

Russ Ladley

Hi Kerry,

Please accept the enclosed technical comments from the Puyallup Tribe. Thanks for all your assistance in helping us to better grasp the many complexities of this massive cleanup effort!

Russ Ladley



Puyallup Tribe of Indians



June 26, 2017

Kerry Graber, Site Manager
Department of Ecology
PO Box 47775
Olympia, WA 98504-7775

RE: Occidental Chemical Corporation (OCC) Cleanup - Draft Feasibility Study (FS) Comments

Dear Ms. Graber:

The Puyallup Tribe hereby provides its comments on the Draft Feasibility Study and the associated Draft Agreed Order to be issued for the Occidental Chemical Facilities Site. As discussed more fully herein, the Draft Feasibility Study has significant shortcomings. While the Tribe appreciates Ecology's efforts to hold the PLP's responsible, it is time the Occidental Chemical Facilities Site be addressed with action to begin cleanup of almost 100 years of contamination. The PLP's are innovators of technologies for extraction of materials, yet fail to be proactive in removal of the legacy they have left behind of toxic chemicals that are impacting the health and environment of the Tribe as well as the public as a whole. The Tribe urges Ecology, the EPA, as well as the PLPs to move forward toward cleanup of the hazardous substances that the PLP's have left behind impacting water, fish, and human health.

The Puyallup Tribe has resided in the Commencement Bay area since time immemorial. The Tribe has only one reservation and it is the homeland for 4500 members who live, work and recreate here. The Tribe will do whatever is necessary to make sure that past injuries are corrected in the manner necessary to ensure the most rapid recovery possible so that the Tribe can realize the full use potential its properties, protect its intertidal restoration sites, and harvest fish and shellfish without fear consuming a toxins and contaminants originating from the OCC site. The legacy of contamination from over 70 years of chemical production, improper handling and gross mismanagement of harmful compounds along the Hylebos Waterway must be cleaned up. The Tribe owns several properties that are held in trust by the United States that are directly impacted by the contamination that has migrated from the site.

Occidental ranked #364 on the Forbes Global 2000 List in 2015 and on the Fortune 500 list in 2016, with revenues of about \$12.5 billion dollars (2015 dollars) and market capitalization estimated at over \$50 billion dollars. Occidental has operations world-wide and has been a recognized leader and pioneer in the use of innovative technologies to extract oil and gas through carbon dioxide flood technology and carbon sequestration (enhanced oil recovery technology). The Tribe is requesting Occidental continue their record of innovation and use of pioneering technologies to remediate the contamination here on the Tribe's homeland.

Occidental's predecessor, Hooker Chemical, has a long, legacy of contamination resulting from derelict waste practices and dumping – the list of contaminated sites throughout this country is long - Lathrop, CA, Niagara Falls, Hicksville, Long Island, Taft, Louisiana, White Springs, Florida, and Love Canal – to name but a few. Like its predecessor, Occidental's environmental record world-wide is dubious at best, most notably to native populations, as evidenced by a group of 25 indigenous Achuar Peruvians filing suit against Occidental in 2007, demanding cleanup and reparations for environmental damages caused by Occidental over a 30 year period. The indigenous Peruvians argued the company dumped a total of 9 billion barrels of oil by-products in their watersheds used by the Achuar people to fish, drink, and bathe. Though it has been determined that groundwater is not potable on the tideflats, the corollary here cannot be dismissed, with about 1 million pounds of product leaching into site soils, waterway sediments, and groundwater. Like the Peruvians, we hold Occidental fully accountable, even if it takes 7 generations to clean up the hazardous substances present in the environment and continuing to migrate from the site after decades of evaluation with little actual cleanup performed at the site or surrounding areas!

Whether it takes 10 years, 100 years or 1000 years the OCC site must be restored. The term "restored" apparently means different things to different people, agencies and corporations. The Tribe's goal is to be able to safely harvest fish and shellfish from these waters without concern for consumption limits and the ingestion of harmful contaminants as well as to live, work and recreate in and around the former industrial site without fear or risk of breathing, ingesting or being contaminated in any form from the industrial process and chemical waste streams attributed to past operations of the Occidental site as well as ongoing and future actions aimed at cleanup and restoration. This goal is bay-wide and warrants all PLP's do be diligent and conform to past orders and Consent Decrees.

The contamination underlying our properties precludes their full use indefinitely. The expression of contaminated groundwater near and within our intertidal habitat restoration areas not only compromises the long-term success of our restoration efforts but places the Tribe in a precarious position with regard to meeting agency-driven performance standards. It is unconscionable to us that over 25 physical, chemical, and hydro-geologic investigations have been done, with over 12,000 data points collected and there still remains very little site –specific biologic and toxicity information both throughout the site as well as on the Tribe's properties across the waterway.

There has been enough study on this site and while we believe the FS lacked a robust analysis of the alternatives, particularly in regard to all elements but for cost, we believe the FS meets the requirements of the MTCA regulations to move forward in developing a cleanup plan so that Occidental can begin to effectuate a remedy. To that end, we are also requesting WDOE develop the draft cleanup plan as we believe it will be imperative to comprehensively identify in that document how the preferred remedy will be implemented and, as importantly, how reductions in the plume(s) will be measured and the corrective actions which will be taken if progress isn't being made as expected. We are asking that a subsequent draft cleanup plan order with clear performance standards and timeframes are subject to tribal and public review concurrently with the draft cleanup plan.

While we believe the FS is sufficient to move forward, on a parallel path, we are requesting to work with Occidental, WDOE and EPA in designing and implementing monitoring both on our properties and site wide to specifically address our questions about impacts to the biota – specifically our fish, shellfish and benthic organisms. To our knowledge, no bioassay work or toxicity studies were ever completed, either in conjunction with the porewater analysis or separately, which we view as a significant deficiency. Sampling should, and must, include a more comprehensive list of constituents, including dioxins, PCBs, and pesticides.

An agency coordinated in situ bioassay within the Hylebos Waterway and along the OCC shoreline might close a significant knowledge gap in terms of exposure pathways, assimilation rates and consumption risks. The tribe envisions net pens with different fish species that would be held for varying periods and then tested and compared to controls of fish of the same origin but without any OCC/Hylebos exposure. A similar comparison of crabs and shellfish could be performed simultaneously. Such information would help with harvest management concerns as well guide mitigation and cleanup strategies.

We are mystified that subsequent to a limited and insufficient analysis of the cleanup remedies, that containment is largely the recommended approach by installing a 75-foot deep sheet pile wall along 2,200 feet of waterway and capping the uplands with asphalt. Rather, our recommended approach focuses on treating and/or removing the sources of VOCs and SVOCs, caustic, and salt. Figures 5.1, 5.2, 5.3, and 5.5 in the Site Characterization Report (Dec 2016) provide the lateral footprints of these source areas to remediate.

Similarly, Figures 5.7 through 5.17 of the Site Characterization Report also provide a consistent footprint of the pollutants related to the CVOC source areas, including the CVOC plume, TCE/PCE plume, CIS-1,2-DCE plume, and vinyl chloride plume have similar shapes and break points at about -50 FT NGVD where concentrations are generally highest. Remediation efforts should initially target these areas above -50 NGVD. These figures also clearly delineate the extent of contamination on the tribe's properties and intertidal restoration areas. We are requesting Occidental's initial efforts also address the VOC contamination on our properties.

One of the many short comings of the current report is the absence of clear delineation of the contaminate boundaries, particularly to the south and west. Construction of the LNG facility and related site disturbance in such close proximity to the loosely identified boundaries of the plume are more than troubling. In conversations with you and your consultants, it is clear the outer extent of the plume boundary was interpolated based on limited data collected at the LNG site and that in fact, most of the site was not sampled including where the fueling pier will be constructed. Given the nature of the deep earth work required to develop the necessary structural support and foundation elements for the storage tank, it's astonishing that this site has even been considered suitable. It's even more troubling when you consider the amount of earth work activity in progress to date. The virtual absence of monitoring wells in the proposed LNG work area means little to nothing is known about the extent of contamination encountered, how contaminants might be isolated and how exposure issues will be addressed.

The FS report fails to characterize the compounds or suite of compounds that pose the greatest threat to human health and identify a strategy for targeting these compounds for remediation. What safeguards will be imposed to isolate people from these risks, what duration will these safeguards be implemented and how will they be enforced? The absence of a thorough biological risk assessment is troubling and the October 2015 Review and Evaluation of Risk Assessment Documents by Ridolfi Environmental only heightens our concern. . In fact, the exposure and risk analysis in the FS is completely deficient in evaluating risk to human and ecological receptors at the site. However, we agree with the subsequent technical memoranda authored by Ridolfi and ask that their recommendations be effectuated when and where appropriate in the cleanup process.

The OCC Containment Alternatives promotes the use of a barrier wall to isolate the contaminated area from the waterway. A containment wall may provide an effective means of preventing additional contaminants from moving eastward from the site toward the waterway and alternate exposure pathways that due to their location make them more challenging to treat and /or recover. However, it will also result in the loss of more intertidal habitat and therefore requires separate mitigation for loss of shoreline function.

Details of the containment wall construction are not provided. To what depth will the wall footings be installed? What construction materials will be used to ensure its longevity and minimize maintenance and repairs against the corrosive action of sea water, high pH and as well as ground water solvents?

Directional drilling technologies have advanced immensely of late and are employed extensively in the oil shale fracking industry. In the near future it may be possible to actually pursue the solvent plume and inject neutralizing agents (persulfate or other) into the solvent mass beginning with the shallow zone (<60' NGVD) and prioritize those areas mapped or identified as nearest the waterway floor and therefore of greatest potentially risk of release . § 4.1 of the FS should include the mention and review of these technologies in the review of Remedial Alternatives. In any case, a commitment to pursue technologies that offer an effective resolution and lessen the risks of exposure must be required of the liable party and the regulatory agencies must include the application of technological advancements in their ARAR's. According to Table 4.2, 98,000 cubic yards of TCVOC exist within the shallow zone which should be the initial area targeted for cleanup.

The Tribe is not compelled to limit the expense or extent of liability of Occidental. Remediation can be implemented for much of the site and efforts should be undertaken to do so. The notion that the Occidental situation is hopeless or so massive and therefore unsolvable, sets up a dynamic that serves only to justify indecision. In short, such a description seems to excuse the responsible party to almost "walk away" without consequence. Such as approach is unacceptable! Occidental's liability is clear and so is the need to continue clean- up utilizing current technologies with an understanding that as more effective alternatives/methods are devised, they are implemented. Cleanup will continue to a specified standard and only until that standard is reached shall efforts cease.

The Puyallup Tribe demands that CVOC mass removal and /or treatment through any and all proven methods be enacted and continued indefinitely or until the problems are resolved. Table 3.2 indicates

that the CVOC plume consists of 7.8 million cubic yards of material. For most people such a figure is difficult to envision or comprehend and does indeed ring as an insurmountably large volume. For comparative purposes, let's convert this volume of material into a more visually manageable figure.

Each day on average, two Bakken Oil Trains pass through the Puyallup Indian Reservation. These trains consist of 100 rail cars, each car carrying 33,000 gallons of oil. The volume of oil transported converts to 16,340 cubic yards of petroleum per train. If the CVOC contaminated material were collected and shipped off via train it would therefore require 480 trains full of waste which when moved at the same rate as Bakken crude, would require 240 days to remove the entire plume volume. Of course collecting and transporting the CVOC waste material would not be as easy as crude oil since much of the material lies under a federal navigation channel. Nonetheless, this comparison provides a scale of reference.

Let's now assume the CVOC material could be neutralized through an incineration process as identified in the Treatment Alternatives within the FS. Treatment in-place is usually a less expensive alternative as well. This time we'll use the Ash Grove cement kiln in Seattle for comparison. The Ash Grove kiln burns at 2800 degrees Fahrenheit which we will assume destroys all CVOC's and has a treatment capacity of 2400 tons per day. We'll also assume a cubic yard of wet CVOC contaminated sand and silt material is 3500 pounds or 1.75 tons per yard which means the kiln could process about 1370 tons per day. At this rate, the kiln could incinerate the contaminated material in 27.5 years of continuous operation. While this sounds like a long time, Ash Grove has been in operation since the 20's so the scale of the necessary clean up is placed in a more useable frame of reference. Furthermore, this comparison illustrates the possibility of cleaning up the site within the span of a career as opposed to natural remediation over thousands of years and as offered up by the responsible party!

Much of the area can be somewhat remediated already. Why not require all that can be done as a first stage? We can't and won't allow the reservation to be contaminated. Remediation should return the site to beneficial use consistent with nearby properties without significant restrictions yet ensure that any future development on site and adjacent sites does not prevent current or future access and clean-up activities. Long term designation of the Occidental site as "open space" may be the optimal use of the property for the foreseeable future. Preventing business occupation will allow for more rapid response to clean up needs and/ or monitoring findings.

The tribe is currently unable to use its property across the Hylebos Waterway (former Ole and Charley's Marina site) due to the risk of releasing contaminated sediment in to the environment due to in place Institutional Controls §4.2.1. This fact justifies an independent settlement between Occidental and the Tribe so that restitution and mitigation of impacts is realized immediately. The Tribe has jurisdiction over these properties and will seek such restoration and mitigation of the impacts imposed on the Tribe.

The Remedial Action Goals (RAG's) identified in Table 3.1 are shared by the Tribe. However, the documentation within the GRA's (page 25) provides little in the way of assurance that these goals will ever be achieved much less expedited.

It is our understanding that the high pH plume is the secondary concern at the site. Furthermore, any contact of high pH material with marine waters or open air would likely result in natural dilution/neutralization of the high pH material. As such we agree that the bulk of the cleanup expense should initially target the shallow VOC mass as well as the source areas for VOCs, caustics, and salts.

In the not-too-distant future, we are hoping that in-situ mixing of shallow and deep soils and groundwater with persulfate or other oxidation-catalyst system may be promising and that neutralization in-place, if not extraction, may be possible. We would favor such an approach over using slurry or cement walls, which is anathema to us.

We understand from the agencies that a pumping rate over 200-gpm is reasonable and should hydraulically contain the plumes. Therefore, we recommend hydraulic containment of the plume(s) through maximum pumping. However, performance standards to ensure the plumes aren't moving toward the bay must be forthcoming.

When technologies become available, we request Occidental pursue the deeper sources for both VOCs and pH. We recognize the feasibility considerations associated with targeting the pH plume and the potential for fouling the treatment system with dissolved silica, but unfortunately it is the deep zones where most of the contamination exists both under the site and the tribe's properties. As a consequence, we support a final remedy using the array of treatment technologies that are feasible and needed to fully remediate the site and protect human health and the environment.

The absence of "any" analysis into the effects of contaminant impacts from the Occidental site towards anadromous fishes is a glaring deficiency that must be corrected. The Exposure Pathways Assessment Report is lacking in so many key areas it would seem the report is best deemed draft.

The Tribe has spent decades and millions of dollars working toward salmon recovery in the Puyallup Watershed. These efforts include habitat acquisition, stock enhancement and harvest restrictions in both freshwater and marine areas. The collective benefits of requested mitigation actions across the watershed are difficult to assess. Similarly, the collective impacts caused by hundreds of independent contaminant sources may be impossible to assess on a case by case basis. Even the single largest contaminant source in the state poses a difficult challenge when trying to ascribe site specific impacts uniquely assignable to Occidental.

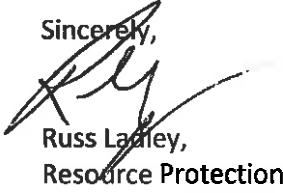
While the impacts of marine contaminants have been reported in a variety of reports across a number of areas they are typically reported for Commencement Bay and not smaller sub-portions of waterways or individual cleanup sites. This is particularly true of anadromous fish which are usually migrating and therefore exposed to contaminants for only limited periods in the spring and fall.

The Tribe would also like clarification as to the points of compliance for groundwater, soil and sediment. The FS does not specifically mention the groundwater point of compliance for site. If Ecology is allowing for an off-property point of compliance, we request notice in addition to any notice provided under WAC 173-340-600. Lastly, we request a sediment point of compliance deeper than the usual biologically active zone (the upper 10 cm of sediment), because Tribal shellfish harvesters would be exposed to

sediments deeper than the BAZ when they harvest geoducks. Geoducks commonly inhabit sediment at depths of 18-24 inches and are found as deep as 36 inches.

The Tacoma OCC site on the Hylebos Waterway is the largest and most contaminated Superfund site found anywhere in the United States. As such, Ecology must hold OCC accountable for past practices and this can only be achieved through the initiation of risk assessments and accelerated site remediation which is not being offered through the preferred remedy.

Sincerely,

A handwritten signature in black ink, appearing to read "Russ LaFley", written over a light grey circular stamp.

Russ LaFley,
Resource Protection Manager