Forensic Architecture

House Committee on Judiciary
Oregon State Legislature
900 Court St. NE, Room 331 (Remote D)
Salem, OR 97301

RE: <u>Opposition to HB 4131 or its placement into another House Bill, including HB 4008</u>

February 8, 2022

Chair Bynum and members of the committee,

Forensic Architecture[1], a research agency of international reputation based at Goldsmiths, University of London, submits this testimony in strong opposition to HB 413, or to its placement into another House bill including but not limited to HB 4008. It is our agency's firm belief that Oregon should retain and expand existing 'tear gas' bans, in light of **clear and significant public health and environmental concerns**. HB 4131 or similar changes are steps in the wrong direction.

[1] Forensic Architecture is an interdisciplinary research agency based at Goldsmiths, University of London, which investigates instances of violence committed by states, police forces, militaries, and corporations. The research team is comprised of architects, scientists, journalists, software developers, and filmmakers. Forensic Architecture's investigations employ technologies—such as digital and 3D modeling, architectural analysis, remote sensing, and machine learning—in order to illustrate and analyze instances of conflict and violence. These technologies have been applied to reconstruct and investigate occurrences (*inter alia*) of forced detention, land dispossession and displacement, killings by police, chemical pollution and environmental destruction, and the domestic use of tear gas against civilian populations, for which the agency has developed unique expertise in modeling and simulation to show how a chemical munition like tear gas can be distributed throughout an environment. Forensic Architecture's investigations have been relied upon and presented in national courts around the world, and before major tribunals and councils such as the United Nations General Assembly, the United Nations Human Rights Council, the United Nations Special Rapporteur on Protecting Human Rights while Countering Terrorism, the Inter-American Court of Human Rights, the International Criminal Court, the European Court of Human Rights, the European Parliament's Committee on Civil Liberties, Justice and Home Affairs, and the Colombian post-conflict Commission for the Clarification of Truth, Coexistence, and Non-repetition. Forensic Architecture has worked with and for major international non-governmental organizations, including Human Rights Watch, Amnesty International, Médecins Sans Frontières (Doctors Without Borders), and the International Committee of the Red Cross. Forensic Architecture's founder and principal investigator, Professor Eyal Weizman, is a tenured professor at Goldsmiths, University of London and a former Global Scholar at Princeton University. He sits on the Technology Advisory Board of the International Criminal Court, is a life fellow of the British Academy.

Tear gas[2] **is banned for use in warfare** under the Geneva Conventions[3] and the Chemical Weapons Convention.[4] However, the use of tear gas and related chemical agents in law enforcement has only increased year-on-year in the United States.[5]

The Geneva Conventions define **a chemical weapon** as **any munition or device "specifically designed to cause… harm through… toxic chemicals."** The "Safety Data Sheets" for munitions used by the Portland Police Bureau (PPB) during the 2020-21 racial justice protests in the city note that those munitions carry the danger of convulsion, cerebral edema, severe allergic skin reaction, bronchial spasms, and anaphylactic shock, among other harms.[6] Munitions available to, and used by, US law enforcement agencies, including agencies active in Oregon, contain toxic active and inactive ingredients such as 2-chlorobenzalmalononitrile ("fatal if inhaled"; "very toxic to aquatic life"),[7] 2-chloroacetophenone ("may cause cancer"; "toxic to aquatic life with long lasting effects"),[8] zinc chloride ("causes severe skin burns and eye damage"),[9] hexachloroethane ("suspected of causing cancer"; "very toxic to aquatic life"),[10] and heavy metal compounds, such as lead dithiocyanate ("anticipated human carcinogen"; "causes damage to

[2] The phrase—tear gas—is an umbrella term for a group of chemical compounds that "make people unable to function by causing irritation to the eyes, mouth, throat, lungs, and skin.". One of the most commonly used compounds is chlorobenzylidene malononitrile, or "CS." See *Facts About Riot Control Agents*, Centers for Disease Control and Prevention, https://emergency.cdc.gov/agent/riotcontrol/factsheet.asp (last visited Jan. 30, 2022).

[3] *See* Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, 26 U.S.T. 571 (June 17, 1925); *see also* Natasha Williams, et al., *The Problematic Legality of Tear Gas Under International Human Rights Law* at 9, International Human Rights Program, University of Toronto, Faculty of Law (Aug. 2020), *available at* https://ihrp.law.utoronto.ca/sites/default/files/media/Legality%20of%20Teargas%20-%20Aug25%20V2.pdf

[4] *See* Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, Organisation for the Prohibition of Chemical Weapons. (3 Sep 2022)

[5] *See* Craig Rothenberg, et al., *Tear gas: an epidemiological and mechanistic reassessment*, Annals of the New York Academy of Sciences 1378(1), 96-107 (2016), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5096012/.

[6] "Safety Data Sheet" for Triple-Chaser Separating Canister, CS, manufactured by Safariland/Defense Technology: http://sds.chemtel.net/webclients/safariland/finished_goods/Defense%20Technology%201026%20-%20Triple-Chaser%20Separating%20Canister%20CS%20-%20US.pdf

[7] https://pubchem.ncbi.nlm.nih.gov/compound/2-Chlorobenzylidenemalononitrile#datasheet=LCSS

[8] https://pubchem.ncbi.nlm.nih.gov/compound/10757#datasheet=LCSS

[9] https://pubchem.ncbi.nlm.nih.gov/compound/5727#datasheet=LCSS

[10] https://pubchem.ncbi.nlm.nih.gov/compound/6214#datasheet=LCSS

organs through prolonged and repeat exposure")[11] and barium chromate ("harmful if inhaled"; "may cause cancer")[12]. Munitions that make use of such toxic chemicals to control civilian populations by threat of harm must be understood as **chemical weapons**. It is only by virtue of a technical exception[13] in the Conventions above that they are not already commonly labelled as such. *Ipso facto*, the ongoing deployments of such munitions by law enforcement agencies across Oregon and the US, including the PPB, are acts of **domestic chemical weapon use** against civilians.

Forensic Architecture has developed methodologies to model how tear gas spreads across an urban environment. In partnership with local experts, including legal and activist organisations, we use this and other approaches to underscore the lethal consequences of so-called "less-lethal" munition use by law enforcement. An ongoing avenue of research within our agency applies this same methodology to the use of chemical weapons in Portland during the 2020-21 racial justice protests.

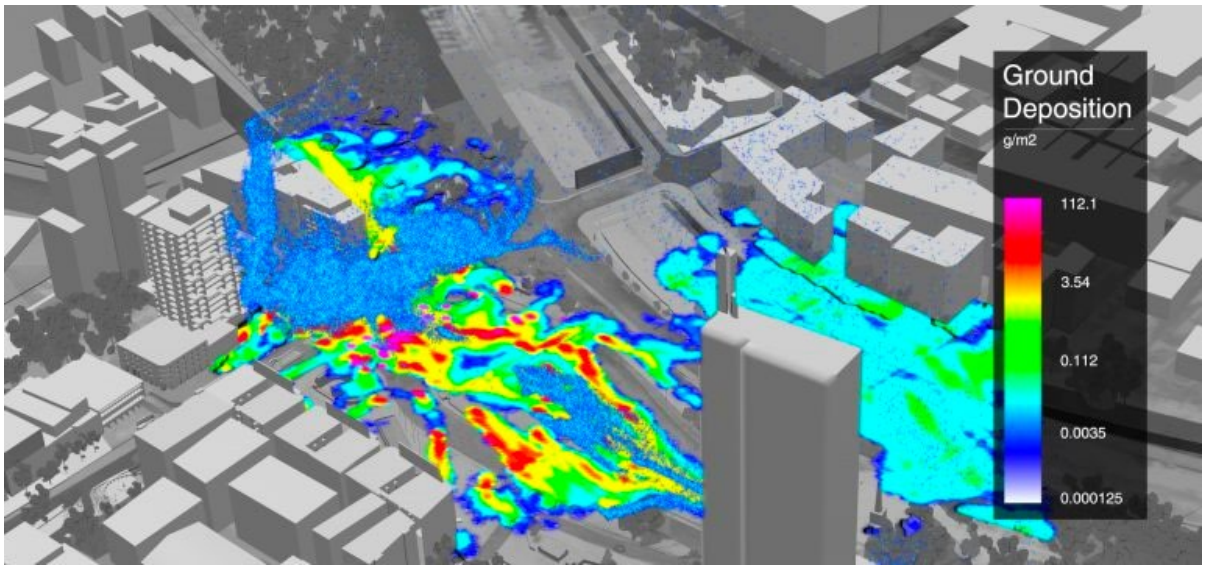

Fig. 1. *Source: Forensic Architecture. A still from our investigation into tear gas use by the Chilean police. Estimated ground depositions of CS are 'mapped' onto a digital model of the site of a major protest in Santiago, Chile. Colours vary according to density.*[14]

[11] https://pubchem.ncbi.nlm.nih.gov/compound/11616#section=Hazards-Identification

[12] https://pubchem.ncbi.nlm.nih.gov/compound/25136

[13] The Conventions exclude domestic 'law enforcement' purposes from their definition of chemical weapons.

[14] *See Tear Gas in Plaza de la Dignidad*, Forensic Architecture (Dec. 12, 2020), https://forensic-architecture.org/investigation/tear-gas-in-plaza-de-la-dignidad

Tear gas is inherently indiscriminate in its impact, subjecting large groups of citizens to fundamentally uncontrollable levels of harm,[15] in response to the perceived or actual infractions of a minority within those groups. When Forensic Architecture investigated the use of tear gas during protests in Santiago, Chile, our research found that for a total of three minutes during a ten-minute period on 20 December 2019, the concentration of CS in a single cubic metre of air at a sample point surpassed the threshold of 'serious hazard' according to the Chilean police's own guidelines, while peaks of **more than 100 times a 'safe recommended level'** were recorded.[16]

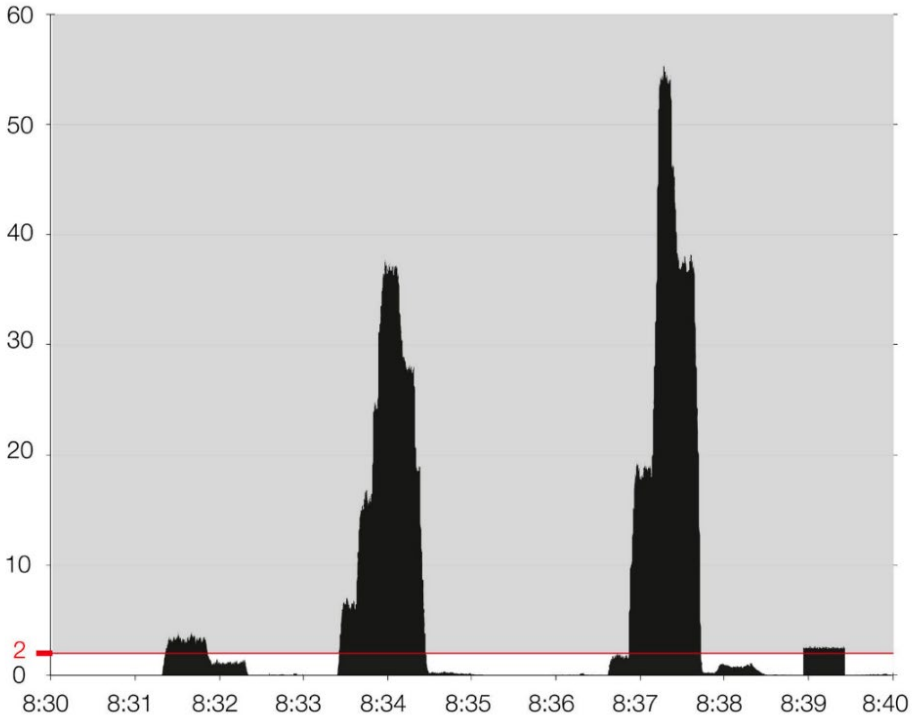

Fig. 2. *Source: Forensic Architecture. The x-axis is time, ranging from 8:30-8:40 PM on the evening of 20 December 2019. The y-axis is concentration of CS in mg/m^3. The graph shows modelled levels of CS concentrations in a sample point in Santiago, Chile, during a major protest. The red line marks a threshold of serious danger (2mg/m^3) for tear gas concentrations, according to the Chilean police's guidelines. This threshold (2mg/m3) was surpassed for a total duration of 185 seconds in ten minutes; peaks of more than 50mg/m3 were recorded.*

[15] *See for example* Prof Anna Feigenbaum, *Tear Gas* (2017, Verso), particularly chapter 4, e.g. "the aim is to blanket entire streets in clouds of chemical weapons—preferably invisibly—which can lead to gassing bystanders and gas seeping into nearby buildings or homes.", *and* "When Portland police use tear gas, protesters aren't the only ones breathing it", https://www.opb.org/article/2020/09/08/when-portland-police-use-tear-gas-protesters-arent-the-only-ones-breathing-it/

[16] *See Tear Gas in Plaza de la Dignidad*, Forensic Architecture (Dec. 12, 2020), https://forensic-architecture.org/investigation/tear-gas-in-plaza-de-la-dignidad

Exposure to tear gas and adjacent chemical agents may cause "significant injuries as well as permanent disabilities", including harms to human "neurological, oropharyngeal, cardiac, pulmonary, and musculoskeletal systems,"[17] or induce symptoms including "blurred vision," "burning," "choking sensation, "vomiting," while "[l]ong-lasting exposure or exposure to a large dose" can lead to "blindness," "glaucoma," "respiratory failure," or "immediate death due to severe chemical burns to the throat and lungs."[18] In Portland, Oregon, specifically, of 2257 people who self-identified as having been subjected to tear gas, 1995 people (88.4 percent) reported eye issues including "eye burning" and "blurred vision," 1238 (54.9 percent) reported skin issues including "burns."[19]

According to data gathered by the Chemical Weapons Research Center, on one night in Portland in January 2021, agents from DHS deployed munitions containing a total of more than half a kilo of CS.[20] Malononitrile, an active ingredient in CS, "may be fatal if inhaled, swallowed, or absorbed through the skin or mucous membranes," and carries a probable oral lethal dose for humans of "5-50 mg/kg, or between seven drops and one teaspoonful, for a 70 kg [150 lb] person."[21]

Even still, experts believe that the health impacts of tear gas are understudied.[22] Much of the available scientific literature is based on military research conducted 40 years ago or more, on young healthy subjects; thus, they "do not address the potential health effects for vulnerable populations."[23]

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[17] Rohini J. Haar, *Health impacts of chemical irritants used for crowd control: a systematic review of the injuries and deaths caused by tear gas and pepper spray*, BMC Public Health, 17: 831 (2017), https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-017-4814-6.
[18] *Facts About Riot Control Agents*, Centers for Disease Control and Prevention, https://emergency.cdc.gov/agent/riotcontrol/factsheet.asp (last visited Jan. 30, 2022).
[19] Britta N. Torgrimson-Ojerio, *Health issues and healthcare utilization among adults who reported exposure to tear gas during 2020 Portland (OR) protests: a cross-sectional survey*, BMC Public Health, 21: 803 (2021), https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-021-10859-w.
[20] https://twitter.com/JuniperLSimonis/status/1352808445867528192
[21] Morman, A., Williams, Z., Smith, D., Randolph A.C. (2020). *Riot Control Agents: Systemic Reassessment of Adverse effects on Health, Mental Stability, and Social inequities.* (June 26th, 2020).
[22] *Id.*
[23] *Press Release: Tear Gas Use During COVID-19 Pandemic Irresponsible; Moratorium Needed, Says American Thoracic Society*, Am. Thoracic Society (June 11, 2020), https://www.thoracic.org/about/newsroom/press-

Environmental impacts are similarly understudied, but warning signs are clear. Following tear gas deployment in 2020, Portland's Bureau of Environmental Services found elevated levels of contaminants in stormwater and sediment.[24] Another active ingredient in CS—2-chlorobenzaldehyde—has been cited as being "toxic to aquatic organisms" with "long term adverse effects."[25] During Operation Diligent Valor, hexachloroethane, a suspected human carcinogen, also noted for its toxicity to aquatic life, was used by federal agents.[26,27] These munitions could have severe consequences for numerous nearby ecosystems, including the Willamette River, which provides spawning, rearing, and essential habitat for numerous threatened and endangered species.[28]

Demonstrably, the human health and environmental impacts of tear gas deployment can be severe. Nevertheless, operational planning by law enforcement routinely remains blind to the prospect. In the ongoing case of *Nw. Ctr. for Alternatives to Pesticides v. U.S. Dep't of Homeland Sec.*, DHS argued that "to send reinforcements to a temporary hotspot to carry out law enforcement functions has no foreseeable environmental impact". In the case of *Don't Shoot Portland vs the City of Portland*, in September 2020, the

releases/journal/2020/tear-gas-use-during-covid-19-pandemic-irresponsible-moratorium-needed,-says-american-thoracic-society.php; *see also Tear Gas*, Oregon Health Authority, https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/HEALTHYNEIGHBORHOODS/TOXICSUBSTANCES/Pages/Tear-Gas.aspx (identifying a New York Academy of Sciences article as stating "that there is lack of data available on the range of health effects from tear gas exposure").

[24] *Press Release: Environmental Services Releases Results of CS Gas Residue Sampling in City Stormwater Pipes; $20,000 Penalty to Feds*, Portland Bureau of Environmental Services (Sept. 10, 2020), https://www.portland.gov/bes/news/2020/9/10/environmental-services-releases-results-cs-gas-residue-sampling-city-stormwater.

[25] *Id.*

[26] "Chemical Weapons Research Center", https://www.chemicalweaponsresearch.com/.

[27] Safety Data Sheet (Dec. 1, 2015), *available at*http://sds.chemtel.net/webclients/safariland/finished_goods/Defense%20Technology%201083%20-%20Military-Style%20Maximum%20Smoke%20HC%20Grenade.pdf; *see also* Juniper L. Simonis, *Quantifying use of lethal ZnCl2 on Black Lives Matter demonstrators by United States Homeland Security* at 5 (Sept. 30, 2020), https://zenodo.org/record/4434918#.YfdfBfXMJTY ("HC smoke has further significant effects on the environment, including defoliation and long-term reduction in tree growth, and stunted development, scale deterioration, skeletal weakness, and bioaccumulation in fish." (citations omitted)).

[28] Those species may include winter steelhead, pacific lamprey, Chinook salmon, Coastal Cutthroat Trout, Oregon Chub, and others already facing numerous risk factors related to water quality problems.

City described tear gas as "minimally injurious."[29] This **clear "disregard" for the human and environmental health risk**[30] should be a powerful argument against expanding law enforcement agencies' power of use.

The use of toxic chemicals in response to civilians exercising their first amendment rights is unjustifiable. Forensic Architecture concurs with the assessment of local experts that the indiscriminate use of "crowd control" munitions against protesters marching for racial justice exacerbates existing systemic inequalities, curtails freedoms of assembly and speech, and disproportionately impacts vulnerable communities.[31] We note also that, as cited by Morman et al, "crowd control" munitions including tear gas have been used at a higher rate within Black Lives Matter protests than white supremacy or Proud Boy marches in Oregon.[32] The release of chemical agents that are banned in warfare into civilian environments should never be viewed as "routine".[33] Such weapons are **demonstrably and foreseeably extremely dangerous**; alternative models for maintaining the safety and rights of communities must be urgently sought.

We are encouraged to note that in 2020, Senators from Oregon asked the Environmental Protection Agency to investigate the "impacts of sustained tear gas use."[34] In 2008, the U.S. Army Environmental Center (USAEC) determined that many of the chemical agents discussed herein must be phased out of use

[29] That document available here: https://storage.courtlistener.com/recap/gov.uscourts.ord.152816/gov.uscourts.ord.152816.17.0.pdf, p12

[30] *See* Craig Rothenberg, et al., *Tear gas: an epidemiological and mechanistic reassessment*, Annals of the New York Academy of Sciences 1378(1), 96-107 (2016), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5096012/.

[31] *ibid*.

[32] *ibid*.

[33] As it was described in the Opinion and Order of US District Judge Karin J. Immergut in the case of *Nw. Ctr. for Alternatives to Pesticides vs DHS*, on 3 August 2021: "In sum, the challenged actions here are routine, temporary, tentative, and responsive to the actions of others."

[34] Senator Ron Wyden, et. al., *Letter to Andrew Wheeler, Environmental Protection Agency* (Aug. 13, 2020), https://www.wyden.senate.gov/imo/media/doc/EPA%20tear%20gas%20letter.pdf.

by the military due to their toxicity to humans and their environments;[35] the military stopped producing smoke grenades containing hexachloroethane at least as early as 2012,[36] yet grenades containing the same chemical were used as recently as 2020 on the streets of Portland. The Judiciary Committee of the Oregon House of Representatives should follow these examples, retaining and expanding existing local bans, with a view to leading the nation toward a wholesale ban on the domestic use of chemical weapons.

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[35] Rush, Tamera. ”Smoke and Dye Replacement”, WP-200122. Strategic Environmental Research and Development Program (SERDP). https://www.serdp-estcp.org/Program-Areas/Weapons-Systems-and-Platforms/Energetic-Materials-and-Munitions/Pyrotechnics/WP-200122/(language)/eng-US/.

[36] Jason Kaneshiro, Army labs join forces for healthier smokes”, *US Army*. (20 Dec 2012). https://www.army.mil/article/93339/army_labs_join_forces_for_healthier_smokes/.