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### Via Email

Brian Sato, P.E.  
Toxics Cleanup Program  
Department of Ecology  
3190 160th Ave. SE  
Bellevue, WA 98008-5452

### **RE: Olivine Comments to Bellingham Bay Central Waterfront Site - *Draft Final Remedial Investigation and Feasibility Study Report***

Dear Mr. Sato:

On behalf of Olivine Corporation, and with the assistance of The Intelligence Group, we respectfully submit the following comments to the *Draft Final Remedial Investigation and Feasibility Study Report, Central Waterfront Site, Bellingham, Washington* prepared for the Port of Bellingham by Anchor QEA, LLC (Anchor).

As you know, Olivine leased two parcels from the Port of Bellingham for its olivine ore processing and storage operations between 1963 and 1992. Until 1980, Olivine's operations were limited to the waterway (north) side of Hilton Avenue. It was not until 1980 that Olivine began leasing the Port's property south of Hilton Avenue adjacent to the City's Roeder Avenue Landfill, which is located within the CWF site. At that time, Olivine expanded its warehouse and cement processing operations (not ore crushing) onto property that the Port previously leased to the OMC trucking company, which conducted truck fueling and maintenance, and utilized an underground fuel storage tank. Olivine never used the UST and ceased operations at both leased parcels in 1992 when the Port lease was terminated.

As you will recall, in April 2016, Olivine provided Ecology with comments regarding the Port of Bellingham's proposed Interim Action Work Plan for construction of the All American Marine Building and C Street Terminal within the CWF Site, which are now essentially complete. Olivine's comments regarding the soil and groundwater cleanup levels applicable to the All American Marine interim action are applicable to the draft final RI/FS. As discussed below, despite the relevance of that interim action, the CWF RI/FS failed to discuss or consider the disposition of over 6,757 cubic yards of soil excavated and removed for the All American Marine building construction, which was not based on or subject to the proposed cleanup levels (e.g., in some cases screening levels) and rather enormous cleanup costs now being proposed for the other CWF uplands that the Port has not yet redeveloped. Indeed, the soils excavated for the

All American Marine building construction were managed without any additional disposal or treatment costs – contrary to the CWF RI/FS cleanup standards and remedial action cost estimates. Nor does the CWF RI/FS include any soil or other data collected during the All American Marine building construction – which data should have been evaluated as part of the remedial action cost estimates for the former Olivine leased site(s). A copy of Olivine’s comments on the All American Marine Interim Action Work Plan are attached and incorporated in our comments on the CWF Site by reference.

As you are also aware, Olivine previously met with and presented Ecology staff (including yourself) with scientific analyses and information regarding the potential toxicity of nickel (the only toxic metal in olivine ore) in the I&J Waterway sediments with regard to the I&J Waterway Cleanup Action Plan and remedial design. These discussions have focused on the on marine sediment bioassay analyses that Ecology has used for identifying nickel contaminated sediments, despite the presence of other COCs in those bioassay samples, including other toxic metals, mercury, PAHs and PCBs. More recently, Ecology revised the sediment cleanup standard for nickel in the I&J Waterway sediments to 211 mg/kg), which is not referenced in the draft final CWF RI/FS.

Overall, Olivine believes that the CWF RI/FS continues the biased characterization of nickel as a primary contaminant of concern in the both the I&J Waterway sediments and the upland soils where Olivine operated along Hilton Avenue at the CWF Site, as well as the unsupported attribution of other COCs, including PAHs and metals to Olivine that are unrelated to Olivine’s operations. Indeed, the CWF Site encompasses a large geographic area with multiple, historic industrial operations, including a municipal landfill, portions of the Georgia Pacific pulp mill and settling ponds, a bulk petroleum storage facility, sawmills and wood waste burners, marine and vehicle engine production and repair facilities and a rail line, all of which have much stronger lines of evidence to the CWF COCs and existing soil contamination that is present at the site today.

#### **1. Soil Cleanup Levels – Nickel and PAHs**

The RI/FS’ selection of the nickel background level in soil, 48 mg/kg, as the cleanup standard, is not supported by the technical data or any human or ecological impacts. The former Olivine property adjacent to the I&J Waterway has been vacant and unused by the Port since 1992, when the Port terminated Olivine’s lease and demanded Olivine remove the piles of olivine ore, which it did.

There is no basis to support cleanup of the upland soils to the nickel background standard at the CWF Site. The lack of any exposure pathways, other than direct contact with soils, has already been acknowledged and accepted by Ecology, the Port and City of Bellingham for the All American Marine building and site development south of Hilton Avenue and for the AWB public trail system that crosses over the former Olivine uplands (both parcels). In both cases, “capping” was determined to be the appropriate remedial action.

The CWF RI/FS ignores these interim actions, does not incorporate any actual soil or groundwater data from their construction and sampling, and seeks to implement a cleanup

standard for nickel that can only be justified as a means to holding Olivine liable for the removal and disposal of hundreds if not thousands of tons of soil containing metals, PAHs, PCBs and other hazardous substances from multiple, ubiquitous historic sources on land that the Port of Bellingham leased for decades and continues to own, lease and redevelop at a profit.

The only exposure pathways of concern for the AAM Interim Action or ASB trail, is from direct human contact and soil to groundwater. This is confirmed in Section 7.3 of the RI/FS, which states that soil cleanup levels are selected based on human direct contact and soil-to groundwater leaching pathways. However, the RI/FS asserts that the 48 mg/kg nickel background standard is necessary to be protective of a groundwater-to-surface water pathway, a pathway which is incomplete and does not exist at the Olivine Uplands or anywhere else within the CWF site.

The groundwater pathways Section 6.3.2 of the RI/FS states that “impacted subsurface soils remain in place; however, groundwater monitoring has shown that petroleum hydrocarbons, metals, and PAHs in soil are not a source of contamination to groundwater.” Section 6.3.3 states “the groundwater to surface water/sediment pathway is not complete for this subarea” and “The soil impacts are not a source of contamination to groundwater; monitoring over time has indicated empirically that soil contamination is not leaching to groundwater”.

Accordingly, the groundwater data in the RI/FS confirms that there are no exceedances of COCs and the soil to groundwater pathway is therefore eliminated. The data and information in the RI/FS confirms that:

1. Nickel does not exceed the groundwater screening levels anywhere at the Site.
2. Nickel is only present in soil in a subarea where groundwater pathway is incomplete.
3. Using the nickel background standard within this area does not address a groundwater to surface water pathway for which cleanup levels were selected to address.

There is thus no basis for the selection of the background soil level for nickel based on protection of a groundwater to surface water pathway that does not exist at the Site. Rather, the RI/FS itself includes the selection of capping as a cleanup alternative within the Hilton Avenue Properties subarea to eliminate the only complete pathway at the Site: the direct-exposure pathway. The proposed cleanup action alternative indicates that Anchor may have developed remediation levels<sup>1</sup> for this subarea, but did not present that approach or the remediation levels within the Draft RI/FS. The proposed cleanup level for nickel should address complete pathways at the Site, which is the MTCA Method B screening level of 1,600 mg/kg and is based on human exposure via direct contact pathway to 15 feet below ground surface.

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<sup>1</sup> Remediation levels identify the concentrations of hazardous substances at which different cleanup action components will be used and may be used at sites where a combination of cleanup action components are used to achieve cleanup levels at the point of compliance (WAC 173-340-355). The RI/FS presents a site-specific soil remediation level for total petroleum hydrocarbons (Section 7.3.1) but does not present site-specific remediation levels for nickel. Based on the elimination of the groundwater pathway, a soil remediation level would be appropriate.

The selected cleanup level for carcinogenic polycyclic aromatic hydrocarbons (cPAHs)<sup>2</sup> is 0.140 mg/kg, based on the MTCA Method B screening level (Table 7-5 and Table 4-2a of the RI/FS). This is inconsistent with other chemicals and does not meet the criteria stated in the RI/FS. Section 4.2.2.3 of the RI/FS states: “The RI soil screening levels must protect against recontamination of marine sediment quality. Since the most stringent soil screening levels derived for the Site are more stringent than the current SMS criteria, they are protective of marine sediment quality in Whatcom and I&J Waterways.” However, the soil cleanup level of 0.140 mg/kg is higher than the Washington State Sediment Management Standards (SMS) Sediment Cleanup Objective (SCO) of 0.061 mg/kg, and is also higher than the site-specific background-based threshold value selected for I&J Waterway of 0.086 mg/kg. The RI/FS should explain how the soil cleanup level for cPAH TEQ will be selected to protect sediment quality in I&J Waterway.

## **2. Hilton Avenue Properties Subarea Errors and Clarifications**

There are numerous incomplete or inaccurate references in the draft RI/FS, including:

- Use of the former DMMP screening level for nickel in sediments (Table 4-4). Ecology has since determined that the sediment cleanup level for nickel is 211 mg/kg for the I&J Waterway.
- The RI/FS figures that are intended to depict the extent of contaminants exceeding the screening levels do not actually depict the individual metal exceedances – laterally or vertically at the Site, as they are all lumped together (See for example, Figure 6-7).
- None of the figures show the extent or value of nickel.
- The figures do not reference the cleanup levels, but instead only show the screening level values and exceedances, which are not relevant.

## **3. Incomplete COC Remediation Cleanup Levels**

As noted above, it is unclear from the existing information in the RI/FS which COCs require remediation, and to what extent. Given the complexity of the Site, with multiple sources, COCs, and exposure pathways, more information is needed in the RI/FS to demonstrate that the lateral and vertical extents of individual COCs have been delineated. For example, at Olivine’s request, The Intelligence Group evaluated the soil data presented in Table 6-10 for arsenic, barium, cadmium, chromium, chromium VI, copper, lead, mercury, nickel, selenium, silver, zinc, total cPAH TEQ, and TPH-G. COCs exceed screening levels are localized within the central portion of the Olivine North Parcel. Only six samples collected within the Hilton Avenue Properties Subarea were analyzed for nickel. All six of these samples were within the top 1 foot of soil. Nickel concentrations range from 93 to 1,240 mg/kg. All nickel samples exceed the most

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<sup>2</sup> As calculated by the total equivalency quotient (TEQ) method under Table 708-3 under Washington Administrative Code (WAC) 173-340-900.

stringent soil screening level of 48 mg/kg (natural background) but none exceed the MTCA Method B (direct contact) screening level of 1,600 mg/kg, which is appropriate for this Site.

Total cPAH TEQ exceedances of the MTCA Method B screening level of 0.14 mg/kg range from 0.18664 to 4.781 mg/kg at a depth of 0–9 feet below ground surface (bgs) within the central portions of both the Olivine North and Olivine South Parcels. The remaining COCs in exceedance of the screening level (i.e., arsenic, cadmium, copper, lead, mercury, selenium, silver, and zinc) are concentrated within the central portion of the Olivine North Parcel. Exceedances occur in samples collected between 0 and 1 ft. bgs for copper, between 0 and 9.5 ft. bgs for arsenic, cadmium, lead, selenium, and silver, and between 0 and 18.5 ft. bgs for mercury, which is also present in the I&J Waterway sediments but has been ruled out as a COC by the Port, based on what Olivine has previously asserted is the Port's assumption of Georgia Pacific's liabilities after granting it a release of liability for mercury in the I&J Waterway.

Olivine therefore questions the use and reliance on the existing figures in the Draft RI/FS in determining the extent of contamination for both the individual and grouped COCs, and how they were used to develop an adequate conceptual site model.

#### 4. Olivine is Not a Source of PAHs or other Metals

##### A. PAHs

Section 6.4 of the RI/FS states that the sources of PAHs in the Hilton Avenue Properties subarea are the former Olivine Facility and the former sawmill, while Time Oil is the source of only TPH. There is no support for this characterization. As also noted in the I&J Waterway RI/FS, Olivine operated an "experimental" incinerator at the Port's property. The details about the incinerator are lacking in the RI/FS, but any implication that the incinerator was a source of hazardous substance contamination at the site is not substantiated. The experimental incinerator at the Port's property was only operated for a few days a month in 1980 and 1981. During that time, Olivine conducted test burns of approximately one ton of municipal waste it obtained from the City of Bellingham. At most, this incinerator was a minor source compared to the former Time Oil fuel terminal that operated from the early 1960s to the mid-1980s and the larger amount of burning that occurred during the lumber mill days and from the sawmill demolition. Moreover, the locations of the PAH exceedances in soil are not near the location of the former incinerator, which was on the southeast corner of the facility, close to Hilton Avenue (Figure 5 of Attachment 2).

The sample data presented in the RI/FS includes large sample depth intervals, (e.g. 3 to 8 or 0 to 9 feet below ground surface). The former Olivine facility operations would only be associated with the top 1 to 2 feet of soils, not with any deeper contamination. There is insufficient data to conclude that the surface soils are contaminated with PAHs.

Time Oil should also be considered a potential source of PAHs, cPAHs and naphthalenes are associated with petroleum. In fact, these COCs are required to be tested for petroleum release investigations for MTCA cleanup sites, as identified in Table 830-1 in the WAC 173-340-900. There is no data presented in the RI that indicates Anchor tested soil and/or groundwater for

PAHs within the former Time Oil property. Anchor's discussion in the RI/FS focuses heavily on the former Olivine facility, while the former Time Oil facility is not thoroughly characterized.

There is no mention of stormwater and sediment contamination at and to the upland portions of the CWF Site, including the Olivine Upland soils (or to the I&J Waterway), despite the documented presence of metals and other contaminants from industrial and commercial operations, vehicle and equipment storage and use, fuel storage, roofs, and outdoor storage of metals and chemicals. Section 4.2.2.1 of the CWF RI/FS mentions "urban background concentrations of widespread urban contaminants (e.g., PAHs) have been measured in soils within Seattle and Bellingham, Washington, and this information is incorporated into Section 6 of this RI/FS as appropriate." However, no discussion of this topic was found in Section 6. The RI/FS should identify urban background concentrations of cPAHs and compare to the Site concentrations to determine whether they are elevated above background.

#### B. Nickel

Section 6.3 of the RI/FS states "The source of nickel in soil is associated with historical processing of olivine mineral and facility demolition and grading. The source of other metals [at the former Olivine processing facility] may be associated with the foundry sand process, in which clean, uniformly sized, high quality silica sand is bonded to form molds for ferrous (iron and steel) and nonferrous (copper, aluminum, brass) metal castings." There are several reasons why Olivine is not the source of the metal contamination in soil other than nickel:

- The olivine material used at the Olivine facility was mined from the Twin Sisters Dunite formation, located in the North Cascades. This formation was analyzed by USGS (Attachment 3) and it does not contain arsenic, cadmium, mercury, or silver. It contains nickel, chromium, and lead, and trace amounts of copper and zinc. The soil samples collected within this area, as described in Table 6-10 of the RI/FS, include screening level exceedances of arsenic, cadmium, mercury, and silver, and therefore do not appear to match the Dunite material.
- The suggestion that metal castings may also be a source of the metals in soils observed in this area is not supported by any empirical evidence. The former Olivine facility never manufactured metal castings; its operations were limited to crushing olivine ore into sands and short-term use of an experimental incinerator (discussed in the next comment). An Environmental Site Assessment was conducted in 1994 for the Coast Guard, shortly after the Olivine facility ceased operations, and the resultant report describes the former facility's operations, including a historical perspective of the facility from a 1965 document. This report was included in the Draft RI/FS reports' references section.
- Olivine's operations did not involve any excavation or disturbance of soils. Olivine is only potentially associated with surface contamination, not subsurface contamination. Several metals were detected in soil at concentrations exceeding their respective screening levels within the Hilton Avenue Properties subarea; however, these exceedances were observed in samples up to 9.5 ft. bgs for arsenic, cadmium, lead, selenium, and silver, and up to 18.5 ft. for mercury.

- Alternative potential sources of metals contamination in site soils are the adjacent landfill and the anthropogenic fill material that was used to build the Central Waterfront properties.

Other than nickel, Olivine's operations were not a source of the metals exceeding cleanup levels observed in Site soils. The RI/FS should be updated with the correct operational history for the former Olivine facility and the multiple sources of metals clarified. Section 9.2 of the RI/FS states that remedial design will assess the potential need for removal of olivine sands and capping to address bank erosion. There was no clarification as to why olivine sands require removal as part of a site remedy. The draft RI/FS does not describe any pathway of concern and the proposed removal was not included in the evaluation of cleanup action alternatives. Such removal is more likely associated with the need for the Port to repair and replace the bulkhead which it has failed to maintain since 1992, after Olivine ceased operations.

Unless there is a technical justification for removal of any residual olivine sands as necessary to achieve cleanup standards, such action should be removed from the FI/FS and addressed separately as a maintenance project by the Port. At the least, it must be better described, incorporated into a cleanup action alternative, and evaluated as part of the FS. The RI/FS should fully characterize the contamination present here, identifying detected contaminant concentrations and proposed cleanup levels to explain what is being remediated and why. The FS should also present a description of the proposed removal depths and volumes and associated costs. If removal or capping of the material is required for site redevelopment purposes, rather than for remediation purposes, it should be addressed separately from the RI/FS.

## **5. Groundwater Monitoring**

Groundwater contamination is not found in the Hilton Avenue Properties Area and no groundwater monitoring is needed in this subarea, as described in Section 9.3 of the Draft Final CWF RI/FS. However, this conclusion is not reflected in the Appendix I cost tables. Appendix I, Table 1 identifies the groundwater monitoring as a sitewide cost, but as described in Section 9.3 of the RI/FS, it is only for the Landfill Perimeter and C Street Properties subareas, not for the Hilton Avenue Properties Area. The cost estimate tables should be revised to apply the groundwater monitoring costs to only the subareas where monitoring is required.

## **6. All American Marine Interim Action**

As noted at the outset of our comments, the All American Marine (AAM) Interim Action is mentioned in the CWF RI/FS but its relationship to the preferred cleanup action alternative for the Site is not discussed. The AAM Interim Action is being conducted concurrent with the redevelopment of the central portion of the Site for the AAM manufacturing building. The interim action consists of excavation of soils within the building footprint, followed by capping within this footprint with a minimum of 4 inches of gravel topped with 3 inches of hardscape material (asphalt and/or concrete, according to the AAM Interim Action work plan). A minimum of 24 inches of softscape material (uncontaminated topsoil/clean soil) will be placed as a landscape cap. An environmental cap for the launchway that is to be built is under consideration. A landfill gas control system is to be implemented for the AAM manufacturing building and will consist of a landfill gas collection layer, strip geocomposite, vapor barrier, and landfill gas vents.

According to the CWF RI/FS Section 9.1.5.2, The AAM interim action is currently in progress. Approximately 6,757 cubic yards (cy) of soil was excavated from the Site, of which the majority (5,000 cy) were reused onsite. 13,978 square yards of hardscape and softscape caps were used onsite and the landfill gas collection system was also installed.

According to the AAM and C Street Final Interim Action work plan (dated March 2016) a completion report will be prepared following the completion of both the AAM and C Street interim actions. We understand that some components of either or both interim actions may still be in progress. However, 6,757 cy of soil was excavated from the footprint of the building before the Draft RI/FS report was completed. The results of performance and confirmation sampling that was conducted as part of the interim action should be available and is useful for better understanding the lateral and vertical extents of contamination, especially in an area where relatively few samples were historically analyzed. Further, the removal of the contaminated soil will likely affect the plan for the final cleanup of the Site. It appears that the proposed capping area overlaps with a portion of the AAM building footprint (where contaminated material was either removed or already capped), but the cost estimate tables in the FS present these remedial activities each as separate costs. The CWF RI/FS should include technical information on the results of this Interim Action, to the extent that it is available, and should discuss whether this action eliminated a portion of the contamination or changed the extents in which capping is required.

Thank you for your attention and consideration of these comments to the CWF Site RI/FS. Please do not hesitate to contact me if you have any questions.

Very Truly Yours,



Allan Bakalian  
Counsel for Olivine Corporation  
Enclosures  
cc: Olivine Corporation  
The Intelligence Group

**Attachment 1**

**Relevant pages from Environmental Site Assessment,  
Landau Associates, Inc., 1994**



A second phase of site uses began in April 1963 (Figure 3) when Olivine Corporation began leasing the southern portion of the site, and when a company called H & H Products was leasing the northern portion of the site from the Port of Bellingham (see Figure 3 for approximate lease boundary). A handwritten note in the Port files provides some indication of needed site preparations for these two companies: for Olivine, site work would include extending the bulkhead, filling behind the bulkhead, rebuilding a trestle, filling and grading low spots, and dredging and providing moorage for 3,000 ton barge; for H & H Products, site work would include filling and grading low spots, paving access and loading surfaces, cleaning up, and providing subsurface drainage. According to the lessee Corky Smith, Jr., the site contained the remains of a former sawmill and was littered throughout with debris, including scrap lumber, wood waste, metal cable, and sawmill equipment including a crane and steam engine. The scrap lumber and wood waste were burned onsite, and the sawmill equipment was sold to scrap and junk dealers (the steam engine is still found onsite). In September 1964, the Port authorized the construction of an office building, installation of water supply, and blacktopping of the Olivine lease area. According to Mr. Smith, shortly thereafter, the company also erected a 40- x 80-ft metal building, which housed olivine processing machinery. A Port of Bellingham map (1968) (Figure 4) shows that H & H Products was leasing the northern portion of the site as recently as the late 1960s. However, no further information regarding this business was found, and it is apparent that Olivine acquired the remainder of the lease area as we know it today in 1976. A detailed explanation of site uses in the mid 1960s is taken from the article "Olivine Corporation," published in the November 1965 issue of *Pit and Quarry*:

At the mill site, a Kenworth tractor-trailer unit dumps to stockpiles of the different types of rock. These stockpiles are placed on a concrete pad to minimize contamination. When processing rock of any specific color for exposed aggregate, it is transferred from its stockpile by an Oliver crawler loader to the feed hopper of the primary crushing plant.

A reciprocating plate feeder transfers material from the hopper to a 30-in Pioneer belt conveyor for transport to a 15-in x 24-in Consolidated Steel jaw crusher. Discharge from the jaw, which is driven by a 75-hp motor, is received on a 24-in Kolman conveyor and carried to the 3-ft x 5-ft Kolman screen which is an integral unit with the conveyor. The screen is filled with 1-in opening screen cloth from which the oversize is chuted to a 12-in conveyor and carried to the crusher feed belt in closing the circuit. Screen throughs are received on an 18-in conveyor for transport to the final screening phase for exposed aggregate products.

The feed entering the final phase is discharged to a 3-ft x 10-ft double-deck Simplicity screen. Both decks are split, and the five sizes of aggregate separated

from the 1-in feed are chuted into an underlying 5-compartment bin. The screen is equipped with spray bars to wash any dust off the aggregates.

Washed, sized aggregates are trucked from the bin compartments to stockpiles on the concrete pad for drainage. They subsequently are reclaimed from stockpile by the crawler loader for bagging. The loader discharges the particular product being shipped into a hopper from which it is conveyed to a bin above a bagger. These products are shipped in 50-lb and 100-lb bags.

In processing olivine, a split is made at 5/8-in on the final screen noted above, with (+)5/8-in material flowing to a 24-in disc crusher. Discharge from the latter is recirculated to the screen from which the (-)5/8-in fraction is conveyed to a surge pile.

Material reclaimed from the surge is conveyed to a company-fabricated dryer. Dried olivine is discharged from the dryer to a 40-ft Johnson bucket elevator, and is raised to feed the initial one of two screening phases in the top of the mill building. Flow from the elevator is received on a drag conveyor and is transferred to a 4-ft x 6-ft Tyler Hum-mer screen. Oversize from this unit is chuted to a 16-in x 24-in Universal roll crusher. Discharge from the crusher, which is driven by a 50-hp motor, is recycled to the first screen.

A 40-mesh fraction from the first screen is chuted to a finished product bin, and throughs are spouted to a lower screen. The latter is a 3-ft x 10-ft Tyler Hum-mer on which all finer products (down to 200 mesh) are separated. These are chuted into other finished product bins which, along with underlying bagging equipment and the overlying screening equipment, occupy one end of the mill building. The remaining area of the building is utilized for packaged product storage.

When primarily processing 40-mesh olivine sand, the milling system delivers about 7 tph of finish-grade materials. When necessary to build up stocks of the finer sizes, the system delivers between 4 and 5 tph. The bins and processing units (screens are enclosed) are vented to a company-designed wet scrubber for dust control. The seven sizes of olivine sand are drawn from their respective bins for bagging with a 110FS Bemis single-spout packer. Packaging is done in 100-lb Bemis Ridglok bags. Packaged products are palletized and rehandled to storage or loading docks by a Clark forklift truck.

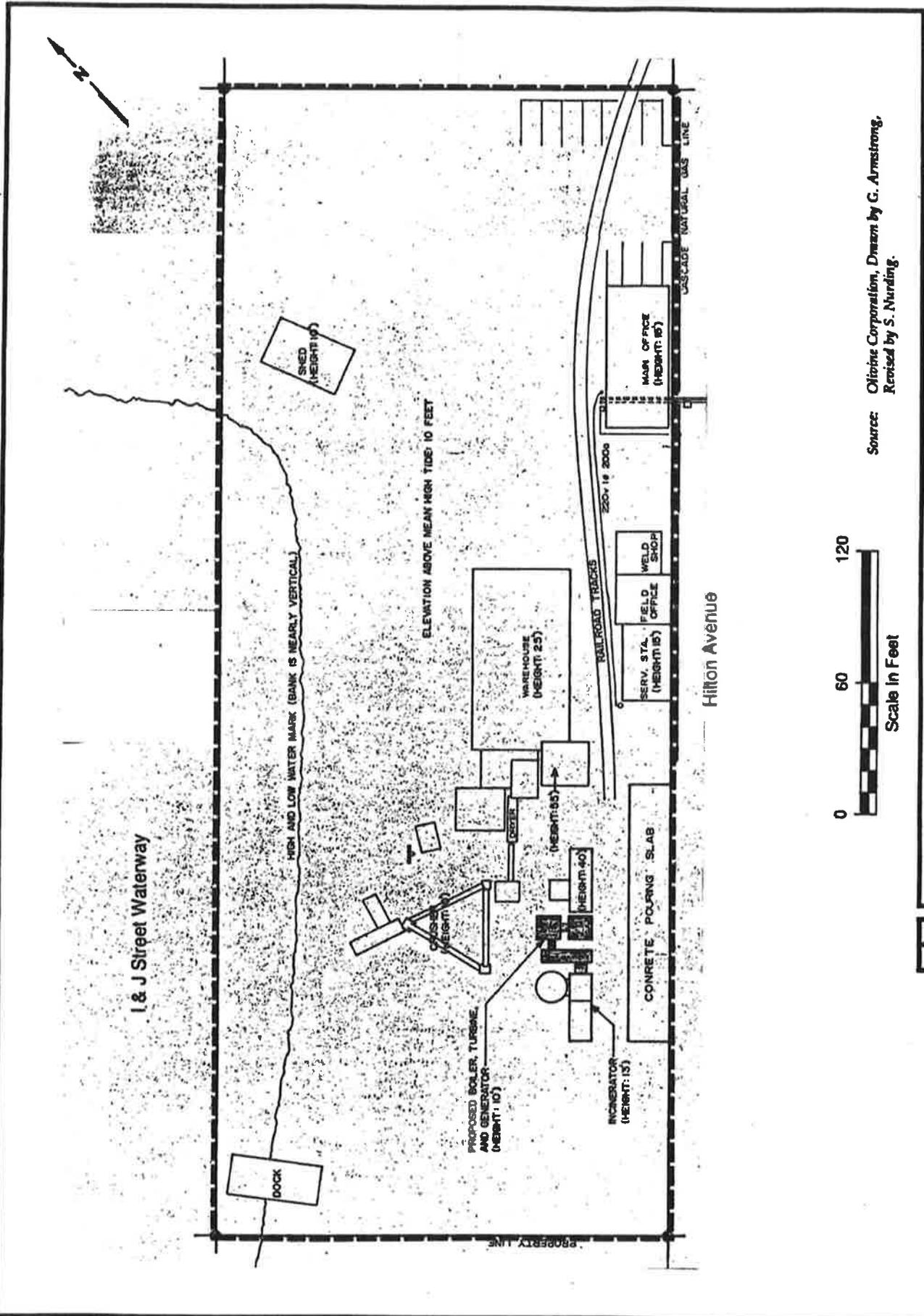
A plant evaluation in 1973 noted that site improvements included a batch plant, 42- x 80-ft steel building, screening tower, screening equipment, air scrubbing equipment, air pollution equipment, crushing equipment, storage bins, barge loading ramp, railroad car loading ramps, four elevators, an office, and a shop. Between 1963 and 1992 (Figure 5), Olivine Corporation manufactured two products onsite: foundry sand and refractory materials for incinerators. Mr. Smith says that the process was mechanical (consisting of grinding, crushing, and screening) and did not utilize chemicals (a natural gas-fired dryer was used during the processing cycle). Mr. Smith says they did not use any underground storage tanks for fuel storage. However, they did

have an above ground storage tank used to store waste oil from heavy equipment oil change outs and re-greasing operations, from which a local company called Vintage Oil hauled away waste oil for recycling in the 1980s. The maintenance shop was used to service heavy equipment such as trucks and tractors, including regular oil changes and maintenance. Some of the olivine processing equipment was chain driven and required regular greasing. According to Smith, the only other use of the site occurred in 1981-1982, when an experimental solid waste incinerator (measuring 8 inches in diameter and about 12 ft high situated on a concrete pad) was operated onsite (southeast corner) as demonstration of the feasibility of operating a larger incinerator at the Olivine Corporation facility on Thomas Road north of Bellingham. He does not recall where resulting fly ash was disposed.

Features of the site in 1980 are shown on Figure 5 and included the following: warehouse, shed, main office, field office, welding shop, maintenance shop (labeled serv. sta.), crusher, dryer, concrete pouring slab, incinerator (temporary), dock, and railroad tracks. Olivine processing continued for the next decade, but Olivine Corporation's lease was terminated in July 1992; in late 1993, all buildings and processing equipment were removed from the site and remaining olivine sand was graded over the balance of the site (Smith 1994).

### **3.2 ADJACENT HISTORIC SITE USES**

Historic uses of the area surrounding the site can also be traced back to the early 1890s, when the Great Northern Railroad established a railroad corridor along Roeder Avenue. A 1912 map of the area (Turbeville and Scott 1983) shows that the primary activity in the surrounding area consisted of Whatcom Falls Lumber Company operations. Features of the lumber mill are shown in detail on 1904 and 1913 fire insurance maps. In 1904, mill features not found on the subject site included the following: shingle mill, sawmill, machine shop, and fuel shed. By 1913, the mill also extended north of the subject site (lumber yard) and site features noted on the 1904 map were still in operation. However, the surrounding area was still unfilled and structures were supported by pilings, including Crescent Mills, which operated northeast of the subject site at the intersection of Chestnut Street (now vacated) and H Street (now Hilton Avenue). By the late 1940s and early 1950s, uses of the surrounding area had undergone much change. The large Whatcom Falls Lumber Company was no longer in business south and north of the subject site, and smaller businesses had developed on recently filled ground. In 1951, these included the Bayshore Lumber Company at the head of the I & J Street Waterway, the U.S. Navy Reserve Center at the intersection of Roeder and H Street, and North Pacific Frozen Products (later to be



Source: *Oltone Corporation, Drawn by G. Armstrong, Revised by S. Nurning.*



Historic Site Features Map - 1980

Figure 5

**Attachment 1**

**USGS Certificate of Analysis, Dunite, Twin Sisters Mountain**





# United States Geological Survey Certificate of Analysis

## Dunite, Twin Sisters Mountain DTS-2B

Material used in the preparation of this reference material was collected from a quarry located in Twin Sisters Range, approximately 20-due-miles east of Bellingham, Washington. The Twin Sisters dunite is composed of virtually unaltered, coarse grained enstatite bearing dunite with accessory amounts of chromite and chromium diopside (Ragan, D.M., 1963). Mineralogical analysis of DTS-2B reveals that the dominant mineral is Fosterite (90+%) with minor amounts of chromite and trace amounts of lizardite. DTS-2B was collected from the same general location as DTS-1.

Element concentrations were determined in a round robin study involving 20 international laboratories. Recommended values are listed when analytical results provided by three independent laboratories using a minimum of two independent analytical procedures are in statistical agreement. Information values with standard deviations are listed when at least two independent laboratories have provided information. Information values without standard deviations represent information from a single laboratory or analytical procedure.

### Recommended values

Oxide□	Wt %	±	Oxide	Wt %	±
Al	0.24	0.03	Al <sub>2</sub> O <sub>3</sub>	0.45	0.06
Ca	0.09	0.01	CaO	0.12	0.01
Fe <sub>tot</sub>	5.43	0.15	Fe <sub>2</sub> O <sub>3</sub> <sub>tot</sub>	7.76	0.21
Mg	29.8	1.1	MgO	49.4	1.8
Si	18.4	0.4	SiO <sub>2</sub>	39.4	0.8
Element	µg/g	±	Element	µg/g	±
Co	120	10	Ni	3780	220
Cr	15500	1100	V	22	8
Mn	830	40	Zn	45	5

### Information values

Element	Wt %	±	Element	µg/g
Fe(II)	4.27	0.20	Ba	16
Na	0.02		Cu	3
			Ge	0.7
			Pb	4
			Rb	2
			Sb	0.6
			Sc	3

Denver, Colorado  
March 2001

Dr. Stephen Wilson  
U.S. Geological Survey  
Crustal Imaging and Characterization Team

### Bibliography

Ragan, D.M., 1963, Emplacement of the Twin Sisters Dunite, Washington, American Journal of Science, 261:549-565.

### Glossary

±	One standard deviation
Wt %	Weight percent of element/oxide as received
µg/g	Micrograms of element per gram of sample, as received

### Notes

Unless otherwise indicated, total element concentrations are reported for material on an as-received basis.

### Ordering Information

USGS reference materials (RMs) may be obtained directly from Dr. Stephen A. Wilson at the address or numbers listed below. The price for each bottle of RM is \$80.00 (U.S.) **except** DGPM-1 which is \$175.00 (U.S.). This cost includes all shipping and handling charges using normal mail delivery. Urgent requests for RMs should be initiated by FAX or e-mail. If required, overnight delivery is available with these charges added to the final bill.

Dr. Stephen A. Wilson  
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Box 25046, MS 964  
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Tel: 303-236-2454  
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e-mail: [swilson@usgs.gov](mailto:swilson@usgs.gov)

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March 23, 2018

Mr. Allan Bakalian  
Zeno Bakalian P.S.  
4020 Lake Washington Blvd. NE, Suite 100  
Kirkland, WA 98033-7862

RE: Response to Olivine Comments to Bellingham Bay Central Waterfront Site  
Draft Final Remedial Investigation/Feasibility Study Report

Dear Mr. Bakalian:

The Department of Ecology (Ecology) received your letter dated November 1, 2017 (enclosed) and has made revisions to the Remedial Investigation/Feasibility Study (RI/FS) report based upon your comments. The majority of the changes incorporate soil direct contact cleanup levels for chemicals of concern (COCs) in the Hilton Avenue Properties subarea (including 1,600 mg/kg for nickel) that have empirical data to demonstrate the soil COCs are not a source for groundwater impacts. The RI/FS shows nickel does not exceed the 1,600 mg/kg cleanup level for soil direct contact. Please note that there is a small area at the head of I&J Waterway that has material (possibly olivine flour) exposed at the shoreline due to erosion. This material will be sampled and evaluated shortly, and addressed in the Cleanup Action Plan for the Central Waterfront Site.

Ecology's response to the November 1, 2017 comment letter is outlined below.

**Paragraph 2**

Regarding dates and land use; Section 2.1.2 Former Olivine Uplands Area has been revised to indicate correct dates and no use of the underground storage tank in this area.

**Paragraph 3**

Regarding All American Marine interim action. Ecology has responded to Olivine's April 2016 comments (see Ecology's May 2016 Response to Comments, available on Ecology's web page). The 2016 interim action work, including the disposition of the excavated soils, will be documented in the Interim Action Completion Report and will be submitted to Ecology shortly. The final document will be made available to Olivine and the public.



#### **Paragraph 4**

Regarding I&J Waterway sediment cleanup level for nickel, Ecology acknowledges the recently developed site specific preliminary sediment cleanup level for nickel as 211 mg/kg. Section 4.2.2.3 has been revised to reference this.

#### **Paragraph 5**

Regarding biased characterization of nickel and unsupported attributions of other contaminants of concern (COCs) (e.g., cPAHs and other metals). The nickel soil cleanup level has been revised for the Hilton Avenue Properties Subarea from 48 mg/kg (background) to 1,600 mg/kg (MTCA Method B direct contact). The RI/FS has been revised to remove unsubstantiated claims that Olivine may be a source of cPAHs or other metals based on the lack of data or evidence in the Hilton Avenue Properties area of the Site. Section 2.1.2 Former Olivine Upland Area, and Section 6.3 Hilton Avenue Properties Subarea have been revised to update Olivine's site history and remove references that Olivine may be associated with cPAHs and other metals.

#### **1. Soil Cleanup Levels – Nickel and PAHs**

The cleanup level for nickel in soils for the Hilton Avenue Properties Subarea has been revised to use the MTCA Method B direct contact value of 1,600 mg/kg.

Soils with cPAH concentrations in the Hilton Avenue Properties Subarea exceeding the 0.140 mg/kg soil cleanup level for direct contact will be capped. This will also be protective of the soil-to-sediment erosion pathway. There are no soil cPAH concentrations that are in-between the 0.016 mg/kg sediment management standards – sediment cleanup objective (SMS-SCO) and the 0.14 mg/kg direct contact cleanup level, therefore, all soil concentrations exceeding the SMS-SCO will be capped and protective of the soil-to-sediment pathway. Section 4.2.2.3 has been revised to explain the Central Waterfront cleanup action must protect against recontamination of marine sediment by soil erosion.

#### **2. Hilton Avenue Properties Subarea Errors and Clarifications**

- Table 4-4 has been revised with I&J Waterway site specific preliminary sediment cleanup level for nickel of 211 mg/kg.
- Appendix E – Data Screening Supporting Information contains figures that show individual metal exceedances. Some of the figures have been revised to show updated cleanup levels for direct contact and soil-to-sediment (SMS). Appendix E figures were used to inform the composite of the metal exceedances in RI/FS Figure 6-7. The vertical extent of contamination can be found for each sample location in Table 6-10.
- See Appendix E and Table 6-10 for lateral and vertical extent of nickel contamination.
- The figures have been revised to show cleanup level exceedances.

#### **3. Incomplete COC Remediation Cleanup Levels**

See previous Ecology response. The RI/FS has been updated to incorporate additional soil cleanup levels in the vicinity of the former Olivine facility to acknowledge soil is not a source of groundwater contamination in this area. Please note that the purpose of the RI/FS document is to provide adequate information to inform a cleanup remedy. Capping has been identified in the

RI/FS as the preferred remedial action for the Hilton Avenue Properties Subarea. This remedy is based on all of the COCs that exceed cleanup levels. The extent of the cap is based on evaluating all the COC that exceed cleanup levels. Delineating the extent of individual contaminants like nickel for the purpose of cleanup cost allocation among PLPs is beyond the scope of the RI/FS and comment response document.

**4. Olivine is Not a Source of PAHs or other Metals**

As noted in the response to paragraph 5 above, the RI/FS does not contain information to substantiate claims that Olivine is a source of PAHs or other metals at the site. Section 6.3 of the RI/FS has been revised accordingly.

Regarding olivine sands exposed near the shoreline due to bank erosion at the end of the bulkhead. Although this is a small and minor element of the overall site cleanup, this area will be sampled to inform how it will be addressed in the Cleanup Action Plan.

**5. Groundwater Monitoring**

The RI/FS is not intended to provide a basis for the allocation of cleanup cost contributions between PLPs. As stated in Section 9.3, groundwater monitoring is not anticipated in the Hilton Avenue Properties Subarea and the cost estimates in Appendix I reflect this.

**6. All American Marine Interim Action**

See previous responses regarding cost allocation, and interim action completion report.

Ecology appreciates your review and comments on the draft RI/FS report. You and your team provided meaningful comments that helped inform our revisions to improve the document. The final RI/FS document, along with a table that tracks all updates, is available on Ecology's webpage at <https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=3418>.

Sincerely,



Brian S. Sato, P.E.  
Toxics Cleanup Program

Enclosure: Zeno Bakalian comment letter dated Nov. 1, 2017

cc: John Level, Attorney General's Office, Ecology Division

To: Brian Sato, Site Manager  
WA Department of Ecology  
Toxics Cleanup Program  
3190 160th Avenue SE  
Bellevue, WA 98009-5452  
via email submission to: [brian.sato@ecy.wa.gov](mailto:brian.sato@ecy.wa.gov)

October 31, 2017

**RE: Comments for the Bellingham Bay Central Waterfront Cleanup Site Remedial Investigation/Feasibility Study**

To Whom It May Concern:

Thank you for this opportunity to submit a public comment on the Bellingham Bay Central Waterfront Cleanup Site Remedial Investigation/Feasibility Study (RI/FS). RE Sources for Sustainable Communities is a local organization in northwest Washington, founded in 1982. RE Sources works to build sustainable communities and protect the health of northwest Washington's people and ecosystems through the application of science, education, advocacy, and action. We have over 20,000 members in Whatcom, Skagit, and San Juan counties and submit this letter on their behalf.

We appreciate the efforts to educate the public on this RI/FS public comment period including the public meeting with the consultants present who compiled the report and studied the site. We appreciate the time and dedication taken to reach out to the public and encourage public understanding and participation in this process. We believe it is crucial to have community understanding and support in the cleanup process.

This report was well put together and we appreciate the explanations included in the RI/FS, including how decisions were made and ranking decided. This left us with little questions or concerns in the end. The only comment we would like to note is that we would like the cleanup plan to consider Alternatives B and C in terms of more stormwater protection if possible. We believe that this would increase the permanence of the cleanup by preventing possible recontamination of adjacent sites via stormwater.

Thank you for your time.

Sincerely,

Eleanor Hines  
Lead Scientist, Clean Water Program  
RE Sources for Sustainable Communities



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March 23, 2018

Ms. Eleanor Hines  
RE Sources  
2309 Meridian Street  
Bellingham, WA 98225

RE: Response to Central Waterfront Remedial Investigation/Feasibility Study comments

Dear Ms. Hines:

The Department of Ecology (Ecology) received your October 31, 2017 comment letter and sincerely appreciates the support from you and your organization. We look forward to future opportunities to partner with RE Sources to provide meaningful outreach and environmental education.

Based on comments received (yours and one more), the Remedial Investigation/Feasibility (RI/FS) was revised to incorporate soil direct contact cleanup levels for the Hilton Avenue Properties Subarea based on empirical data showing soils are not a source for groundwater impacts in this area. This revision did not change the outcome of the selected remedy and Alternative A was retained as the preferred remedial alternative. As you point out, Alternatives B and C provide an increased environmental benefit, but the incremental cost for implementing these alternatives exceed the incremental benefit achieved by Alternative A and unfortunately, were not retained.

The final RI/FS document, along with a table that tracks all of the revisions is available on Ecology's webpage at <https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=3418>.

Thank you again for your comments.

Sincerely,

Brian S. Sato, P.E.  
Toxic Cleanup Program

