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Dr. Alaa Kamel
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Environmental Protection Agency
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Sent via upload to Docket EPA-HQ-OPPT-2021-0415

RE: Comments on Draft Toxic Substances Control Act (TSCA) Screening Level Approach for Assessing Ambient Air and Water Exposures to Fenceline Communities

Dr. Kamel,

We appreciate the opportunity to recommend revisions and improvements to Version 1.0 of the Draft TSCA Screening Level Approach for Assessing Ambient Air and Water Exposure to Fenceline Communities. The National Tribal Toxics Council (NTTC, or Council) is an EPA Tribal Partnership Group (TPG) supported by the EPA Office of Pollution Prevention and Toxics. The Council is focused on providing Tribes with an opportunity for greater input on issues related to toxic chemicals and pollution prevention. The Council is actively engaged in advocating for improved protections for fenceline communities that are exposed to chemicals via ambient air and water pathways and we are particularly interested in supporting a final screening level methodology that can be applied to future chemicals undergoing risk evaluation under TSCA Section 6.

EPA's "Path Forward for TSCA Chemical Risk Evaluations"[i] announced the Agency's intent to consider exposure pathways that had been inappropriately excluded from risk evaluations under the previous administration, including fenceline communities. The NTTC applauds EPA's policy changes in reconsidering risk evaluation under new TSCA "in accordance with the Biden-Harris Administration's Executive Orders and other directives, including those on environmental justice, scientific integrity, and regulatory review" – changes that will allow EPA to ensure the protection of "all communities, including those that have been historically underserved.[i]" EPA's commitment to consider the air and water pathways by which people are exposed to toxic chemicals is a welcome change – one that more accurately reflects real-world exposures and that comports with Congress' intent for TSCA's comprehensive scope. In the next sections, we make specific suggested revisions that

should be considered for a final fenceline screening methodology, in order for such a screening approach to be fully protective of vulnerable populations.

Recommended Revisions and Improvements

Broaden the Definition of a Fenceline Community

The proposed screening level methodology evaluates potential risks to "fenceline" human receptors in proximity to facilities releasing chemicals to ambient air and to waterbodies. EPA's commitment to identify those who are most impacted by toxic chemicals appears to be limited to communities *near* industrial facilities, and this is cause for concern for tribes and indigenous peoples. If terms like "fenceline" or "frontline" are understood in a metaphorical sense, they may be capacious enough to include tribal exposures because tribal populations are often vulnerable in multiple ways. However, if "fenceline communities" are only considered in a literal, geospatial sense, they will exclude numerous exposure pathways for many other vulnerable Americans, including tribal people. Oftentimes, the pathways excluded correspond to activities and practices that are profoundly important to who they are as Indigenous peoples. If a literal understanding of these terms guides EPA's or other agencies' development of screening, evaluation, and other analytical tools, a large part of the impacts to tribes and indigenous people will likely continue to be missed. As considered in the Draft Screening Methodology, a focus solely on geospatial analysis will continue to fail to fully capture tribal peoples' exposures and injuries from toxic chemicals.

We recommend the use of screening tools, such as EPA's geospatial environmental justice mapping tool EJSCREEN[ii], which uses "geographic information systems (GIS) to assess the proximity of vulnerable subpopulations to environmental hazards" or to ambient pollutant concentration data.[iii] EJSCREEN, for example, focuses on a particular geospatial location – e.g., a person's place of residence – and permits queries into the number of various polluting sources, such as hazardous waste facilities or Superfund sites, or into the ambient pollutant concentrations within a certain distance – e.g., a one-mile buffer – and then overlays this information with various demographic factors. Furthermore, we recommend EPA characterize violations of air emissions in fenceline communities. Industrial sources which violate Pm10 or Pm 2.5 do not disclose the nature of the Pm 10 or Pm 2.5 that may likely add to risk and health impacts; radioactivity, mercury, heavy metals that many times make up the character of these violations must be disclosed and communicated to these communities.

The NTTC urges EPA to build out tools like that and to use them for screening by enhancing their capacity to account for cumulative exposures and by increasing their coverage of tribal and rural areas. Due to the paucity of federal resources that apply to these areas, state-level databases, such as water quality and waste records, should be considered to better elucidate exposures in these areas.

A focus solely on proximity to a particular facility will fail to fully capture tribal peoples' exposures and injuries from chemicals released to the environment. Tribal people can be exposed to contamination whenever the natural resources on which they depend are impacted by the release of toxic substances into the environment – a release that sometimes can occur at a very distant location. If one were to enlist a proximity to an industrial facility to gauge a person's

exposure to chemical contaminants, it would miss entirely the fish harvested so far beyond the typical buffer zone (assuming the screening tool even accounted for the fish ingestion exposure pathway). This same person may also be exposed to these and other contaminants through their consumption of other fish, animal, and plant species – often harvested, hunted, or gathered miles outside of reservation boundaries, pursuant to their treaty-reserved rights – as well as through a host of other exposure pathways occasioned by their use of or contact with various waters and other natural resources as they undertake their traditional lifeways.

Furthermore, industrial facilities as modeled in the screening methodology are not the only sources of toxic chemical releases to ambient air and water. Unlined landfills, with no containment, no cover, and no leachate treatment—often the same landfills that employ open burning with no emissions control as a management tool and which are located within one mile of a community (as is the case for more than 200 Alaska tribes), are a significant source of pollution and the communities in their proximity should be considered "fenceline". Likewise, communities in close proximity to under-designed and exempted wastewater lagoons and their discharge points, particularly those subject to minimal secondary biological treatment standards.

Evaluate Population Susceptibility as Well as Proximity

In the 2016 Lautenberg Chemical Safety for the 21st Century Act ("Lautenberg Act") that amended TSCA, Congress armed EPA with the authority and tools to identify and evaluate chemical substances' harms to those populations that are at greatest risk, focusing in particular on "potentially exposed or susceptible subpopulations." With this term, The Lautenberg Act emphasized that "potentially exposed or susceptible subpopulations" ("PESS") be the touchstone for EPA's evaluation of the risks posed by chemical substances.

TSCA § 3(12) defines "potentially exposed or susceptible subpopulations" to mean "a group of individuals within the general population identified by the Administrator who, due to either greater susceptibility or greater exposure, may be at greater risk than the general population to adverse health effects from exposure to a chemical substance or mixture, such as infants, children, pregnant women, workers, or the elderly."[iv] EPA's implementing regulations repeat this definition verbatim. EPA's definition thus appropriately embraces the broad authority conferred by the statute to protect any subpopulation that it identifies as potentially being "at greater risk … of adverse health effects" whether due to "greater susceptibility" or "greater exposure" to "a chemical substance or mixture."[v] The statutory language in TSCA is clear in calling out both exposure and susceptibility, instructing EPA to evaluate risks to "potentially exposed or susceptible subpopulations." Thus, both proximity and susceptibility should be part of the Fenceline Screening methodology. Both exposures and susceptibilities must be considered in order to accurately evaluate the risks posed by toxic substances, and the two are in fact often interrelated.[vi]

Native peoples' particular histories and circumstances mean that they often have multiple, interrelated susceptibilities relevant to considering toxic substances' health impacts and will often be among the most exposed and the most susceptible to toxic substances' harms. Scientists have recognized that numerous factors, both intrinsic and extrinsic, contribute to susceptibility.[vii] Intrinsic factors include, for example, "lifestage, genetics, underlying disease status, [and] nutrition." Extrinsic factors include, for example, "social and life circumstances such as poverty

and life [i.e., psychosocial] stress." Each of these factors can individually or in combination increase humans' susceptibility to harm from exposure to toxic chemicals, and scientists have made progress in developing methods to account for this.[viii] Additionally, researchers have demonstrated that many factors contributing to susceptibility, including pre-existing diseases and poverty, are not equally distributed, but are rather disproportionately present for indigenous people, among others.[ix]

The available data show that American Indian and Alaska Native people have numerous pre-existing conditions of the sort recognized as intrinsic factors that increase susceptibility. For example, they suffer from diabetes at an extraordinary rate – among adults, the rate is nearly three times that of other non-Native groups.[x] The rate for Native children is approximately two times that of their counterparts in the general U.S. population.[xi] American Indian adults are also 50 percent more likely to be diagnosed with coronary heart disease than their white counterparts; and 10 percent more likely than non-Hispanic white adults to have high blood pressure.[xii] Studies of air pollution exposures have found that people with underlying diabetes and cardiovascular disease faced an increased risk of mortality from exposure to particulate matter.[xiii]

Additionally, the concern for the susceptibilities of particular lifestages applies, for example, to Native children and elders. As EPA has recognized, children are uniquely susceptible to many adverse health effects of chemical substances. According to the Children's Health Protection Advisory Committee (CHPAC), these include substances that exhibit "Reproductive toxicity; Developmental toxicity (including developmental neurotoxicity); Carcinogenicity; Endocrine toxicity, including metabolism disrupting chemicals; Respiratory toxicity and potential effects on lung development, structure or function; Immunotoxicity; and Toxicity through preconception and/or *in utero* exposures."[xiv] Accounting for susceptibilities during this lifestage in fact implicates exposures during preconception, during pre- and post-natal development, and throughout childhood, adolescence, and young adulthood (considering, for example, that neurodevelopment continues for several years past the age of 18). [xv] As observed by CHPAC, "many of the remaining 53 chemicals [on EPA's TSCA Workplan] have hazard and/or exposure profiles suggesting children's environmental health concerns."[xvi] CHPAC recommends that EPA should prioritize such substances under TSCA and evaluate their risks with children's particular susceptibilities in mind. This need is all the more urgent for Native children, for whom the intrinsic susceptibilities of this lifestage are often heightened by myriad extrinsic susceptibilities, as discussed below.

EPA's Screening methodology would be improved by full consideration of susceptibility of fenceline communities, as well as proximity. There is sufficient evidence to take these considerations into account in a screening methodology. The current scientific consensus is that consideration of both exposures and susceptibilities is necessary to an evaluation of risk. In fact, this point has been recognized by the National Research Council of the National Academies of Science for more than a decade, and various researchers have developed methods for operationalizing this recognition.[xvii] The need to consider the role of both exposures and susceptibilities is thus well within the "best available science" mandates of TSCA[xviii].

Screening Should Include Other Water Pathways, in Addition to Treated Drinking Water and Recreational Swimming

The Screening Methodology uses modeling to estimate drinking water exposure and incidental oral and dermal exposures from recreational swimming. Analysis of these pathways limits consideration to drinking from public water systems and recreational interaction with water bodies. In Native communities, additional exposures via water can result from:

- Drinking, which can be from untreated and unregulated small systems (less than 15 homes), or private well water, surface haul water, and spring water systems;
- Hygienic use, through daily steam baths and/or immersion in surface water flows that may contain high levels of contaminants;
- Ceremonial use through steam baths and full body immersion in surface water flows that may contain contaminants that exceed human health risk levels;
- Multiple cultural activities (e.g. reed harvest, mouthing, weaving);
- Subsistence activities (e.g. hunting, gathering);
- Recreational activities (e.g., swimming in natural waters that may contain toxic substances);

The model's consideration of drinking water from public water systems compliance monitoring data does not extend to many tribal families, e.g., within the Navajo Nation, where 15% - 30% of homes don't have piped water and where it is widely known that many people get their water from unregulated sites, which EPA estimates number "in the low thousands," and recognizes are often contaminated with, among other things, chemical substances.[xix] Many Alaska Native villages are unplumbed and water contaminated from nearby unlined landfills, and/or potentially from the discharge and flooding of proximate under-designed wastewater lagoons, is used for all of the above-mentioned uses, for example. If this screening methodology will be used to determine whether a certain exposure pathway or a certain subpopulation/community will be excluded from a full risk evaluation, all exposure pathways, along with any susceptibilities, need to be considered.

Include Disposal Sites as Chemical Releasing Facilities

Populations living near disposal sites were not considered fenceline communities and this omission affects tribal people because of the proximity of unregulated landfills to tribal communities, as well as the prevalence of common dumpsters, transfer stations, and home burn barrels on tribal lands. All landfills and transfer stations should be considered a "facility" in this context and releases from these to air and water should be modeled, since environmental release data used for facilities includes disposal site near-release. For example, 229 tribes in Alaska live near a designated disposal site that accepts construction and demolition waste. Transfer stations are commonplace in Indian Country and they often accept products containing toxic chemicals (e.g. foam board insulation and other consumer products containing HBCD).

Another possible disposal related exposure route that was not considered in the screening is the processing and disposal of sludge-bound chemicals in biosolids that are released broadly through land application.

Account for Non-Central Tendency Lifeways and Circumstances

EPA continues to employ exposure assumption reflecting the hypothetical "average American". Native peoples' particular lifeways and circumstances mean that they have different, often greater, exposures to toxic substances than typically accounted for by agencies' exposure assessments. Native peoples' connection to place means that, unlike the hypothetical "average American," they will often reside in one location – their reservation, village, community – for their entire life, and harvest and use resources from one area for their entire life. Their lifeways involve frequent interaction with and use of these particular lands, waters, and resources – in fact, they view themselves *as peoples* to be inseparable from and essentially synonymous with their places and resources.

The impact of using inputs that reflect tribal exposures, rather than general population exposures, is often profound. The resulting risk estimates can differ significantly – e.g., by a factor of 100 – when even a single assumption (e.g., the fish ingestion rate) is varied. When several variables are combined, as they generally must be to calculate environmental risks, the difference between estimates of tribal and general population exposures becomes even more pronounced. Table 1 compares several exposure factors as between the general population and various tribal populations engaging in subsistence or traditional practices.

Exposure Factor	**General Population**	**Tribal Populations**
Drinking Water Intake	2.4 liters/day	4+ liters/day
Fish Ingestion	22 grams/day	1,000 to 1,500 grams/day
Residential Mobility	13 to 33 years	70 years (+ generations)
Sweat Lodge, Ceremonial	NO	YES

Table 1: Comparison of Representative Exposure Factors: General U.S. Population vs. Various Tribal Populations Engaging in Subsistence or Traditional Practices[xx]

Estimate Impact of Non-TRI Releases and Peak Chemical Releases

EPA acknowledges that the scope of the screening-level analysis is limited to facilities that report to the Toxics Release Inventory (TRI) and Discharge Monitoring Report (DMR) information. TRI and DMR have exemptions and thus the screening does not include all environmental releases of the chemical or all the facilities that release that chemical. The methodology should incorporate a way to capture releases from TRI-exempt facilities that use chemicals in quantities below the annual activity threshold and/or do not meet the employment threshold that trigger reporting.

In addition the methodology averages chemical concentrations in air emissions and wastewater streams, whereas actual daily releases may be higher or lower than the estimated average daily discharge. Because this methodology is a screening tool, it should be as conservative as possible and capture higher-end estimate of possible releases.

Account for Cumulative Exposure from Multiple Chemicals

Real-life exposures are not limited to a single chemical at a time; rather, they result from an array of chemicals and their transformation products, in singles and in multiples (i.e., mixtures), where

they may act cumulatively and synergistically – with immediate and/or latent adverse effects on human health. NTTC notes that TSCA specifically mentions the need to consider risks posed by mixtures and that is explicitly stated in the definition of PESS.

If screening for potential risks can result in an exclusion of exposures from risk evaluation, then the screening approach warrants a conservative examination of all exposure pathways, in aggregate and with accurate duration of exposure, combined with any possible susceptibilities the population may experience.

Include Fenceline Ingestion Pathways

Exposures via the ingestion of fenceline fish, game, and plant life (including aquatic) needs to be included in EPA's models, at rates representative of tribal consumption. Resources from these fenceline environments may be used by tribal members who may not reside there and their potential exposures—via ingesting, and during gathering, fishing, hunting, processing, and recreating, need to be included. Tribal people's elevated exposures through the ingestion pathway, due to their greater fish ingestion rates and different fish and other marine and aquatic life consumption practices, are widely acknowledged (if not fully accounted for), including by EPA.

In closing, NTTC would like to pose the following questions to the SACC for consideration before the screening methodology is finalized. NTTC is concerned that vulnerable populations may continue to be excluded from risk evaluation, resulting in risk management actions that are not protective of the populations that need them the most.

1. Can communities in close proximity to other sources of environmental contamination, such as unlined landfills within 1 mile of residents, be considered a "fenceline" community?
2. Can a vulnerable population, like a tribal community with multiple susceptibilities, that is also a "fenceline community", be used as a case-study in the development of this screening methodology?
3. Why are general population exposure pathways at the basis of this screening approach that is designed to screen for exposures experienced by PESS? As NTTC has described in detail in multiple letters to the EPA, tribal peoples' exposures pathways differ from those of the general population in a variety of ways—tribal lifeways result in more exposure routes and much more frequent exposures to environmental releases that are of longer duration than those of populations who do not lead a subsistence lifestyle and whose spiritual, social, and physical wellbeing is not intimately intertwined with the local environment. PESS exposures need to be the pathways used to determine risks to PESS.
4. How are exposures aggregated in screening methods? How can multiple exposures and multiple (or any) susceptibilities be better evaluated?
5. Why does EPA continue to use a residential mobility value of 33 years in screening when this is not the most conservative estimate? NTTC has informed the Agency on multiple occasions that it does not represent tribal members.
6. How does the fenceline community screening relate to other PESS groups that are not considered "fenceline"?

7. How is resource use from a "fenceline" environment by non-residents considered in this methodology? Tribal members often exercise their Treaty-protected rights to hunt, fish, and gather well outside their reservation boundaries. How is EPA screening potential exposures via subsistence?

Thank you again for the opportunity to comment. NTTC welcomes any opportunity to work with EPA, as their tribal partnership group, to ensure that Native Americans do not continue to be excluded of any future risk evaluations and risk management decisions.

Should you or your staff have questions or comments regarding our letter, please contact myself, Dianne Barton, NTTC Chair, at (503) 731-1259 / bard@critfc.org or Susan Hanson, NTTC Co-Chair, at susanthanson9@icloud.com.

Sincerely,

Dianne C. Barton, Ph.D.
Chair, National Tribal Toxics Council

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[i] EPA, News Release, "EPA Announces Path Forward for TSCA Chemical Risk Evaluations" (June 30, 2021) https://www.epa.gov/newsreleases/epa-announces-path-forward-tsca-chemical-risk-evaluations.

[ii] *See, generally*, EPA, "EJSCREEN: Environmental Justice Screening and Mapping Tool" https://www.epa.gov/ejscreen.

[iii] J. Chakraborty, et al., *Disproportionate Proximity to Environmental Health Hazards: Methods, Models, and Measurement* 101 Am. J. of Public Health S1 (2011).

[iv] 15 U.S.C. § 2602(12).

[v] 40 C.F.R. § 702.33.

[vi] *See, e.g.,* P.D. Koman, et al., *Population Susceptibility: A Vital Consideration in Chemical Risk Evaluation Under the Lautenberg Toxic Substances Control Act*, PLoS Biol 17(8): e3000372. https://doi.org/10.1371/journal.pbio.3000372 2-4 (2019)(listing, additionally, "exposures to other chemicals," whereas other enumerations consider only non-chemical stressors – on the assumption that co-exposures to other chemicals are captured as part of analyses of aggregate and cumulative exposures); NRC, *Science and Decisions: Advancing Risk Assessment* 110, 111, and 213 (2009), https://pubmed.ncbi.nlm.nih.gov/25009905/.

[vii] P.D. Koman, et al., *Population Susceptibility: A Vital Consideration in Chemical Risk Evaluation Under the Lautenberg Toxic Substances Control Act*, PLoS Biol 17(8): e3000372. https://doi.org/10.1371/journal.pbio.3000372 2-4 (2019).

[viii] *See, e.g.,* C.M. McHale et al., *Assessing Health Risks from Multiple Environmental Stressors: Moving from G×E to I×E*, 775 Mutational Research 11– 20 (Jan. 2018), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5863617/; R.N. Hines, *Approaches for Assessing Risks to Sensitive Populations: Lessons Learned from Evaluating Risks in the Pediatric Population*, 113 Toxicological Sci. 4– 26 (Jan. 2010), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3469276/; D.C. Payne-Sturges et al., *Methods for Evaluating the Combined Effects of Chemical and Nonchemical Exposures for Cumulative Environmental Health Risk Assessment*, 15 Intl. J. Envtl. Research & Pub. Health 2797 (2018), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6313653/.

[ix] *See, e.g.*, R. Morello-Frosch et al., *Understanding the Cumulative Impacts of Inequalities in Environmental Health: Implications for Policy*, 30 Health Affairs 879–887 (May 2011), https://www.healthaffairs.org/doi/pdf/10.1377/hlthaff.2011.0153; see generally, National Environmental Justice

Advisory Council, *Ensuring Risk Reduction in Communities with Multiple Stressors: Environmental Justice and Cumulative Risks/Impacts* at 5 (Dec. 2004), https://www.epa.gov/sites/production/files/2015-02/documents/nejac-cum-risk-rpt-122104.pdf.

[x] U.S. Department of Health and Human Services, Office of Minority Health, "Diabetes and American Indians/Alaska Natives" https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=33 (stating that in 2018 (the most recent year for which data are available), "American Indian/Alaska Native adults are almost three times more likely than non-Hispanic white adults to be diagnosed with diabetes" and citing CDC 2021. Summary Health Statistics: National Health Interview Survey: 2018. Table A-4a. http://www.cdc.gov/nchs/nhis/shs/tables.htm).

[xi] G. Isaac, et al., *Native American Perspectives on Health and Traditional Ecological Knowledge*, 126 Envtl. Health Persp. 6 (Dec. 2018) https://doi.org/10.1289/EHP1944.

[xii] U.S. Department of Health and Human Services, Office of Minority Health, "Heart Disease and American Indians/Alaska Natives" https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=34

[xiii] *See, e.g.*, A. Zanobetti & J. Schwartz, *Are Diabetics More Susceptible to the Health Effects of Airborne Particles?*, 164 Am. J. Respir. Crit. Care Med. 831– 33 (Sep. 2001), https://pubmed.ncbi.nlm.nih.gov/11549541/; A. Zanobetti et al., *Are There Sensitive Subgroups for the Effects of Airborne Particles?*, 108 Envtl. Health Perspectives 841–45 (Sep. 2000), https://pubmed.ncbi.nlm.nih.gov/11017888/.

[xiv] *See, e.g.*, Children's Health Protection Advisory Committee, Letter to EPA, Re: Protecting Children's Health under Amended TSCA: Chemical Prioritization 6 (Jan. 26, 2021) https://www.epa.gov/sites/default/files/2021-02/documents/2021.01.26_chpac_tsca_charge_response_letter.pdf. The Children's Health Protection Advisory Committee thus recommends that EPA prioritize addressing such hazards under TSCA given their relevannce to the various lifestages of "childhood." *Id.* at 6.

[xv] *Id.* at 1.

[xvi] *Id.* at 2.

[xvii] NRC, *Science and Decisions: Advancing Risk Assessment* 110, 111, and 213 (2009), https://pubmed.ncbi.nlm.nih.gov/25009905/; *see, e.g.*, C.M. McHale et al., *Assessing Health Risks from Multiple Environmental Stressors: Moving from G×E to I×E*, 775 Mutational Research 11–20 (Jan. 2018), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5863617/; R.N. Hines, *Approaches for Assessing Risks to Sensitive Populations: Lessons Learned from Evaluating Risks in the Pediatric Population*, 113 Toxicological Sci. 4–26 (Jan. 2010), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3469276/; D.C. Payne-Sturges et al., *Methods for Evaluating the Combined Effects of Chemical and Nonchemical Exposures for Cumulative Environmental Health Risk Assessment*, 15 Intl. J. Envtl. Research & Pub. Health 2797 (2018), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6313653/.

[xviii] 15 U.S.C. § 2625(h).

[xix] EPA, "Providing Safe Drinking Water in Areas with Abandoned Uranium Mines" https://www.epa.gov/navajo-nation-uranium-cleanup/providing-safe-drinking-water-areas-abandoned-uranium-mines (citing 2020 estimates for a reduction in the number of families who lack piped water, down to 15% from a 30% estimate by the Navajo Nation in 2003, but acknowledging that "[n]evertheless, human consumption of unregulated water is reportedly widespread due to a lack of regulated water systems in the more remote and sparsely populated regions of the Navajo Nation").

[xx] Sources for Table 1 figures: General Population Drinking Water, 2.4 liters/day (recommended default; 90th percentile per capita value), EPA, *Human Health Water Quality Criteria: 2015 Update* (June 2015) https://www.epa.gov/sites/default/files/2015-10/documents/human-health-2015-update-factsheet.pdf; see also, EPA, *Exposure Factors Handbook – Chapter 3, Update 2019* https://www.epa.gov/expobox/exposure-factors-handbook-chapter-3. Tribal Population Drinking Water, 4+ liters/day, B. Harper, et al., *Traditional Tribal Subsistence Exposure Scenario and Risk Assessment Guidance Manual* (2007) https://health.oregonstate.edu/sites/health.oregonstate.edu/files/research/pdf/tribal-grant/exposure_scenario_and_risk_guidance_manual_v2.pdf; General Population Fish Ingestion, 22 grams/day (recommended default; 90th percentile per capita value) EPA, *Human Health Water Quality Criteria: 2015 Update* (June 2015) https://www.epa.gov/sites/default/files/2015-10/documents/human-health-2015-update-factsheet.pdf; see also, EPA, *Exposure Factors Handbook, Chapter 10 – Intake of Fish and Shellfish,* 10-1, 10-4 (2011) https://www.epa.gov/sites/default/files/2015-09/documents/efh-chapter10.pdf; Tribal Population Fish Ingestion, 1,000-1,500 grams/day, B.L. Harper et al., *The Spokane Tribe's Multipathway Subsistence Exposure Scenario and Screening Level RME*, 22 Risk Analysis 513, 518 (2002)("Historically, the Spokane Tribe consumed

roughly 1000 to 1500 grams of salmon and other fish per day"); *see also* B.L. Harper & D.E. Walker, Jr., *Columbia Basin Heritage Fish Consumption Rates*, 43 Hum. Ecology 237, 242 (2015); B.L. Harper & D.E. Walker, Jr., *Comparison of Contemporary and Heritage Fish Consumption Rates in the Columbia River Basin*, 43 Hum. Ecology 225, 233 (2015); General Population Residential Mobility, 13-33 years ("central tendency" and "upper-end" values from EPA's Draft TSCA Risk Evaluation on Cyclic Aliphatic Bromide Cluster (HBCD), Docket EPA-HQ-2019-0237), see NTTC, Comments on the Draft TSCA Risk Evaluation on Cyclic Aliphatic Bromide Cluster (HBCD), Docket EPA-HQ-2019-0237 at 6 (Aug. 30, 2019); Tribal Population Residential Mobility, 70 years (+ generations), B. Harper, et al., *Traditional Tribal Subsistence Exposure Scenario and Risk Assessment Guidance Manual* (2007) https://health.oregonstate.edu/sites/health.oregonstate.edu/files/research/pdf/tribal-grant/exposure_scenario_and_risk_guidance_manual_v2.pdf.