



Washington Department of Ecology
Attn: Sam Meng, Arkema Cleanup Site Manager
PO Box 47775
Olympia, WA 98504-7775

February 20, 2026

Via Ecology's Public Comment Form | [Arkema Inc. \(Cleanup Site ID 3405\)](#)

Re: Arkema Inc. | Interim Action Work Plan, Agreed Order, and SEPA DNS

Dear Washington State Department of Ecology,

For over 35 years, Communities for a Healthy Bay (CHB) has been working to engage people in the protection of Commencement Bay, the waters of the South Sound, and the diversity of life they sustain. We are a 501(c)3 nonprofit working with residents, businesses, and governments to offer practical, solutions-based environmental leadership in the Puget Sound area. We strive to mobilize popular support for decisions that make our communities healthier and more vibrant.

I am writing on behalf of CHB and our Policy and Technical Advisory Committee (PTAC) to comment on the Arkema Cleanup Site documents—Draft Interim Action Work Plan (IAWP), Draft Agreed Order, SEPA DNS, and Site Fact Sheet.

First, we would like to say that we appreciate Ecology's comment period extension and for continuing to oversee this cleanup in the Tacoma Tideflats. The Arkema site has a long industrial legacy, with multiple cleanup actions completed since the 1980s under multiple authorities, and yet contaminants remain far above state cleanup levels and could require multiple future MTCA cleanup actions.

While we support prompt action to reduce ongoing contaminant transport into the Hylebos Waterway, the interim action now proposed is a major engineered intervention (barrier wall and extensive caps) that would facilitate future industrial use. It is critical that redevelopment does not serve as the sole end of remediation, does not crowd out better final-cleanup alternatives, and does not shift long-term burdens to shoreline systems and the communities that are affected by cumulative Tideflats impacts. We offer the following comments:

From Current Conditions to Final Cleanup

Existing Contamination

Ecology's fact sheet depicts arsenic-contaminated groundwater associated with the site and identifies plume contours including 50,000 µg/L arsenic groundwater concentrations on the legend (and a 5,000 µg/L contour), underscoring that the remaining groundwater concentrations

addressed by this interim action are orders of magnitude above drinking water benchmarks (e.g., EPA's 10 µg/L arsenic standard for public water systems).

The Draft IAWP documents the historical severity and persistence of contamination. It states that monitoring well MW 6E1-1 (near former Penite Pit #1) had the highest arsenic groundwater concentration ever measured at the site: 3,670,000 µg/L, and repeatedly exceeded 1,000,000 µg/L through 1993 (Draft IAWP, Summary of Background Information, p. 2-5).

The Draft IAWP further indicates that, while remedial actions have removed substantial arsenic mass and plume behavior is described as stable or declining in portions of the system, “very high dissolved arsenic concentrations remain” in portions of the Upper and Intermediate Aquifers; it also states that “the overwhelming majority of arsenic remaining within the current main arsenic plume resides within the upper portion of First Aquitard soil” (Draft IAWP, Summary of Background Information, p. 2-6).

Accumulation of Toxics

Ecology's site page describes the operational and disposal history that created the contamination problem: chemical manufacturing from 1927 to 1997 including sodium arsenite (“Penite”) manufacturing; wastes dumped into pits; arsenic leaching into soil and groundwater and nearby sediments; and a “Taylor Lake” pond complex with some ponds described as highly caustic (high pH), as well as other releases.

Ecology's site page also documents extensive prior cleanup actions and significant spending through February 2021 (approximately \$16 million for investigation/evaluation and \$66 million for cleanup), including soil/sediment removal and caps, a sheet pile wall, pump-and-treat and in-situ stabilization for the main arsenic plume, and other remedial actions—yet contaminants remain above state cleanup levels.

Given this record, the interim action must be supported by a clear, compelling explanation: ***what is the remaining transport mechanism and why is an additional barrier wall—beyond existing shoreline controls—necessary and expected to materially reduce contaminant discharge to surface water and sediments?*** Ecology's DNS states that the interim action is required (through the Agreed Order Amendment) “to reduce the rate of arsenic entering the Hylebos Waterway through groundwater,” but the public record must connect that objective to a performance framework that can be verified, enforced, and adapted.

Efficacy of Interim Action

WAC 173-340-430 is explicit: interim actions “shall not be used to delay or supplant the cleanup process,” must not foreclose reasonable final alternatives, must be followed by additional actions unless cleanup standards are confirmed, and Ecology must set appropriate deadlines.

The Draft IAWP states confirmation monitoring is “premature” because cleanup standards and remediation levels have not been established, the feasibility study is still ongoing, and a final cleanup action has not been developed (Draft IAWP, Preliminary (30%) IA Design, p. 4-8). This

reinforces the need for Ecology to embed enforceable interim-to-final milestones into the Agreed Order framework—not only design/construction deadlines for interim infrastructure.

We ask Ecology to: Require an enforceable schedule for completion and public release of the full Remedial Investigation (RI) / Feasibility Study (FS) / Cleanup Action Plan (CAP) package and final remedy selection/implementation, consistent with the “no delay” requirements of WAC 173-340-430.

Critical Areas and Shorelines

Increased Shoreline Hardening

The interim action is explicitly shoreline-protective in its intent—preventing arsenic migration to the waterway—but it relies heavily on engineered containment and extensive capping. Ecology’s fact sheet describes (1) an underground barrier wall around the arsenic plume core, (2) a watertight cap over the barrier wall area (geotextile + PVC liner + gravel), and (3) a permanent asphalt cap over roughly 24 acres intended to reduce infiltration, decrease contaminant transport toward the waterway, and support future land use goals.

The Draft IAWP states that the new barrier wall alignment will be placed as close as practicable to the existing sheet pile wall (within three to five feet), “effectively replacing the prior function of the SPW in those areas,” and the wall will be keyed into the Second Aquitard (Draft IAWP, Preliminary (30%) IA Design, p. 4-2).

This proposal must be understood in the context of additional shoreline armoring underway nearby. Ecology’s published Occidental cleanup responsiveness summary describes a vertical barrier wall adjacent to the Hylebos Waterway to contain shallow groundwater with high pH and other contaminants, approximately 2,200 feet long and 70–75 feet deep, paired with a cover system.

We ask Ecology to: Address the combined effect of (a) Arkema’s new shoreline-adjacent containment wall and extensive paving, and (b) the nearby Occidental/OxyChem shoreline barrier wall and integrated asphalt cover, is a continuing pattern of shoreline hardening in a waterway that is already part of the larger Commencement Bay Nearshore/Tideflats Superfund system.

Critical Area and Shoreline Protections

Ecology’s fact sheet explains that MTCA excuses cleanup parties from the application process for certain state and local permits, listing exemptions for (among other things) the City of Tacoma Shoreline Substantial Development Permit and WDFW Hydraulic Project Approval, while stating Ecology still requires the Port to follow the rules on relevant permits.

WAC 173-340-710(9) is more specific and more enforceable: while certain remedial actions under an order/agreed order may be exempt from procedural requirements, they must still

comply with substantive requirements; Ecology must consult with agencies/local governments to identify substantive requirements, identify permit exemptions and substantive requirements in the order/work plan, and provide public notice seeking comment on those substantive requirements.

We ask Ecology to: Publish a “Substantive Shoreline/Critical Area Requirements Matrix” that can be used to identify (1) procedurally exempt permit/approval, (2) the substantive standards that would apply, (3) proper consultation, and (4) how each substantive standard would be demonstrated and enforced through interim action design, construction, and long-term O&M.

Habitat and Stormwater Performance Metrics

Because the interim action includes a long-lived paved cap supporting future industrial yard use, stormwater quantity and quality become a primary pathway question, not a secondary design detail. Ecology’s fact sheet indicates stormwater outfalls and treatment structures are part of Phase 1 alongside barrier wall installation.

Peer-reviewed evidence demonstrates that engineered green stormwater infrastructure can meaningfully reduce roadway runoff toxicant loading: a field experiment and modeling study published in *Environmental Science & Technology Letters* found mature bioretention systems can reduce 6PPD-quinone mass loadings by >~90% under typical storm conditions, and emphasizes the urgency of runoff interventions given 6PPD-quinone’s acute toxicity to salmonids.

Other peer-reviewed stormwater media work supports evaluating sorptive amendments: an ACS Environmental Au column study found biochar- and regenerated activated carbon-amended engineered media filters removed a suite of co-contaminants including metals, trace organics, and PFAS while maintaining hydraulic conductivity in laboratory conditions.

We ask Ecology to: Require the interim action to include enforceable stormwater performance objectives (with monitoring and maintenance commitments) that address both metals and emerging roadway-derived contaminants likely found in a large paved industrial surface setting, and evaluate high-performance bioretention and sorptive media options (including biochar-amended media) as part of the stormwater treatment train—not just end-of-pipe minimum compliance.

Aquifers and Hydrogeology

Lack of Aquifer Isolation

The Draft IAWP provides detailed hydrogeology that identifies (from shallowest to deepest): Upper Aquifer (in fill), First Aquitard (upper silt), Intermediate Aquifer (intermediate sand), Second Aquitard (lower silt), and Deep Aquifer (lower sand). It notes the First Aquitard is typically 5–10 feet thick but that thin/leaky portions have been identified and are likely

preferential pathways for arsenic transport from the Upper Aquifer to the Intermediate Aquifer (Draft IAWP, Summary of Background Information, p. 2-2).

The Draft IAWP further states that, for the main arsenic plume, groundwater in all three aquifers generally flows east toward the waterway; that the Intermediate and Deep Aquifers are tidally influenced and can experience flow reversals; and that vertical gradients between the Upper and Intermediate Aquifers are downward during both low and high tidal stages, while gradients between Intermediate and Deep Aquifers can be downward and/or upward depending on tidal stage and location (Draft IAWP, Summary of Background Information, p. 2-2).

Interim Design Evaluation

The Draft IAWP's barrier wall design is explicitly intended to address deeper flow pathways. It states that the barrier wall will be keyed into the Second Aquitard, with the depth to the top of the Second Aquitard in PDI borings ranging from 26.5 to 33 feet bgs, and the wall installed up to 3 feet below the top of the Second Aquitard to eliminate Intermediate Aquifer groundwater flow below the wall (Draft IAWP, Preliminary (30%) IA Design, p. 4-2).

Given the documented tide influence and cross-unit gradients, Ecology should require something like a public-facing "Hydrogeologic Defensibility Addendum" that demonstrates: (1) how tidal reversals and vertical gradients were incorporated into performance expectations; (2) how thin/leaky aquitard zones and utility/obstruction conduit risks were evaluated; and (3) how monitoring will detect bypass around/under the wall and along shore interfaces. This is necessary to ensure that "containment" is not a narrative claim but an evidenced performance pathway.

We ask Ecology to: Require the final interim action approval record to include a concise defensibility package (conceptual model + sensitivity framing + monitoring triggers) that explicitly addresses tidal influence, vertical gradients, and preferential leakage pathways—supported by the Draft IAWP's own hydrogeologic characterization.

Contamination Mobility

Arsenic Mobility Affected by pH

The Draft IAWP documents that elevated pH in parts of the main arsenic plume "limit opportunities for sorption and cause reducing conditions ($E_h < 0$ V) that hamper sorption and limit co-precipitation with metal oxides," which in turn affects dissolved arsenic behavior (Draft IAWP, Summary of Background Information, p. 2-6).

The same section states that favorable attenuation conditions near the shoreline can occur due to mixing of marine surface water with groundwater, including oxidizing conditions, neutral pH, high conductivity, and high iron oxide concentrations, and that such mixing can cause hydraulic tidal dispersion that limits the amount of fresh groundwater discharged (Draft IAWP, Summary of Background Information, p. 2-6).

These concepts are directly tied to whether a barrier wall and caps will reduce harmful discharge in practice, particularly if tidal mixing and redox/pH shifts can either attenuate or mobilize arsenic. The U.S. Geological Survey summarizes that arsenic release and persistence in groundwater depend strongly on arsenic form and geochemical conditions in aquifers, including redox and pH controls.

Additional Barrier Wall

Ecology's fact sheet states that the barrier wall will be "impermeable," preventing groundwater inside the walled area from moving through it, and that caps will minimize infiltration and contaminant transport toward the waterway. The DNS states that this interim action is being required to reduce the rate of arsenic entering the waterway through groundwater.

However, the Draft IAWP also states that existing shoreline controls—including the existing sheet pile wall, intertidal shoreline cap, and subtidal shoreline cap—"help attenuate arsenic concentrations in groundwater prior to discharge" (Draft IAWP, Summary of Background Information, p. 2-6). It also states that the barrier wall will be placed close to and effectively replace the prior function of the existing sheet pile wall in portions of the alignment (Draft IAWP, Preliminary (30%) IA Design, p. 4-2).

This creates the central question for public review: ***If existing shoreline controls already attenuate arsenic, what specific deficiency is the new wall addressing (integrity, depth, alignment, hydraulic short-circuiting, tidal pumping, or preferential leakage), and what measurable performance improvement should the public expect?*** This explanation must be explicit.

Need for Monitoring Triggers

The Draft IAWP states that the interim action Compliance Monitoring Plan will be included with the 90% design submittal and identifies six groundwater monitoring tasks. It specifies monthly static water level monitoring for six months then quarterly for key wells, but it lists the frequencies for dissolved arsenic monitoring (Task 4) and longer-term comprehensive events (Tasks 5–6) as TBD based on ongoing design and modeling work (Draft IAWP, Table 3: Overview of IA GWM Plan).

As discussed earlier, because pH conditions are explicitly linked to arsenic mobility at this site in the Draft IAWP, Ecology should require the final monitoring plan to include numeric action levels and response actions for field parameters and for dissolved arsenic changes—so that monitoring is decision-relevant and protective, not merely descriptive. EPA's arsenic drinking water rule emphasize arsenic's health risks at low levels and the need for protectiveness over long durations—underscoring why monitoring triggers matter when concentrations are orders of magnitude higher in legacy groundwater plumes.

We ask Ecology to: Require the final interim decision documents and design approvals include (1) a clear narrative and quantitative rationale for how the new wall outperforms

existing shoreline controls and why (including addressing pH and tidal effects), and (2) monitoring action levels/triggers tied to clearly defined adaptive responses.

Ongoing Uncertainty

Unresolved Contamination Source

The Draft IAWP acknowledges continuing uncertainty about specific elevated concentration areas: it states the exact cause(s) of elevated arsenic groundwater concentrations at/near and downgradient of shoreline monitoring location 124+00-2 have not yet been determined and continue to be studied as part of the ongoing RTC Data Gaps Investigation, with current suspicion including preferential leakage through the sheet pile wall and thin/leaky First Aquitard locations (Draft IAWP, Summary of Background Information, p. 2-6, footnote 12).

At the same time, the Draft IAWP's monitoring plan leaves key long-term tasks as TBD (Tasks 4–6). If the most decision-relevant monitoring frequency remains TBD through final approval, then the public has no clear assurance that interim action performance will be evaluated promptly enough to trigger corrective action before the site is further hardened and put back into intensive use.

We ask Ecology to: Require that “TBD” monitoring frequencies convert into explicit commitments (with rationale) and to publish a short data-to-decision framework explaining how monitoring results will be interpreted and what thresholds will trigger additional actions or modifications.

Center for Urban Waters Research

Recent monitoring and research across the broader Superfund system highlight that “cleanup completed” does not necessarily mean “contamination pathways closed.” A 2025 Puget Sound Institute article reports that despite more than four decades of cleanup in Tacoma's industrial Tideflats, research suggests toxic chemicals such as PCBs and PBDEs may still be entering waterways, and it describes a new project led by Center for Urban Waters affiliates (with Ecology and the Port) to identify contaminant “hotspots,” motivated by the troubling possibility of undiscovered sources and pathways.

The related “Commencement Bay Hotspot Studies” project page explains that Commencement Bay has seen improvements and major investment (stating more than \$600 million invested in cleanup and restoration), yet recent monitoring shows elevated contaminants in the Hylebos/Blair/Sitcum waterways and in some cases rebound following dredging—raising questions about ongoing sources reintroducing contaminants.

These active studies underscore why Ecology should treat interim actions that harden shorelines and cap large areas as decisions that require high transparency, enforceable performance requirements, and a clear pathway to final cleanup—not simply as near-term construction projects.

Ensuring Alignment and Accountability

The Hylebos Waterway is part of the larger Commencement Bay/Nearshore Tidelands Superfund Site, and federal enforcement history shows that multiple parties and multiple waterways have required extensive sediment cleanups and source controls over decades. Additionally, the newly approved Tidelands Subarea Plan will also play a key role in the development trajectory of any sites remediated to industrial use standards.

Given this context—and the documented ongoing uncertainty and hotspot investigations—Ecology should use the Arkema interim action to set a clear standard for how interim containment is evaluated, monitored, and transitioned to final remedy selection, rather than allowing interim measures to accumulate as piecemeal redevelopment enablers across the shoreline.

Conclusion

We would like to reiterate that the Arkema site is just one of the multiple high-profile contaminated sites along the Hylebos Waterway. Overall, the Tacoma Tidelands face challenges from numerous sources, including: (i) the cumulative impacts of pollution along the Hylebos and Blair (e.g., PBDEs, PCBs, legacy contamination, shipping emissions), (ii) the public health impacts of routine exceedances of fecal coliform in the Foss, (iii) the lack of tree canopy exacerbating the urban heat island effect in the Port of Tacoma, (iv) sea level rise and flooding, and (v) the lack of a comprehensive understanding of how and where contamination is moving through the Tidelands.

While we will always support thorough cleanups of severely contaminated sites, we maintain a healthy skepticism about the efficacy of cleanup actions until active monitoring and review takes place. We also want sites to be remediated to the maximum extent possible to protect habitat and species, despite cost or redevelopment timelines. Given the breach of the current barrier wall and the resulting toxics exposure, we know this site will require specific attention and monitoring.

Communities for a Healthy Bay thanks the Washington State Department of Ecology for the opportunity to comment. We also sincerely appreciate the Ecology staff who kept us informed with presentations and maintained productive communication.

Sincerely,



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