

RESERVE SILICA DRAFT REMEDIAL INVESTIGATION REPORT COMMENTS

Submitted by Michael & Donna Brathovde, to DOE January 09, 2018

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Submitted by Michael & Donna Brathovde, to DOE January 09, 2018

EXECUTIVE SUMMARY

The draft Remedial Investigation Report, Reserve Silica Ravensdale Site document (RI), dated November 2017, was prepared by Aspect Consulting, LLC to characterize “the nature and extent of contamination at the Reserve Silica Ravensdale Property.” Based on our review of this RI, we strongly disagree with Aspect’s key conclusions, assertions and recommendations. We believe the current draft RI does an inadequate job of both identifying Contaminants of Concern (COCs) which might reasonably be expected on the Property, and in assessing the extent of possible contamination – i.e., defining the MTCA cleanup “Site”.

Aspect identified three potential sources of contaminants on the Property which they felt could pose a risk to human health and the environment: (1) Leachate containing high pH and arsenic discharging from the Lower Disposal Area (LDA); (2) Arsenic and lead in road base and fill soil along the Lower Haul Road; and (3) Storage and use of petroleum products on the Plant Site. The LDA Leachate source is currently being addressed by Holcim and DOE separate from this RI, and thus the material presented in the RI represents findings from that ongoing investigation, and no additional analyses are offered by Aspect. Aspect’s assessment of the Lower Haul Road did find slag present on, in and under the roadway; but they concluded the arsenic and lead associated with the slag did not appear to be leachable. As such, Aspect concluded that this potential contamination source did not pose a risk to health or the environment, beyond that already being addressed in the LDA Leachate effort. Aspect’s assessment of the Plant Site did find localized cases of shallow soil contamination by petroleum-based products and arsenic. But test results indicated no contamination of lower soil strata or groundwater. This finding led to the suggestion “there is not a complete pathway for leaching from soil to groundwater”, leading Aspect to conclude that this Plant Site source did not pose a risk to human health or the environment. Besides these two analyses (Lower Haul Road and Plant Site), and the ongoing Holcim/DOE assessment of the known LDA Leachate source, Aspect asserts that “No other investigation was warranted at this Property”. Based on these findings, Aspect recommends that the MTCA ‘Site’ “... should be reduced from the full Property to Lot 6 or the portion containing the LDA and the area in which the leachate is discharging”; and “the focus of continued remedial action be on the LDA, leachate from the LDA, and migration of high pH and arsenic-contaminated groundwater and surface water” arising from the LDA. And Aspect states that this remaining remedial action is the responsibility of Holcim (US) Inc. as part of the Post-Closure Permit for the LDA.

We believe ongoing efforts to assess the full nature and extent of the contamination attributable to CKD in the LDA must be completed before a final determination of the MTCA “Site” can be made. We also believe there are several other areas of the Property, besides Lot 6, the Plant Site, and the Lower Haul Road, on which COCs are reasonable to suspect, but for which no testing has apparently been conducted. In addition, we believe that there are other COCs, beyond those reported in this draft RI, that may well be expected on this site, but for which no testing has apparently been done.

These perceived shortcomings in the draft RI are elaborated below. We feel these issues should be addressed as part of the RI, before the MTCA “Site” can be defined. And, as a Potentially Liable Party, we believe Reserve Silica, and their parent company, Reserve Industries, should not be released from liability or responsibility before a thorough Remedial Investigation, Feasibility Study, and Cleanup Action Plan are finalized for this Property.

RESERVE SILICA DRAFT REMEDIAL INVESTIGATION REPORT COMMENTS

Submitted by Michael & Donna Brathovde, to DOE January 09, 2018

1.0 INTRODUCTION

The following reflects our comments/concerns regarding the draft *Remedial Investigation Report, Reserve Silica Ravensdale Site* document, dated November 2017, as prepared and submitted to DOE by Aspect Consulting, LLC. These comments are respectfully submitted to DOE by Michael & Donna Brathovde; January 09, 2018.

We commend Reserve Silica, and Aspect Consulting, for performing this analysis, and assembling this draft Remedial Investigation (RI) report. The information contained in this draft report certainly advances our collective understanding of the environmental and human health risks posed by this Property. And we thank DOE for allowing us the opportunity to submit comments on this draft for DOE consideration as they evaluate this RI.

1.1 Objective of RI Study

The reported objective for the draft RI is *“to fully characterize the nature and extent of contamination at the Reserve Silica Ravensdale Property.”*¹ While we admit to being novices regarding evaluation of hazardous waste contamination, our understanding is that characterizing the “nature” of the contamination involves identifying the Contaminants of Concern (COCs) which might reasonably be expected to occur on the Property, as well as the media known or suspected to be impacted; while characterizing the “extent” of contamination involves testing for *“any area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located.”*² This area is then defined as the MTCA “Site”.

1.2 Our Overall Assessment of Draft RI

Based on this understanding, we believe the current draft RI does an inadequate job of both identifying COC’s which might reasonably be expected on the Property, and in assessing the extent of possible contamination – i.e., defining the “Site”.

1.3 Overview of Aspect’s Draft RI Study & Conclusions

Aspect claims to have assessed *“the nature and extent of contamination at the Reserve Silica Ravensdale Property”*³ (i.e., the full 377 acres⁴), and further states that *“This RI Report addresses the entire Property”*⁵. Based on their assessment, they identified three potential sources of contaminants on the Property *“where the documented or potential presence of COCs may pose a risk to human health and the environment”*: (1) *“Leachate containing high pH and arsenic discharging from the LDA;”* (2) *“Arsenic and lead in road base and shallow subsurface fill soil along the Lower Haul Road;”* and (3) *“Storage and use of petroleum products on the Plant Site.”*⁶

With regards to source #1 (leachate from the LDA), Aspect states that because *“The nature and extent of elevated pH and dissolved arsenic and lead in surface and groundwater attributed to discharge from the LDA is being managed and overseen by the responsible party Holcim (US) Inc., their consultants, and Ecology this data gap is part of the Closed Landfill OU#1 and not part of this RI.”*⁷ Furthermore, besides assessing the other two potential sources of contamination (Plant Site and Lower Haul Road), Aspect asserts that *“no*

hazardous conditions have been identified anywhere else on the Property”⁸ and that “No other investigation was warranted at this Property ...”⁹ Based on the analyses presented in this draft RI, Aspect concludes that the Plant Site “does not pose a risk to human health or the environment”¹⁰; and the slag, arsenic and lead present in the surface and shallow subsurface fill along the Lower Haul Road “do not appear to be leachable.”¹¹ As such, Aspect’s overall recommendation is that “...the Site should be reduced from the full Property to Lot 6 or the portion containing the LDA and the area in which the leachate is discharging”¹² and “the focus of continued remedial action be on the LDA, leachate from the LDA, and migration of high pH and arsenic-contaminated groundwater and surface water that either is piped to the Infiltration Ponds, flows overland into the South Pond, or migrates to groundwater in the shallow aquifer.”¹³ And Aspect states that this remaining remedial action is the responsibility of Holcim (US) Inc. as part of the Post-Closure Permit for the LDA.¹⁴ As such, Aspect’s recommendation under this draft RI would imply that the MTCA “Site” would be limited to Lot 6 (or a portion thereof), and Reserve Silica would have no further responsibility in the cleanup effort as all remaining areas of concern are under the responsibility of Holcim (US) Inc.

1.4 Our Reaction to Aspect’s Draft RI Conclusions and Recommendations

We strongly disagree with Aspect’s key conclusions, assertions and recommendations.

(1) We find that there seems to be no evidence-based rationale for Aspect’s assertion that “...the Site should be reduced from the full Property to Lot 6 or the portion containing the LDA and the area in which the leachate is discharging.”¹⁵

(2) We believe ongoing efforts to assess the nature and extent of the contamination attributable to CKD in the LDA must be completed before a final determination of the MTCA cleanup “Site” can be made.

(3) We believe there are several other areas of the Property, besides Lot 6, the Plant Site, and the Lower Haul Road, on which Contaminants of Concern (COCs) are reasonable to suspect, but for which no testing has apparently been conducted.

(4) We believe that there are other COCs, beyond those reported in this draft RI, that may well be expected on this site, but for which no testing has apparently been done.

(5) We also have concerns regarding the adequacy of Aspect’s evaluation of the Plant Site and the Lower Haul Road in this draft RI.

We feel these issues should be addressed as part of the RI before the MTCA “Site” can be defined. And, as a Potentially Liable Party, we believe Reserve Silica, and their parent company, Reserve Industries, should not be released from liability or responsibility before a thorough Remedial Investigation, Feasibility Study, and Cleanup Action Plan are finalized. These perceived shortcomings in the draft RI are elaborated below.

2.0 COMMENTS ON ASPECT'S RI ANALYSES, CONCLUSIONS AND RECOMMENDATIONS

2.1 Comments on Aspect's Evaluation of the Plant Site Contamination Risk

From our novice perspective, it appears that Aspect's evaluation of the Plant Site is quite comprehensive; though we question their rationale for excluding this area from the "Site". The test results do show localized soil contamination above MTCA Method A cleanup levels by Diesel Range Organics, Heavy Oil-Range Organics, Total Naphthalene and Total cPAH TEQ near the site of the Diesel Underground Storage Tank (AB-2 soil boring), and by arsenic in the equipment storage and maintenance area (AMW-5). Reported test results indicate that this contamination appears to be confined to the upper soil layers, and the test results would further indicate it has not penetrated to deeper (7.5 foot) levels, nor contaminated underlying groundwater. Based on these results, Aspect concludes "*there is not a complete pathway for leaching from soil to groundwater*"¹⁶. While the lab results would tend to infer this, there is nothing in the well logs for these test holes that would appear to indicate an actual barrier to deeper penetration of the contamination; unless it could be that the 3 ½ - 5' thick stratum of coal tailings lying from 2 ½' and 8' below the surface is filtering/immobilizing these contaminants from further penetration. However, no soil test samples were submitted from the coal tailings stratum from any of the test holes to indicate if contaminants are present within this stratum. Based on their 'incomplete leaching pathway' conclusion, Aspect concludes that these identified contamination cases are "*limited in extent and not impacting groundwater and therefore, does not pose a risk to human health or the environment.*"¹⁷ Based on this conclusion, Aspect recommends excluding the ~9 acre Plant Site from the MTCA "Site".

However, these test samples do show shallow soil contamination above MTCA cleanup levels. As such, these localized areas of the Plant Site do satisfy the MTCA "Site" definition ("*any area where a hazardous substance has been deposited, stored, ...*"). And given the extremely close proximity to groundwater-fed Ravensdale Lake (~60' distant, with surface level just ~6' below the Plant Site ground level), it seems we should be particularly careful with known sources of contamination like those identified in the RI study. And given that Reserve has not committed to any particular future use of this site (and has suggested a public "open space" use), it would seem that this shallow, contaminated soil could reasonably be expected to pose a future risk to human health as well. As such, it would seem these localized areas of the Plant Site should be included in the MTCA "Site"; and cleanup of this documented shallow soil contamination should be addressed.

As novices, another question regarding the Plant Site RI testing would be the apparently high levels of dissolved metals (calcium, magnesium, potassium and sodium) in the groundwater samples from all five wells (AMW-1 through AMW-5) on this parcel.¹⁸ While there appear to be no MTCA Method A cleanup levels set for these dissolved metals, the observed concentrations exceed PQL in all cases.¹⁹ Is this an issue of concern? And could the high levels of calcium and sodium (and magnesium?) in Ravensdale Lake²⁰ be associated with operations on either the plant site or the mining/dumping portions of the site? Also, the DOE SHA indicates past testing for manganese, but we see no testing for manganese in any of these RI lab samples. Is this something that should be tested for in the RI?

2.2 Comments on Aspect's Evaluation of Slag and the Lower Haul Road Contamination Risk

Aspect did eight test borings in the Lower Haul Road adjacent to the LDA, explicitly checking for the presence of ASARCO slag, which was reportedly used in the road beds and surfacing of roads on the Property. These borings confirmed the presence of slag "*in surface and shallow subsurface fill*" [up to a

depth of 6' below ground level].²¹ Testing of select soil samples from these borings for arsenic and lead²² showed the presence of arsenic above MTCA Method A Cleanup Levels, and one instance where lead exceeded MTCA levels. Aspect reported that Leachability tests on these samples indicated "*arsenic and lead in soils are not leachable and, therefore not mobile*".²³ As such, Aspect dismisses the presence of ASARCO slag, and its associated arsenic and lead contamination registering above MTCA cleanup levels, from further consideration in the RI.

Without further investigation, we strongly disagree with dismissing slag and its resulting contamination from the RI. We have several issues with Aspect's RI analysis in this regard.

First, Aspect's recommendation to dismiss the impact of slag in this RI is totally dependent on the 'non-leachable' test conclusion. This conclusion appears to us to be contrary to EPA's assessment of ASARCO slag. EPA indicated that groundwater under the ASARCO smelter site had been contaminated with arsenic, copper, zinc and other metals. They also found leaching to groundwater from slag in the presence of saltwater. And when slag is in proximity to organic wastes, e.g., wood debris, "*the decomposition of the wood releases organic acids which cause the metals bound to the slag to be released into the groundwater.*"²⁴ The well logs for some of Aspect's Lower Haul Road borings indicate the presence of "abundant organics", "abundant woody debris", etc. So it would appear, based on our novice understanding, that Aspect's 'non-leachable slag' conclusion may be inconsistent with EPA's assessment, particularly in the presence of the documented organic materials. It would seem this apparent inconsistency should be explicitly addressed prior to dismissing the impact of ASARCO slag from the RI.

Second, the leachability test performed by Aspect was designed "*to evaluate material sitting in place that is exposed to rainfall to simulate the leaching potential of a contaminant and assess chemical mobility in the environment.*"²⁵ But we question whether this test adequately evaluates the leachability of these metals under onsite conditions. Specifically, it would appear that this test simulates leachability in the presence of rainwater – which is typically slightly acidic. We know on this site, surface and groundwater pH's can be extremely alkaline due to the CKD leachate (pH to 13 and above). So the big question is whether the slag on, in and below the Lower Haul Road, and the arsenic and lead associated with it, is stable in the presence of this extremely alkaline surface/groundwater, or whether it may be leachable under these unusual conditions. It does not appear that any test of slag-contaminant leachability in the presence of highly-alkaline surface/ground water was performed. Given the unique conditions of this location, it would seem such testing should be a part of the RI.

Third, Aspect's testing of the Lower Haul Road was limited to a short (~850') stretch of the road adjacent to the north end of the LDA. This road actually follows the LDA for another ~1,000' further south. But for some unspecified reason, this southern segment was not tested in the draft RI. This is especially of concern given that the southernmost two tests Aspect did do, showed the deepest concentrations of slag, high arsenic levels, and the highest pH of all the 'groundwater grab samples' tested. Furthermore, there would seem to be no basis whatsoever to limit the testing for ASARCO slag material to just the portion of the Lower Haul Road along the LDA. The likely source of the slag on the Property roads was Reserve's predecessor, Industrial Mineral Products (IMP), which mined the Property for silica sand from 1972 until 1986. During this time period, IMP also had the exclusive contract to purchase copper slag from the ASARCO smelter in Tacoma. From about 1973 to 1985, IMP was aggressively selling this slag material as road ballast, fill material, driveway gravel, and for numerous other purposes. Obviously, IMP also used this

slag on the Property's roads. And we know of no reason to suspect that they limited the use of slag to the Lower Haul Road along the LDA. There is another ~2,600 feet of the Lower Haul Road beyond the LDA, plus ~5,000 feet of Upper Haul Road, plus another 1,500+ feet of other roads on the Property. Apparently none of these have been tested for slag either. And these roads impact Lots 3, 4 and 5 to the south of the RI Lower Haul Road testing area, as well as Lots 1 and 2 in the northeast. It would certainly seem that additional borings on the roads in other portions of the Property should be conducted as part of the RI – particularly if it is determined that contaminants known to be associated with ASARCO slag are leachable under onsite conditions of very high pH ground and surface water, or when in contact with organic debris.

Fourth, while we could find no detailed Laboratory test results in the RI for the Lower Haul Road borings, it would appear that the RI testing checked only for arsenic and lead.²⁶ ASARCO slag is known to be very high in arsenic.²⁷ However, slag from the ASARCO smelter in Tacoma was also laden with other toxic metals including lead and copper (as well as cadmium, antimony, chromium, nickel and zinc; and organic compounds such as dimethylaniline?).^{28 29 30} In addition, in 1986, the State Health Department's testing of ASARCO slag identified radium in their samples.³¹ The EPA cleanup program for ASARCO included a component to excavate slag driveways and other areas with small slag particles and replace this with gravel to minimize human exposure to the slag.³² Obviously, this was not done for the mine roads on the Property. However, given Reserve's continuing efforts to convince King County to upzone portions of the Property to a Rural Residential zoning, to allow them to site a housing development on the Property, it would seem that all roads on the property should be tested for ASARCO slag, and for all toxic contaminants known to be associated with it (not just arsenic and lead), as part of the RI.

One final point of concern regarding the presence of ASARCO slag on the Property's roads: the RI description of the Plant Site identifies a "truck wash" on the Plant Site. This designation is quite vague and ambiguous. This facility is actually a truck wheel wash, where all trucks leaving the Property drive through this wheel wash to wash the dirt/dust/mud off the truck tires before entering the public Ravensdale-Black Diamond Road. This facility was mandated by King County Dept of Permitting and Environmental Review. Water for this facility is pumped from Ravensdale Lake. Our understanding is that the waste water from this wheel wash facility is pumped out of the wheel wash and to the Settling Ponds on the west end of the Plant Site Lot (presumably to the "Sedimentation Pond" in the SW corner).³³ It would seem that this process has the potential to serve as a direct pathway for slag, slag-mud and slag-dust to be transported from the Property roads south of the Ravensdale-Black Diamond Road, to the Settling Ponds north of the Road. And these Settling Ponds are in very close proximity to both Ravensdale Lake and Creek, and within a "Category 1 Critical Aquifer Recharge Area" for downstream public water supplies.³⁴ It would seem prudent to test the wheel wash facility, and the dump site for this wastewater in the Settling Ponds, for potential contaminants associated with ASARCO slag as part of the RI.

2.3 Ambiguity in Aspect's Recommendation of Lot 6 Being the MTCA "Site"

The draft RI recommends "...the Site should be reduced from the full Property to Lot 6 or the portion containing the LDA and the area in which the leachate is discharging."³⁵ This recommendation seems ambiguous as to whether Aspect is recommending the MTCA "Site" should be the full Lot 6 (~67 acres), or should be limited to "the portion [of Lot 6] containing the LDA and the area in which the leachate is discharging" (~38 acres).

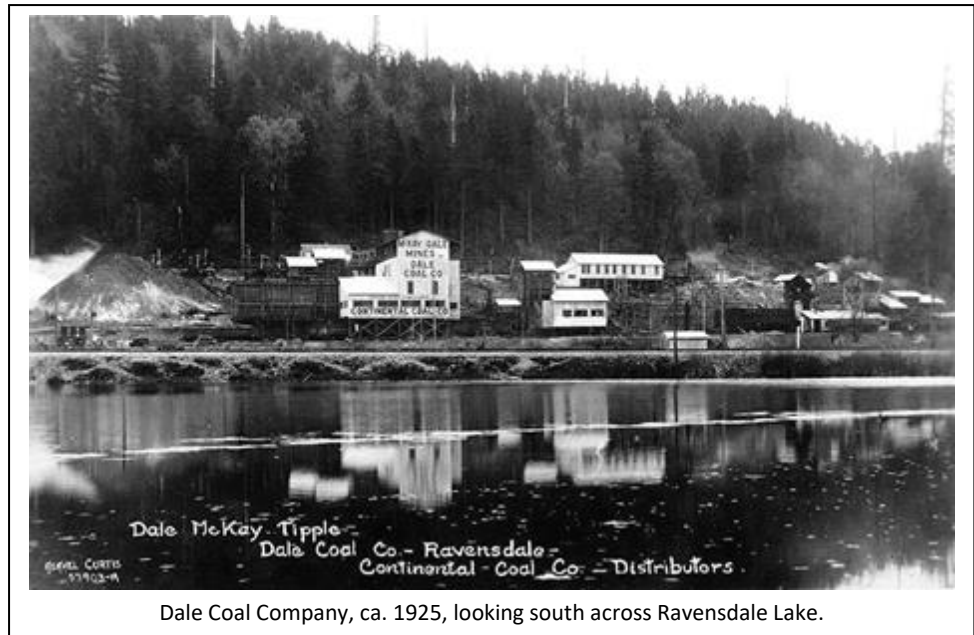
In our view, the **Dale Strip Pit** (DSP) should clearly be included in the “Site”; as we know CKD, a hazardous substance, was “*deposited, stored, disposed of, or placed, or otherwise come to be located*” in the DSP - thus qualifying it as part of the MTCA “Site”. Including the remainder of Lot 6 would encompass the mine portal area (and water discharge site for both the former Dale #4 and Dale #7 underground coal mines), and the site of the extensive Dale Coal Co processing facilities (from 1925-1946). The draft RI provides essentially no evidence to support excluding these areas from the MTCA “Site”.

With respect to the **portal area** and the water discharge from the portal: both the Dale #7 and Dale #4 underground mines from the late 1920’s were “waterlevel” mines, whereby the groundwater entering these mines would flow downslope through the excavated mine tunnel and exit to the surface at the portal. The Dale #4 seam was surface mined to a depth of ~40’³⁶ in the late 1940’s (depth of the underground mine was ~160’ below the deepest surface mining level³⁷), producing the DSP, which was filled with CKD (among other materials) in the 1980’s. The RI states that bedrock wells below the DSP “*suggest that the historical mine workings are a groundwater discharge path for the bedrock system beneath the DSP.*”³⁸ And further, “*There has been no evidence of COCs in groundwater that is collected within the underground coal mine workings that emerges through the north portal (based on testing by others at this location) suggesting that groundwater is not in contact with CKD in the DSP.*”³⁹ Aspect thus concludes “*The DSP does not pose a risk to human health or the environment.*”⁴⁰

While these are most encouraging test results, and we certainly hope Aspect’s conclusion is correct; the ‘suggestion’ that “... *groundwater is not in contact with CKD in the DSP*” would seem to conflict with the Robinson & Noble studies in 1985 and 1986 that concluded “*the water [discharge from the mine portal] was a blend of natural and CKD-impacted water*”.⁴¹ And the arsenic ratings from the MWB-1SDSP and MWB-5DSP Dale Strip Pit Bedrock wells in the DOE SHA in excess of MTCA Method A cleanup levels, also raise concerns about the robustness of Aspect’s conclusion. Furthermore, the ‘discharge path’ provided by the mine tunnel for bedrock groundwater in the vicinity of the DSP to reach the surface, effectively defeats the natural barrier provided by the geologic fault “*expected to block any northerly movement of groundwater flow through north-south trending bedding plane fractures south of the fault.*”⁴² Given these uncertainties, and the huge challenges of dealing with CKD-contaminated groundwater (as proven by the LDA experience over the past 14 years), we believe the portal area, and the downgradient areas below the portal outflow, should remain part of the MTCA “Site”.

The other area of concern within Lot 6 (but outside the DSP and the LDA-impacted area) is the **former processing site of the Dale Coal Company operations**, immediately south of the Ravensdale-Black Diamond Road, in the north end of Lot 6. There was a very large coal processing plant and numerous associated structures located at this site from 1925 through the late 1940’s/early 1950’s (see photo next page). This coal processing site included the coal washing, processing and sorting plants, coal bunkers, boiler house, machine and forge shop, oil house, powder house, pump house, winch house, warehouse, offices, and a briquette manufacturing plant, as well as other facilities.⁴³ It would seem that this site would have many of the same contamination risk elements as the Reserve Silica Plant Site - and possibly more. So if this portion of Lot 6 is to be considered for exclusion from the MTCA “Site”, then it seems testing of this location for typical 1920’s – 1940’s industrial site contaminants should occur as part of the RI before this area is officially eliminated from the MTCA “Site”.

Given the above arguments for including the DSP, the mine portal, and the Dale Coal Company processing site within the MTCA “Site” (as well as the likely slag-containing roads within this area), pending further investigation and testing, we strongly believe the “Site” should NOT be limited to just “the portion [of Lot 6] containing the LDA and the area in which the



Dale Coal Company, ca. 1925, looking south across Ravensdale Lake.

leachate is discharging”, as suggested in the draft RI; but should include, at a minimum, ALL of Lot 6, including all of the Holcim Easement area (including the access road connecting the LDA and the DSP, which is required for Holcim to carry out their mandated management of the CKD).

3.0 FURTHER INVESTIGATION NEEDED TO DEFINE EXTENT OF MTCA “SITE” (BEYOND LOT 6)

If one accepts that the “Site” includes all of Lot 6, and excludes the majority of the “Plant Site”, this leaves ~300 acres of the Property that Aspect is recommending be excluded from the MTCA “Site”. But no rationale is suggested in the RI to support this major recommended exclusion. And it would appear that there has been no testing whatsoever of these ~300 acres to justify such exclusion. Before the MTCA “Site” can be finalized, we’d suggest the following investigations should also be performed as part of the RI.

3.1 Other CKD-related contamination risks beyond Lot 6

While the draft RI clearly recommends that the LDA and leachate area encompassed by Lot 6 be part of the MTCA “Site”, we strongly believe that, based on the definition (“*any area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located.*” [emphasis added]), the “Site” should also include those areas beyond Lot 6 where contaminated soil, groundwater and/or surface water is known, or might reasonably be suspected, to have migrated. This would clearly include the adjacent Baja property, where the infiltration ponds are primarily located, and where monitoring wells MW-5A and MW-6A have demonstrated ongoing pH and arsenic issues presumed to be driven by CKD in the LDA.

In addition, it would seem that additional testing should be required of the RI to determine if CKD-contaminated soil, ground, or surface water has spread to other portions of the Property, or to other adjacent properties. Of particular concern would be:

- (a) The **settling ponds** portion of the Plant Site Lot – contaminated groundwater is clearly migrating this direction from the infiltration pond area (wells MW-5A and MW-6A). The RI states that most of the water recharge north of the BPA easement is via groundwater moving through the recessional outwash gravel.⁴⁴ The RI further assumes “*that Wetland A also receives recharge via groundwater,*”⁴⁵ and that “*Ravensdale*

Lake may receive a portion of groundwater from the LDA and infiltration ponds.”⁴⁶ The Vashon recessional outwash gravels underlying the area between the infiltration ponds and Ravensdale Lake and Creek⁴⁷ are highly permeable, with a “High” Aquifer Susceptibility [to contamination] rating.⁴⁸ Kent Springs (for City of Kent water supply) and Covington Well Field (for Covington Water District water supply) are both downgradient from the infiltration ponds, ~2.4 miles. The infiltration ponds/settling ponds area is classified as a “Category 1 Critical Aquifer Recharge Area and the entire Property is located within a 5-Year Wellhead Protection Area.”⁴⁹ In short, CKD-related contamination of the groundwater underlying the infiltration ponds, settling ponds and Ravensdale Lake and Creek, could represent an extremely high risk to human health. And the inferred north direction of groundwater flow in the vicinity of the Plant Site, as shown in RI Figure 4.1, is quite arbitrary,⁵⁰ and disagrees with prior studies indicating more of a NNW or NW flow direction. In spite of this high risk exposure, and the migration of CKD-contaminated groundwater in this general direction, AMW-1 is the sole test well in the entire ~50-acre settling pond area. And based on prior borings in this area, this well may not be representative of conditions within the settling ponds.⁵¹ Given this sensitive exposure, it would seem an additional well between AMW-1 and AMW-2, as well as another well or two southwest of AMW-1, is needed to determine the current extent of contaminated groundwater, and for continued monitoring of this contaminant migration. Without these additional test wells, it is difficult to defend Aspect’s conclusion that “Groundwater samples collected from wells installed as part of the Plant Site RI suggest that the plume of elevated pH and increased concentrations of dissolved metals does not extend onto the Plant Site at concentrations of regulatory concern.”⁵²

[Note: as a side concern, the DOE SHA indicates arsenic in MW-6A well at 41.60 in the February/May 2015 sample; but RI Section 4.4.1.3 indicates Golder sampling of MW-6A in Feb 2016 at 121, and in May 2016 at 199. What is the presumed source of this apparent **huge increase in dissolved arsenic**? And what are the implications of this significant increase in one year’s time?]

(b) The **roadside ditches** along the Ravensdale-Black Diamond Road below the infiltration ponds, and along the Baja property – anecdotal reports indicate that stormwater standing in these ditches has killed the vegetation in the ditch in the past, and the presumed cause was contaminated toxic stormwater.

(c) The adjacent **Powell property** to the west (Powell is just south of Baja) – the RI reported that in 2004, Arcadis “... concluded that preventing leachate generation [from the LDA] was not likely to be possible and recommended capture and treatment of the leachate instead.”⁵³ So the focus over the past 10+ years has been to divert surface and groundwater from coming into contact with the CKD, and to capture the leachate and dissipate it through infiltration ponds. But the RI also reports that “Occasionally, leachate overfills the drainage ditch and flows, uncontrolled, over the ground surface to the west”⁵⁴ i.e., toward Powell. And “Water in the South Pond reportedly occasionally overflowed to the west”⁵⁵ i.e., toward Powell. [Note, the RI concludes that the South Pond is “supplied by precipitation and groundwater/leachate from the LDA.”⁵⁶ And the DOE SHA shows the South Pond surface water to have arsenic, lead and pH levels far above MTCA cleanup levels.] This contaminated leachate below the leachate conveyance system has also been reported by others in the past.⁵⁷ And the arsenic and pH issues picked up in the Lower Haul Road borings (AB-10 thru AB-12), would also indicate a high risk of contaminate migration onto the adjacent Powell property. As such, it would seem that testing of the adjacent Powell property for CKD-contaminated ground and surface water should be a part of the RI, to define the extent to which “a hazardous substance has come to be located”, and thus to define the MTCA “Site”.

In addition to known CKD in the DSP and LDA, there are also references to the possible dumping or spreading of CKD in other areas of the property as well. DOE's January 2016 Site Hazard Assessment alludes to this possibility, stating, "... CKD might be present in other locations [besides DSP and LDA...]" The RI references that in 2000, Tacoma Environmental Sciences, Inc found CKD (as well as melted glass, coal and ASARCO slag) "in the LDA bank and base of the ditch at the west side of the lower haul road."⁵⁸ In addition, the discovery of "Thin, interbedded layers of CKD" in the upper two feet..., CKD "mixed with sand/silty sand and coal fragments in soil to depths of 5.5 to 6.5 feet bgs [below ground surface] in [RI] borings AB-11 and AB-12" "and at a depth of approximately 11 feet" bgs of the Lower Haul Road (RI borings AB-07, AB-11 and AB-12), which is adjacent to, but outside the LDA pit,⁵⁹ - would tend to confirm that CKD was likely spread/buried in other areas besides just the DSP and the LDA.

While we obviously don't know where such additional CKD dumping may have occurred, some likely locations for additional testing might include: (a) Lot 4 below the Lower Haul Road; (b) the east half of Lot 3 beyond the road connecting the Upper and Lower Haul Roads; (c) adits (air shafts, vents, test borings) for the Dale #7 underground mine on Lot 2 (just east of, and parallel to the DSP, see RI Figure 2-2); and the Settling Ponds area of the Plant Site Lot.

3.2 Other CKD-related Contaminants of Concern beyond arsenic, lead and pH

We did not locate any Laboratory Analytical Reports for the Lower Haul Road test borings (AB-5 through AB-12) in the RI, but it would appear from Aspect's summary table (Table 3), that the only tests performed on these soil samples was for arsenic and lead, plus pH for the three groundwater grab samples collected. Long-term monitoring results for surface and groundwater, as reported in the DOE Site Hazard Assessment, also monitor manganese, though we found no lab test results for manganese in this RI. Reserve's environmental consultant, GeoEngineers, reported in 2015 that analyses by the EPA indicate that CKD can also contain concentrations of thallium, antimony, chromium, total-2,3,7,8-substituted dioxins, and total hexachlorodibenzodioxin⁶⁰. Other reports indicate that CKD may contain extremely carcinogenic dioxins and furans, especially when organic materials such as tires and medical wastes were used as a supplemental fuel sources in the cement kilns generating the CKD.^{61,62} It is known that the Seattle Ideal/Holnam Cement plant, the source of the known CKD dumped at Ravensdale between 1979 and 1989, used tires as a fuel source for a period beginning in 1986.⁶³ This cement plant also tested the use of medical wastes as a fuel source,⁶⁴ though the exact time period when this testing occurred has not been discovered.

Given the extreme toxicity of some of these contaminants which are known, in some cases, to be associated with CKD, it would seem that the RI should include testing for these, as well as the arsenic, lead and pH currently being tested.

3.3 Other contamination risks besides CKD, ASARCO slag, and Plant Site industrial contaminants

Besides the potential Plant Site contaminants tested for in the RI, and CKD and ASARCO slag-related contamination, there are three other suspected contaminate risks that, it would seem, should be investigated as part of the RI, to determine the MTCA "Site" on the Property. These risk areas are (1) the Dale Coal Company coal processing site in the north of Lot 6; (2) the coal tailings pile in the north of Lot 1; and (3) the possible application of industrial-waste "fertilizer" products on the Property, especially on the eastern portion of Lot 3.

3.3.1 Dale Coal Company Coal Processing Plant

This potential contamination risk source was previously addressed in Section 2.3 of this report.

3.3.2 Coal Tailings

Prior studies commissioned by Reserve indicated the existence of ~ 10 acres of coal tailings in the north end of Lot 1.⁶⁵ This tailings pile was produced as a waste from the coal processing operations of the Dale Coal Company on this site between 1925 and 1946. Assessment of the contaminate potential of these tailings by GeoEngineers in 2015, under contract by Reserve, concluded that these tailings piles “*may result in contamination by heavy metals, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), and other associated contaminants*”.⁶⁶ No evaluation of this potential source of contaminants seems to have been conducted as part of this RI. It would seem that this portion of the Property should not be excluded from the MTCA cleanup “Site” until such evaluation has been performed. Note also that Aspect encountered significant buried Coal Tailings in their test borings AB-1 through AB-4 on the Plant Site, just across the road from these tailings on Lot 1. But no soil samples appear to have been taken from the Coal Tailings strata under the Plant Site as part of the RI. Perhaps these buried coal tailings should also be tested for the potential contaminants identified by GeoEngineers, as part of the RI.

3.3.3 Industrial Waste “Fertilizers”

A third potential source of contamination on the Property is the possible use of industrial waste “fertilizer” on the forested portions of the property. Since 1972, three different operators on the Property (IMP, L-Bar, Ideal Cement) were aggressively pursuing disposal of industrial waste products through sale as a “fertilizer”, and for other uses. Industrial Mineral Products (IMP), operator of the Property from 1972 to 1986 and headquartered in Ravensdale, also owned a magnesium recovery plant in Chewelah, Washington. During this period, IMP developed an agricultural fertilizer and road deicer “product” from the residue (Flux Bar Residue) of their magnesium recovery operation. IMP asked the Washington State University Agricultural Experiment Station in Puyallup to test this fertilizer product for use in western Washington.^{67 68} WSU declined to test the material. But it is unknown whether IMP may have tested this product on their own, on their Ravensdale Property.

With pending legal challenges relating to extensive contamination from ASARCO slag, IMP was dissolved in December of 1986, after selling all their assets, including the Ravensdale silica sand mining and CKD waste disposal operations, and the Chewelah magnesium recovery operation, to Reserve through Reserve’s wholly-owned subsidiary, L-Bar Products, Inc. Through this transaction, Reserve also retained former IMP officers and staff who had been operating the Ravensdale Property for IMP. Following the buyout, Reserve (L-Bar Products), aggressively pursued the marketing of the Chewelah magnesium-waste “fertilizer”⁶⁹ (and road deicer^{70,71}), under the brand names Cal Mag, Ag Mag, and Al Mag - with widespread sales between 1986 and 1991 to agricultural buyers throughout eastern Washington and the Willamette Valley. This was done legally by labeling the hazardous material as a “product,” thus exempting it from hazardous waste disposal regulations.^{72,73,74}

In 1991, concerns regarding the fertilizer’s safety were raised,⁷⁵ with crop failures attributed to use of the fertilizer,⁷⁶ as well as complaints of soil sterilization and health issues and even death of animals fed agricultural crops that had been grown with this fertilizer.⁷⁷ An independent analysis of the fertilizer product characterized it as volatile, unpredictable, unsafe, and potentially poisonous to farmlands; and that advertising materials for this “fertilizer” were “*designed to deceive*.”^{78,79,80}

There are also indications that, like their predecessor IMP, Reserve/L-Bar was pushing to gain a market for this magnesium-waste “fertilizer” in western Washington (possibly for use as a forest fertilizer). As with IMP

before them, there is reason to suspect Reserve/L-Bar may have “tested” this fertilizer on some of the forests on their Ravensdale Property.

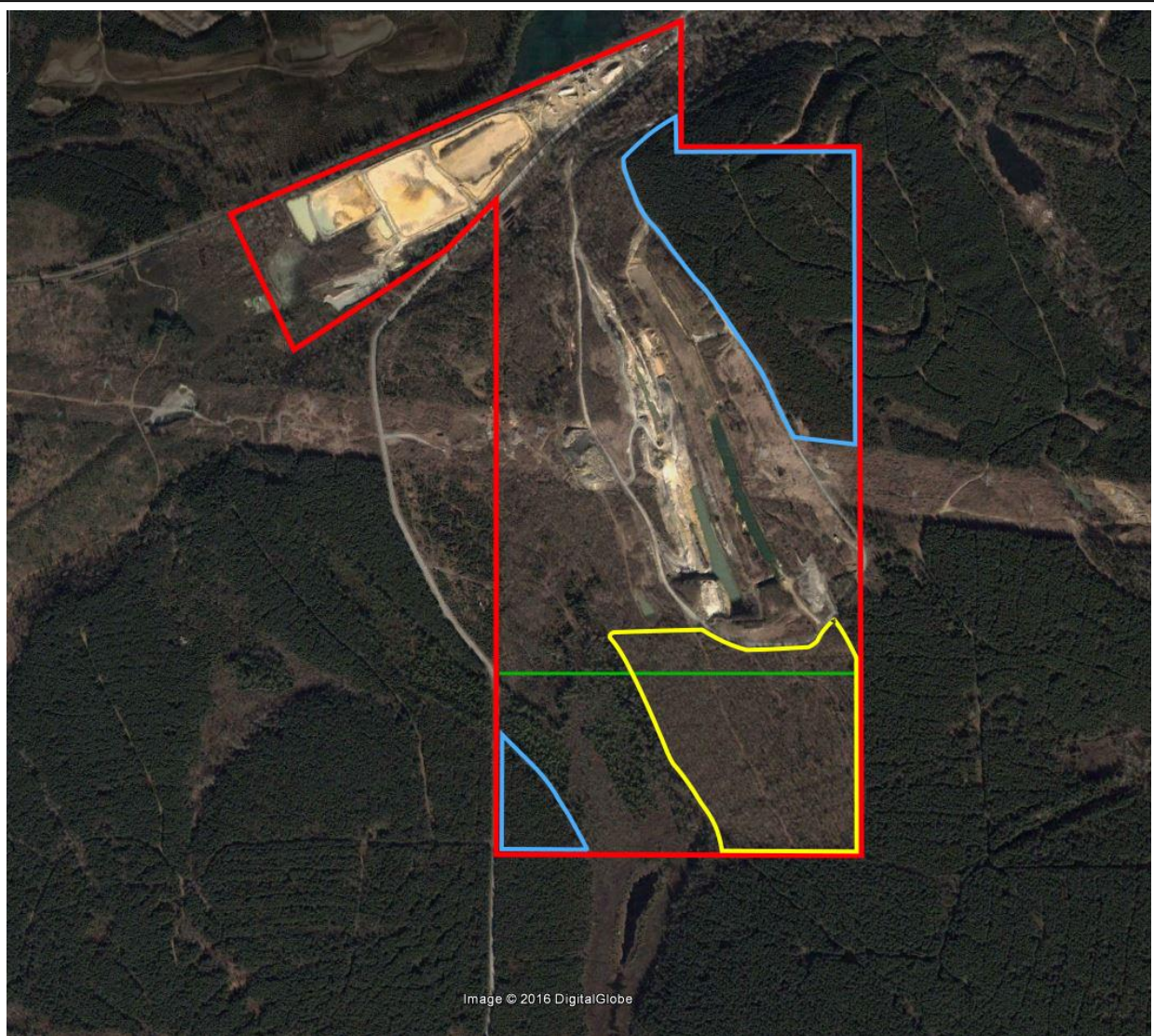
In addition to the magnesium-waste fertilizer risk, there is some potential that CKD may also have been spread across forested portions of the Property as a fertilizer/liming agent. Ideal Cement in Seattle, had an arrangement whereby they would purchase ASARCO slag and Ravensdale silica sand from IMP for use in their cement manufacturing. Ideal Cement in turn, would then dispose of their CKD wastes in the Ravensdale DSP and LDA mine pits. This arrangement was in effect from 1979 until the Reserve buy-out in 1986. Ideal would continue to dispose of CKD in Reserve’s DSP pit until 1989. But by 1987, the majority of Ideal’s CKD wastes were being sold as a liming agent/fertilizer product for agricultural use in western Washington,^{81 82 83} with the remainder being disposed in the DSP through 1989.

It would be reasonable to suspect that during the 1986 – 1989 period, Reserve and/or Ideal may have tested this CKD liming agent product on some of the forests on the Ravensdale Property, to reduce the natural acidity of the forest soils and improve timber growth. If such use were to have occurred, other portions of the Property besides the DSP and the LDA may exhibit CKD-related contamination as well. Apparently, no testing for CKD outside the DSP and LDA has occurred. Aspect’s RI borings in the Lower Haul Road to test for ASARCO slag, however, did discover the presence of CKD in 3 of the 8 borings.

Potential evidence that some kind of unique treatment, perhaps a “fertilizer” test, on portions of the Property sometime during the late 1970’s or 1980’s period, is the very apparent anomaly in the condition of the forest in the east half of Lot 3 compared to the forests on Lots 1 and 2, and to the forests on adjacent properties. This anomaly can be clearly seen on the April 2002 Google Earth aerial image below. These forests were all owned and managed by Burlington Northern Timberlands (BNT), and were all clearcut harvested and replanted in the 1980’s. The RI⁸⁴ confirms prior statements by Reserve, that they have done no forest management activities on any of these lands during their tenure (since 1986). And yet, this timber stand on the east of Lot 3 is dramatically different in character from the other undisturbed forests on the property, and from the adjacent surrounding forests – in spite of apparently the same harvest and planting management and soil conditions. This dramatic difference was also identified in prior Reserve-sponsored studies by International Forestry Consultants (Feb 2012) and American Forest Management (May 2016). Might a “test” application of a magnesium-waste “fertilizer” or a CKD-liming agent by IMP, Reserve/L-Bar, and/or Ideal Cement account for this dramatic difference in forest conditions? The eastern portion of Lot 3 would seem to be an ideal location to perform such a test, as it has gentle topography, easy access, and is outside the prospective mining area (and has remained zoned Forestry and included within the Forest Production District, unlike most of the Property which is zoned Mining). And the forests on Lots 1 and 2 would provide a perfect “control” to monitor the impact of a fertilizer test.

At this point, the possible use of one or more of these industrial waste “fertilizer” products on the Property is pure speculation. But it would seem there is enough circumstantial evidence to warrant testing for contaminants known to be associated with Cal Mag/Ag Mag/Al Mag and CKD-based fertilizer/liming agent as part of the RI. While we don’t know what Contaminants of Concern may be associated with the magnesium waste fertilizers, presumably this could be found in the court case documents relating to this litigation (Case #91-1345CV, *Behrman v. L-Bar*, Circuit Court of Oregon, Washington County, Hillsboro, OR). Alternatively, WDOE was integrally involved, along with US EPA, in the litigation against L-Bar Products in 2000, regarding

cleanup of the Magnesium flux bar residue from the Chewelah site⁸⁵ and other legal actions.^{86,87} So DOE may already have internal information on the contaminants present in this material.



April 2002 Google Earth image showing the dramatic vegetation difference between the heavily timbered northeast and southwest areas (highlighted in blue) and the southern portion upland of the wetlands (highlighted in yellow). Also note the heavily timbered lands surrounding the Reserve Silica property that were harvested and replanted by BN Timberlands at about the same time as the timber stands of the Reserve property. The lands below the green line and to the east are zoned Forest and located within the Forest Production District. (Google Earth, ©2016.)

If such “fertilizer” tests were determined to have been performed on Lot 3, indicating another potential source of COCs on the Property, this raises another series of additional concerns. While previous studies have concluded (and this RI confirms), that groundwater originating from north of the BPA powerline tends to flow in a northerly to northwesterly direction, groundwater originating south of the BPA powerline (e.g., Lot 3) tends to drain in a southwesterly direction, “to Wetland B, which eventually discharges to Sonia Lake and Ginder Lake to the south of the Property.”⁸⁸ As such, if testing confirms a contamination source present on Lot 3, then additional testing should also check for potential migration of such contamination to the southwest and Wetland B.

3.4 Other Untested Areas and Contaminants

This Property has a very long history as a dumping/disposal site in the County, partly due to its remoteness from urban areas, and partly due to the presence of coal and sand mining pits, shafts and tunnels – which provide what appeared to be ideal disposal sites for various wastes. In addition to the CKD, ASARCO slag, coal tailings and possible industrial waste “fertilizer” contamination risks on the Property, there are also other locations on the Property that have not been tested for possible contamination, but which may well have received contaminated wastes over the site’s 90-year operating history. In addition, there are likely other hazardous wastes that have been dumped on the Property, either legally or illegally, but for which we have no documentation.

There was undoubtedly some level of undocumented dumping on the Property during the early coal mining days (1899-1915), the Dale coal mining days (1926-1946), and the early sand mining days (1968-early 1970’s). Other than the abandoned coal mines and their associated surface portals and adits, it would be hard to even guess the locations of such dumping. But we know the Property has operated as a fill site at least since 1971,⁸⁹ through backfilling of the surface coal and sand mining pits, with both known and unknown materials.⁹⁰ In addition to CKD and borrow (mixtures of soil, sand and/or gravel), the RI indicates “*other materials, which may have included clay-rich till and mining wastes and/or rejected clay and sand batches and glass cullet*”⁹¹ and “*clay and fine sand from the settling ponds*”⁹² and other “*non-CKD*” material was deposited in the DSP. The RI states that “*Reclamation and landfilling have been conducted under county grading permits since 1971,...*”⁹³ Filling of the entire Upper Pit, and portions of the North and Lower Pits, apparently occurred under various County grading permits issued by KC-BLD, KC-DDES, and KC-DPER. Filling of the North and Lower Pits continued under solid waste landfill permits issued by SKC Public Health;⁹⁴ which allowed dumping on the site consistent with a landfill.⁹⁵ The DOE reportedly had the site “*listed as a landfill until December 1999.*”⁹⁶ Consistency of early-day fill monitoring for permit compliance is unknown, but was likely not always reliable.⁹⁷ The RI indicates “*There are verbal accounts of acceptance of soil during active sand mining in the 1980s, maybe as a courtesy to customers. Full trucks would arrive and Reserve Silica would allow them to dump their load of soil before being filled with sand.*”⁹⁸ This dumping may well have included unpermitted materials. Finally, in July 2012, SKC Public Health issued an Inert Waste Disposal Permit⁹⁹ that specified only soil material free of contaminants, radioactive and hazardous wastes could be dumped on the site. Prior to issuance and monitoring of this inert waste permit in 2012, it is largely unknown what other waste materials may have been dumped at the site.¹⁰⁰ This view is corroborated in WDOE’s Site Hazard Assessment from January 2016, where they state that other sand mining pits “*were filled with unknown materials not expected to be CKD*”.¹⁰¹ The filling of the North and Lower Pits continues to today under the SKCPH inert waste permit.¹⁰²

Aspect asserts that “*Based on the conditions of the permit(s) for the Inert Waste Landfill (and interim actions completed to remain consistent with those permits) it is **assumed** [emphasis added] that the Inert Waste Landfill areas [i.e., Upper, North and Lower Pits]... were filled as required through the conditions of the permit.*”¹⁰³ Based on this assumption, they claim the Inert Waste Lot (Lot 5), which encompasses these three sand mining pits, should be excluded from the MTCA “Site”.

It seems that the issuance by SKCPH of the Inert Waste Permit in 2012, and the relatively diligent monitoring for dumping compliance with this permit since 2012, should give us some confidence that materials dumped in these three pits since 2012 are unlikely to constitute a hazardous waste contamination risk. [Some tests on the known dumping of debris from the 520 bridge demolition work at this site in 2016 do raise questions

about this validity of this assumption.] However, the unknown, and likely loosely-monitored dumping in these pits prior to 2012, likely pose a potential risk. It would seem that Aspect's assumption of permit compliance as the basis for excluding the Inert Waste Lot (Lot 5) from the MTCA "Site" should be validated through additional testing in the RI.

Given the unknown character of some of the fill material used in the early days for filling the mine pits, it's uncertain what COCs should be tested for. We presume DOE has a list of COCs commonly associated with landfills. Combined with the expanded list of CKD-related COCs described previously, such testing would hopefully identify any toxic contaminants associated with these other unknown and undocumented fill sources.

Two other areas which might also be suspected of having received undocumented dumping in the early days are:

(a) The Dale #7 underground coal mine network, with its associated surface adits (airshafts, vents, test borings, etc.) - the DSP was the strip mining of the Dale #4 seam; the Dale #7 (underground, never strip mined) lies just east of, and parallel to the DSP, on Lot 2 – see RI Fig 2-2. It would seem that the RI should locate and check the surface adits to this underground mine for unauthorized waste disposal.

(b) Settling ponds portion of the Plant Site Lot – this area would seem to be a logical area to have received undocumented dumping, either during the Dale Coal Co days (1925 – 1946), or during the early sand mining days (1968 – early 1980's). The single test well, AMW-1, in the extreme SE portion of this area would not appear to constitute adequate testing for potential contaminants to justify exclusion of this entire area from the MTCA cleanup "Site".

It would seem that a comprehensive RI should at least address these other potential sources of contamination described above.

4.0 OTHER MISCELLANEOUS ISSUES / CONCERNS / COMMENTS

RI Section 2.3.3 Environmental Setting/Forestry: While Aspect has correctly quoted conclusions from the prior studies done by American Forest Management and International Forestry Consultants, the implication left from Aspect's write-up is that the Property is not suitable for forest management. This conclusion has been demonstrated to be invalid, and this "unsuitable for forestry" conclusion has been rejected by both the King County Executive, and by the King County Rural Forest Commission. The majority of these lands are indeed suitable for long-term commercial forest management.

RI Figure 2-2 Historical Coal Mining Map: Note that while this map appears to do a pretty good job of displaying the extent of the Dale #4 and Dale #7 underground mines on the property, the extent of underground mining underlying the north portions of Lots 1 and 6 by the Northwestern Improvement Company prior to 1915, are significantly understated in this Figure.

RI Section 2.3.5 Environmental Setting/Groundwater Use: While Aspect's summary of groundwater use within 2 miles of the site appears correct, the major concern relates to potential contaminant migration which could threaten the large public water supply sources serving the City of Kent and the Covington Water District, just ~2.4 miles downgradient from the Property and the infiltration ponds. (Also of concern could be

the water wells providing drinking water to the Maple Ridge Highlands housing development,¹⁰⁴ ~ ½ mile NW of the Reserve Property.) It seems this major risk area (i.e., Kent and Covington well fields) should be included within the RI write-up, even though it is outside the 2-mile radius.

RI Figure 2-7 Geologic Cross Sections: the “Tan Pit” appears to be referenced in this Figure. The “Tan Pit” is also referenced in the January 2016 DOE SHA. But this sand mine pit doesn’t seem to be referenced anywhere in the narrative of the RI (that we could find). And it isn’t shown on any of the RI maps that label the various mine pits. One would presume this pit would have been described in RI Section 2.2.3, 2.2.4, and/or 3.2. Where is this pit located? When, and with what material, was it filled?

RI Section 4.4.1 Field Investigations/Remedial Investigation/Plant Site Investigation: water sample RSRL-033017 was “*obtained from Ravensdale Lake to support a water rights evaluation*”. The lab test results from this sample (RI Appendix E, first set of results, page 37), shows dissolved calcium, magnesium and sodium above PQL levels. There apparently are no MTCA Method A cleanup levels specified for these metals. Do these results imply a level of contamination of Ravensdale Lake? Is this an issue? Do any of the other lab results on this sample (first set of results in Appx E, pages 22, 24, 26, 28) raise any issues re: potential contamination of Ravensdale Lake? The Lake is reportedly fed by springs under the Lake, which are apparently sourced by groundwater originating south of the Lake, potentially including Reserve’s Property.

RI Section 5.1 Conceptual Site Model/Contaminants of Concern: ‘dissolved lead in surface water’ should also be listed as a COC, based on DOE January 2016 Site Hazard Assessment findings.

RI Limitations: This “Limitations” disclaimer states “*All reports prepared by Aspect Consulting for the Client apply only to the services described in the Agreement(s) with the Client.*” It would be helpful to review the terms of the Agreement between Aspect and Reserve for this RI. A prior environmental assessment contract between Reserve and GeoEngineers (July 2015) appeared to have been structured such that Reserve maintained a very strong level of control over the issues addressed by the consultant, the nature of the analysis to be performed, and even the data/information provided to the consultant to perform the analysis. These restrictions and the resulting limitations were alluded to in multiple locations in that consultant’s report.¹⁰⁵ It is interesting that this prior report, which is very applicable to this RI, is not included within the very extensive list of references, bibliography list, or the extensive “*Property Environmental Reports of Significance*” in Appendix C of this RI – even though the Aspect authors indicated they were fully aware of this report. [Note: we have a copy of this 13-page report if you should desire a copy.] It would be comforting to know that the Agreement between Aspect and Reserve for this RI gave Aspect complete independence to structure and perform the RI analysis; gave Aspect complete access to all Reserve data, reports, etc. which are likely to have a material influence on the RI results (including reports that are unfavorable to Reserve’s mining, landfilling and reclamation activities); and that the Conclusions and Recommendations from this RI are totally Aspect’s, with no pressure, coercion or influence from Reserve.

5.0 SUMMARY OF OUR COMMENTS ON DRAFT RI

We believe the current draft RI does an inadequate job of both identifying COC’s which might reasonably be expected on the Property, and in assessing the extent of possible contamination – i.e., defining the “Site”. We believe ongoing efforts to assess the nature and extent of the contamination attributable to CKD in the LDA must be completed before a final determination of the MTCA cleanup “Site” can be made. We also believe there are several other areas of the Property, besides Lot 6, the Plant Site, and the Lower Haul Road,

on which Contaminants of Concern (COCs) are reasonable to suspect. In addition, we believe that there are other COCs, beyond those reported in this draft RI, that may well be expected on this site. We feel these outstanding issues should be addressed as part of the RI before the MTCA "Site" can be defined. As such, we disagree with Aspect's recommendation that *"...the Site should be reduced from the full Property to Lot 6 or the portion containing the LDA and the area in which the leachate is discharging."* (i.e.: basically just that area being managed by Holcim (US) Inc.) And, as a Potentially Liable Party, we believe Reserve Silica, and their parent company, Reserve Industries, should not be released from liability or responsibility before the Remedial Investigation, Feasibility Study, and Cleanup Action Plan are finalized.

REFERENCES AND NOTES

- ¹ RI Executive Summary, paragraph 1
- ² RI Executive Summary, paragraph 3
- ³ RI Executive Summary, paragraph 1
- ⁴ The RI consistently quotes the total Property as being 377 acres, but other Aspect maps, and County information indicate a total of 382 acres for the Property
- ⁵ RI Executive Summary, paragraph 3
- ⁶ RI Section 6.1
- ⁷ RI Section 4.3, point #1
- ⁸ RI Executive Summary, paragraph 2
- ⁹ RI Section 4.4
- ¹⁰ RI Section 4.4.1.3
- ¹¹ RI Section 4.4.2.2
- ¹² RI Executive Summary, paragraph 3
- ¹³ RI Executive Summary, last paragraph
- ¹⁴ RI Section 4.3, last paragraph
- ¹⁵ RI Executive Summary, paragraph 3
- ¹⁶ RI Section 4.4.1.3
- ¹⁷ RI Section 4.4.1.3
- ¹⁸ RI Table 2
- ¹⁹ RI Appendix E, Lab Results, second set of lab results, pages 27-28; and RI Table 2
- ²⁰ RI Appendix E, Lab Results, first set of lab results, sample RSRL-033017, page 37; also note: magnesium PQL is listed as 1100, is this correct? Or should it be 11,000?
- ²¹ RI Section 4.4.2.2 and RI Figure 4-3
- ²² Note that we did not locate any lab test results for these samples in Appendix E. Based on RI Table 3, it appears only arsenic and lead were tested for
- ²³ RI Section 6.1, paragraph 2
- ²⁴ USEPA. *The Asarco Tacoma Smelter Superfund Projects: A Brief Overview*. 1994. <http://nepis.epa.gov/>
- ²⁵ RI Section 4.4.2.2
- ²⁶ RI Table 3
- ²⁷ Lave, Lester B., ed. *Risk Assessment and Management: The Proceedings of the Annual Meeting of the Society for Risk Assessment, November 1985*. Springer Science & Business Media, 1987. <https://books.google.com/books>
- ²⁸ WDOE. *Toxics Cleanup in Commencement Bay: A Changing Environment and a Toxic Legacy*. <http://www.ecy.wa.gov/>
- ²⁹ USEPA. *The Asarco Tacoma Smelter Superfund Projects: A Brief Overview*. 1994. <http://nepis.epa.gov/>
- ³⁰ WDOE. *Lower Duwamish Waterway: Cement Kiln Dust: Summary of Existing Information*. April 2015. [Lower Duwamish Waterway - Cement Kiln Dust: Summary of Existing Conditions](#)
- ³¹ EPA grant report F5C3052, Game Without End: politics, pollution, public health and the Tacoma smelter, Marianne Sullivan, Columbia University, 2009, pg 320; as reported in March 2013 letter from Middle Green River Coalition to King County Council.
- ³² USEPA. *The Asarco Tacoma Smelter Superfund Projects: A Brief Overview*. 1994. <http://nepis.epa.gov/>
- ³³ RI Section 3.1.1
- ³⁴ RI Section 2.3.2
- ³⁵ RI Executive Summary, paragraph 3
- ³⁶ RI Section 3.1.2
- ³⁷ RI Figure 2-7
- ³⁸ RI Section 3.1.2
- ³⁹ RI Section 5, paragraph 5

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- ⁴⁰ RI Section 3.1.2
- ⁴¹ RI Section 3.1.2
- ⁴² RI Section 5, pg 31 last paragraph
- ⁴³ Blanket Insurance listing of Dale Coal Company buildings and equipment at Dale plant site, Dec 1941-Jun 1943; from Northern Pacific archives, Location 137.I.13.1B; #1567, Aug 10, 1945
- ⁴⁴ RI Section 2.3.4
- ⁴⁵ RI Section 2.3.4
- ⁴⁶ RI Section 5, Valley Fill bullet
- ⁴⁷ RI Section 2.4, and Hart-Crowser, City of Kent, Wellhead Protection Program – Clark, Kent, and Armstrong Springs, April 2, 1996.
- ⁴⁸ Aquifer data in this paragraph from Hart-Crowser, City of Kent, Wellhead Protection Program – Clark, Kent, and Armstrong Springs, April 2, 1996.
- ⁴⁹ RI Section 2.3.2
- ⁵⁰ RI Section 4.4.1 – AMW-1 was installed “to evaluate groundwater quality in the **presumed** [bold added] downgradient direction of monitoring wells located at the Infiltration Ponds”. Note that assumed direction of groundwater elevation lines in Figure 4-1, which support the North groundwater flow assumption, are very arbitrary, and seem to be inconsistent with prior studies by Hart-Crowser (City of Kent, Wellhead Protection Program – Clark, Kent, and Armstrong Springs, April 2, 1996) and others, that would indicate a more northwesterly flow direction.
- ⁵¹ It also seems strange that the characteristics of the AMW-1 well drilled for the RI are so substantively different from prior borings done in the Settling Ponds area. RI 3.4.1 indicates soil borings were done in the Settling Ponds area in 2002 & 2005/6. These borings ranged in depth from 46 – 62’; encountered groundwater at 35 – 51’ bgs; and encountered glacial till at 45 – 55’ bgs. The RI well log for AMW-1 was bored to 41.5’ depth, encountered static groundwater at 20’, and glacial till (recessional outwash) at 37’. These substantial differences between the RI well and prior borings raises concerns regarding the representativeness of the AMW-1 well.
- ⁵² RI Section 5, paragraph 6
- ⁵³ RI Section 3.1.1
- ⁵⁴ RI Section 3.1.1
- ⁵⁵ RI Section 2.3.4
- ⁵⁶ RI Section 3.1.1
- ⁵⁷ Public Health-Seattle, King County. 2014. “Routine Inspection/Field Review of a Closed Landfill.” Inspection; as reported by GeoEngineers. *Preliminary Environmental Conditions Letter Report, July 22, 2015*. Reserve Silica Demonstration Project Proposal, May 1, 2016, Appx. K, pg. 5; as well as others e.g., GeoEngineers, July 22, 2015
- ⁵⁸ RI Section 2.2.4, Roadway Areas
- ⁵⁹ RI Section 4.4.2 and Figure 4-3.
- ⁶⁰ GeoEngineers. *Preliminary Environmental Conditions Letter Report, July 22, 2015*. Reserve Silica Demonstration Project Proposal, May 1, 2016, Appx. K, pg. 5.
- ⁶¹ Montana State Supreme Court. Minutes of the Montana Senate, Committee on Natural Resources, February 15, 1993: Exhibit no. 6. [Montana State Supreme Court](#)
- ⁶² WDOE. *Lower Duwamish Waterway – Cement Kiln Dust: Summary of Existing Information. April 2015*. [Cement Kiln Dust: Summary of Existing Information - Washington State ...](#)
- ⁶³ USEPA. *Burning Tires for Fuel and Tire Pyrolysis: Air Implications*. <http://nepis.epa.gov/>
- ⁶⁴ WDOE. *Washington State Dioxin Source Assessment*. July 1998. <https://fortress.wa.gov/ecy/>
- ⁶⁵ International Forestry Consultants, Reserve Silica Ravensdale Property Forest Analysis, Feb 13, 2012.
- ⁶⁶ GeoEngineers. *Preliminary Environmental Conditions Letter Report, July 22, 2015*. Reserve Silica Demonstration Project Proposal, May 1, 2016, Appx. K, pg. 4.
- ⁶⁷ Spokesman-Review. *State Refuses Use of Quarry as Waste Site*. November 30, 1983. <https://news.google.com/newspapers>
- ⁶⁸ Chemical & Engineering News. *Hazardous Waste Finds Use as Low-cost Fertilizer*. December 24, 1984. <http://www.sciencemadness.org/>

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- ⁶⁹ Seattle Times. *Fear in the Fields, Part I: How Hazardous Wastes Become Fertilizer – Spreading Heavy Metals On Farmland Is Perfectly Legal, But Little Research Has Been Done To Find Out Whether It’s Safe*. July 3, 1997. <http://community.seattletimes.nwsourc.com/> Also, link to entire Duff Wilson Seattle Times *Fear in the Fields* series and book, *Fateful Harvest* can be found at <http://www.bioethicscourse.info/>
- ⁷⁰ US Patent 4692259 A. 1986-87. *Water-Activated, Exothermic Chemical Deicing Formulations*. <http://www.google.com/patents/US4692259>. Patent application notes that the deicing product can also be used as fertilizer.
- ⁷¹ Justia Patents. Patents by Inventor Ronald J. Roman. <http://patents.justia.com/inventor/ronald-j-roman>
- ⁷² Seattle Times. *Fear in the Fields Part II: How Hazardous Wastes Become Fertilizer – Lack of Fertilizer Regulation in U.S. Leaves Farmers, Consumers Guessing About Toxic Concentrations on Farms*. July 4, 1997. <http://community.seattletimes.nwsourc.com/> Also, link to entire Duff Wilson Seattle Times *Fear in the Fields* series and book, *Fateful Harvest* can be found at <http://www.bioethicscourse.info/>
- ⁷³ Wilson, Duff. *Fateful Harvest: The True Story of a Small Town, a Global Industry, and a Toxic Secret*. HarperCollins, New York. 2001.
- ⁷⁴ Chemical & Engineering News, December 24, 1984. *Hazardous Waste Finds Use as Low-cost Fertilizer*. <http://www.sciencemadness.org/>
- ⁷⁵ Spokane Chronicle. *Dispute Ends With Removal of Fertilizer*. October 9, 1987. <https://news.google.com/newspapers>
- ⁷⁶ Seattle Times. *Fear in the Fields, Part I: How Hazardous Wastes Become Fertilizer – Spreading Heavy Metals On Farmland Is Perfectly Legal, But Little Research Has Been Done To Find Out Whether It’s Safe*. July 3, 1997. <http://community.seattletimes.nwsourc.com/> Also, link to entire Duff Wilson Seattle Times *Fear in the Fields* series and book, *Fateful Harvest* can be found at <http://www.bioethicscourse.info/>
- ⁷⁷ Wilson, Duff. *Fateful Harvest: The True Story of a Small Town, a Global Industry, and a Toxic Secret*. HarperCollins, New York. 2001.
- ⁷⁸ Seattle Times. *Fear in the Fields, Part I: How Hazardous Wastes Become Fertilizer – Spreading Heavy Metals On Farmland Is Perfectly Legal, But Little Research Has Been Done To Find Out Whether It’s Safe*. July 3, 1997. <http://community.seattletimes.nwsourc.com/> Also, link to entire Duff Wilson Seattle Times *Fear in the Fields* series and book, *Fateful Harvest* can be found at <http://www.bioethicscourse.info/>
- ⁷⁹ Logansport Pharos-Tribune. *Alcoa Building Own Plant To Use Waste In Fertilizer*. August 6, 1997. <https://www.newspapers.com/>
- ⁸⁰ More information can be found in Case #91-1345CV (*Behrman v. L-Bar*), Circuit Court of Oregon, Washington County, Hillsboro, OR as referenced in Duff Wilson’s book, *Fateful Harvest*.
- ⁸¹ USEPA. *Report to Congress on Cement Kiln Dust*. December 1993. <http://nepis.epa.gov/>
- ⁸² WDOE. *Lower Duwamish Waterway – Cement Kiln Dust: Summary of Existing Information*. April 2015. [Cement Kiln Dust: Summary of Existing Information - Washington State DOE](http://www.wa.gov/DOE/CementKilnDust)
- ⁸³ WDOE. Washington State Dioxin Source Assessment. Pub. No. 98-320. July 1998. <https://fortress.wa.gov/ecy/>
- ⁸⁴ RI Section 3. Note that RI Section 3.6.1 indicates extensive investigation and rotary percussion drill holes to 82’ deep in SE corner of Lot 3 were bored for exploration into potential expansion of surface silica sand mining in 2003. But the Google Earth image demonstrating the unique characteristics of this timber stand was from April 2002 – before this “exploration” work occurred.
- ⁸⁵ WDOE. *L-Bar Site Cleanup Action Plan Agreed Order*. June 2000. <https://fortress.wa.gov/ecy/>
- ⁸⁶ Spokane Chronicle. *L-Bar Investigation Just Latest In Series Of Cleanup Problems*. June 26, 1992. <https://news.google.com/newspapers>
- ⁸⁷ WDOE. *L-Bar Site: Agreed Order No. DE 94TC-E104*. January 5, 1995. [Department of Ecology - Access Washington](http://www.wa.gov/DOE/AccessWashington)
- ⁸⁸ RI Section 2.3.4
- ⁸⁹ RI Section 2.2.4, and GeoEngineers. *Preliminary Environmental Conditions Letter Report, July 22, 2015*. Reserve Silica Demonstration Project Proposal, May 1, 2016, Appx. K, pg. 7.

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- ⁹⁰ GeoEngineers. *Preliminary Environmental Conditions Letter Report, July 22, 2015*. Reserve Silica Demonstration Project Proposal, May 1, 2016, Appx. K, pg. 7. Also RI Section 4.3, bullet #2
- ⁹¹ RI Section 2.2
- ⁹² RI Section 2.2.4
- ⁹³ RI Section 2.2.1
- ⁹⁴ RI Section 2.2.4 and 3.1 and GeoEngineers. *Preliminary Environmental Conditions Letter Report, July 22, 2015*. Reserve Silica Demonstration Project Proposal, May 1, 2016, Appx. K, pg. 7.
- ⁹⁵ GeoEngineers. *Preliminary Environmental Conditions Letter Report, July 22, 2015*. Reserve Silica Demonstration Project Proposal, May 1, 2016, Appx. K. pgs. 2 and 8.
- ⁹⁶ Environmental Data Resources report, Phase I Environmental Site Assessment; as reported in GeoEngineers. *Preliminary Environmental Conditions Letter Report, July 22, 2015*. Reserve Silica Demonstration Project Proposal, May 1, 2016, Appx. K, pg. 7.
- ⁹⁷ We have documentation, as recent as 2016, of numerous instances of unpermitted material being dumped on the property adjacent to Reserve, under King County Department of Permitting and Environmental Review (DPER) filling and grading permits which were supposedly being “monitored” by the same DPER inspector as was responsible for monitoring the Reserve Property for the last decade. In only one case over the past six years did DPER require the adjacent landowner to remove this unpermitted material.
- ⁹⁸ RI Section 3.2
- ⁹⁹ RI Section 3.2
- ¹⁰⁰ GeoEngineers. *Preliminary Environmental Conditions Letter Report, July 22, 2015*. Reserve Silica Demonstration Project Proposal, May 1, 2016, Appx. K, pg. 7.
- ¹⁰¹ WDOE. Reserve Silica Site Hazard Assessment, Worksheet 1. January 2016. <https://fortress.wa.gov/ecy/>
- ¹⁰² RI Section 2.2.4 and 3.1 and GeoEngineers. *Preliminary Environmental Conditions Letter Report, July 22, 2015*. Reserve Silica Demonstration Project Proposal, May 1, 2016, Appx. K, pg. 7.
- ¹⁰³ RI Section 5, 2nd paragraph
- ¹⁰⁴ RI Section 2.3.5
- ¹⁰⁵ GeoEngineers. *Preliminary Environmental Conditions Letter Report, July 22, 2015*. Reserve Silica Demonstration Project Proposal, May 1, 2016, Appx. K.