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September 29, 2021

Washington State Department of Ecology
ATTN: Mr. Chuck Gruenenfelder, Hydrogeologist, Toxics Cleanup Program
4601 N. Monroe St.
Spokane, Washington, 99205

**RE: L-Bar Site 2021 Addendum to 2020 Compliance Monitoring Plan**

Dear Mr. Gruenenfelder:

On behalf of Alcoa Corporation, Great West Engineering has prepared this letter and supporting attachments to describe recent well rehabilitation work, and related updates to the L-Bar site Compliance Monitoring Plan (CMP).

**Attachment A** provides a summary of well rehabilitation work performed over a two-day period on July 12-13, 2021. This well maintenance work consisted of replacing/repairing bollards, repair of lockable hinged lids, installing a new stick-up surface casing at well P-20B, and repair of the flush-mount monument at P-09. This work required an adjustment to the PVC stick-up height at selected locations (see last page of Attachment A). This work was performed to maintain the integrity of protective bollards, lids, and overall functionality and protectiveness of wells for continued monitoring as needed under the CMP.

**Attachment B** provides an updated set of CMP monitoring tables to supersede the respective monitoring and analytical tables as presented in the *L-Bar Site Compliance Monitoring Sampling and Analysis Plan, 2020 Revision* (Jacobs). **Table 3** has been updated to reflect the adjusted top-of-casing PVC elevations following the well maintenance/repair work as described above. These adjustments were based on field observations by Jacobs staff, whom measured the amount of PVC that was cut/removed to accommodate the repairs. As shown in the table, five of the CMP wells were modified (P-19, P-25, P-27, SA-10, and SA-14) and thus require a new top-of-PVC measurement point for static water levels to generate site hydrographs and the respective groundwater flow maps.

**Table 4** (in Attachment B) has been updated to reflect the current analytical test methods and reporting limits performed by Anatek. As shown in the table, these reporting limits are confirmed to be less than the respective cleanup levels, to facilitate tracking of remedy progress towards achievement of cleanup levels for all CMP analytes. We propose that the updated tables (Tables 3 and 4 in Attachment B) constitute the '2021 CMP Addendum' to the latest *L-Bar Site Compliance Monitoring Sampling and Analysis Plan, 2020 Revision* (Jacobs).

Please let us know if you have any questions or would like to discuss.

Sincerely,

**Great West Engineering, Inc.**

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Craig Sauer, LG

Enclosures:

Attachment A. L-Bar Site Well Rehabilitation Summary (Jacobs, 2021)

Attachment B. L-Bar Site 2021 CMP Addendum, Updated Monitoring Tables



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# Attachment A.

*L-Bar Well Rehabilitation Site Work* (Jacobs 2021).



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# L-Bar Well Rehabilitation Site Work, July 12-13, 2021

This field visit summary provides an overview of well rehabilitation work conducted at the L-Bar site July 12-13, 2021, by Environmental West Exploration under subcontract to Jacobs. This work scope included repairs of surface protective casings/monuments, protective bollards, and/or general maintenance to support continued long-term monitoring obligations under MTCA in compliance with WAC 173-160-420.

## Well Maintenance/Rehabilitation Work

Three primary categories of rehabilitation work were completed during this site work. Text from the original scope of work is presented below. Note, any deviations in work completed from the approved scope of work are identified red text.

- Bollard Replacement and Repair:
  - P-05: furnish and install 1 new bollard; re-align and secure 2 loose bollards
  - P-06: furnish and install 2 new bollards
  - P-12: furnish and install 1 new bollard
  - P-13: furnish and install 3 new bollards
  - P-19: furnish and install 1 new bollard; re-align and secure 2 loose bollards
  - P-20B: furnish and install 2 new bollards
  - P-25: furnish and install 1 new bollard; re-align and secure 2 loose bollards
  - P-27: furnish and install 2 new bollards; re-align and secure 1 loose bollard
- Flush-Mount Repair
  - P-09: Repair flush mount completion by extending vault above ground surface.
- Above-Ground Protective Casing Repair/Top of Casing Adjustments:
  - P-19: Extend (i.e., weld in a section of compatible diameter casing to raise the casing height to allow for hinge mechanism to function properly) protective steel cover to repair or replace the lockable hinged lid back to functional working order. Steel protective casing was not extended, but hinged lid is fully functional; top of PVC was cut (lowered) 0.45 feet.
  - P-20B: Install new protective steel cover with lockable hinged lid.
  - P-25: Extend (raise) the protective steel cover to repair or replace the lockable hinged lid back to functional working order. Steel protective casing was not extended, but hinged lid is fully functional; top of PVC was cut (lowered) 0.48 feet.
  - P-27: Extend (raise) the protective steel cover to repair or replace the lockable hinged lid back to functional working order. Steel protective casing was not extended, but hinged lid is fully functional; top of PVC was cut (lowered) 0.30 feet.

- SA-10: Extend (raise) casing with new functional hinge and lockable lid and reattach existing well tag. Steel protective casing was not extended, but hinged lid is fully functional; top of PVC was cut (lowered) 0.38 feet.
- SA-11: Repair or replace with lockable hinged lid, reattach existing well tag. Hinged lid is fully functional without being replaced.
- SA-14: Extend (raise) casing and with new functional hinge and lockable lid and reattach existing well tag. Steel protective casing was not extended. Lid was repaired by welding on a new hinge. Top of PVC was cut (lowered) 0.54 feet.

## Rationale for Deviations

The primary deviation from the scoped work was not extending the existing steel protective casings. The rationale leading to those decisions are as follows:

- High fire danger due to temps in the 90s and very dry conditions (especially in the north fields) could have caused a rapid spread of fire if ignited during welding.
- Only one protective casing well lid hinge required replacing (SA-14). All the other hinged lids were fully functional following some hand work - wire brushing, lubrication, and exercising the hinge bolts repeatedly until movement with ease.
- Based on site experience and anecdotal information, some of the steel protective monuments and well pads have sunk over the years (due to sheer weight and compressible, saturated clayey soils) and likely could continue into the future.
- Welding on a 4 to 8-inch casing extension thus might be only beneficial for several years (if sinking continued). Welding of this length of casing may also weaken the overall integrity of the casing, or possibly impact the integrity of the PVC due to the heat (though some shielding could have been implemented.
- Prior to being at the site, Environmental West did not know exact diameter of protective casings, thus identifying compatible extensions might have caused delays
- A survey level was used to establish top of casing elevations relative to a fixed elevation (such as a well pad). Once the PVC was cut, the “new” top of casing was again surveyed to determine accurate elevation reductions.

During the site work, Mark Henry/Jacobs called Craig Sauer/Great West (who initiated development of the original scope while at Jacobs) to discuss the above issues. Following some discussion of the merits of cutting the PVC versus extending the steel casing, Craig agreed that cutting the PVC would be acceptable, though it was recognized that this would lead to changes in established reference elevations and database management work later.

# Recommendations

Ecology tags were not found on most wells that were worked on. If a tag was located, it was screwed to the inside or top of the protective monument.

Given that Alcoa no longer owns the L-Bar property, it is recommended that all wellheads be locked.

In consideration of the flat groundwater gradient of the site and potential continued sinking of wells/wellheads or impacts from seasonal flooding of the Colville River, it is recommended that periodic resurveying (every three to five years possibly) be completed for all wells used to evaluate groundwater flow direction and gradient.

Redevelopment of existing wells was originally proposed to be included in this work, but was not included in the contracted work. Given the fine-nature of water-bearing materials at the site, periodic redevelopment is recommended. Though this may not have been the best time to complete the work (due to a very dry spring and summer), redevelopment using surging/bailing and/or pumping is still recommended to be completed.

P-05 after install of one bollard and righting/securing of two bollards

P-06 before and following install of two more bollards and righting/securing existing bollards. Note, second picture shows large tractor tire between P-06 and P-06D

P-08 following install of a new locking/expandable well cap and mounding around new monument that is about 2 inches above existing asphalt surface. This fix was discussed and implemented with Johnie McCanna and Brian from Wildfire as opposed to cutting the casing down.

P-12 before and after install of one new bollard and righting of another

P-13 before and after following install of three bollards

P-19 after install of one bollard, righting of two bollards, casing cut down by 0.45 feet, and spot-painting tops of bollards and monument to improve visibility.

P-20B following install of protective casing and two bollards. Note lined ditch just west of the well. P-20B was previously just a PVC stickup above ground.

P-25 before and after install of one bollard, casing cut down by 0.48 feet, and spot-painting tops of bollards and monument to improve visibility. Note that center pivot wheel runs about 3 feet north of the protective casing (directly towards reader).

P-27 before and following install of two new bollards, righting/securing existing bollard, and casing cut by 0.30 feet. Upon arrival, protective casing lid was rubbing against PVC, thus why PVC was cut down.

SA-10 before, showing stickup and inability to close lid, and after hinged lid fixed and casing cut by 0.38 feet

SA-11. No pics taken. Fixed lid so it opens and closes with ease, installed a new well cap, and installed Ecology tag on wellhead

SA-14 following welding/repair of workable hinge/lid and after cutting PVC by 0.54 feet

## Summary of July 2021 Well Rehabilitation Work for the L-Bar Site

| Well ID | Location | Location Surface | # New Bollards Installed | # Existing Bollards Repaired | Flush-mount Repair | Steel Casing/ Hinged Lid Repair | Top of PVC Adjustment (feet) |
|---|---|---|---|---|---|---|---|
| P-05 | North Field | Grass | 1 | 2 | - | - | |
| P-06 | North Field | Grass | 2 | - | - | - | |
| P-09 | Center of Facility | Asphalt [2] | - | - | 1 | - | |
| P-12 | South of site | Grass | 1 | - | - | - | |
| P-13 | South of Stockpile | Grass | 3 | - | - | - | |
| P-19 | North Field | Grass | 1 | 2 | - | 1 | -0.45 |
| P-20B | North Field (berm) | Grass | 2 | - | - | 1 [a] | |
| P-25 | Northwest Field | Grass | 1 | 2 | - | 1 | -0.48 |
| P-27 | North Field | Grass | 2 | 1 | - | 1 | -0.30 |
| SA-10 | Top of Stockpile | Gravel | - | - | - | 1 | -0.38 |
| SA-11 | Top of Stockpile | Gravel | - | - | - | 1 | |
| SA-14 | Top of Stockpile | Gravel | - | - | - | 1 | -0.54 |
| **TOTALS** | **-** | **-** | **13** | **5** | **1** | **7** | |

[a] A new protective casing was installed at P-20B. It previously was simply PVC sticking up above ground with no protective casing.

# Attachment B.

*L-Bar Site 2021 CMP Addendum, Updated Monitoring Tables*



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**TABLE 3**

Groundwater Monitoring Well Network and Construction Details

*L-Bar Site - 2020 Compliance Monitoring Program, 2021 Addendum*

| | | 2013 | 2021 adj. | 2021 revised | | | | |
|---|---|---|---|---|---|---|---|---|
| **Location** | **Well** | **TOC Elev. (ft)** | **TOC Elev. (ft)** | **TOC Elev. (ft)** | **Total Depth (ft bgs*)** | **Interval Depth (ft bgs*)** | **Screen Length (ft)** | **Water-Bearing Formation** |
| Background | P-12 | 1649.43 | 0 | 1649.43 | 14 | 7 - 12 | 5 | swbu** |
| | Prod. Well | NA | 0 | NA | 80 | 70 - 80 | 10 | confined alluvial sand/gravel |
| North of Site | P-05 | 1642.99 | 0 | 1642.99 | 12.5 | 6 - 11 | 5 | swbu |
| | P-06 | 1642.33 | 0 | 1642.33 | 12.5 | 4.5 - 9.5 | 5 | swbu |
| | P-19 | 1640.03 | 0.45 | 1639.58 | 8 | 2.5 - 4 | 1.5 | swbu |
| | P-20B | 1642.25 | 0 | 1642.25 | 9 | 4 - 6 | 2 | swbu |
| | P-25 | 1639.41 | 0.48 | 1638.93 | 12.5 | 6 - 11 | 5 | swbu |
| | P-27 | 1642.19 | 0.30 | 1641.89 | 12.5 | 4 - 9 | 5 | swbu |
| Site Interior | P-09 | 1643.81 | 0 | 1643.81 | 10 | 4 - 6 | 2 | swbu |
| | P-13 | 1645.98 | 0 | 1645.98 | 7.5 | 3.5 - 5.5 | 2 | swbu |
| Magnesite Residue Pile | SA-10 | 1672.07 | 0.38 | 1671.69 | 41 | 35.5 - 40.5 | 5 | swbu, near mag. pile/native silt interface |
| | SA-11 | 1668.27 | 0 | 1668.27 | 42 | 36 - 41 | 5 | swbu, near mag. pile/native silt interface |
| | SA-14 | 1666.85 | 0.54 | 1666.31 | 37 | 31 - 36 | 5 | swbu, near mag. pile/native silt interface |

Notes:

TOC = Top of Casing

Well construction details approximate

*bgs = below ground surface

**swbu = shallow water-bearing unit

**TABLE 4**
Groundwater Analytical Suite and Methods
*L-Bar Site - 2020 Compliance Monitoring Program, 2021 Addendum*

| Wells[a] | Analytical Parameter | Method | MRL[b] | Cleanup Level[c] | Sampling Frequency[d] |
|---|---|---|---|---|---|
| All Wells. P-05, P-06, P-09, P-12, P-13, P-20B, P-25, P-27, SA-10, SA-11, SA-14, and PW | **Primary Indicator Parameters:** | | | | |
| | Ammonia ($NH_3$ as N) | SM 4500$NH_3$ - H | 0.05 mg/L | 0.13 mg/L | Semi-Annual (2x/year) |
| | Chloride (Cl) | EPA 300.0 | 0.2 mg/L | 230 mg/L | Semi-Annual (2x/year) |
| | Total Dissolved Solids (TDS) | SM 2540C | 5 mg/L | 1092 mg/L | Semi-Annual (2x/year) |
| | **Secondary Parameters:** | | | | |
| | Nitrate (as N) | EPA 300.0 | 0.1 mg/L | 10 mg/L | Every other year (2x/year) |
| | Nitrite (as N) | EPA 300.0 | 0.1 mg/L | 1 mg/L | Every other year (2x/year) |
| | Barium (total) | EPA 200.8 | 0.02 mg/L | 1 mg/L | Every other year (2x/year) |
| | Manganese (total) | EPA 200.8 | 0.001 mg/L | 0.44 mg/L | Every other year (2x/year) |
| | Selenium (total) | EPA 200.8 | 0.001 mg/L | 0.0082 mg/L | Every other year (2x/year) |
| | Thallium (total) | EPA 200.8 | 0.001 mg/L | 0.00112 mg/L | Every other year (2x/year) |
| | Turbidity[c] | EPA 180.1 | 0.02 NTUs | NA | Every other year (2x/year) |

Notes:

(a) Well network shown in Figure 1.

(b) MRL = method reporting limit.

(c) Cleanup Levels from Table 4-14 of *L-Bar Cleanup Levels Development and Feasibility Report* (CH2M HILL, 1999).

(d) Primary indicator parameters are sampled consistently twice per year (semi-annually), secondary parameters are sampled twice per year every other year. Secondary Parameters typically sampled during even years, for example, 2012, 2014, 2016, etc.

(e) Turbidity collected twice per year every other year as a companion with total metals. No cleanup level is available for the site for turbidity.