.google.com/file/d/1RupTThbAmfhiz_FQ0af6uMlsZWJXthNU/view.

[11] C.R.S. 25-1-109.

[12] 5 C.C.R. 1002-41.5.

[13] Water Quality Control Commission Policy 20-1, *Policy for Interpreting the Narrative Water Quality Stadards for Per- and Polyfluoroalkyl Substances (PFAS)*, (July 14, 2020)
https://drive.google.com/file/d/1nmx36TBR8YsSkdvc3M53McmQTh7eD_Av/view.

[14] https://www.natlawreview.com/article/icymi-epa-takes-big-science-step-towards-setting-drinking-water-standard-pfoa-and#:~:text=EPA%20states%20that%20PFOA%20is,set%20for%20PFOA%20at%20zero.

Both the LLSF and the DACWPF are uphill from homes that utilize the groundwater for well water, specifically, the Gun Club Estates Development. Groundwater underneath LLSF and DACWPF flows in the direction of wells that use that water to create drinking water for nearby communities. This means that groundwater likely contaminated with PFAS is going to be used as drinking water for nearby communities like the Gun Club Estates Development.

CDPHE should act immediately to protect the state's waters and safeguard public health by testing LLSF and the surrounding area for PFAS.

CDPHE's Monitoring Must Use Total Organic Fluorine Testing

CDPHE is already aware of the importance of testing, as the agency is already planning on testing private wells for 1,4-Dioxane and other volatiles. However, CDPHE must also test for PFAS in order to protect human health and the environment from harmful chemicals.

The analytical chemistry tools used to study and quantify PFAS have evolved to meet the new demands presented by this large class of chemicals.[15] EPA currently states that there are thousands of PFAS.[16] Current tests can only detect 70 PFAS, failing to identify many PFAS compounds and the full extent of PFAS contamination. However, a Total Organic Fluorine test (TOF) shows the total concentration of organic fluorine. A TOF is indicative of the amount of PFAS, information which is necessary to adequately assess the environmental impact of PFAS contamination.[17] The large number of chemicals in the PFAS class spark the need to screen for all PFAS because we cannot detect the individual constituents.

By using a TOF and revealing the presence of unidentified PFAS, CHDPE will understand the total extent of its PFAS contamination and be able to minimize the actual harm of toxic forever chemicals already in the environment.

Requests

Given the dangers PFAS pose to Colorado's residents and environment and the growing evidence of widespread PFAS contamination from LLSF, we reiterate our request that your department take the following actions:

1. Immediately develop and implement a plan to regularly test the LLSF for PFAS contamination;
2. Immediately develop and implement a plan to regularly test the 3-mile-long off-site plume (which is part of the DADS and found on off-site private property);

[15] Envtl Prot. Agency, *EPA Announces First Validated Laboratory Method to Test for PFAS in Wastewater, Surface Water, Groundwater, Soils*, (Sept. 2, 2021) https://www.epa.gov/newsreleases/epa-announces-first-validated-laboratory-method-test-pfas-wastewater-surface-water.
[16] PFAS Master List of PFAS Substances, https://comptox.epa.gov/dashboard/chemical-lists/pfasmaster (last visited Jan. 21, 2022).
[17] Lloyd J Winchell et. al., *Analyses of per and polyfluoroalkyl substances (PFAS) through the urban water cycle: Toward achieving an integrated analytical workflow across aqueous, solid, and gaseous matrices in water and wastewater treatment*, (June 20, 2021) https://www.sciencedirect.com/science/article/pii/S0048969721003235.

3. Immediately develop and implement a plan to regularly test the influent and effluent of the water treatment plant of LLSF;
4. Develop and implement a remediation plan for the storage of PFAS contaminated waste;
5. Issue a notice to the communities with drinking water that may be contaminated with PFAS from LLSF; and
6. Schedule a meeting with the undersigned staff to discuss the issue further.

We appreciate your prompt attention to this urgent issue of public and environmental health and await your response.

Sincerely,

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